UNIVERSIDADE ESTADUAL DE CAMPINAS

PRÓ-REITOR: NANCY LOPES GARCIA

Capes PrInt

CALL AND INSTITUTION INFORMATIONS

Program – Capes/PrInt **Call 41/2017 – Capes/PrInt**

Institution – Universidade Estadual de Campinas

Institution acronym – UNICAMP

Inscrition Number: CAPES/PRINT 685144P

PERSONAL INFORMATIONS

Name - NANCY LOPES GARCIA

Date of birth - 28/01/1964 **Nationality -** Brazilian

IDENTIFICATION DOCUMENTS

CPF – 945.113.657-68

ID number – 8266291-5 **Issuing agency - SSP/SP**

PHONES

Contact number - +55 (19) 35214729 **or** +55 (19) 32895158

Cell phone number - +55 (19) 997963589

EMAIL

nancy.garcia@reitoria.unicamp.br

pro-reitoria.prpg@reitoria.unicamp.br

ADDRESS FOR CORRESPONDENCE

Institution address – AC Unicamp Cidade Universitária 121 Campinas/SP Brasil 13083970

Personal address - Rua Dr. Heitor Nascimento Cidade Universitária 35 Campinas/SP Brasil 13083800

INSTITUTIONAL COMMITTEE

BRAZILIAN MEMBERS

Brazilian member 1

Name: LILIANE MARIA FERRARESO LONA
Email address: liliane@feq.unicamp.br
Phone number: 5519991186085
Postgraduate Program: CHEMICAL ENGINEERING

Field of research: CHEMICAL ENGINEERING

Admission date: 01/05/1996

Brazilian member 2

Name: ISCIA TERESINHA LOPES CENDES
Email address: lopescendes@gmail.com
Phone number: 551935218909
Postgraduate Program: HUMAN GENETICS

Field of research: MEDICINE

Admission date: 01/03/2017

Brazilian member 3

Name: ADRIANA ZERLOTTI MERCADANTE
Email address: azm@fea.unicamp.br
Phone number: 55 19996013297
Postgraduate Program: FOOD SCIENCE

Field of research: FOOD SCIENCE AND TECNOLOGY

Admission date: 01/02/1998

Brazilian member 4

Name: ADEMAR RIBEIRO ROMEIRO
Email address: ademar@eco.unicamp.br
Phone number: 55 1935215752
Postgraduate Program: ECONOMIC DEVELOPMENT
Field of research: ECONOMY

Admission date: 01/08/1997

Brazilian member 5

Name: CARLOS ALFREDO JOLY
Email address: cjoly@unicamp.br
Phone number: 55 1935211503
Postgraduate Program: PLANT BIOLOGY

Field of research: BOTANY

Admission date: 01/09/1978

Brazilian member 6

Name: ELEONORA CAVALCANTE ALBANO
Email address: eleonora.albano@reitoria.unicamp.br
Phone number: 551935214887
Postgraduate Program: LINGUISTICS

Field of research: LINGUISTICS

Admission date: 01/04/1983

Brazilian member 7

Name: EVELY BORUCHOVITCH
Email address: evely@unicamp.br
Phone number: 551932530123
Postgraduate Program: EDUCATION

Field of research: EDUCATION

Admission date: 01/07/1996

Brazilian member 8

Name: PAULO REGIS CARON RUFFINO
Email address: ruffino@ime.unicamp.br
Phone number: 55 1935216033
Postgraduate Program: MATHEMATICS

Field of research: MATHEMATICS

Admission date: 01/02/2005

Brazilian member 9

Name: LEILA DA COSTA FERREIRA
Email address: leilacf@unicamp.br
Phone number: 551937887690
Postgraduate Program: ENVIRONMENT AND SOCIETY

Field of research: ENVIRONMENTAL SCIENCE

Admission date: 01/05/1989

FOREING MEMBERS

Foreing member 1

Name: MARIN VAN HEEL

Email address: marin.vanheel@googlemail.com

Institution: RIJKSUNIVERSITEIT GRONINGEN

Field of research: ASTRONOMY

ORCID number: 0000000207267352

DIAGNOSTICS

Strenghts

Title - Excellence in Research

Justification - Unicamp accounts for 6.6% of scientific production and for 5.4% of PhD students at the national level in the 2012-2016 period, in addition to being the leader among Brazilian universities with regard to patents and the per capita number of articles annually published in journals indexed in ISI/WoS. Unicamp is associated with research quality. The Times Higher Education (THE) Ranking points Unicamp as the best university of Latin America,

maintaining its place the global ranking of universities. The university is among the 50 best universities in the world with less than 50 years (15th place), among the top 10 universities in Latin America (QS Ranking – 2nd place), and in the 9th place regarding Brics Network University. Research in UNICAMP is structured in 1,107 groups according to latest data from the Council of CNPq Groups (2015), involving the participation of practically its entire faculty, researchers, postdoctoral students, associate researchers and professors, undergraduate and postgraduate students, and specialized technical staff. Research and innovation activities are strongly related to excellence in undergraduate activities and, particularly, in the postgraduate's. According to data from 2016, there are 5,409 funded projects; 20,047 productions, being books (224), articles in journals (4,657), book chapters (814), full papers published in Conference Proceedings (1,395), published abstracts (2,735), required patents (80), applications for registration of computer programs (21); and among these, the indexed publications – Web of Science/InCites (3,420) and SCOPUS/SciVal (4,434). It accounts for nearly 34 thousand students enrolled in 66 undergraduate courses and 86 postgraduate programs, with 11 Professional Master's Degree. The annual average of dissertations and theses defended is 2,100 and 99% of its professors hold a PhD degree. According to the CAPES/MEC evaluation, of the 75 Academic Postgraduate Programs, 18 Master's degree and 19 PhD programs are rated 5, and 33 Master's degree programs and 33 PhD programs are rated 6 and 7. Postgraduate Programs have national and international level of excellence, having received, since the inauguration of *Prêmios CAPES de Tese* (CAPES Dissertation Award), 13 Major Awards, 72 CAPES Dissertation Awards, and 61 Honorable Distinctions. This large number of educators and researchers leads the national per capita ranking of scientific publications in indexed international journals. In the 2012-2016 period, Unicamp was responsible for 21,977 publications by SCOPUS/Scival, with 130,199 citations having 25% of its publications in 10% of the most cited journals.

Title - Internationalization

Justification - The faculty of UNICAMP is strongly inclined to international collaboration. Such aspect is reflected in the high level of publication in foreign-language journals, the large number of agreements signed with foreign universities, and the active participation of professors and researchers of UNICAMP in international projects. We may say that UNICAMP has a remarkable internationalization degree when compared with the vast majority of the

Brazilian universities. This internationalization is also reflected on the attraction of foreign scientists for short and long stays, and also on the increasing internationalization of the faculty of the university. As hires were being resumed in the university, the proportion of foreign teachers began to increase. The proportion of foreign professors accounts for 5%, and the number of foreign students in regular postgraduate programs accounts for 6.2%. PhD students of UNICAMP do internships, preferably in countries such as United States of America, Canada, Spain, Germany, Italy, France, United Kingdom, and Argentina; they participate in international cooperation projects funded by funding agencies, such as CAPES and FAPESP, Santander, and foreign agencies as well as in those funded with the very resources of the university. Unicamp also welcome many students from several countries, especially Latin Americans from Colombia, Peru, and Ecuador who undertake their Master's degree and PhD programs. In 2016 we welcomed 935 foreign students in postgraduate programs, 786 for Master's degree (302) and PhD (484) and 149 special students, those authorized by the educational unit for attending classes without, however, having an institutional link with the University. To provide support to their internationalization activity, UNICAMP counts on an administrative unit, the Executive Board of international Relations (from Portuguese, *Direção Executiva de Relações Internacionais* – DERI), which houses the Offices of Student Exchange and that of Partnerships and Agreements, as well as *Instituto Confúcio* and *Instituto King Sejong*. UNICAMP offers foreign language classes to their postgraduate students and Portuguese to foreign students.

Title - Relationship with the society

Justification - The tradition of Unicamp in scientific research and in the development of technologies made it intensely connected with the society in at least three major dimensions. In the **economic level**, the role of Unicamp is as an institution that produces scientific and technological knowledge, in addition to training students to become skilled workforce, which drawn in to its surroundings a complex of other research centers, besides an important business park in the fields of telecommunication, information technology, and biotechnology. Many of these companies were born of Unicamp itself and of the entrepreneurial skills of its former students and professors. They are called "daughters of Unicamp," almost all working in the areas of leading-edge technology. In the **teaching level**, the university has a strong Undergraduate Program with a wide range of courses in the fields of exact sciences,

technology sciences, biomedical sciences, humanities, and arts; and a Postgraduate Program of excellence with the highest percentage of students, accounting for about 5.1% of all academic Master's theses and PhD dissertations under development in the country. In the **social level**, Unicamp has been characterized by maintaining strong links with the society through its extension activities and vast health area. Four major hospital units make Unicamp the largest center of medical and hospital care in the countryside of the state of São Paulo, covering a population of 5 million people in a region of nearly a hundred municipalities, in addition to the services of physical and sports activities and dentistry care provided to the overall population. Unicamp also outstands for its inclusive policies of members of under-represented social groups, whether for racial discrimination, gender, age, nationality, and physique. The success of policies of inclusion in the Undergraduate Programs of Unicamp, such as the Program of Affirmative Actions and Social Inclusion (from Portuguese, *Programa de Ações Afirmativas e Inclusão Social* – PAAIS) and the Program of Interdisciplinary Training (from Portuguese, *Programa de Formação Interdisciplinar Superior* – ProFis), creatively developed by the university, show that academic excellence can be combined with social inclusion. Postgraduate programs provide a progressive commitment concerning actions for social inclusion. The first experiments with ethnic and racial quotas were implemented in the postgraduate programs of the Institute of Philosophy and Humanities (IFCH) of UNICAMP for the admission in its postgraduate courses, which were followed by the Institute of Economics (IE) and the Institute of Language Studies (IEL).

Title - Infrastructure and Location

Justification - Unicamp, founded in 1966, currently has 6 Campuses: Campinas-Barão Geraldo (597,370 m^2), Campinas-COTUCA (5,790 m^2), Limeira-(Campus I) and COTIL/FT/PFL (19,274 m^2), Limeira-(Campus II) and FCA (29,428 m^2), Paulínia-CPQBA (13,231 m^2), Piracicaba-FOP (26,260 m^2). Its resources amount to R$3,055,144,086: R$2,433,216,713 budget and R$621,927,373 non-budgeted. There are 24 Teaching and Research Units, 3 Hospitals, 21 Interdisciplinary Centers, 2 Technical Schools, and 29 Libraries. The campus of Unicamp in Campinas, in the district of Barão Geraldo, São Paulo, has a privileged location with easy access to state highways: Dom Pedro I, Bandeirantes, and Anhanguera, which are the access roads to our different Campuses. This highway system also integrates the metropolitan region of Campinas, singled out as one of the most important technological centers of Latin America,

with several areas of the state of São Paulo and other states, also enabling the road connection with other South American countries. We highlight the National Center for Research in Energy and Materials (CNPEM) as a member of this center, with four national laboratories that are worldwide references and open to the scientific and business communities, and CPqD, which is the largest laboratory in the area of ICT in Latin America. The city of Campinas also has the International Airport of Campinas (Viracopos) and is near and with easy access to the airports of Congonhas (Congonhas) and the Guarulhos International Airport (Cumbica), in São Paulo. Such geographical location favors the departure and arrival of professors and students of Unicamp as well as the access to foreign professors and students. The Barão Geraldo campus provides facilities for foreign visitors, such as the "Casa do Professor Visitante" Hotel [Home of the Visiting Professor], which features lodgings, food, and space for on-campus events. Next to the campus and to the district of Barão Geraldo, there are other hotels, pensions and Airbnb homes. The university and the agglomeration of Barão Geraldo offer residential facilities that are combined with a rural environment and make it extremely attractive for domestic and foreign visitors.

Title - Bibliographic Collection and Qualified Biological Collections and High-performance Laboratories and Centers

Justification - The Library System of Unicamp (from Portuguese, *Sistema de Bibliotecas da Unicamp* – SBU) supports the activities of teaching, research, and extension, enabling the whole community access to information stored and produced at UNICAMP. SBU is currently composed of 29 libraries, one being the central library (Biblioteca Central Cesar Lattes), one of a specific area, and others allocated in Teaching and Research units and centers. SBU has a collection of 993,220 books; 1,739 current journals; 42.338 e-journals in full text; 106.341; 48.105 dissertations in the Collection of Digital Dissertations. On the SBU website, among many possible accesses, we highlight the Portal de Periódicos CAPES [Portal of CAPES Journals], Catálogo–Base Acervus [Acervus Catalogue], E-journals, E-Books, Institutional Clearinghouse, Zika-BDZ Digital Library, Information Competence Program, Portal of Scientific Journals, Turnitin, Laboratory of Accessibility, and instructions for registering on the ORCID. The Biological Collections are available for scientific research and technological development with quality, scientific basis, and in accordance with the current legislation. The UEC Herbarium is the 2nd greatest herbarium of São Paulo state in relation to angiosperms and

one of the largest in Brazil, being the main reference for any study, from Brazil or abroad, on Brazilian plants; it is accredited as a "Trustee" along with the CGEN. The Collection of the Museum of Zoology from UNICAMP (ZUEC) is among the seven largest in Brazil with over 65 thousand listed issues of vertebrates and 414 thousand of invertebrates in addition to the soundtrack collection Fonoteca Neotropical Jacques Vielliard (FNJV). The Brazilian Collection of Environment and Industry Microorganisms (from Portuguese, *Coleção Brasileira de Micro-organismos de Ambiente e Indústria* – CBMAI) preserves, stores, and distributes biological material, including GMOs, restricted to risk groups 1 and 2. The collection of medicinal and aromatic plants consisting of cultivated plants *in vivo*, seeds and cultures *in vitro*, herbarium and a DNA bank; it is "Trustee" and member of *Rede Global de Biodiversidade Genômica* [Global Biodiversity Genomics Network]. All collections are partially or totally computerized. To support research and technological development we rely on the National Center for High-performance Processing (from Portuguese, *Centro Nacional de Processamento de Alto Desempenho*), a center of excellence in new computer trends, and on the Central Laboratory of High Performance Technologies (from Portuguese, *Laboratório Central de Tecnologias de Alto Desempenho em Ciências da Vida* – LaCTAD), which works in the areas of Cell Biology, Genomics, Proteomics, and Bioinformatics, in addition to the 9 Centers for Research, Innovation, and Dissemination (CEPIDs-FAPESP) whose headquarters are in Unicamp.

Weaknesses

Title - Imbalance in the cooperation relationship with the best international academic centers.

Justification - Collaboration in international research with universities and research centers of leading countries in science and technology are established by partnership projects with foreign institutions through signed agreements or individual agreements signed by professors; and also through exchange of professors and students. However, the cooperative relationships with these centers are still asymmetrical, especially regarding the exchange of students. Whereas PhD scholars of Unicamp undertaking home-and-abroad programs, in order of importance, go to United States of America, France, United Kingdom, and Spain, foreign PhD students are mostly from Latin American countries. The participation of students from these four countries only accounts for 2% of the total number of foreign students. The

difficulty in attracting students from leading institutions seems to be due to the lack of appealing mechanisms of the university to those students, although UNICAMP has signed numerous international agreements that provide mobility of professors and students in both directions.

Title - Lack of PhD programs and subjects taught in English.

Justification - The lack of mastery of the English language on the part of a significant portion of the faculty, and mainly of the students, constitutes an important obstacle to the greater dissemination of subjects offered in a foreign language. Nowadays, there is only one academic PhD program that is exclusively taught in English. The federal legislation constitutes an obstacle to the greater visibility of the subjects being offered in English, which, when taught by foreign professors/researchers, are often not declared as such in the official documents of the university.

Title - Difficulty with foreign languages and delay in acquiring proficiency.

Justification - There is still a portion of professors and, particularly, postgraduate students that demonstrate limited proficiency in foreign languages, particularly in English. These are professors graduated in Brazil and students who have had a very poor learning of this language. The provision of English language classes offered for both professors and postgraduate students is limited and does not meet the set of this demand. There is also the problem of delay in obtaining the certificate in English language, which also restricts mobility, particularly of our students.

Title - Still limited proportion of scientific studies in partnership with foreigners.

Justification - Although Unicamp occupies the first place among the great Brazilian universities in terms of scientific productivity per professors, and although this production is accomplished in international journals of great impact, the number of articles in partnership with foreign scientists is still below 50%. We must recognize that Unicamp gone through a significant process regarding the collaborative production of scientific studies over the past 10 years, in 2007 the ratio was 27%, and in 2017 we reached 40%. But this number is still below USP, UFRJ, and UFABC.

Title - UNICAMP websites are not designed for foreigners.

Justification - The dissemination of information on the postgraduate programs in English and Spanish languages is still highly restricted. Information provided in these languages is limited and are not available in a very didactic way, which hinders the access of students who have no knowledge of the Portuguese language.

Describe the vocation of the institution

The main objective of UNICAMP is to be an academic center of excellence, educating students in undergraduate and postgraduate levels and producing basic and applied research that contribute to the economic and social development. We rely on an innovative model, which makes research an education qualifier at all levels, and relationships with the society as intrinsic components of its academic role in level of excellence.

Describe other relevant information about the internationalization level of the Institution

The *Planejamento Estratégico* (Strategic Planning) – Planes 2016-2020 highlights internationalization among its strategic goals. Thus, the overall objectives of the so-called *Projeto PRINT UNICAMP* [PRINT UNICAMP Project] are fully aligned with the Strategic planning of the university. Planes propose the following priority focuses of the Internationalization Programs: To support and conform to the internationalization strategies of the university, preparing administrative teams to facilitate the arrival of foreigners and the departure of students, faculty, and staff abroad. In teaching, this process aims at qualifying the education of students, preparing them for professional practice in the globalized world. This requires actions that not only enable student mobility, but which also allow the interaction of our students with students from other countries and with a curricular orientation more integrated and compatible with foreign universities. Decisions on teaching internationalization comprise: Broadening internationalization actions in undergraduate and postgraduate programs and in Technical Schools; making available syllabuses of the subjects taught in English and in Spanish; increasing the provision of courses/subjects taught in English in the units; increasing the provision of Portuguese classes for foreigners; increasing the provision of foreign languages classes. Regarding research, internationalization aims at the qualification of research by acknowledging the results of research conducted elsewhere, along with qualified discussion with other professionals from several fields of knowledge.

INSTITUTIONAL PROJECT

Goals of the Institutional Project -

The PRINT UNICAMP Project aims at making a qualitative leap in the internationalization process of the university regarding all its activities, including those of the postgraduate programs. This project has 22 priority themes for internationalization actions involving 72 postgraduate programs in 113 cooperation projects with foreign institutions of high-scientific reputation and excellent tradition in the education of students, belonging to 52 countries, 26 of which are set out in Annex I. In each of the priority themes proposed by Unicamp, 70% of countries listed as main partners remain as indicated in the public notice. These themes are in accordance with fields of knowledge and are directly related to the major challenges that society shall confront in the coming decades. In this sense, the PRINT UNICAMP Project details, defining priority research themes and aligning internationalization projects of postgraduate programs, a strategy for broadening research and postgraduate programs of long reach involving all the university, which fits into the strategic planning of UNICAMP. The implementation of this set of actions will allow the ongoing internationalization within the university to change level. By this strategy, research conducted at Unicamp will become more intensely integrated into international research networks. We expect that research can make a qualitative leap, thus increasing even more its technological and scientific impact. Our overall goal is to change the pattern of international relationship that has been established in recent years with leading universities and research centers, in such a way it becomes more symmetrical and open new channels of cooperation in these same bases with new centers of excellence. This greater symmetry is directly related with our ability to conduct high-level research in high-impact projects in partnership with major international research centers, and it shall be implemented by attracting professors and students of these centers to UNICAMP, including by setting young researchers graduated from these centers at Unicamp, and sending faculty, students, and staff abroad so that they can be fully qualified.

THEMES

Theme 1

Theme – Food, Health and Society

Partner countries – Sweden; Belgium; France; China; Argentina; Italy; Ireland; United Kingdom; Spain; Germany; South Africa; Denmark; Canada; Holland; United States; Austria; Japan; Portugal; Chile.

Justification – The major economic changes, along with the scientific and technological development of the twentieth century, influenced food production chains around the world. We arrived at the 21st century with a predominantly urban population, however, in a heterogeneous scenario from a socio-economic and even cultural point of view, facing the challenge of ensuring the population's access to nutritionally adequate, safe and economically fair food, while preserving food culture and the environment. On the other hand, in addition to human capital, we have natural resources and biodiversity that place us in a privileged position in the international scene, which imposes a second challenge on us, namely, of creating strategies for transdisciplinary research involving specialties that denote different knowledge and skills. In this way, food is studied since its growth (production), through the process (technology) and consumers' tables (perception, preferences, habits and culture), up to its consumption (food x health relationship). This theme can integrate knowledge from different fields and specialties of Unicamp, for development of research projects and training of researchers with broad knowledge to solve complex and multidisciplinary issues of our country. There are several interfaces between this topic and the topic of investigation of Complex Natural and Artificial Systems, Genomics, Proteomics and Metabolomics. Examples of projects in the field include the research on bioactive compounds (prospection, characterization, application and biological effects), use of residues from the agricultural industry, food safety, effect of processing on macro and micro-nutrients, nutrient bioaccessibility and bioavailability, studies using omic approaches (nutrigenomics, proteomics, lipidomics and metabolomics), consumer studies on intrinsic (sensory) and extrinsic (health claims, technology, label and packaging, etc.) properties. Another interesting approach is the competition for the use of land for food production and biomass, for example. There is also the issue of the relationship between food production and climate change.

Goal 1 – Studying food in relation to its production, technology, consumers, market and bioactivity

Description – Integrating knowledge from different fields and specialties of Unicamp, for development of research projects and training of researchers with broad knowledge to solve complex and multidisciplinary issues; improving the knowledge of UNICAMP's teaching staff in the area; increasing the number of publications in international journals on the subject; increasing the number of publications co-authored with foreign researchers; consolidating existing international partnerships; promoting and achieving new international partnerships and projects; attracting students, researchers and professors with international experience; inserting subjects, themes and disciplines in the curricular structure of the programs in a foreign language; improving the percentage of students and professors of the university

with fluency in a foreign language; improving the percentage of staff with fluency in another language; improving the full doctorate courses abroad; improving the interuniversity exchange doctorate courses abroad; improving the percentage of professors with a post-doctorate degree abroad; attracting talented youth with experience abroad or from a foreign country; improving the participation of students and professors in events abroad.

Theme 2

Theme – Investigation of Complex, Natural and Artificial Systems

Partner countries –
Chile; Argentina; France; Holland; Taiwan; Canada; Belgium; Spain; Sweden; Italy; Portugal; Colombia; Israel; Denmark; Australia; Germany; United States; United Kingdom.

Justification – A complex system consists of a large number of interacting agencies, which prevents their evolution in a simple manner. Due to the diversity of these complex systems, their studies are typically interdisciplinary, transiting in broad research areas such as Chemistry, Physics, Engineering, Biology, Mathematics and Computer Sciences. This theme encompasses the development of theories, models, and technologies to solve complex problems in areas such as computer networks, movements of particle systems, fluids behavior, interactions and patterns between structures and categories, geometry/topology of complex assemblies, dynamical systems and nonlinear structures, collaboration networks, management of information in broad databases, health, public management, neurosciences, nanotechnology. For phenomena that cannot be directly modeled by conventional techniques, machine learning can work around this limitation using artificial intelligence algorithms and generalizations. These techniques are particularly useful in robotics, in industry and in high-performance computing and architectures. In this context, the analysis of stochastic, fractal, geometric, algebraic and analytical structures that work with a variety of different techniques also appears. Another area in this field is Computational and Theoretical Physics and Chemistry, which applies basic principles of quantum and nuclear physics to chemical systems to clarify issues related to the structure of matter, its macroscopic properties and the energy of its transformation processes. With the availability of powerful computational resources and qualification of distributed processing, extremely complex phenomena like chemical reactions, modes of action of catalysts, kinetics of chemical processes, brain functioning and quantum computing are being elucidated. Brazil is quite advanced in the field, having contributed significantly to its increment: researchers in the area of complex systems interact strongly with groups abroad, both receiving staff for training and cooperation, and participating in internships in leading-edge institutions with adequate resources and structures for researches in the field.

Goal 1 – Analysis and development of theoretical models and computational tools for studying the structure and evolution of complex systems.

Description – To achieve full theoretical and technological development in areas such as Biology, Physics, Genetics, Engineering and Medicine, it is necessary to carry out development and modeling researches on complex systems by exploiting the analysis of non-linear, stochastic, fractal, geometric

and analytic structures. The study of dynamical systems and EDPs via geometric and analytical approaches to differential equations makes itself present in the construction of mathematical models that can describe the behavior and evolution of systems. However, the computational cost of conducting simulations after each change in the model is often too high, and there is need for robust mathematical notions and theories that interact efficiently with computational systems, ensuring that minor modifications in the model will not make much of a difference for a given implementation of these systems. These issues are relevant for both non-stochastic and stochastic cases. Stochastic cases are also investigated in the areas of Probability, Stochastic Processes and Mathematical Statistics, through the construction of probabilistic models and statistical methodologies. Areas such as Biostatistics, Computational Biology, Bioinformatics, Time Series and Item Response Theory deal with scientific hypotheses verified in applied problems. In Physics, various problems related to materials science and biological systems have in common the strong interaction between their components which determines their dynamics and balance or structural properties, including: fermions and bosons with strong interactions in the weak and strong coupling regime in several scales of length; microscopic scale of the processes that control the plastic deformation of crystalline materials; thermodynamic properties of metallic glasses ("bulk metallic glasses" – BMG); complex quantum systems, like the compounds containing elements that are transition metals, lanthanides or actinides of d or f open layer, and which feature superconductivity phenomena, several magnetic behaviors and metal-insulator transition; processes of speciation and phylogenetic trees; correlation between geometric properties of neural bundles and topological properties of the structural neural network of the brain of mice. It is also necessary to develop computational tools based on theoretical chemistry models to study biological systems of industrial interest (bioethanol production), health and materials sciences.

Theme 3

Theme – Science and Information Technology

Partner countries –

Denmark; Colombia; France; Spain; Japan; Canada; Hungary; Italy; Portugal; Germany; Sweden; Austr alia; Finland; United States; United Kingdom.

Justification – Immense volumes of data are currently prevalent, which requires specialized techniques to process and manage information. More efficient algorithms and improvement of optimization techniques are fundamental to achieve large-scale data processing. Faster computer networks are needed to support the applications that arise daily and, in addition, networks of sensors and actuators, known collectively as IoT, are changing business structures around the world. The creation of computer architectures with more efficient use of energy and better performance is also an international need, as well as the development of cryptographic and information security techniques, and the improvement of the methods for the development of reliable software systems. This theme encompasses not only the development of new theoretical models applied in information management (processing, transmission and storage), such as machine learning, robotics and e-Science, but also the development of new

computing and communication technologies based on electronic and optical processes, involving or not quantum systems. In this context, the interaction between information theory and mathematical sciences also has a natural role.

Goal 1 – Developing the theoretical fundaments and exploring techniques, methods and tools aimed at the understanding of information sciences and technology.

Description – Developing platforms and optimizations necessary for the implementation, in mobile and embedded devices, of inference operations in models capable of performing operations while minimizing the devices' execution time and power consumption. Proposing and validating models, methods, techniques and tools that help to increase the resilience and reduce the latency of the future infrastructure of 5G communication networks, including communication, software and service components. Designing and analyzing 5G radio-access technologies using the paradigm of Software-Defined Networks to study and establish disciplines of physical layer abstraction for RAN, and of plan and control functions abstraction for 5G networks, also exploring programmability in wireless access. Investigating, through the first formal cognitive models in the literature, basic conditions for cognition to evolve under a computational perspective. Developing an environment for intelligent cloud computing services which are highly innovative, secure, interoperable and sensitive to quality-of-service, building a robust intercontinental cloud environment that, by design, is able to handle the heterogeneity of the cloud-distributed systems and also other services for the interaction of local communities. Investigating new systems that represent data semantics through the study of modeling solutions and development techniques to support software applications that benefit from the structure of Active Databases, with new features of storage and data recovery. Devising new approaches and exploring techniques, methods and tools with a focus on the process of Validation and Verification for the development of cyber-physical systems in the specification, design and implementation phases. Developing new photonic technologies, new purely photonic materials and devices, for generation, transmission, processing and detection of optical signals for transmission and processing of information, in an increasingly faster, more efficient and cheaper manner. Developing a simulation tool to test algorithms for prospecting of lunar water for the 2020 mission of I-Space/Team Hakuto Lunar Rover to the Moon. Studying adaptive embedded systems.

Theme 4

Theme – Nanotechnology

Partner countries –

Chile; Russia; Mexico; Belgium; China; Canada; Germany; Italy; Spain; France; Australia; Austria; Den mark; Sweden; Holland; United States; United Kingdom; Argentina; Portugal.

Justification – The development of new materials and the study of their applications, especially in the field of Nanotechnology, is a strategic research area with a wide range of industrial applications. Nanotechnology is defined as "the search for new techniques for synthesis and processing using the

building blocks of nature – atoms, molecules and macromolecules – for the intelligent design of functional materials, systems and components with differentiated roles and qualities, where dimensions and tolerances in the order of 0.1 to 100 nm have a decisive role". This science of cutting-edge materials is essentially interdisciplinary, and demands from basic researches in Physics and Chemistry to studies in Biology/Molecular Biology, Pharmacology, Medicine, Electronics and many others. Despite the profound impacts it has already generated on the economy and society, it is still necessary to evaluate its environmental and health implications. Unicamp's cutting-edge research groups, which rank among the best in the world, study various aspects of this field, using the university's excellent infrastructure and material support for carrying out these researches; both the potential of these groups for accepting students and researchers from abroad, and the demand for students and professors from centers outside the country, make this a highly relevant theme.

Goal 1 – Nanotechnology and new materials.

Description – Materials with nanometric dimensions represent a new class of materials. Arranged monolayers of carbon such as graphene have different electronic properties from isolated carbon atoms or macroscopic blocks (graphite) formed by these monolayers, reverberating in all their other properties. Chalcogens of transition metals, for example, change their electronic structure and begin to emit light efficiently when in monolayers, while in multiple layers, emission is non-existent. Such changes in the properties of these materials have been studied intensely and it is sought to understand in a more fundamental way the relationship between their morphological and structural properties with other properties, such as luminescence or electronic transport. Thus, one can mention the synthesis of semiconductor membranes associated with nanodimensional materials such as graphene or BN, which have great potential for application in optoelectronic devices and also in flexible electronics. These two-dimensional materials, which have been broadly studied in relation to their optical properties, still lack studies concerning their interface with Biology. To fill this gap, the interaction of these nanomaterials with bacteria is being studied. In another interface with Biology and Medicine, in the realization of hyperthermia-based therapies, magnetic nanoparticles allow the local heating of tissues and potentially the destruction of tumor cells, for example. Semiconductor nanoparticles, or other forms of quantum dots, can also feature specific optical properties such as the emission of single photons, with very important applications in quantum computing. Other materials, such as carbon nanotubes, feature exotic properties, such as negative Poisson ratio. In addition to optical, magnetic, mechanical and biological properties, ultrathin films have electronic properties that allow them to grant specificity to sensors. It is worth noting that researches also contemplate a more applied character, such as the modification of the surface of metallic alloys by plasma or ion deployment, to improve mechanical properties such as toughness or wear resistance, both vital to the industry. Therefore, it is extremely important to study the preparation, properties and applications of different nanomaterials – including nanoparticles, fullerenes, nanostructured zeolites and semiconductors.

Theme 5

Theme – The challenges of democracy

Partner countries -

Germany; Angola; Canada; China; Spain; Italy; Mexico; Norway; Switzerland; Uruguay; Vietnam; Russia; Mozambique; Portugal; India; Iran; Australia; Argentina; Belgium; Chile; Denmark; Colombia; Ecuador; United States; Holland; South Africa; France; United Kingdom.

Justification – Democracy and democratic processes are a central theme of the humanities, which encouraged researches that allowed not only understanding, but also improving mechanisms of democracy itself. From a historical point of view, researches feed not only the knowledge of the past, but illuminate the dilemmas of the present. Indeed, the 21st century brings new challenges to democracy. We now face the evolution of authoritarian doctrines, which appropriate democratic mechanisms, such as the expansion of neo-Nazi and neo-fascist parties through the elections, especially in Europe, the use of referendums to support processes that, under a certain perspective, in any way would be considered as democratic, as well as the decrease in public opinion, in various parts of the point of adherence to democracy and to democratic institutions. That is, even in formally democratic countries, and often in the name of an abstract principle of democracy, we witness political, economic, social and cultural changes that indicate processes that, from another perspective, could not be regarded as democratic. Formally, in an understanding of democracy as a representative political system, we are also faced with new challenges. Elected presidents have been recently removed from power before the end of their terms, revealing the current fragility of the electoral system as a means of stability of political power. The electoral process itself began to be influenced by new technologies, such as the use of social networks. In this sense, recent electoral processes in various parts of the world have shown how these networks served both as a new non-institutional way of political engagement, as for the manipulation of false information ("Fake News" is part of the political vocabulary nowadays). Thus, both in relation to its meaning and to its classification as a political process, the notion of democracy becomes one of the major themes of the humanities in contemporary times. At the same time, the contribution of the humanities for democracy in times of uncertainty becomes fundamental. It should be highlighted that, due to the global scope of the issue, researches on this theme are of international nature and may be optimized by PRINT.

Goal 1 – Understanding democracy and democratic processes based on the new challenges being faced in the 21st century from an interdisciplinary approach.

Description – The purpose of the theme is to better understand democracy and the contemporary processes that somehow wear has expectations on this type of government. Given the global character of the subject, comparative researches with international partners is needed. In this sense, it is intended to encourage international collaboration with leading-edge research institutions devoted to the subject. For each specific point of view, collaboration can be initiated or deepened from different strategies. In this way, it is intended to initiate and foster partnerships with institutions of excellence, always grounded on the join assessment and development of knowledge. For this purpose, the creation of long-term

networks is intended, to increase the number of publications co-authored with foreign researchers and to increase the number of publications in foreign languages, as well as in qualified international journals. We also intend to promote the attraction of students, researchers and lecturers, from foreign countries or with international experience, by offering disciplines and courses in foreign languages. Another of the objectives is to enable the students of the Program to develop networks abroad, which should be done in two ways: firstly, by increasing the opportunity for the students to participate in international conferences; secondly, by increasing the number of interuniversity exchange scholarships for students of the Programs. With this, not only will we improve the education offered to the students, but also increase the exchange between Unicamp and international institutions. We should also aim to increase the number of professors with post-doctorate degrees abroad, as well as the participation of the teaching staff in events overseas. All these goals, as exposed above, must be integrated into long-term partnerships, grounded on the exchange of knowledge so that each individual action results in lasting consequences.

Theme 6

Theme – Difference, diversity and inequality

Partner countries –

Uruguay; Switzerland; Australia; Belgium; China; Ecuador; India; Iran; Norway; Vietnam; Venezuela; Ar gentina; Sweden; Russia;

Mozambique; Holland; Colombia; Denmark; Canada; Cuba; Germany; Spain; France; Greece; Italy; Me xico; Portugal; Japan; Angola; United States; Chile; United Kingdom; South Africa.

Justification – The theme of difference imposes itself on our times and marks the way we understand diversity in globalization. In this sense, diversity is a theme that runs through the most diverse national states and becomes an element of international conventions such as the Convention on the Protection and Promotion of the Diversity of Cultural Expressions, UNESCO, 2005. This is because in our times, production processes of social and cultural difference have played an increasingly central role in the establishment of policies, identities and subjects. The humanities have been engaged in understanding these processes, from the perspective of denaturalization of differences and from the historical contexts in which they emerge. The dynamics of formation and articulation of differentiation categories have been investigated in the different areas of knowledge, particularly with regard to differences of gender, race, social class, sexuality, generation (with emphasis on youth) and ethnicity/nation. The production processes of difference are inscribed in a field of social power relations, instituting types of normativity and hierarchies. In this sense, they relate to social inequality. On the one hand, these processes can be mobilized by dynamics related to prejudice, intolerance, discrimination and violence. On the other, as the humanities strive to demonstrate, the borders that delimit the “other” can also point to the cohabitation of different experiences, become political resources for groups that demand equality, reinforce the subjects’ positions and feelings of belonging from a perspective of defense of social and cultural diversity, rescue the memory of peoples and of the various local and global cultures that

produce direct effects on education, public policies and social movements. This research agenda of the humanities on difference, diversity, and inequality has an international character, seeing as the subjects and social groups that fight for rights, memory, and respect for differences transit and sympathize with each other in a transnational scenario. In this way, this theme will allow the development of researches involving comparative perspectives and international partnerships, something that will be possible through PRINT, with the aim of developing new alternatives for the construction of other social arrangements, grounded on different ethical, political and/or epistemological assumptions.

Goal 1 – Studying production processes in their relations with diversity and inequalities and bodily practices in/of cities and their impacts on the urban setting and on public spaces.

Description – Integrating knowledge from different fields related to the Human Sciences for development of research projects and training of researchers capable of establishing an in-depth reflection on the theme of difference and co-related topics in the contemporary world; encouraging researches aimed at understanding the complex dynamics in the interface between diversity and inequality, with potential for realization of connections with researches being developed on the theme overseas; increasing the number of publications co-authored with foreign researchers; consolidating existing international partnerships; promoting and achieving new international partnerships and projects; attracting students, researchers and professors with international experience; inserting subjects, themes and disciplines in the curricular structure of the programs in a foreign language; improving the percentage of students and professors of the university with fluency in a foreign language; improving the percentage of staff with fluency in another language; improving the full doctorate courses abroad; improving the interuniversity exchange doctorate courses abroad; improving the percentage of professors with a post-doctorate degree abroad; attracting talented youth with experience abroad or from a foreign country; improving the participation of students and professors in events abroad; proposing international dialogues to problematize how bodily practices in/of cities are constructed and relate to each other in the production of differences, diversities and inequalities.

Theme 7

Theme – Methodology, epistemology and language

Partner countries –

Mexico; Denmark; Romania; Sweden; Germany; Belgium; Chile; China; Japan; Italy; Argentina; Spain; Angola; Austria; Ecuador; Holland; India; Iran; Russia; Mozambique; Norway; Switzerland; Uruguay; Ve nezuela; Vietnam; France; Canada; Hungary; Portugal; Greece; Cuba; Australia; South Africa; United States; United Kingdom; Colombia.

Justification – The humanities have as central theme the ways of acquiring knowledge. On the one hand, this is done through the reflection on the way of production of knowledge itself, namely, through the constant production of reflections about methodology. On the other, through the use of methods and tools of analysis. In relation to this last point, it should be noted that the humanities have been able to

deal with the use of increasingly more complex methods and tools. With the evolution of technology, it is possible to aggregate and analyze a vast universe of information (Big Data), refine the mechanisms for data collection and analysis, as proposed by the courses, and rethink the locations of social reality, through the digital ethnography technique. Also, technological innovation in the use of research tools allows the collection and cross-referencing of data with speed and accuracy that would have been unthinkable a few years ago. In addition, the humanities are characterized by their reflexivity on the knowledge they produce and their limits. The different types of knowledge are not only forms of production of knowledge, but objects for reflection on their own right. In this way, the humanities are continuously developing theories about themselves, producing an epistemological and metatheoretical framework mobilized in various researches, from the most diverse fields of knowledge. Researches in the humanities, in the various areas encompassed by them, and according to the most diverse research interests, are only possible due to the advancement of the reflection on knowledge and methodology and to the innovation of the analysis tools available. This requires a continuous work of research on epistemology, methodology and language, which should be grounded on the collaboration with international centers, a process which may be optimized by PRINT.

Goal 1 – Encouraging cutting-edge researches and optimal training in innovative techniques and methods in the humanities and language studies.

Description – 1) One of the central objectives of this theme is to encourage cutting-edge researches and optimal training in innovative techniques and methods in the humanities, having as target-audience researchers and graduate students from Unicamp, as well as foreign students an researchers, also contemplating institutional diversity. 2) It is intended to incorporate to the project internationally recognized professors and experts due to the quality and excellence of their researches, and to the cross-sectional dialogue they maintain with the different areas that make up the Human Sciences and language studies, in particular. 3) The theme was also thought of as a potential space to strengthen research partnerships, stimulate international exchanges and institutional collaborations and give visibility to graduate researches and programs related to the topic.

Theme 8

Theme – State, policies and education

Partner countries –

Sweden; Angola; Spain; Colombia; Italy; Denmark; Portugal; Canada; Uruguay; Mozambique; United Kingdom; Germany; France; Chile; Mexico; Argentina; United States.

Justification – Need for local, national and international researches on public education policies (formulation, implementation and evaluation for education), educational administration and educational systems, with emphasis on the relationships between State and Society, planning, assessment, legislation, financing, management and comparative education in its different stages (early childhood education, primary education and high school) and Higher Education, modalities of education

(education of young people and adults and professional education), as well as education in cultural networks and their forms of organization between civil society and political society.

Goal 1 – Investigating the interfaces of public education policies with the State and society.

Description – Increasing the knowledge and skills in different areas and specialties for the development of research projects aimed at articulating the formation of researchers with propositions and resolutions of education and school issues in the country and in coordination with international experiences; intensifying studies and researches of the teaching staff of the State University of Campinas in the field; developing and analyzing strategies of sport coaches in the academic and professional context, contributing to the development of knowledge and skills for practical interventions focused on the assignment of value to these professionals; increasing the number of publications in national and international journals on the subject; increasing the number of publications co-authored with foreign researchers; consolidating existing international partnerships; promoting and achieving new international partnerships and projects; attracting students, researchers and professors with international experience; inserting subjects, themes and disciplines in the curricular structure of the programs in a foreign language; improving the percentage of students and professors of the university with fluency in a foreign language; improving the percentage of staff with fluency in another language; improving the full doctorate courses abroad; improving the interuniversity exchange doctorate courses abroad; improving the percentage of professors with a post-doctorate degree abroad; attracting talented youth with experience abroad or from a foreign country; improving the participation of students and professors in events abroad.

Theme 9

Theme – Genomics, Metabolomics and Proteomics

Partner countries –

Spain; Canada; Chile; Switzerland; Portugal; Germany; Austria; Denmark; Holland; South Africa; France; Sweden; Slovenia; Australia; Singapore; United States, United Kingdom.

Justification – One of the great global challenges of the life sciences for the 21st century is integrating the knowledge generated by the so-called “omic” sciences to achieve a better understanding of cellular functioning. The potential impact of “omic” sciences is limited by the instrumental technology currently available, which however evolves quickly, and by the databases, which are still mostly incomplete. Thus, the theme includes not only the collection and characterization of data on genomes, transcriptomes, proteomes and metabolomes, but also studies aimed at developing and implementing instruments for the field; association and integration of data and platforms of different “omic” sciences; use of large-scale data on sequences of DNA, RNA, protein or other metabolites for the generation of new products; generation of knowledge in Biology and Functional Genomics; integration between Biology and Computer Sciences, Statistics, Mathematics and/or Engineering to store, analyze, interpret and process biological data on a large scale.

Goal 1 – Obtaining, storing, analyzing, interpreting and processing biological data on a large scale.

Description – Integrating knowledge from different fields and specialties of Unicamp, for development of research projects and training of researchers with broad knowledge to solve complex and multidisciplinary issues; improving the knowledge of UNICAMP's teaching staff in the area; increasing the number of publications in international journals on the subject; increasing the number of publications co-authored with foreign researchers; consolidating existing international partnerships; promoting and achieving new international partnerships and projects; attracting students, researchers and professors with international experience; inserting subjects, themes and disciplines in the curricular structure of the programs in a foreign language; improving the percentage of students and professors of the university with fluency in a foreign language; improving the percentage of staff with fluency in another language; improving the full doctorate courses abroad; improving the interuniversity exchange doctorate courses abroad; improving the percentage of professors with a post-doctorate degree abroad; attracting talented youth with experience abroad or from a foreign country; improving the participation of students and professors in events abroad.

Theme 10

Theme – Study and use of Biodiversity

Partner countries –

Ecuador; Spain; Argentina; Canada; France; Holland; Colombia; Italy; Denmark; Venezuela; Australia; Austria; Germany; Mexico; South Africa; Finland; Belgium; Czech Republic; French Guiana; Sweden; Switzerland; Uruguay; New Zealand; Peru; Chile; United States; Portugal; United Kingdom.

Justification – Considerable part of world biodiversity (mainly Brazilian) remains unknown. Little is known about the organization of biological diversity and its response to human actions. There is a great lack of conceptual models and technological innovation capable of allowing the conservation and management of biodiversity with sustainable and economically competitive exploitation of the resources provided by it. In this way, the theme includes, in addition to the description and characterization of biological organisms, studies aimed at understanding the challenges posed to biodiversity by climate change and pollution; the maintenance of the capacity of ecosystems to provide products and services to support life; the maintenance of cultural and social diversity of local and/or indigenous communities; strategies for the fair and balanced distribution of the benefits arising from the use of genetic resources.

Goal 1 – Description and characterization of biological organisms and studies aimed at strategies for the maintenance and sustainable use of biodiversity.

Description – Integrating knowledge from different fields and specialties of Unicamp, for development of research projects and training of researchers with broad knowledge to solve complex and multidisciplinary issues; improving the knowledge of UNICAMP's teaching staff in the area; increasing

the number of publications in international journals on the subject; increasing the number of publications co-authored with foreign researchers; consolidating existing international partnerships; promoting and achieving new international partnerships and projects; attracting students, researchers and professors with international experience; inserting subjects, themes and disciplines in the curricular structure of the programs in a foreign language; improving the percentage of students and professors of the university with fluency in a foreign language; improving the percentage of staff with fluency in another language; improving the full doctorate courses abroad; improving the interuniversity exchange doctorate courses abroad; improving the percentage of professors with a post-doctorate degree abroad; attracting talented youth with experience abroad or from a foreign country; improving the participation of students and professors in events abroad.

Theme 11

Theme – Energy sources and Energy Matrices: Development, Integration, Sustainability and Technological Innovation

Partner countries –

France; Mexico; Japan; Norway; United Kingdom; Sweden; Ireland; Australia; Denmark; United States; Holland; Canada; Russia; Italy, Argentina and Estonia

Justification – Energy, one of the most valuable commodities, has been increasingly featured in researches with new and traditional sources, new public policies, technological innovations and business strategies for their management. This resulted from developments that occurred in the last decade. On the one hand, there was increase in demand due to the improvement in quality of life and progress of emerging countries, as well as the extension of the use of electronic devices, electric cars, fossil and non-fossil energies. On the other, public policy and agreements between nations were ratified to reduce the CO2 emissions arising from traditional fossil fuels. The fields of Engineering are already addressing the theme of energy and intend to advance their focus on the research and development of new energy sources and improvement of traditional sources. Biofuels, second generation ethanol, generation of fuels via alternative and biological routes, solar and wind farms (onshore and offshore), ocean energy, management of the network's power, new technologies for electric power storage such as advanced metal-air batteries and supercapacitors, improvement and rationalization of the exploitation and use of oil and natural gas are already topics under research aiming at the sustainable and integrated use of energy. The challenge is great and requires more partners contributing in diverse fields in the researches that are intensified by new projects. Examples of specific projects include Bioprocess Engineering for the production of biofuels up to the fourth generation, development and characterization of polymeric materials for photovoltaic cells and solar panels, and innovations in maritime oil science and engineering to meet the demands for energy and fundamental raw materials associated with the growth of world economy. The knowledge and experience obtained in offshore oil production constitute solid foundations for offshore development of wind, solar, tidal, wave, maritime, thermal and geothermal energy, for the extraction of various minerals from deep-sea deposits, for the

extraction of CO2 from hydrate beds or from underground reservoirs and for researches on the biodiversity and microbiology of exotic or extreme environments. Several of these studies are conducted in global contexts and therefore the development of this theme in UNICAMP is also of high relevance and national and international interest.

Goal 1 – Advancing scientifically and technologically in the development, sustainability and innovation of procedures and processes related to energy sources and energy arrays.

Description – General objectives of this theme, through internationalization and focusing on projects that explore energy sources and energy matrices, include integrating and expanding knowledge of different areas and specialties of Unicamp and other international institutions. The following objectives in relation to this topic stand out: a) training researches and improving the knowledge of Unicamp's teaching staff on the subject; b) increasing the number of publications co-authored with foreign researchers; c) attracting students, researchers and professors with international experience in the area; d) inserting subjects, themes and disciplines in the curricular structure of the programs in a foreign language; e) improving the percentage of students and professors of the university with fluency in a foreign language; d) improving the participation of students and professors in events abroad. It is intended, in what concerns the technical aspects of this theme: a) innovating the technologies for sustainable exploitation of natural resources, with appropriation and expansion of offshore technology and experiences in the field of oil and natural gas, to obtain the innovations and advancements necessary for the rational and sustainable exploitation of traditional and renewable energy sources, natural resources and the undersea space; b) researching and developing processes, products and systems for generation of fuels and electrical power from the exploitation and efficient and sustainable use of renewable sources; c) studying new energy sources and evaluating thermodynamic data to improve the existing processes and propose new technologies, exploring new raw materials, new production methods and the evaluation of innovative energy storage strategies; d) integrating new technologies in the electrical systems of the future, to develop new applications, concepts and methodologies of analysis and control of electric power systems in the presence of emerging technologies with the goal of enabling potential benefits, improving the operation of these networks and increasing the use of renewable and alternative energies; therefore, the purpose of this theme is to perform scientific (with production of articles) and technological (with transfer of technology to the productive sector) advances, training highly qualified human resources to lead the development of this sector (through the guidance provided to undergraduate, master's, doctoral and postdoctoral researches).

Theme 12

Theme – Design and development of products and processes

Partner countries – Spain; Greece; Switzerland; Japan; United States; Denmark; Ireland; New Zealand; Germany; France; Austria; Portugal; Australia;
Chile; Holland; Canada; Belgium; Argentina; Italy; Sweden; United Kingdom; South Korea.

Justification – The economy and the overall operation of the world are dependent on the marketing of innovative products which are able to meet the new demands, as well as on the evolution of existing products. Researching and establishing new strategies and technologies related to the design of products can, for example, be accomplished through the designing and prototyping of products by conventional means or through the mediation of computers, often involving mathematical modeling and simulation, techniques such as additive manufacture and others involving sub-micrometric scale processing, such as microfluidics or modification of superficial characteristics of materials, always with the aim of achieving specific attributes. The manufacturing processes of these new products should be designed and implemented, if non-existent, or, if already in operation, often require reworking the costs and reassessing their energy efficiency and potential environmental impacts. The application, for example, of the principles of system engineering in the planning, design, development, optimization, operation and control of industrial processes, even with regard to the flow of information and materials, results in higher-quality products, produced in a faster and more efficient manner, at more competitive costs. In the food services industry, for example, reducing the number and content of ingredients and components in the formulations of processed products, reducing process time and operating costs and increasing added value, are important challenges. Innovation is also present in the environment of agricultural development, especially with respect to high-scale production processes, which require real-time and increasingly accurate decisions to achieve profitability and productivity, highly impacting the field of agricultural industry and all of its branches. New materials and products can be developed more efficiently, from polymeric molecules, fuels, valves for different applications, microchips, mobile phones, devices for processing of digital signals and recognition of patterns, products for civil construction, equipment and devices for medical use, to industrial or agricultural machines, in an almost unlimited manner. Therefore, concentrating efforts on this subject with regard to internationalization is of enormous importance to UNICAMP.

Goal 1 – Researching and establishing new strategies and technologies related to the design of innovative products and production processes.

Description – This theme was established to integrate knowledge from different fields and specialties of Unicamp, for development of research projects and training of researchers with broad knowledge to solve complex and multidisciplinary issue. As a result, it will be possible to improve the knowledge of Unicamp's teaching staff in the area, increasing the number of publications in international journals and co-authored with foreign researchers, consolidating existing international partnerships, attracting students, researchers and professors with international experience, inserting subjects, themes and disciplines in the curricular structure of the programs in a foreign language, improving the percentage of students and professors of the university with fluency in a foreign language, improving the full and interuniversity exchange doctorate courses abroad, improving the percentage of professors with a post-doctorate degree and the participation of students and professors in events abroad, as well as stimulating entrepreneurship. The specific objectives in this regard include: a) obtaining a wide range of bio-products for different applications from biomass originated from different types of plants; b) developing (bio)processes and (bio)products in the food industry to obtain safer foods, with high

nutritional and technological quality, from sustainable processes; c) developing intelligent air-conditioning systems for animal production; d) proposing the development of researches on the advanced manufacturing processes of various products.

Theme 13

Theme – Frontiers of Mathematics, the Natural Sciences and Engineering: Challenges of the 21st Century

Partner countries –

Russia; Spain; Israel; Australia; Norway; Chile; Turkey; Mexico; Ireland; Singapore; Italy; Argentina; Peru; Japan; New Zealand; United Kingdom; United States; Canada; France; Portugal; Sweden; Germany; Switzerland; Austria; Iran; Holland.

Justification – The richness and complexity of Mathematics, the Natural Sciences and Engineering feed on intrinsic properties and structures, uniting different fields of knowledge. Advances in the Sciences allow answering scientific and technological questions generated in Engineering. There are many areas of concern focused on this subject which are likely to be benefited by internationalization. As for Mathematics and its applications, researches in algebra, analysis, geometry/topology, optimization, operations research, numerical analysis, mathematical applications in Geosciences, Physics and Biology and in emerging areas such as computational intelligence and image processing are highly relevant. In Chemistry, a contemporary challenge is the development of tools and techniques to characterize chemical and biochemical systems for inspection of materials, as well as new methodologies for analyzing and processing data. In Physics, studies addressing the physics of high energies, with application of the microcosm to the macrocosm, with intrinsically international nature and in collaboration with large laboratories, such as CERN, FERMILAB and LNLS, are of great importance. In Engineering, the focus of work is, to a large extent, aligned with the 14 grand challenges and goals listed for almost a decade by the National Academy of Engineering of the USA: make solar energy economical; provide energy from fusion; develop carbon sequestration methods; manage the nitrogen cycle; provide access to clean water; restore and improve urban infrastructure; advance health informatics; engineer better medicines; reverse-engineer the brain; prevent nuclear terror; secure cyberspace; enhance virtual reality; advance personalized learning and engineer the tools of engineering scientific discovery. The investigation of researches based on the principles of green chemistry, tools and models for analysis and modification of the life cycle of products and processes, the production of multifunctional materials, the use of biomass as a renewable raw material, materials with new electrical and magnetic properties, the modification of surfaces, the integration of nano-objects into macro-devices, the acquisition of materials and devices for clinical use, the engineering of biological tissues, the development of intelligent, sustainable and resilient constructed environments, for instance, is considered to be highly relevant.

Goal 1 – Combining different fields of knowledge in the areas of Mathematics, Natural Sciences and Engineering to answer scientific and technological issues of relevance.

Description – This theme certainly has one of the most multi, inter and trans-disciplinary global objectives of UNICAMP. The following specific objectives focused on solving challenges of the 21st century through the interaction between various units of UNICAMP and international institutions stand out, with the consequent qualification of its professors and students, increase in attractiveness for foreign professionals and students and in the number of projects and publications conducted in cooperation: a) investigating algebraic structures, their relationships, interactions, and applications in theoretical physics, cryptography and coding theory; b) describing and quantifying geometric structures in their abstract form and their manifestations in spacetime, such as the symmetries of matter, information and coding; c) intensifying and expanding the interactions of Mathematics with other areas of Science and of Engineering, both in the search for solutions to problems, and for the increase in their insertion; d) using Mathematics to obtain both fundamental explanations and practical applications of quantum theory; e) applying Physics in scientific and technological challenges focusing on sustainability, health and researches on devices and materials; f) studying Particle Physics and Cosmology, to, for example, understand the fundamental laws of nature and its basic components, the origin of specific properties and its consequences, the reason for the cosmic expansion of the Universe and aspects related to heavily interactive nuclear matter; g) developing procedures and arrangements for the quantitative and qualitative study of molecular aspects of chemical and biochemical systems; h) studying through multidisciplinary researches, biomechanics, knowledge from Engineering, Biology and Information Technology, the phenomena of nature, with an emphasis on the biomechanics of trees; I) developing a methodology for the designing of adaptive embedded systems based on formal models of computation and machine learning, aiming at the implementation of cooperative classifiers; j) developing procedures for obtaining micro and nanostructured biomaterials characterized in detail from natural and synthetic molecules for application in the biomedical field; k) studying the modernization of infrastructure with the adaptation and construction of intelligent, resilient and sustainable environments.

Theme 14

Theme – Innovation and Sustainability

Partner countries –

Russia; Australia; Italy; Japan; Norway; Portugal; Germany; Switzerland; Canada; China; United States; Holland; Uruguay; Ireland; Argentina; Colombia; Mexico; United Kingdom.

Justification – The relationship between innovation and sustainability must be observed from different perspectives, considering the need for articulation of the various dimensions of the very concept of sustainability. Therefore, the rescue and demonstrations of the concept of sustainability should be considered. Reflections on the conditions, difficulties, challenges and opportunities for transformation of socio-economic development through the advancement of the understanding of contemporary environmental problems should also be integrated, which is not so easily accomplished. One of the

fields most often considered by the analyses is that of the policies and instruments focused on innovation applied to the energy sector, especially (but not only) renewable energy sources, aiming at sustainability, without disregard to the reaction of economic agents to these policies. Concepts such as sectoral innovation systems applied to the new technologies will be assessed, as will the discussion on instruments to evaluate and promote innovation in renewable energies. These elements must contribute to thinking of policies (public, but not only) for an "energy transition" towards low-carbon solutions. Thus, the theme should encompass projects including the issues relating to new technologies for adaptation to and mitigation of climate change; green technologies, renewable energy, low-carbon economy, food security, conservation and public policies.

Goal 1 – Discussing instruments to evaluate and promote innovation in renewable energy. These elements must contribute to thinking of policies (public, but not only) for an "energy transition".
Description – The relationship between innovation and sustainability must be observed from different perspectives, considering the need for articulation of the various dimensions of the very concept of sustainability.

Theme 15

Theme – Social and Economic Development, Socio Demographic and Territorial Dynamics: Challenges Posed by the Transformations in the 21st Century

Partner countries –

China; Colombia; France; Chile; Mexico; Sweden; Holland; Uruguay; Bolivia; Canada; India; South Africa; Germany; Portugal; Argentina; Austria; Spain; United Kingdom; Italy; Switzerland; Russia; United States.

Justification – The global social and economic transformations in recent years have been marked by greater interpenetration of economic and social flows (people, goods, services, financial and productive capital). At the same time, demographic and territorial dynamics and new socio-spatial practices also are also undergoing deep and challenging changes resulted from articulations between different scales (global, national, regional and local), subjects (state, organized social groups, global companies, etc.) and determinations (economic, cultural, political and environmental). These changes are accompanied by tensions that unfold in different dimensions, all of them with strong impacts on developing countries and their ability to respond actively to these transformations: i) in the matter of the dispute in the economic scenario for greater global influence over the geopolitical system; ii) in the transformations and instability of the international financial and monetary system; iii) in the productive structure and technological changes; iv) in changes in policies for science, technology and innovation; v) in the growing inequality of income and wealth that is observed between countries and within countries; vi) in the intense demographic changes in the internal dynamics of countries and between countries; vii) in the challenges associated with the environmental issue; viii) in the transformations of the work world; ix) in issues related to the regional development within territories; x) in the new fundamentals of the region

and the new roles of borders as well as the new nexus of constitution of places; xi) in the question of density of occupation and territorial uses; xii) in the new forms of cooperation between developing countries. All these transformations require: i) capacity of theoretical understanding and development in the general knowledge about these different themes; ii) formulation of response strategies and actions, in particular, but not only, through public policies.

Goal 1 – Analyzing the transformations in the world economy and impacts on economic development.
Description – Integrating knowledge from different fields and specialties of Unicamp, for development of research projects and training of researchers with broad knowledge to solve complex and multidisciplinary issues; improving the knowledge of UNICAMP's teaching staff in the area; increasing the number of publications in international journals on the subject; increasing the number of publications co-authored with foreign researchers; consolidating existing international partnerships; promoting and achieving new international partnerships and projects; attracting students, researchers and professors with international experience; inserting subjects, themes and disciplines in the curricular structure of the programs in a foreign language; improving the percentage of students and professors of the university with fluency in a foreign language; improving the percentage of staff with fluency in another language; improving the full doctorate courses abroad; improving the interuniversity exchange doctorate courses abroad; improving the percentage of professors with a post-doctorate degree abroad; attracting talented youth with experience abroad or from a foreign country; improving the participation of students and professors in events abroad.

Theme 16

Theme – Studies on healthy systems, prevention, promotion and monitoring

Partner countries –

Italy; Australia; France; Honduras; Ireland; Spain; Polonia; Argentina; Canada; Portugal; United States; United Kingdom; New Zealand.

Justification – The study of health systems is being developed internationally, having as goals comparability of assistance, transfer of technology and the improvement of translational research. The fact of Brazil being a large country with average income, the only one with these characteristics to develop a public universal health system that finances the provision of services, makes it a very interesting study object for international exchanges. The great Brazilian heterogeneity in epidemiological terms, in relation to income per capita and to HDI, also puts in perspective the challenges and barriers that can be best addressed by international researches and collaboration. Brazilian cultural singularities and social diversity, as well as the country's pioneer interventions for promotion and prevention of certain issues (i.e: STD/AIDS, smoking, etc.) make it an interesting partner for international researches. Unicamp already has international experience with exchanges associated with the theme.

Goal 1 – Developing international exchanges related to the study of health systems, promotion, surveillance and prevention.

Description – Integrating knowledge from different fields and specialties of Unicamp, for development of research projects and training of researchers with broad knowledge to solve complex and multidisciplinary issues; improving the knowledge of UNICAMP's teaching staff in the area; increasing the number of publications in international journals on the subject; increasing the number of publications co-authored with foreign researchers; consolidating existing international partnerships; promoting and achieving new international partnerships and projects; attracting students, researchers and professors with international experience; inserting subjects, themes and disciplines in the curricular structure of the programs in a foreign language; improving the percentage of students and professors of the university with fluency in a foreign language; improving the percentage of staff with fluency in another language; improving the full doctorate courses abroad; improving the interuniversity exchange doctorate courses abroad; improving the percentage of professors with a post-doctorate degree abroad; attracting talented youth with experience abroad or from a foreign country; improving the participation of students and professors in events abroad.

Theme 17

Theme – Chronic emerging and overlooked diseases

Partner countries –

Canada; Belgium; France; Japan; Spain; Singapore; United Kingdom; Denmark; South Africa; United States; Italy.

Justification – All around the world, as life expectancy grows and socio-sanitary conditions improve, the relative prevalence of chronic diseases increases. This process is already completely installed in the developed world and rapidly expanding in Brazil. Thus, stimulating researches, training and exchanges in relation to chronic diseases becomes a relevant challenge for the near future. Studies on chronic diseases range from basic research to translational research including methods from Chemistry, Physics, Mathematical Sciences and the Social Sciences. Unicamp already has international experience with exchanges associated with the theme, and owns international centers of excellence related to it (Cepids). Still, given its geographical location, Brazil has faced the (re)emergence of diseases like the Arboviruses, yellow fever, etc., and the resurgence of neglected diseases such as leprosy, malaria, etc. These new epidemics characterize unprecedented situations, determined by globalization and rapidness of transport and travel, and by the urbanization of the occurrence of many of them, making them an object of interest for the globalized world. The study of these aggravations articulates from basic areas such as Biology and Genetics to clinical, preventive and sociocultural interventions, having been prioritized by numerous international research agencies. Unicamp already has international experience with exchanges associated with the theme.

Goal 1 – Developing international exchanges related to the study of chronic, emerging and overlooked diseases.

Description – Integrating knowledge from different fields and specialties of Unicamp, for development of research projects and training of researchers with broad knowledge to solve complex and multidisciplinary issues; improving the knowledge of UNICAMP's teaching staff in the area; increasing the number of publications in international journals on the subject; increasing the number of publications co-authored with foreign researchers; consolidating existing international partnerships; promoting and achieving new international partnerships and projects; attracting students, researchers and professors with international experience; inserting subjects, themes and disciplines in the curricular structure of the programs in a foreign language; improving the percentage of students and professors of the university with fluency in a foreign language; improving the percentage of staff with fluency in another language; improving the full doctorate courses abroad; improving the interuniversity exchange doctorate courses abroad; improving the percentage of professors with a post-doctorate degree abroad; attracting talented youth with experience abroad or from a foreign country; improving the participation of students and professors in events abroad.

Theme 18

Theme – Therapeutic and pharmacological innovations

Partner countries –

Holland; Portugal; Argentina; Chile; Belgium; Spain; Ireland; Germany; Italy; Switzerland; France; Cana da; United Kingdom; United States.

Justification – Unicamp is a well-ranked university in relation to the production of innovations, taking into account the patents deposited. Among them, perhaps the most relevant are found in the preparation, development and testing of new therapeutic and pharmacological resources, such as the development of new polymeric materials, free of Bisphenol A and with low contraction of application in the Dental field and those associated with it, and biomaterials for controlled release of bio-modifiers, drugs and devices for regeneration, restoration and replacement of soft and hard tissues. These studies encompass several areas of study, from the development of new substances to the discovery of new uses for drugs, cosmetics or materials and devices for dental, dermatological and systemic use. The study of the use of resources derived from the rich Brazilian biodiversity is a source of international interest, and partnerships with international centers of excellence would only bring benefits. Unicamp already has international experience with exchanges associated with the theme.

Goal 1 – Developing international exchanges related to the study of therapeutic and pharmacological diseases.

Description – Integrating knowledge from different fields and specialties of Unicamp, for development of research projects and training of researchers with broad knowledge to solve complex and multidisciplinary issues; improving the knowledge of UNICAMP's teaching staff in the area; increasing

the number of publications in international journals on the subject; increasing the number of publications co-authored with foreign researchers; consolidating existing international partnerships; promoting and achieving new international partnerships and projects; attracting students, researchers and professors with international experience; inserting subjects, themes and disciplines in the curricular structure of the programs in a foreign language; improving the percentage of students and professors of the university with fluency in a foreign language; improving the percentage of staff with fluency in another language; improving the full doctorate courses abroad; improving the interuniversity exchange doctorate courses abroad; improving the percentage of professors with a post-doctorate degree abroad; attracting talented youth with experience abroad or from a foreign country; improving the participation of students and professors in events abroad.

Theme 19

Theme – Global environmental changes/climate changes and landscape dynamics

Partner countries –

Colombia; India; Mexico; Canada; Norway; China; Uruguay; Russia; Austria; Japan; Cuba; Portugal; Sp ain; Holland; Germany; Australia; United States; United Kingdom.

Justification – Human activities are at the heart of the debate on global environmental changes, being configured as unprecedented challenges to contemporary society, in the transition to the Anthropocene epoch. Global climate changes pose challenges to various countries, which must combine economic, social and technological development to mitigate greenhouse gas emissions. Environmental governance must be promoted at different levels (local, national and global), from the development of Science, Technology and Innovation, and with the participation of various social actors, in the search for environmentally responsible development. This theme fits into the debate of the economic, social, political and environmental dimensions of climate change, focusing on the question of how the State and society respond to the risks arising from these changes in different spheres in interconnected analyses that are able to stimulate the dialogue between the human and natural dimensions of the process, which must include different multifactorial and multi-scale methods of research and analysis. The investigation and analysis of biogeophysical processes governing the organization of the landscape and the impacts related to the use and occupation of territories in these environments contribute to the mitigation of natural hazards related to economic and social activities, especially when they are associated with the application of innovative geotechnologies on quaternary surface covers and others. Another factor of great importance for the planet, but for Brazil in particular, is its vulnerability to climate changes that can profoundly impact the vast territory and affect development if there is no capacity of reaction, mitigation and prevention. Thus, it is important to consider the risk of natural disasters associated with severe atmospheric instabilities for the monitoring of extreme events and natural disasters in several scales of the territory. In relation to this theme, we also consider the abundance of natural resources the country has and that require strategic use, as well as the consumption of energy

resources which affect not only the economic issues, but also the political life of countries, at a moment of extensive discussions on the growing scarcity of energy.

Goal 1 – Studying biogeophysical and environmental processes governing the organization of the landscape and the impacts related to the use and occupation of territories.
Description – Regarding the global environmental changes, we consider the risk and natural disasters associated with severe atmospheric instabilities for the monitoring of extreme events and natural disasters in several scales of the territory. In relation to this theme, we also consider the abundance of natural resources the country has and that require strategic use, as well as the consumption of energy resources which affect not only the economic issues, but also the political life of countries, at a moment of extensive discussions on the growing scarcity of energy.

Theme 20

Theme – Teaching challenges in the 21st century

Partner countries –

Angola; Norway; Spain; Germany; France; Mexico; Malawi; Portugal; Colombia; Austria; United Kingdom; Israel; Italy; Chile; Argentina; Canada; Mozambique; United States.

Justification – The exchange of experts in teaching between Unicamp and research institutions from abroad will allow the issues related to the teaching challenges of the 21st century to be analyzed. Considering that we live in contemporary times, the complexity of current problems must be considered in an interdisciplinary and internationalized manner. Similarly, as a principle, the action of teaching/educating and its implications for training of teachers and policies; for the production of knowledge; in the practices of memories and histories; in the workplace and for the professionalization of teachers, within contexts of formal (primary and higher) and non-formal education, from the perspective of education for all, we understand the importance of these research themes, as well of studies on psychological processes involved in educational, social and cultural phenomena aiming at the development of students in the different levels and modes of teaching. The topic covers several areas of knowledge and it should also be highlighted that Unicamp has dozens of courses that can, through partnerships and collaborations with each other, with other graduate programs of the university and notably with graduate programs abroad, develop research actions such as: development of common indicators for undergraduate education, expansion of bilingual disciplines and development of international internship projects for undergraduate students at the partner universities, international residences in the pro-teaching style, creation of online platforms and repositories of best practices, case studies on public schools and higher education systems in the network between universities, etc. The theme also foresees the development of researches on the training of teachers and other social actors that play educational roles in different contexts.

Goal 1 – Training of Primary Education teachers: mathematical and statistical aspects; psychological, socio-cultural processes; and inequality, difference and inclusion.

Description – Developing and consolidating research projects focused on: teaching of probability and statistics, at Primary Education level, in conjunction with the partner universities; training of Primary Education teachers in the mathematical and statistical aspects of decision making. Training of a teaching staff that specializes on the theme, with master's, doctoral and postdoctoral degrees in the area. Contributing to advancements in researches and training, and to the improvement of practice within the context of Education in Sciences and Mathematics from a broad perspective (methodological and conceptual), aiding the understanding of the relationship between science and technology and the social, political, environmental and economic contexts, with a leading-edge theoretical framework for the development of subsequent actions in the educational practices. Developing researches, of inter- and multidisciplinary character, on topics related to teaching, learning, in the various forms of education, and particularly on training of teachers and other social actors that play educational roles in different contexts. Studying the psychological processes involved in educational, social and cultural phenomena aiming at a greater understanding of learning and human development in contexts of formal and non-formal education; Improving relations between research groups from different countries who work with the theme for the cross-cultural production of knowledge, creating concrete conditions for the execution of processes of internationalization of research teams. Developing intercultural and transdisciplinary researches on the cultural production of populations that are traditionally excluded and marginalized (in their local and global dimensions) and their direct effects on education, public policies and social movements.

Theme 21

Theme – Aging: a global challenge

Partner countries – Germany; Portugal; United States; Italy; United Kingdom; Japan.

Justification – The increase in life expectancy and decreasing birth rates are the reasons used to explain the increase in the proportion of older adults in the population, and transform ageing both into a social risk and into a political demand. Until very recently, old age was seen as belonging to the private and family spheres; a matter of individual security addressed by charitable associations. With the transformation of ageing into a social issue, a set of guidelines and interventions, often contradictory, is defined and implemented by the State and by private organizations. A specific field of knowledge – Gerontology – is created with professionals and institutions responsible for the training of specialists. As a result, attempts at the homogenization of representations about this population segment are triggered, and a new cultural category is produced: older adults, as an autonomous and coherent segment that imposes another sectioning of social geography, authorizing the implementation of specific modes of management. A closer look at the social policies geared to this segment is essential to understand the forms of political management of this new social geography. The growing interest of the media in older adults is the result of their transformation into new political actors and into a consumer market, as this

segment of the population (individuals aged 60 years or more) becomes increasingly more significant from a numerical point of view, also for being the sector with the highest incomes in the different social classes. The images and representations produced about old age, its gains and losses, are crucial to understand this population and how their needs are perceived, as well as in which ways that particularly the State, the market and families are working to meet them.

Goal 1 – Ageing as a global challenge must have as objective researches in different fields of knowledge both with regard to the health sciences as to the humanities.
Justification – The increase in life expectancy and decreasing birth rates are the reasons used to explain the increase in the proportion of older adults in the population, and transform ageing both into a social risk and into a political demand, as well as into a new challenge for the health sciences.

Theme 22

Theme – Transversal dialogues: art, language, knowledge

Partner countries – Mexico; Colombia; Ecuador; Canada; Germany; Australia; Nigeria; United Kingdom; Chile; South Africa; Argentina; France; United States; Ireland; Portugal; Italy; Spain; Switzerland.

Justification – Human beings are not exhausted in their own complexity, neither can they reduce most of their manifestations to private objects of a discipline or cultural context. If this truth has always been imposed to the arts and to the humanities and social sciences, in the current historical moment, it cries out for recognition in the knowledge-producing and scientific policy-formulating institutions. Art, culture and languages/literatures have been increasingly revealing their vocation as a form of transversality that is manifested not only in artistic and cultural contexts (when different expressions are transposed in determined poetic, pedagogical and investigative purposes), but also is expanded through symbiotic associations with different areas such as the Health Sciences, Computer Sciences, Engineering, Education, Philosophy, History, Anthropology and Sociology. The promotion of principles of equality from the historical dimension and of criticism about the friction between cultures and knowledge is also relevant to the vocation of the arts, cultures and languages/literatures. The promotion of core activities and transdisciplinary and transcultural research groups, as well as the promotion of links between institutions that recognize the need for interdisciplinary researches that are carried out ethically and responsibly, given the challenges of human beings in the contemporary world, are key strategies for a type of diversification and innovation in research in Arts and Humanities at Unicamp that is not transformed into multiple and super-specialized subareas, and that, at the same time, remains up-to-date with what has been carried out internationally in programs and research centers focused on interdisciplinary objects, instead of departments or areas.

Goal 1 – Consolidating and expanding the existing internationalization efforts and the visibility of PPGs Theory and Literary History, Linguistics, Applied Linguistics, Visual Arts, Music and Art on Stage.

Description – Consolidating and expanding the existing internationalization efforts of programs related with the broad area of Linguistics, Letters and Arts located in our Institution, namely: Theory and Literary History PPG, Linguistics PPG, Applied Linguistics PPG, Visual Arts PPG, Music PPG and Art on Stage PPG, increasing the visibility of these Programs, as well as the impacts of their search results, with the aim of attracting researchers from foreign institutions, creating synergy and strengthening the positions of the Programs in relation to the quadrennial review internationalization item 2017-2020 of CAPES. In general, it is expected: to attract foreign and Brazilian researchers with experience abroad to carry out researches and teaching activities and events alongside the groups and lines of research of the six programs; to implement a systematic policy of exchanges with international centers of excellence; and to promote the international visibility and increased impact of intellectual productions of our researchers. To this end, four main lines of actions are proposed: 1) promotion of teaching and student mobility for academic training and consolidation of institutional partnerships; 2) strengthening of the academic education axis, focusing on the training of future teachers, researchers and administrators in higher education in Linguistics, Letters and Arts; 3) increased impact of the intellectual production of our professors and students; 4) sharing of partial research results through the promotion of international scientific events.

POSTGRADUATE PROGRAMS LINKED TO THIS PROPOSAL

Theme 1- Food, Health and Society

Postgraduate Program 1 – INTERNAL MEDICINE

Capes evaluation (2017 evaluation grade) – 5

Justification – The project proposed by the Postgraduate program in Food and Nutrition on this theme focuses on the entire food production chain, from the field to consumers, seeking sustainable alternatives for use of natural resources and improvement of the quality of life of the population through the food.

Postgraduate Program 2 – NUTRITION, SPORTS AND METABOLISM SCIENCES

Capes evaluation (2017 evaluation grade) – 4

Justification – This project adheres to the priority theme “Food, Health and Society”, since it covers the following topics associated with this issue: – “Development of processes for the production of food, which in addition to ensuring the microbiological physico-chemical, sensory and stability attributes should also encourage and facilitate the production of healthier and more sustainable food”. – “Consumer perception and association of concepts “natural”, “with less or free of additives”, “with less components deemed as aggressive to health” with healthier food”. – “Adoption of techniques that minimize losses and that can use waste from processing with physical, chemical, microbiological and sensory benefits” – “Development of efficient, sustainable and innovative processes” – “Bioactive compounds have been sought to replace synthetic additives and when incorporated into processed

foods, add value to the final products, particularly when extracted from natural sources". – "Extension of shelf life with security for consumers."

Postgraduate Program 3 – FOOD SCIENCES

Capes evaluation (2017 evaluation grade) – 7

Justification – The projects developed by professors of PPGCA are focused on the lines of research on food analysis, chemistry, biochemistry, microbiology and toxicology. Professors in the Food Analysis field lead intense studies on the characterization of minor and major food compounds through application of several analytical techniques, green chemistry included. Professors in the lines of research on Food Biochemistry have been developing studies on selection of microorganisms that produce enzymes. In addition, they have noteworthy performance in the characterization of Brazilian-native or exotic fruits and vegetables; in the field of functional foods; in the study of relationships of food consumption and compounds with their beneficial effects for health; in the development of bioprocesses; in the study of reutilization of industrial residues; and in the use of bioprocesses to develop ingredients for various industrial applications. In the line of research on Food Chemistry, professors focused mainly on the study of pigments in foods and those produced by microorganisms and antioxidant compounds, and on evaluation of bioavailability and relationship to health. In addition, they lead studies on the characterization of lipids and of systems and mechanisms for control of oxidation of lipids in foods, and on the functional, technological and nutritional properties of proteins. Professors in the area of Food Microbiology dedicate themselves to the study on the behavior and the role of (pathogenic, deteriorating and benefic) microorganisms in foods, on the identification and characterization of these microorganisms with respect to ecological, genetic and metabolic aspects, on the impact of food processing on microbial ecology and its metabolites, and on the application of "omics" in the analysis of important microorganisms in foods. Professors in the line of research on Food Toxicology act in the development of toxicological trials and studies of residues and depletion of veterinary drugs in animals. The program also develops analytical methods to determine toxic compounds that are naturally present and/or formed during food processing, and evaluation models of exposure to toxic substances transmitted by foods.

Postgraduate Program 4 – AGRICULTURAL ENGINEERING

Capes evaluation (2017 evaluation grade) – 4

Justification – Concern with food production; Prohibition of opening of new areas for production; Competition of areas for food and biofuel production; Synergy of systems for the mixed combination of food production (ILPF).

Postgraduate Program 5 – FOODS AND NUTRITION (33003017042P0)

Capes evaluation (2017 evaluation grade) – 5

Justification – The research projects of the professors of the Postgraduate Program in Foods and Nutrition focus on two areas: "Food Consumption and Quality" and "Experimental Nutrition Applied to Food Technology". The first develops researches on acceptability and sensory properties which guide

food preferences, in addition to studies on consumer behavior and choices, with great potential for intra- and inter-cultural studies about consumer habits and choices. The second area is also quite prolific in researches on utilization of waste from the agricultural industry, which results from the processing on macro and micro nutrients, bioaccessibility and bioavailability of nutrients and approaches. Therefore, interdisciplinarity characterizes PPGAN, because food is subject of researches under different perspectives, from its composition and structure, through its production and processing, to the perception of consumers and consumption.

Postgraduate Program 6 – FOOD ENGINEERING

Capes evaluation (2017 evaluation grade) – 7

Justification – This project adheres to the priority theme “Food, Health and Society”, since it covers the following topics associated with this issue: – “Development of processes for the production of food, which in addition to ensuring the microbiological physico-chemical, sensory and stability attributes should also encourage and facilitate the production of healthier and more sustainable food”. – “Consumer perception and association of concepts “natural”, “with less or free of additives”, “with less components deemed as aggressive to health” with healthier food”. – “Adoption of techniques that minimize losses and that can use waste from processing with physical, chemical, microbiological and sensory benefits” – “Development of efficient, sustainable and innovative processes” – “Bioactive compounds have been sought to replace synthetic additives and when incorporated into processed foods, add value to the final products, particularly when extracted from natural sources”. – “Extension of shelf life with security for consumers.”

Postgraduate Program 7 – FOOD TECHNOLOGY

Capes evaluation (2017 evaluation grade) – 5

Justification – The Postgraduate Program in Food Technology can contribute to this topic in a broader manner, because it covers lines of research that include the study of the food processing chain, of vegetable (grains, fruits and vegetables) and animal (poultry, pigs, cattle and aquatic animals) origins, as well as the impact of mineral compounds (salts of sodium, calcium, phosphates etc.), since the field, through the steps of processing and production, including their use for the preparation of products, considering also the entire system of packaging, of logistics for distribution to consumers within standards of the Brazilian and/or international legislation, regarding their microbiological, nutritional and technological qualities. As contribution to health and society, the Program already has the know-how for producing new ingredients, such as modification of oils or fats without trans-isomers and application of these in bakery and animal-origin products, as well as of products free from gluten, sodium, dairy, trans fatty acids, cholesterol and other nutrients for special diets, including ingredients that confer healthiness to products, such as fiber, Omega fatty acids 3 and 6, resistant starch to reduce the glycemic index, protein with different backgrounds, utilization of by-products originated from processing industries of various sectors, such as the meat, oil extraction and dairy industries, among others. The Program already has studies focused on emerging technologies such as high-pressure, cold plasma, ozonation, irradiation and others for application in ingredients or finished products.

Theme 2 - Investigation of Complex, Natural and Artificial Systems

Postgraduate Program 1 – MATHEMATICS

Capes evaluation (2017 evaluation grade) – 7

Justification – Dynamical Systems (DS) and Partial Differential Equations (PDEs) are mathematical objects that have been attracting the attention of a large community of national and foreign researchers. The reason for that is the fact they present inherent riches by both their intrinsic structures, involving a mishmash of analytical and geometric elements, as their usefulness in modeling and analyzing complex systems. In fact, DS and PDEs form together a central language in the study of numerous phenomena in biological, physical, chemical, engineering, social, and economic sciences. Thus, new knowledge on DS and PDEs naturally impact the understanding of different complex systems in various areas of knowledge.

Postgraduate Program 2 – STATISTICS

Capes evaluation (2017 evaluation grade) – 5

Justification – The randomness paradigm is, both in the Sciences (human, physical, biological, etc.) as in the Technologies, a natural approach for studying systems featuring a complex behavior. Equipped with mathematical rigor, probabilistic and statistical techniques have a fundamental role in applying the Empiricism principles. Therefore, the PGP-Statistics fits the theme “Investigation of Complex, Natural, and Artificial Systems.”

Postgraduate Program 3 – PHYSICS

Capes evaluation (2017 evaluation grade) – 7

Justification – Complex systems refer to a broad research area, of multidisciplinary character. This area is characterized by involving interaction between a high number of elements. As elements, we can consider from particles and atoms to even individuals. In short, any kind of element that can be characterized as part of a population. The interactions between these elements and their high numbers make the usual methods, analytical or numerical, insufficient for the analysis and understanding of both the structure and dynamics of these systems. Different techniques have been developed for studying complex systems in general, with a strong emphasis on models based on numerical simulations but also a constant concern with the development of analytical models, at least as support for the results understanding. These models have the advantages of allowing a wide application and can be used in a “horizontal” manner, that is, be used in the various problems from different research areas, both of physics and chemistry as of biological and social systems.

Postgraduate Program 4 – CHEMISTRY

Capes evaluation (2017 evaluation grade) – 7

Justification – In this theme, the PGP-Chemistry proposes the development and use of theoretical and computational methods to study biological systems and new materials. Currently, computer methods in chemistry are crucial for understanding and devising complex systems, such as proteins, polymers, functionalized surfaces, etc. Modern methods of computational chemistry are commonly used by interdisciplinary or experimental groups. This proposal intends to support specialized groups in the use and development of these techniques. Such proposal is broadly linked to research projects on computational physics and biology and research on advanced methods for high-performance computing.

Theme 3 - Science and Information Technology

Postgraduate Program 1 – ELECTRICAL ENGINEERING

Capes evaluation (2017 evaluation grade) – 6

Justification – Integrated photonics is one of the main responsible for the increased transmission rates in the current optical communication systems, enabling an increased density of installed transceivers and lower energy consumption per bit broadcasted. The insertion of this multimode technology into these systems will allow a further increase of these rates from the spatial multiplexing of channels.

Postgraduate Program 2 – COMPUTER SCIENCE

Capes evaluation (2017 evaluation grade) – 7

Justification – This project aims to investigate relevant issues in the topic of Information Science and Technology, which are listed below: Machine learning (ML) has become a powerful tool for constructing computational models capable of modeling, in a non-analytical manner, complex problems involving a high number of variables in a multidimensional hyperspace. Optimizing the execution of efficient models for ML that result in great MIIPS/Watt relations is a major problem. 5G communication networks are intended to connect under a single core network several access networks, both wired and wireless, of high flow and low response time, which are required to support a wide range of services from the Internet of the Future, including IoT (Internet of Things) environments, smart cities, and autonomous vehicles. High requirements of performance (high flow and low latency) and robustness (reliability and resilience) will have to be supported both at the level of communication networks as in software platforms. Autonomous robotics problems involve from the construction of robust and secure systems to learning models able to endow these robots of such autonomy. Building systems capable of dealing with these processes in an optimized way is essential for a successful robotic subproject. Building a robust intercontinental cloud environment, whose design considers the heterogeneity of the systems distributed in clouds and others, is a challenge for computing, which will positively impact the interaction of local communities. The treatment of a large amount of dynamic data is essential for current computer systems. Data flows provided by new types of sensors in different application contexts require new techniques to represent and consult the data, and the investigation of new paradigms to develop applications considering “active” databases. Modern systems architectures are evolving into Cyber-

Physical Systems (CPS), i.e., systems where the physical aspects are deeply integrated with the cybernetic aspects of communication and computing, providing to physical systems new “smart” features. These systems are highly complex and the V&V process execution is not trivial, because the behavior of such systems is highly dynamic, representing a research challenge.

Postgraduate Program 3 – PHYSICS

Capes evaluation (2017 evaluation grade) – 7

Justification – The development of new techniques and materials have been fundamental to the information processing throughout the last century. In particular, photonics has been inserted into the 21st-century society in a similar way to the electronic insertion in the 20th century, Photonic devices have been developed for applications in the most diverse areas, with emphasis on applications in information and communication technologies. Unicamp plays a leading role in Optics and Photonics in Brazil. In addition to the scientific production and dissemination of knowledge, great contributions were made to the formation of human capital in this area for the academia and the national industry. Since the first optical fibers (South of the Equator) were produced in our labs, in 1976, several companies were created by former students and professors. Recently, the IFGW hired about 10 young professors from important research centers abroad, associated with the themes mentioned. In addition, the IFGW recently opened a research center focused on photonics, the Photonicamp, which aims to be an internationally renowned environment, conducive to the continuous development of this area. Our goal is to attract young talents and post-doctoral fellows from abroad, in addition to sponsoring interuniversity exchange doctorates abroad for our students and scientific missions for our post-docs and professors.

Postgraduate Program 4 – MECHANICAL ENGINEERING

Capes evaluation (2017 evaluation grade) – 5

Justification – Collaboration between Unicamp and KTH, already underway, with funds from the Swedish-Brazilian Research and Innovation Center (CISB).

Theme 4 - Nanotechnology

Postgraduate Program 1 – CHEMISTRY

Capes evaluation (2017 evaluation grade) – 7

Justification – The activities provided for in each of the subprojects within this participation proposal of the PGP-Chemistry in this theme focuses on design, preparation, and strategies for chemical, physical, and morphological characterization of materials with nanometer dimensions. Synthetic and analytical approaches involved are substantially different from those employed in other specialties of Chemistry, being considerably distinguished from traditional methodologies and justifying its inclusion in this group.

Postgraduate Program 2 – ELECTRICAL ENGINEERING

Capes evaluation (2017 evaluation grade) – 6

Justification – Nanomaterials will be developed and, from them, devices for application in nano- and micro-electronics.

Postgraduate Program 3 – PHYSICS

Capes evaluation (2017 evaluation grade) – 7

Justification – The PGP-IFGW integrates research groups working in several nanotechnology areas. Among the research lines, one can cite the growth of new materials in nanoscale by tension engineering, the development of self-organized semiconductor devices, development of flexible electronics, development of new material based in carbon nanotubes, studies in organometallic nanostructures, studies on optical properties of nanostructured materials, studies on nanoparticles of interest to medicine, studies on self-repairing surfaces, studies on magnetic coupling in nanoscale systems, studies on the interaction between nanostructured semiconductor systems and bacteria, studies on the treatment of surfaces by plasma, studies on bi-dimensional matters (graphene, TMD, BN, among others). These research activities seek to better understand the new properties observed in materials whose dimensions may be as small as 1 atom thick. such as graphene, up to a few tens of nanometers, such as the thickness of fine films or semiconductor nanowires. In these dimensions, the new properties of interest can be optical, electronic, magnetic, structural, biological or thermodynamical. The groups associated with the PGP-IFGW rely on a vast infrastructure, including synthesis equipment, such as Chemical Beam Epitaxy, sputtering, and physical beam deposition systems, and characterization equipment, such as microscopes, spectrometers, diffractometers, magnetometers, magnetic resonance imaging equipment, among many others, capable of performing a wide range of synthesis experiments with precision and sensitivity for nanoscale and nanostructured materials. In addition, teams dedicated to simulations strongly collaborated with experimental teams to decisively contribute to the searching and understanding of innovative phenomena and properties. These groups include international partnerships with excellent laboratories in several countries. These collaborations, with bilateral student exchange programs, are vital for the quality maintenance of research and training of human resources for Brazil. Thus, we understand that research developed in nanotechnology by the PGP-IFGW professors meets the scope of this program.

Theme 5 - The challenges of democracy

Postgraduate Program 1 – POLITICAL SCIENCE

Capes evaluation (2017 evaluation grade) – 6

Justification – Democracy is a central theme of Political Science. It would not be an exaggeration to say that this subject was consolidated as a study area from the discussion of democratic regimes, regime transitions, as well as the consequences of such regime on the different social life spheres. Currently, new challenges arise, whether from the evaluation of the functioning, representation degree, or even efficiency of representative systems; whether from the point of view that understands democracy as provider of greater opportunities and democratization of work relations, relationships

between States, public policies; or even from the understanding of the role of the State. The Graduation Program in Political Science of Unicamp has a long tradition of studies in the area, which is explained in the long-term international partnership with the Michigan University in “The Comparative Study of Electoral Systems Project”, or even through the INCT – Institute of Democracy and Democratization of Communication. Through this project, we intend to create and consolidate new international partnerships. It should be highlighted that, due to the global scope of the issue, research on this theme are of international and comparative nature, so they can be potentiated by the PRINT. In this sense, face the challenges posed to democracy in the 21st century – representation dilemmas, new forms of political engagement and vindications languages, issues posed by the diversity, among others, which can be summed up in the idea of rights, equality, citizenship, and social justice – it is crucial that we seek to deepen the understanding of new dynamics and challenges of democratic processes.

Postgraduate Program 2 – SOCIAL SCIENCES

Capes evaluation (2017 evaluation grade) – 4

Justification – Democracy is a cross-cutting issue to Social Sciences, focusing the efforts by three of its subjects: Sociology, Anthropology, and Political Science. The interdisciplinary character of the Graduation Program in Social Sciences justifies the interest in an integrated approach to the topic. Moreover, the theme concerns almost all research lines of the PGPSS, such as “Social Processes, Identities, and Representations of the Rural World,” “Work, Politics, and Society,” “Gender Studies,” “Modes of Knowledge and their Expressions,” “China-Brazil Relations Studies,” “Studies on Cities,” and “Studies on Heritage and Memory.” The current national and international context has motivated new theoretical and analytical perspectives related to these research lines: regarding violence in the countryside and in the city; decision-making processes and workers’ rights; gender violence and conservatism; memory as a political process, among others. Such research focus, with a clear international interface, resulted in partnerships developed by the PGPSS professors, such as the one that involves the research “Co-production of knowledge on gender and sexuality in Brazil: activism and relations with science,” in partnership with the University of Massachusetts, City University of New York (CUNY), and Universidad Nacional Autónoma de México (UNAM); “Violence, gender, and boundaries of sexuality: from the consolidation of rights to public abuses and intolerance,” in partnership with Columbia University; and “RRI-Practice: Responsible Research and Innovation in practice,” in partnership with the Oslo Metropolitan University. It is expected that such project will benefit these partnerships, as well as give rise to new arrangements. It should be highlighted that, due to the global scope of the issue, research on this theme are of international and comparative nature, so they can be potentiated by the PRINT. In this sense, face the challenges posed to democracy in the 21st century – representation dilemmas, new forms of political engagement and vindications languages, issues posed by the diversity, among others, which can be summed up in the idea of rights, equality, citizenship, and social justice – it is crucial that we seek to deepen the understanding of new dynamics and challenges of democratic processes.

Postgraduate Program 3 – SOCIOLOGY

Capes evaluation (2017 evaluation grade) – 6

Justification – Democracy and its conceptual and social developments have been a central theme in the Humanities. The Graduation Programs involved here have a long tradition of comparative multidisciplinary studies on the issue, result of already consolidated international partnerships such as, for example, “The Comparative Study of Electoral Systems Project” in partnership with the Michigan University; “Co-production of knowledge on gender and sexuality in Brazil: activism and relations with science, “in partnership with the University of Massachusetts, City University of New York (CUNY), and the Universidad Nacional Autónoma de México (UNAM); Chair Roberto Cardoso de Oliveira, a bi-national agreement with the Centro de Investigaciones y Estudios Superiores en Antropología Social (CIESAS-Mexico); “Innovation in methods and ethics: digital ethnography and vulnerable communities” with the University of Leicester (United Kingdom), RMIT University, and UNSW SIDNEY; “Violence, gender, and boundaries of sexuality: from the consolidation of rights to public abuses and intolerance,” in partnership with Columbia University. The INCT/Ineu is a research network that integrates dozens of researchers from North American, Latin-American, and European universities. Such partnerships can be deepened, and the goal of this project is to make new international partnerships. It should be highlighted that, due to the global scope of the issue, research on this theme are of international and comparative nature, so they can be potentiated by the PRINT. In this sense, face the challenges posed to democracy in the 21st century – representation dilemmas, new forms of political engagement and vindications languages, issues posed by the diversity, among others, which can be summed up in the idea of rights, equality, citizenship, and social justice – it is crucial that we seek to deepen the understanding of new dynamics and challenges of democratic processes. In all these debates, sociology has an extensive theoretical and methodological arsenal that will be mobilized in the collective development of this research.

Postgraduate Program 4 – INTERNATIONAL RELATIONS (UNESP – UNICAMP – PUC-SP)

Capes evaluation (2017 evaluation grade) – 5

Justification – Democracy and its conceptual and social developments have been a central theme in the Humanities. The Interinstitutional Postgraduate Program in International Relations San Tiago Dantas has a long tradition of comparative interdisciplinary studies on issues in the international sphere, both in hemispheric as in global terms. The program may benefit from international partnerships already consolidated by the other programs in the proposal, such as, for example, “The Comparative Study of Electoral Systems Project” in partnership with the Michigan University; “Co-production of knowledge on gender and sexuality in Brazil: activism and relations with science, “in partnership with the University of Massachusetts, City University of New York (CUNY), and the Universidad Nacional Autónoma de México (UNAM); Chair Roberto Cardoso de Oliveira, a bi-national agreement with the Centro de Investigaciones y Estudios Superiores en Antropología Social (CIESAS-Mexico); “Innovation in methods and ethics: digital ethnography and vulnerable communities” with the University of Leicester (United Kingdom), RMIT University, and UNSW SIDNEY; “Violence, gender, and boundaries of sexuality: from the consolidation of rights to public abuses and intolerance,” in partnership with Columbia University.

Professors in the Program are part of the INCT/Ineu, which is a research network that integrates dozens of researchers from North American, Latin-American, and European universities. Such partnerships can be deepened, and the goal of this project is to make new international partnerships. It should be highlighted that, due to the global scope of the issue, research on this theme are of international and comparative nature, so they can be potentiated by the PRINT. In this sense, face the challenges posed to democracy in the 21st century – democracy problems in multilateral institutions, representation dilemmas, new forms of political engagement and vindications languages, issues posed by the diversity, among others, which can be summed up in the idea of rights, equality, citizenship, and social justice – it is crucial that we seek to deepen the understanding of new dynamics and challenges of democratic processes.

Postgraduate Program 5 – SOCIAL ANTHROPOLOGY

Capes evaluation (2017 evaluation grade) – 5

Justification – Democracy and its conceptual and social developments have been a central theme in the Humanities. In the case of Anthropology, this theme was studied mainly in the second half of the 20th century along with discussions on nation, nationalism, and State as central issues in the study of the so-called “complex societies”. In this period, the developments are also methodological, since the anthropologists focus on their own societies. The Graduation Program in Social Anthropology has a long tradition of comparative multidisciplinary studies on the issue, result of already consolidated international partnerships such as, for example, “Co-production of knowledge on gender and sexuality in Brazil: activism and relations with science, “in partnership with the University of Massachusetts, City University of New York (CUNY), and the Universidad Nacional Autónoma de México (UNAM); Chair Roberto Cardoso de Oliveira, a bi-national agreement with the Centro de Investigaciones y Estudios Superiores en Antropología Social (CIESAS-Mexico); “Innovation in methods and ethics: digital ethnography and vulnerable communities” with the University of Leicester (United Kingdom), RMIT University, and UNSW SIDNEY; “Violence, gender, and boundaries of sexuality: from the consolidation of rights to public abuses and intolerance,” in partnership with Columbia University. The INCT/Ineu is a research network that integrates dozens of researchers from North American, Latin-American, and European universities. Such partnerships can be deepened, and the goal of this project is to make new international partnerships. It should be highlighted that, due to the global scope of the issue, research on this theme are of international and comparative nature, so they can be potentiated by the PRINT. In this sense, face the challenges posed to democracy in the 21st century – representation dilemmas, new forms of political engagement and vindications languages, issues posed by the diversity, among others, which can be summed up in the idea of rights, equality, citizenship, and social justice – it is crucial that we seek to deepen the understanding of new dynamics and challenges of democratic processes.

Theme 6 - Difference, diversity and inequality

Postgraduate Program 1 – POLITICAL SCIENCE

Capes evaluation (2017 evaluation grade) – 6

Justification – Difference, diversity, and inequality are central themes in Political Science. The struggle for expanding citizenship rights, the role of social movements, processes of difference production, class relations, and the impact of these phenomena in the relationship between civil society and State in the construction of State are important objects to Political Science. This research agenda on difference, diversity, and inequality has an international character since the subjects and social groups that fight for rights, memory, and respect for differences do traffic and sympathize with each other in a transnational scenario. Through this project, the Postgraduate Program in Political Science of Unicamp aims to strengthen and create new international partnerships for the development of research on the topic.

Postgraduate Program 2 – SOCIAL ANTHROPOLOGY

Capes evaluation (2017 evaluation grade) – 5

Justification – The theme of difference and diversity has been both central and raw material of anthropological analyses since the institutionalization of the subject. On the other hand, the Ethnography, method par excellence of Anthropology, is based on the difference, which is central for the comparative and relational exercise of the subject, taking 'otherness' as its starting point. This project aims to discuss, in a comparative and international perspective, the processes of difference production that are inscribed in social relations of power and institute norms and hierarchies, which relate to social inequality experiences. From this statement, the axes of projects we have already developed and with which we intend to expand partnerships are: studies on the shifts of meaning of State relations and rural and city workers; analyses on the nation reconfigurations and the global cultural processes involving tastes, distinction, and identities among social collectives; groups in social vulnerability situations due to migration processes, eviction or expropriation and exploration of their territories, gender and ethnic discrimination; studies on social production of science; intellectual trajectories and politic-intellectual activism in a historical perspective; social and ethnic movements; political, economic, and cultural articulations among countries; themes related to youth, social use of technologies, anthropological aspects of environment studies, and conflicts. On the one hand, these processes can be mobilized by dynamics related to prejudice, intolerance, discrimination, and violence. On the other hand, as shown by Anthropology, the boundaries of the "other" can also point to the coexistence between different experiences, become political resources of groups that claim for equality, reinforce subject and belonging positions in the defense of social and cultural diversity, rescue the memory of local folks and cultures that produce direct effects in education, public policies, and social movements. The research agenda of anthropology regarding difference, diversity, and inequality has an international character since the subjects and social groups that fight for rights, memory, and respect for differences do traffic and sympathize with each other in a transnational scenario. The topics of the project intimately dialogue with the priority theme chosen.

Postgraduate Program 3 – SOCIOLOGY

Capes evaluation (2017 evaluation grade) – 6

Justification – This project aims to discuss, in a comparative perspective and with international partners, the processes of difference production that are inscribed in social relations of power and institute norms and hierarchies, which relate to social inequality experiences. From this statement, the axes of projects we have already developed in the area of sociology and with which we intend to expand partnerships are: studies on work relations in different countries, observing the shifts of meaning of work, State, and rural and city workers relations; analyses on the reconfigurations of the idea of nation and global cultural processes involving tastes, distinction, and identities among groups and social classes; groups in social vulnerability situations due to migration processes, eviction or expropriation and exploration of their territories, gender and ethnic discrimination; studies on social thinking, public intellectuals, and comparison of their politic-intellectual activism in a historical perspective; social and ethnic movements; political, economic, and cultural articulations among the countries within BRICS; themes related to youth, social use of technologies, sociological aspects of environment studies, and conflicts of the contemporary world. On the one hand, these processes can be mobilized by dynamics related to prejudice, intolerance, discrimination, and violence. On the other, as the humanities in general, and sociology in particular, strive to demonstrate, the borders that delimit the "other" can also point to the cohabitation of different experiences, become political resources for groups that demand equality, reinforce the subjects' positions and feelings of belonging from a perspective of defense of social and cultural diversity, rescue the memory of peoples and of the various local and global cultures that produce direct effects on education, public policies, and social movements. This sociology research agenda on difference, diversity, and inequality has an international character since the subjects and social groups that fight for rights, memory, and respect for differences do traffic and sympathize with each other in a transnational scenario. The topics of the project, both in a historical perspective and in empirical and contemporary investigations, intimately dialogue with the priority theme chosen.

Postgraduate Program 4 – HISTORY TEACHING

Capes evaluation (2017 evaluation grade) – 4

Justification – The project will give us conditions, not only to strengthen, but also to expand the program internationalization initiatives, through a topic – "Difference, Diversity, and Inequality" – which is essential in research developed within the Postgraduate Studies in History at Unicamp. We even have already consolidated partnerships in effect, which fall specifically within the chosen priority theme, such as the co-tutelage agreement with the Rice University, focused in ethnic relations in the colonial and post-colonial world, or the agreement with the Getty Institute under the program Connecting Art Histories, with the purpose of consolidating the research area in non-European art at Unicamp. The existence of different focal areas in the Program (Politics, Memory and Cities, Social History, Cultural History, History of Art, History Teaching) enhances the effects and contributions included in this project because all areas establish a common bond around the issues related to diversity and cultural transits. In fact, the main topics developed within the research groups of the programs have a direct relation with themes related to difference and diversity, such as, for example, religiosity, gender relations, visual

culture, classical tradition, non-European arts and culture, urban culture, political languages, social movements, and slavery.

Postgraduate Program 5 – PHYSICAL EDUCATION

Capes evaluation (2017 evaluation grade) – 4

Justification – Bodily practices as cultural representations, such as games, dances, gymnastics, sports, fights, among others, are part, in contemporary times, of spare time occupation and body education. Such practices, observed in times and spaces through the materialization of public initiatives, are the target of actions, recognized as legitimate, for a population regarded as homogenous. However, this population resists and adheres to such process, producing hybrids and other social settings. Anchored in the Humanities, this study proposes international dialogue to discuss how such practices are built and how they relate to the production of differences, diversities, and inequalities.

Postgraduate Program 6 – SOCIAL SCIENCES

Capes evaluation (2017 evaluation grade) – 4

Justification – The theme of Difference, Diversity, and Inequality is central to Social Sciences, being approached from a very productive dialogue between Sociology, Anthropology, and Political Science approaches. The Social Sciences have been responsible for a contribution of great social and academic relevance on the topic. We have already developed an important range of projects on the theme, in conjunction with our research lines and covering: studies on work relations in different countries, observing the shifts of meaning in work, State, and rural and city workers relations; inequality and prejudice, violence and discrimination linked to gender and sexuality, and their intersections with other categories, such as race, gender, social class; preservation of historical and cultural heritage in inequality contexts; political, economic, and cultural articulations among the countries within BRICS; conflicts and violence in the rural areas and cities, among others. This is an eminently international research agenda since the historical context that characterizes the emergence of disputes for the recognition of difference is not only post-colonial but also characterized by an intense cultural transit. The Postgraduate Program in Social Sciences has actively participated in this agenda, as shown, for example, in some of the research projects with international interface we have been developing, such as the project “Work in Brazil and France: meaning of the changes and changes of meaning,” in partnership with the Centre de Recherches Sociologiques et Politiques de Paris, which aims to understand the production of inequalities from changes in the working universe. This is a theme in which we have accumulated important research experience, which shall be deepened in the year to come.

Postgraduate Program 7 – LINGUISTICS

Capes evaluation (2017 evaluation grade) – 7

Justification – Language, in its different expressions, is part of the production, reproduction, and transformation of social representations that impact both the evolution and acquisition of language itself as the social practices of exclusion/inclusion in the societies where such takes place. The project

examines the construction of difference, diversity, and inequality that takes place in and from human language. It considers aspect both from the language itself as from the power relations in it, as pointed out in the description of theme 10, norms and hierarchies, which act in the production of identity and differences.

Postgraduate Program 8 – HISTORY

Capes evaluation (2017 evaluation grade) – 6

Justification – The project will give us conditions, not only to strengthen, but also to expand the program internationalization initiatives, through a topic – "Difference, Diversity, and Inequality" – which is essential in research developed within the Postgraduate Studies in History at Unicamp. We even have already consolidated partnerships in effect, which fall specifically within the chosen priority theme, such as the co-tutelage agreement with the Rice University, focused in ethnic relations in the colonial and post-colonial world, or the agreement with the Getty Institute under the program Connecting Art Histories, with the purpose of consolidating the research area in non-European art at Unicamp. The existence of different focal areas in the Program (Politics, Memory and Cities, Social History, Cultural History, History of Art, History Teaching) enhances the effects and contributions included in this project because all areas establish a common bond around the issues related to diversity and cultural transits. In fact, the main topics developed within the research groups of the programs have a direct relation with themes related to difference and diversity, such as, for example, religiosity, gender relations, visual culture, classical tradition, non-European arts and culture, urban culture, political languages, social movements, and slavery.

Theme 7 - Methodology, epistemology and language

Postgraduate Program 1 – LINGUISTICS

Capes evaluation (2017 evaluation grade) – 7

Justification – It is noteworthy that the proper epistemological investigation to the Humanities is still necessary (including for a better definition of its concept of science, limits, progress, evaluation forms) worldwide. In this project, several areas of Linguistics (in association with other fields) engage in the epistemological reflection on methodologies adopted in language studies, electing specific themes and methods for its knowledge area, and linking itself to one or more international reference centers in the respective field. Thus, the project aims to increase the epistemological research that is proper and relevant to Language Sciences, to contribute to the knowledge theory developed by the Humanities in general.

Postgraduate Program 2 – SOCIAL SCIENCES

Capes evaluation (2017 evaluation grade) – 4

Justification – The Postgraduate Program in Social Sciences has excelled throughout its history due to the focus on an interdisciplinary project of knowledge, which strongly values the analytical cutouts set in

the disciplinary borders of Social Sciences. The thematic axis will allow deepening the multidisciplinary debate already developed in the PGPSS, enabling the increment of the international dialogue around the theme. Reflection around classical methods of the Social Sciences and around innovative experiences should cover all the research lines of the PGPSS, which have produced studies involving the use of demographic sources; the performance of ethnographies in files, images, and digital environments, among others; the application of surveys in international contexts; the production of data on kinship networks, among others. The methods have been the subject of continuous reflection in the PGPSS have allowed the production of knowledge in different scales, from the most reduced to the most comprehensive ones. The combination of qualitative and quantitative methods encouraged within the Program, given its interdisciplinary calling, allows the realization of highly innovative research, which have benefited from the international dialogue provided by the insertion of our faculty and students into international networks of knowledge production. The realization of the project will allow increasing this international dialogue, enabling the debate between leading-edge initiatives in research in Social Sciences and the development of partnerships in Brazil and abroad, thus strengthening the internationalization process of Brazilian human sciences. Also, the project will contribute to the dissemination of studies developed in the PGPSS.

Postgraduate Program 3 – DEMOGRAPHICS

Capes evaluation (2017 evaluation grade) – 6

Justification – This project will bring together ten Postgraduate programs of the IFCH. Such multidisciplinary collaboration will allow the debate in the diversity of techniques and methods in the Humanities and will develop, between the students and researchers involved, an expanded perspective of the impacts produced by new ways of analyzing the social world. The focus on Experimental methods in Social Sciences, Population Projections and multilevel Analysis, and Theory of Games will be central, for example, for analysis on the perception of voters and projections of the target population in public services and social programs. It will also allow developing research regarding income-transfer policies and its cutouts, enabling an epistemological reflection about causality. Methods of Historical Analysis of Events, Sources, and Archives; Public History and Ethnography in Archives; and Ethnography of Images and Spellings allow studying biographic elements with statistical models and address research designs with the collection of longitudinal data. On the other hand, they allow the study of large-scale processes and generalizing responses on public policies and economic development. In addition, the debate on the source status and the knowledge produced by the research in archives is emphasized, as well as the production of memory. The study and teaching of Digital Ethnology and Digital History methods lies in the relationship between ethnography and digital technologies, focusing on the creative use of digital technologies for compilation and analysis of ethnographic data and in the importance of the ethical reflection in digital ethnographic studies. Kinship networks, in turn, have been the focus of the application of computational analysis in anthropology from the use of technological tools developed in collaboration with different countries. The graph theory has expanded the possibilities of identifying diverse phenomena, allowing the computer treatment of kinship data and connecting the analysis of genealogical and marriage structures with wider relational data. Beyond the intellectual exchange, the

project will make it possible to establish networks among the participant researchers, enabling the development of partnerships in Brazil and abroad, thus fostering the internationalization process of Brazilian human sciences. Also, the project will contribute to the dissemination of studies developed in the institute.

Postgraduate Program 4 – HISTORY

Capes evaluation (2017 evaluation grade) – 6

Justification – This project will bring together ten Postgraduate programs of the IFCH. Such multidisciplinary collaboration will allow the debate in the diversity of techniques and methods in the Humanities and will develop, between the students and researchers involved, an expanded perspective of the impacts produced by new ways of analyzing the social world. The focus on Experimental methods in Social Sciences, Population Projections and multilevel Analysis, and Theory of Games will be central, for example, for analysis on the perception of voters and projections of the target population in public services and social programs. It will also allow developing research regarding income-transfer policies and its cutouts, enabling an epistemological reflection about causality. Methods of Historical Analysis of Events, Sources, and Archives; Public History and Ethnography in Archives; and Ethnography of Images and Spellings allow studying biographic elements with statistical models and address research designs with the collection of longitudinal data. On the other hand, they allow the study of large-scale processes and generalizing responses on public policies and economic development. In addition, the debate on the source status and the knowledge produced by the research in archives is emphasized, as well as the production of memory. The study and teaching of Digital Ethnology and Digital History methods lies in the relationship between ethnography and digital technologies, focusing on the creative use of digital technologies for compilation and analysis of ethnographic data and in the importance of the ethical reflection in digital ethnographic studies. Kinship networks, in turn, have been the focus of the application of computational analysis in anthropology from the use of technological tools developed in collaboration with different countries. The graph theory has expanded the possibilities of identifying diverse phenomena, allowing the computer treatment of kinship data and connecting the analysis of genealogical and marriage structures with wider relational data. Beyond the intellectual exchange, the project will make it possible to establish networks among the participant researchers, enabling the development of partnerships in Brazil and abroad, thus fostering the internationalization process of Brazilian human sciences. Also, the project will contribute to the dissemination of studies developed in the institute.

Postgraduate Program 5 – HISTORY TEACHING

Capes evaluation (2017 evaluation grade) – 4

Justification – This project will bring together ten Postgraduate programs of the IFCH. Such multidisciplinary collaboration will allow the debate in the diversity of techniques and methods in the Humanities and will develop, between the students and researchers involved, an expanded perspective of the impacts produced by new ways of analyzing the social world. The focus on Experimental methods in Social Sciences, Population Projections and multilevel Analysis, and Theory of Games will be central,

for example, for analysis on the perception of voters and projections of the target population in public services and social programs. It will also allow developing research regarding income-transfer policies and its cutouts, enabling an epistemological reflection about causality. Methods of Historical Analysis of Events, Sources, and Archives; Public History and Ethnography in Archives; and Ethnography of Images and Spellings allow studying biographic elements with statistical models and address research designs with the collection of longitudinal data. On the other hand, they allow the study of large-scale processes and generalizing responses on public policies and economic development. In addition, the debate on the source status and the knowledge produced by the research in archives is emphasized, as well as the production of memory. The study and teaching of Digital Ethnology and Digital History methods lies in the relationship between ethnography and digital technologies, focusing on the creative use of digital technologies for compilation and analysis of ethnographic data and in the importance of the ethical reflection in digital ethnographic studies. Kinship networks, in turn, have been the focus of the application of computational analysis in anthropology from the use of technological tools developed in collaboration with different countries. The graph theory has expanded the possibilities of identifying diverse phenomena, allowing the computer treatment of kinship data and connecting the analysis of genealogical and marriage structures with wider relational data. Beyond the intellectual exchange, the project will make it possible to establish networks among the participant researchers, enabling the development of partnerships in Brazil and abroad, thus fostering the internationalization process of Brazilian human sciences. Also, the project will contribute to the dissemination of studies developed in the institute.

Postgraduate Program 6 – INTERNATIONAL RELATIONS (UNESP – UNICAMP – PUC-SP)

Capes evaluation (2017 evaluation grade) – 5

Justification – This project will bring together ten Postgraduate programs of the IFCH. Such multidisciplinary collaboration will allow the debate in the diversity of techniques and methods in the Humanities and will develop, between the students and researchers involved, an expanded perspective of the impacts produced by new ways of analyzing the social world. The focus on Experimental methods in Social Sciences, Population Projections and multilevel Analysis, and Theory of Games will be central, for example, for analysis on the perception of voters and projections of the target population in public services and social programs. It will also allow developing research regarding income-transfer policies and its cutouts, enabling an epistemological reflection about causality. Methods of Historical Analysis of Events, Sources, and Archives; Public History and Ethnography in Archives; and Ethnography of Images and Spellings allow studying biographic elements with statistical models and address research designs with the collection of longitudinal data. On the other hand, they allow the study of large-scale processes and generalizing responses on public policies and economic development. In addition, the debate on the source status and the knowledge produced by the research in archives is emphasized, as well as the production of memory. The study and teaching of Digital Ethnology and Digital History methods lies in the relationship between ethnography and digital technologies, focusing on the creative use of digital technologies for compilation and analysis of ethnographic data and in the importance of the ethical reflection in digital ethnographic studies. Kinship networks, in turn, have been the focus of

the application of computational analysis in anthropology from the use of technological tools developed in collaboration with different countries. The graph theory has expanded the possibilities of identifying diverse phenomena, allowing the computer treatment of kinship data and connecting the analysis of genealogical and marriage structures with wider relational data. Beyond the intellectual exchange, the project will make it possible to establish networks among the participant researchers, enabling the development of partnerships in Brazil and abroad, thus fostering the internationalization process of Brazilian human sciences. Also, the project will contribute to the dissemination of studies developed in the institute.

Postgraduate Program 7 – SOCIOLOGY

Capes evaluation (2017 evaluation grade) – 6

Justification – The Sociology program joins the other graduate programs of IFCH in a multidisciplinary collaboration that will allow the debate about the diversity of techniques and methods of Human Sciences, developing between students, professors and researchers an extended perspective of the impacts produced by the new ways of analyzing the social world. Sociology is characterized as an area of continuous reflection on the possibilities of knowledge and the relationship between theory and research techniques. Since its founders, such as Weber and Durkheim, this concern is central and marks all the development of the area, until today. It is with this accumulated knowledge that the area will collaborate with this project, in dialogue with the other fields of knowledge for the development of methods of research analysis. Below we present some examples of methods deployed by sociology in dialogue with other areas and that will be a research object in this project. Experimental Methods in Social Sciences, Population Projections, Multilevel Analysis and Game Theory are focused on the analysis of voters' perception and projections of population subject to public services and social programs such as cash transfer. Methods of Historical Analysis of Events, Sources and Archives; Public History and Ethnography in Archives and Ethnography of Images and Spellings allow studying biographic elements with statistical models and address research designs with collection of longitudinal data. On the other hand, they allow the study of large-scale processes and generalizing responses on public policies and economic development. In addition, the debate about the source status is emphasized, as well as the knowledge produced by the research in archives and the production of memory. The study and teaching of Digital Ethnology and Digital History methods lies in the relationship between ethnography and digital technologies, focusing on the creative use of digital technologies for compilation and analysis of ethnographic data and on the importance of the ethical reflection on digital ethnographic studies. Beyond the intellectual exchange, the project will enable the establishment of networks among the participant researchers and the development of partnerships in Brazil and abroad, thus fostering the internationalization process of Brazilian human sciences. The Project will contribute to the disclosure of the studies carried out at the institute.

Postgraduate Program 8 – PHILOSOPHY

Capes evaluation (2017 evaluation grade) – 6

Justification – This project is structured in three conceptual marks directly linked to the three elements of the Priority Theme No. 11. The conceptual mark “Metaphysics, Predication, and Philosophy of Nature” is clearly associated with the element Epistemology since it integrates research of the Postgraduate Program that deals with the Aristotle notion of scientific knowledge and Aristotelianism, as well as their importance for the philosophical debate of the beginning of modernity. The theoretical mark “The Historical Heritage of Ethics and of Contemporary Political Thinking” is linked to the topic Methodology, by investigating the contemporary appropriation of Practical Philosophy concepts, such as popular sovereignty and representation. Finally, the mark “Logic and Language” investigates linguistic acts, notions of belief and knowledge, and the theory of probability.

Postgraduate Program 9 – ENVIRONMENT AND SOCIETY

Capes evaluation (2017 evaluation grade) – 6

Justification – This project will bring together ten Postgraduate programs of the IFCH. Such multidisciplinary collaboration will allow the debate in the diversity of techniques and methods in the Humanities and will develop, between the students and researchers involved, an expanded perspective of the impacts produced by new ways of analyzing the social world. The focus on Experimental methods in Social Sciences, Population Projections and multilevel Analysis, and Theory of Games will be central, for example, for analysis on the perception of voters and projections of the target population in public services and social programs. It will also allow developing research regarding income-transfer policies and its cutouts, enabling an epistemological reflection about causality. Methods of Historical Analysis of Events, Sources, and Archives; Public History and Ethnography in Archives; and Ethnography of Images and Spellings allow studying biographic elements with statistical models and address research designs with the collection of longitudinal data. On the other hand, they allow the study of large-scale processes and generalizing responses on public policies and economic development. In addition, the debate on the source status and the knowledge produced by the research in archives is emphasized, as well as the production of memory. The study and teaching of Digital Ethnology and Digital History methods lies in the relationship between ethnography and digital technologies, focusing on the creative use of digital technologies for compilation and analysis of ethnographic data and in the importance of the ethical reflection in digital ethnographic studies. Kinship networks, in turn, have been the focus of the application of computational analysis in anthropology from the use of technological tools developed in collaboration with different countries. The graph theory has expanded the possibilities of identifying diverse phenomena, allowing the computer treatment of kinship data and connecting the analysis of genealogical and marriage structures with wider relational data. Beyond the intellectual exchange, the project will make it possible to establish networks among the participant researchers, enabling the development of partnerships in Brazil and abroad, thus fostering the internationalization process of Brazilian human sciences. Also, the project will contribute to the dissemination of studies developed in the institute.

Postgraduate Program 10 – SOCIAL ANTHROPOLOGY

Capes evaluation (2017 evaluation grade) – 5

Justification – This project is the result of a multidisciplinary collaboration that has been central for Social Anthropology research dealing with specific methodologies, such as those concerning Ethnography, method par excellence of the Anthropology. Such collaboration will allow the debate in the diversity of techniques and methods in the Humanities and will develop, between the students and researchers involved, an expanded perspective of the impacts produced by new ways of analyzing the social world. The focus on Experimental methods in Social Sciences, Population Projections and multilevel Analysis, and Theory of Games will be central, for example, for analysis on the perception and representation of diverse social collectives regarding public services and social programs. It will also allow developing research regarding income-transfer policies and its cutouts, enabling an epistemological reflection about causality, a topic that has been the foundation of Social Anthropology in the reflection about the social production of thinking categories and perception of reality. Methods of Historical Analysis of Events, Sources, and Archives; Public History and Ethnography in Archives; and Ethnography of Images and Spellings allow studying biographic elements with statistical models, but also addressing research designs with the collection of longitudinal data. In addition, the debate on the source status and the knowledge produced by the research in archives is emphasized, as well as the production of memory. The study and teaching of Digital Ethnology and Digital History methods lies in the relationship between ethnography and digital technologies, focusing on their creative use for compilation and analysis of ethnographic data and in the importance of the ethical reflection in digital ethnographic studies. Kinship networks have been the focus of the application of computational analysis in anthropology from the use of technological tools developed in collaboration with different countries. The graph theory has expanded the possibilities of identifying diverse phenomena, allowing the computer treatment of kinship data and connecting the analysis of genealogical and marriage structures with wider relational data. Beyond the intellectual exchange, the project will make it possible to establish networks among the participant researchers, enabling the development of partnerships in Brazil and abroad.

Postgraduate Program 11 – POLITICAL SCIENCE

Capes evaluation (2017 evaluation grade) – 6

Justification – New technologies and the development of research agendas in Political Science have led to the diversification of the methodologies applied to the field. New research techniques, many of them based on computational innovation, has brought enormous gains to the quality of research allowing for new ways to analyze the social world. The focus on experimental methods in Political Science; big data; webscraping techniques, among others, allow the production of their own datum, expanding significantly the possibilities of research in the field. Through this project we will enhance both the teaching methodology and the intellectual exchange. The project will enable the establishment of networks among participant researchers and the development of partnerships in Brazil and abroad, thus increasing the internationalization process of Brazilian Political Science. The Project will contribute to the disclosure of the studies carried out at the institute.

Theme 8 - State, policies and education

Postgraduate Program 1 – EDUCATION

Capes evaluation (2017 evaluation grade) – 5

Justification – The researchers participating in this proposal are present in different research groups, gathered together in several Research Lines of the PGPE, developing studies and research on education public policies, with emphasis on relations between State and Society in the constitution of humanity throughout history.

Postgraduate Program 2 – PHYSICAL EDUCATION

Capes evaluation (2017 evaluation grade) – 4

Justification – Sport stands in a multiple understanding and a representative, aggregator, synthesizer, and unifier concept for different dimensions (Bento, 2006). As such, it requires reflection and actions in an interdisciplinary perspective, enabling the development of public policies aligned to the sports management, contributing to the training of teacher/coach and student/athlete. Sports Pedagogy, from the Humanities, investigates the organization, systematization, application, and evaluation of sporting practices in their different contexts. In short, the research line investigates pedagogical processes and their systematizations, teaching methodologies, and the didactical intervention of the teacher/coach as process manager.

Theme 9 - Genomics, Metabolomics and Proteomics

Postgraduate Program 1 – PLANT BIOLOGY

Capes evaluation (2017 evaluation grade) – 7

Justification – The Postgraduate Program in Plant Biology of Unicamp (PGP/PB) has 31 professors and is a reference in its field, achieving a grade seven in the last CAPES evaluation. One of the reasons for the PGP/PB success was the internationalization strategies developed over the last few decades, with the establishment of collaborations with researchers from institutions abroad in areas at the borders of knowledge, such as Proteomics and Metabolomics, exchange of professors and students, and publications of manuscripts in high-impact international journals. The qualitative indicators of the PGP/PB show that it is attractive not only to Postgraduate students from other countries but also to young researchers and renowned professors seeking internationalized environments to develop their projects. All faculty signings carried out in recent years considered the international experience of the candidates. Such an environment has been attracting foreign professors to apply to the available positions, in addition to routinely receiving visits of foreign professors and researchers. The number of co-tutelage agreements has also been growing, and other institutions with which the PGP/PB faculty already collaborated for many years are inserted in this project, such as the Wageningen University –

Netherlands, o INRA Versailles - France, and the Max Planck Institute of Molecular Plant Physiology, should be agreed in the future.

Postgraduate Program 2 – MEDICAL SCIENCES

Capes evaluation (2017 evaluation grade) – 4

Justification – The need for international partnership in this project is because international collaborators are working with biological samples of patients and implemented routine analysis for outpatients; in a near future, international partnerships may lead to a pharmacogenetic analysis of patients, to improve the chemotherapy treatment. Exchange of experiences in implementing the analysis, as well as the experience in diminishing the cost of them, will bring direct benefits to both research and care.

Postgraduate Program 3 – SURGICAL SCIENCES

Capes evaluation (2017 evaluation grade) – 4

Justification – Project with ongoing international collaboration, for which the exchange of students, researchers, and professors will be necessary, to improve new laboratory, data collection, and result analysis techniques.

Postgraduate Program 4 – INTERNAL MEDICINE

Capes evaluation (2017 evaluation grade) – 5

Justification – The Unicamp Blood Center has an extensive scientific production, with high dedication to research, many of them developed with various international collaborations. One of the major partners of the Blood Center is the Queen's University, Canada, one of the leading universities in studies on molecular and functional investigation of blood clotting and in the development of new therapeutic technologies, such as gene therapy and the next-generation sequencing, aimed not only to hemostasis disorders but also to thromboembolic and onco-hematological diseases. Other important collaborations are with researchers from the King's College London and from universities in Switzerland and Japan, who develop genomic, metabolomic, and proteomic studies to verify the response markers to the use of dendritic cell vaccines with antigens of bone marrow neoplasms. The CAPES Print Program should raise the chance of strengthening these ties through researchers training and visits, having a great impact on the scientific development of our institution, in addition to providing an important advancement in the investigation and treatment of Brazilian patients.

Postgraduate Program 5 – ANIMAL BIOLOGY

Capes evaluation (2017 evaluation grade) – 5

Justification – The proposed project fits one of the focal areas of the Postgraduate Program, called 'Anthropic Relations, Environment, and Parasitology.' The research lines included are focused on the study of parasitism as a biological phenomenon of association between organisms and with the environment, so one can understand the morphological, physiological, nutritional, and behavioral adaptations for the parasite survival within the host and, in many cases, also for their vectors. This

binding is pertinent to the subject since the use of omic tools will provide the breakthrough in identifying pathogenesis markers and possible targets to be validated as essential for the development of active molecules against parasites, vaccine candidates, and new diagnostic approaches. Such proposal is of paramount importance since there is an increase in the number of cases of various parasitic infections, considered emerging or re-emerging, affecting both the national as the world population. The field of molecular epidemiology also consists of an area of broad interest in this proposal.

Postgraduate Program 6 – FUNCTIONAL AND MOLECULAR BIOLOGY

Capes evaluation (2017 evaluation grade) – 6

Justification – The Postgraduate Program in Functional and Molecular Biology (FMB) of UNICAMP has always been among the best Postgraduate Programs in the areas of Physiology and Biochemistry in the country. In these almost 20 years of existence, the PGP-FMB has trained professionals working in several areas of the Physiological and Biochemical Sciences. Many Postgraduates have been fundamental in the nucleation of new research groups within and outside the country, including the very Institute of Biology of Unicamp. Nevertheless, the PGP-FMB has a strong international character, establishing partnerships with universities in the USA, Europe, and several countries in Latin America and other continents. The result of this can be seen the quality of the scientific production, which has been growing over the past few years, both in the number of patents and the own infrastructure of our Institute. Therefore, this project aims to strengthen the links with universities worldwide on the study of themes related to Physiology and Biochemistry. It is worth mentioning that the PGP-FMB is multidisciplinary, including areas such as applied Microbiology, Biotechnology, Neurosciences, Immunology, Nanotechnology, and Molecular Biology, involving studies associated with cardiovascular and metabolic diseases, such as diabetes, obesity, cancer, and hypertension, pain physiology, the physiology and biochemistry of physical exercise, among many others. In this context, our group of professors/researchers have scientific projects of broad inclusion in the country and abroad, focused on systemic, tissue, and molecular changes related to the control of genic, proteic, metabolic, and hormonal expression. Thus, this project fits the theme by addressing molecular, structural, and functional studies associated with biochemical and physiological processes, with emphasis on Genomics, Metabolomics, and Proteomics.

Postgraduate Program 7 – BIOSCIENCES AND BIOACTIVE PRODUCTS TECHNOLOGY

Capes evaluation (2017 evaluation grade) – 4

Justification – The theme integrates data and platforms of different “omics”; use of large-scale data on DNA, RNA, protein, or other metabolites sequences for the generation of new products; generation of knowledge in systemic biology and functional genomics; integration between biology and computer science, and processing of biological data on large scale, which are directly linked to the research lines of the PGP-BBPT.

Postgraduate Program 8 – GENETICS AND MOLECULAR BIOLOGY

Capes evaluation (2017 evaluation grade) – 7

Justification – The proposed project covers all focal areas of the Postgraduate Program in Genetics and Molecular Biology. The research lines to be developed are of enormous relevance both in human health context as in the economic point of view. These lines are aimed at understanding the mechanisms involved in pathogenic microorganisms associated with diseases that affect humans and plants, whereas in the last case the main focus is analyzing factors that impact the productivity of economic-interest plants and the biofuel production. In addition, tumors markers will be investigated, as well as their relationship with the immune system and the relevance of environmental factors (diet and microbiota), aiming at a significant improvement in the quality of life and the aging process.

Postgraduate Program 9 – CELL AND STRUCTURE BIOLOGY

Capes evaluation (2017 evaluation grade) – 6

Justification – "Omic" analyses are very useful in research involving gene expression, signaling pathways, cell proliferation and differentiation.

Postgraduate Program 10 – CLINICAL DENTISTRY

Capes evaluation (2017 evaluation grade) – 7

Justification – This proposal is linked to the priority theme, as some research projects developed in the PGP-DC include the following aspects: 1) Define the genomic and proteomic profile of periodontal tissue cells; 2) Evaluate the role of epigenetic regulation on the osteogenic potential of undifferentiated mesenchymal stem cells and the dental pulp biology; 3) Define the proteomic and metagenomic pattern of patients with aggressive periodontal disease and patients who does not respond to endodontic treatment; and 4) Evaluate the interrelationship between periodontal and endodontic disease, exploring the microbiological etiology. Results of this research will positively contribute to a better understanding of pathological and regenerative processes, enabling the development of new diagnostic tools and new approaches for tissue reconstruction and treatment of periodontal and endodontic diseases.

Postgraduate Program 11 – PHYSICAL EDUCATION

Capes evaluation (2017 evaluation grade) – 4

Justification – Full understanding on the organism functioning is required for a broad biological vision, through System Biology, which, unlike the usual reductionist approaches, seeks a broad and integrated view of systems, metabolic pathways, and their connections, to find a comprehensive response on the functioning of these organisms. The use of "omic" sciences (genomics, proteomics, transcriptomics, and metabolomics), associated with sophisticated analytical technologies, allows a greater global understanding of the organism. Metabolomics identifies and quantifies the metabolites, which are the final products of the cell metabolism and can reproduce the reading of the physiological state of the organism. With that, one may study the changes in metabolites and characterize metabolic profiles in different populations, genders, clinical conditions, or disturbances in the homeostasis of biological systems. Such disturbances can occur due to many factors, such as, for example, the physical exercise,

nutrition, or diseases such as obesity, and, in the field of Physical Education and sports, it has been used to identify new biomarkers, both related to sport performance as to the effect of physical activity in health. These aspects are subject to research linked to two focal areas: “Movement and Sports Biodynamics” and “Adapted Physical Activity”, of the Postgraduate Program in Physical Education at the School of Physical Education. Regarding international partnerships, we have institutional relations with the Universidade de Coimbra, Portugal; in the USA with the Pennington Biomedical Research Center, a world reference center in the area of Genomics and Metabolomics; and in Spain a partnership with the Centro de Excelência in Metabolomica Y Bioanálises (CEMBIO- CEU) of the Universidad San Pablo. We intend to establish new partnerships in the United States, with the Appalachian State University, the University of Texas at Austin (UTA), and the Nova Southeastern University, all classified as universities with “high research activity”.

Postgraduate Program 12 – CHEMISTRY

Capes evaluation (2017 evaluation grade) – 7

Justification – Overall, this proposal describes a series of parallel actions that converge to produce both analytical and chemical tools and approaches as case studies in the diverse areas of the so-called omic sciences. There is no official, formal, and universally accepted definition for this term but, in the scope of this project, it refers to activities that aim to quantitatively and qualitatively characterize sets of genes, proteins, or metabolites that can be associated with certain biological and biochemical functions of organs, cells, or living things. All the planned research involved the study of sets or subsets of these chemical species, either in vivo or in vitro conditions, in addition to the development of chemical techniques for conducting these operations.

Postgraduate Program 13 – PHARMACOLOGY

Capes evaluation (2017 evaluation grade) – 4

Justification – The need for international partnership in this project is because international collaborators are working with biological samples of patients and implemented routine analysis for outpatients; in a near future, international partnerships may lead to a pharmacogenetic analysis of patients, to improve the chemotherapy treatment. Exchange of experiences in implementing the analysis, as well as the experience in diminishing the cost of them, will bring direct benefits to both research and care.

Theme 10 - Study and use of Biodiversity

Postgraduate Program 1 – ECOLOGY

Capes evaluation (2017 evaluation grade) – 7

Justification – The PGP-Ecology of UNICAMP was amongst the first Postgraduate Programs in Ecology in Brazil. In these 42 years of existence, the PGP-Ecology of UNICAMP has formed professionals working in various aspects of understanding and conservation of the Brazilian biodiversity.

Many graduates have been essential in the nucleation of new research groups. Such experience led the PGP-Ecology to be the first course in the area of Biodiversity to get a grade 7 of CAPES. In the last 20 years, the PGP-Ecology has been very active in internationalization activities, establishing partnerships with universities in Europe, the USA, and several countries in Latin America. Recently, these collaborations spread to Asia and Africa, demonstrating the evolution of the internationalization activities of the PGP. This project aims to deepen ties with universities worldwide in the study of biodiversity, in all its aspects. Some professors of the Program study mechanisms behind ecological interactions. Others are studying the community structures and biodiversity patterns whereas some focus on the functioning of tropical ecosystems (Cerrado, Atlantic Forest, and Amazon). Finally, some professors are studying the impact of human activities and climate changes on natural ecosystems and socio-ecologic systems. Therefore, this project fits the theme, by addressing biodiversity in a wider sense.

Postgraduate Program 2 – PLANT BIOLOGY

Capes evaluation (2017 evaluation grade) – 7

Justification – The Postgraduate Program in Plant Biology of Unicamp (PGP/PB) has 31 professors and is a reference in its field, achieving a grade seven in the last CAPES evaluation. One of the reasons for the PGP/PB success was the internationalization strategies developed over the last few decades, with the establishment of collaborations with researchers from institutions abroad, exchange of professors and students, and publications of manuscripts in high-impact international journals. The qualitative indicators of the PGP/PB show that it is attractive not only to Postgraduate students from other countries but also to young researchers and renowned professors seeking internationalized environments to develop their projects. All faculty hirings carried out in recent years considered the international experience of the candidates, which adds to the international expertise of older professors, with an extensive history of international collaboration. Such an environment has attracted foreign professors to apply for vacancies. The PGP/PB also routinely receives visits of foreign professors and researchers. As an example, we can mention the visits of researchers from the University of Western Australia and the University of Missouri, USA, to give courses and participate in collaborative projects. The international experience of PGP/PB professors allows and increasing internationalization of this program. This process can be evidenced by the increasing number of subjects taught in other languages, the number of projects in partnership with foreign institutions, and the significant number of papers published in high-impact international journals. The number of co-tutelage agreements in the Doctorate is also growing and, currently, the PGP/PB keeps students in interuniversity exchange doctorates with Argentina, Australia, and France. Among the universities with an agreement with Unicamp, with which the PGP/PB researchers already maintain collaboration, we highlight the University of Western Australia – Australia, the University of California – USA, and the Freie Universität Berlin – Germany. Other institutions with which the PGP/PB professors already collaborate for many years, such as the Wageningen University – Netherlands and the New York Botanical Garden – USA, should be agreed in the future.

Postgraduate Program 3 – ANIMAL BIOLOGY

Capes evaluation (2017 evaluation grade) – 5

Justification – The proposed project fits one of the focal areas of our Postgraduate Program, called Animal Biodiversity. The research lines to be developed are inserted in a current global scenario, where it is increasingly vital to acknowledge the role of different ecosystems, with emphasis on the biology of their organisms. For that, the phylogenetic and spatial organization patterns exhibited by animals must be known, as well as the evolutionary processes that lead to such patterns, subsidizing the modern systematics. Finally, encouraging the in-depth study of different animal groups in terrestrial and aquatic environments may reflect on the implementation of biodiversity conservation and management policies in our territory.

Postgraduate Program 4 – ANIMAL BIOLOGY

Capes evaluation (2017 evaluation grade) – 5

Justification – The proposed project fits one of the focal areas of our Postgraduate Program, called Animal Biodiversity. The research lines to be developed are inserted in a current global scenario, where it is increasingly vital to acknowledge the role of different ecosystems, with emphasis on the biology of their organisms. For that, the phylogenetic and spatial organization patterns exhibited by animals must be known, as well as the evolutionary processes that lead to such patterns, subsidizing the modern systematics. Finally, encouraging the in-depth study of different animal groups in terrestrial and aquatic environments may reflect on the implementation of biodiversity conservation and management policies in our territory.

Postgraduate Program 5 – ORAL BIOLOGY

Capes evaluation (2017 evaluation grade) – 5

Justification – The relationship between morphology, physiology, and animal and human performances is crucial to establish the structure-function relationship from adaptation hypotheses. One of the most important and common criteria for assessing the hypothesis of environmental adaptation is the evaluation of different energy efficiency designs, implicitly or explicitly incorporating the minimization of energy output that is subject to the selective pressure of the environment. Our understanding on the evolution of bipedalism and human chewing has been revolutionized by energy studies that suggest that the selection to minimize the energy costs of the locomotor system was a driving force in the evolution of specific human features. The relatively elongated ischium of the modern humans, for example, is hypothesized as a way to increase the mechanical advantage of hamstring muscles, thus reducing the energy expenditure during biped walking in human beings when compared to chimpanzees. Despite the potential importance of minimizing energy costs in the evolution of primates and humans, few studies have been done to compare the musculoskeletal design and the energy expenditure in different functional systems, including chewing. Specifically, the relative importance of the energy cost is necessary for understanding the design of feeding, locomotor, masticatory, and swallowing systems that exist in our biodiversity and still remain unknown.

Theme 11 - Energy sources and Energy Matrices: Development, Integration, Sustainability and Technological Innovation

Postgraduate Program 1 – MECHANICAL ENGINEERING

Capes evaluation (2017 evaluation grade) – 5

Justification – Brazil is a country privileged with intense and abundant solar energy and biomass in most of its territory, but the use of that energy is still limited by the high cost of the technologies available. The contribution of biomass, solar energy, and other renewable sources in the Brazilian energy matrix are incipient, considering the several demands that consume large amounts of electrical energy and could be replaced by renewable sources. In addition to meeting the consume peaks, the exploitation of renewable sources offers a number of benefits such as, for example, the reduced use of thermal sources based on fossil fuels and the emission of greenhouse gases. To change this situation, intense operation in research areas and development of new technologies is required, as well as improving the existing technologies, encouraging the population to adopt these alternatives through clarification campaigns, in addition to implementing public policies and tax incentives for domestic users and manufacturers.

Postgraduate Program 2 – FOOD ENGINEERING

Capes evaluation (2017 evaluation grade) – 7

Justification – Brazil is a country privileged with intense and abundant solar energy and biomass in most of its territory, but the use of that energy is still limited by the high cost of the technologies available. The contribution of biomass, solar energy, and other renewable sources in the Brazilian energy matrix are incipient, considering the several demands that consume large amounts of electrical energy and could be replaced by renewable sources. In addition to meeting the consume peaks, the exploitation of renewable sources offers a number of benefits such as, for example, the reduced use of thermal sources based on fossil fuels and the emission of greenhouse gases. To change this situation, intense operation in research areas and development of new technologies is required, as well as improving the existing technologies, encouraging the population to adopt these alternatives through clarification campaigns, in addition to implementing public policies and tax incentives for domestic users and manufacturers.

Postgraduate Program 3 – CHEMICAL ENGINEERING

Capes evaluation (2017 evaluation grade) – 6

Justification – The FCE/UNICAMP proposal under this topic addresses different aspects of the performance of Chemical Engineering professionals, aiming the study of new energy sources and the collection and treatment of essential thermodynamic data for improving the existing processes and proposing new productive technologies. The molecular dynamic and its theoretical basis, the statistical mechanics, put the Thermodynamic research on the borders of what is done today in engineering, whereas the study proposal of developing advanced energy storages based on Lithium-Air technology

is one of the pillars of the priority topic. At the same time, it is known that the generation of high-value co-products is essential for the economic viability of the biodiesel production from microbial oil; therefore, research aiming the development of efficient strains and processes for producing lipids from the cultivation of the unconventional oleaginous yeast *Rhodotorula toruloides* in hemicellulosic hydrolyzes is directly related to the theme of energy matrices.

Postgraduate Program 4 – ELECTRICAL ENGINEERING

Capes evaluation (2017 evaluation grade) – 6

Justification – Electric power systems are undergoing profound changes due to the adoption of new technologies, based in renewable sources, such as wind and solar energy, and alternatives, such as the electric vehicle. However, for such energy sources to be integrated in a way to maximize benefits and minimize adverse impacts, it is necessary that electrical systems become more flexible, with the use of energy storage systems and with a high degree of monitoring, using, for example, the electronic meters with two-way communication and the phasor measurement units synchronized by satellites (GPS). This research project is inserted in the context of integration of these new technologies in electric power systems. It is noteworthy that this integration occurs at all levels of electric power systems, that is, in generations, transmission, and distribution systems, as well as at the premises of end consumers, whether industrial, commercial, residential, or rural. The proponent group is composed of professionals very experienced in the central theme, in the different technologies and integration areas.

Postgraduate Program 5 – PETROLEUM SCIENCES AND ENGINEERING

Capes evaluation (2017 evaluation grade) – 5

Justification – The exploitation of marine environments and their riches present huge challenges, which will only be overcome with great technological advances. At the same time, a vast technological basis was developed over the last few decades for offshore oil activities. This technology allowed overcoming the difficulties of access and operation in the sea, and can also be used, adapted, and improved for the recovering of other marine natural resources. This project aims to use the offshore technology and experience of the field of petroleum and natural gas, seeking to obtain the required innovations and advancements for the rational and sustainable exploitation of energy sources, natural resources, and sea spaces through leading-edge research. Such strategy is an international trend, in which academic research institutions and state and multinational companies participate, many of which originally acting on oil production at the sea, thus having the necessary technology for diverse maritime activities. As part of the vision of future of big international corporations of the oil sector, these companies increasingly invest their efforts and capital in taking advantage of these technologies in the obtainment of energy alternatives and the exploitation of other high value-added resources in the seas. Research groups at Unicamp participated in the development of marine technologies for offshore oil production and are trained to innovate and improve these technologies for the rational and sustainable exploitation of natural maritime resources.

Postgraduate Program 6 – PLANNING OF ENERGY SYSTEMS

Capes evaluation (2017 evaluation grade) – 4

Justification – The reduction of the world dependency on fossil fuels necessarily means a greater use of renewable sources, as well as a more efficient use of energy. However, these options still face technical and economic constraints to be implemented on a large scale, even though renewable energy sources can also lead to great economic and social opportunities. In this sense, bioenergy has been promoted in different countries as a way, not only to enhance energy security, but also to mitigate greenhouse gas emissions (GHG), develop the local economy, and a provide better quality of life in rural areas. On the other hand, the potential of biomass production for bioenergy is not unlimited, and the use of large-scale cultures for bioenergy may cause significant negative impacts, both environmental as socioeconomic. To introduce the biomass in the energy matrix in a competitive and "sustainable" manner, it is essential to quantify the environmental and socioeconomic performance of its supply chain, as well as identifying technological options for the best exploitation.

Theme 12 - Design and development of products and processes

Postgraduate Program 1 – CHEMICAL ENGINEERING

Capes evaluation (2017 evaluation grade) – 6

Justification – The design and development of products and processes has been conducted at the FEQ for nearly five decades, with particular attention to obtaining products from biomass of plants. On this matter, this postgraduate program of FEQ on these theme focuses on several aspects related to: production of bioproducts from lignocellulosic biomass; study of recovery strategies of ionic liquids and deep eutectic solvents (DES) used in biomass pretreatment; development of niobium-based catalysts and processes of xylose dehydration and liquid phase hydrogenation of furfural to obtain platform molecules for chemical synthesis; study of phenolic compounds with antioxidant activity from Brazilian plants; and removal of pharmaceutical emerging pollutants by advanced adsorption or oxidative degradation using non-conventional adsorbents and catalysts, as the ones from vegetable biomass and other sources.

Postgraduate Program 2 – FOOD TECHNOLOGY

Capes evaluation (2017 evaluation grade) – 5

Justification – The significant increase of chronic non-communicable diseases in recent decades, remarkably associated with the diet, has been motivating changes, supported by major health agencies worldwide, in food legislation in several countries. Hence, food technology aims to define consistent alternatives to ensure the processing and consumption of healthier products in the world context of food safety. For this purpose, the main technological strategies applied simultaneously and focused on obtaining healthier and more sustainable foods are highlighted: study of new ingredients, new products, new processes, stability and safety. These technological strategies will be applied for the processing of healthier and more sustainable foods, which is the major theme of this program.

Postgraduate Program 3 – AGRICULTURAL ENGINEERING

Capes evaluation (2017 evaluation grade) – 4

Justification – The research proposed by the FEAGRI covers an innovation within the agricultural development environment, especially with respect to the demands of the large-scale livestock production demanding decision-makings in real time. This is part of the line of research on Precision Livestock Farming aiming profitability and productivity. For this purpose, the obtainment of precise data and their analysis with cutting-edge methodologies, such as the Computational Fluid Dynamics, among others, are important for generation of knowledge and control of the productive process.

Postgraduate Program 4 – FOOD ENGINEERING

Capes evaluation (2017 evaluation grade) – 7

Justification – To develop (bio)processes and (bio)products means, in the food industry, to use sustainable processes to develop “Foods for Life” with technological and nutritional quality. The society demands processed foods that preserve their nutritional value and that meet the increasing growth of world population. Thus, the study of transformation and preservation processes of food is extremely important to ensure food safety and security. This requires the creation of innovative, sustainable processes, with the utilization of residues and lower costs, allowing the population to have access to quality food with reduced cost. Thus, this project has as objective the creation of an integrated platform to broaden the expertise of PGPEA and promote partnerships with international research groups to encourage the development of new technologies in the area and the disclosure of studies in vehicles with more impact. The relevant areas are: Bioengineering and Biotechnology, Process Engineering, Ecodevelopment, Physical Separations and Refrigeration.

Postgraduate Program 5 – FOOD SCIENCE

Capes evaluation (2017 evaluation grade) – 7

Justification – The projects developed by professors of the PGPCA are focused on the lines of research on food analysis, chemistry, biochemistry, microbiology and toxicology. Professors in the Analysis of Food area lead an intense research on characterization of minority and majority food compounds through application of several analytical techniques, green chemistry included. Professors in the lines of research on Food Biochemistry have been developing studies on selection of microorganisms that produce enzymes. In addition, they have noteworthy performance on the characterization of Brazilian-native or exotic fruits and vegetables on the area of functional foods; on the study of relationships of food consumption and compounds with their beneficial effects to the health; on the development of bioprocesses; on the study of reutilization of industrial residues; and on the use of bioprocesses for developing ingredients to have various industrial applications. In the line of research on Food Chemistry, professors are focused mainly on the study of pigments in foods and those produced by microorganisms, antioxidant compounds, and evaluation of bioavailability and relationship to health. In addition, they conduct studies and characterization of lipids and systems and mechanisms of oxidation control of lipids in foods and functional, technological and nutritional properties of proteins.

Professors in the area of Food Microbiology are dedicated to the study of the behavior and the role that microorganisms (pathogenic, deteriorating and benefic) perform on foods, on identification and characterization of these microorganisms with respect to ecological, genetic and metabolic aspects, on study of impact of food processing on the microbial ecology and its metabolites, and on the "omics" application on the study of importance of microorganisms in foods. Professors in the line of research on Food Toxicology act in the development of toxicological trials and studies of residues and depletion of veterinary drugs in animals. The program also develops analytical methods to determine toxic compounds naturally present and/or formed during food processing, and evaluation models of exposure to toxic substances transmitted by foods.

Postgraduate Program 6 – FOODS AND NUTRITION

Capes evaluation (2017 evaluation grade) – 5

Justification – The project proposed by the Postgraduate Program in Food and Nutrition focuses on the entire food production chain, from the field to the consumer, seeking sustainable alternatives for use of natural resources and improvement of the quality of life of the population through the food. This proposal is based on the Food Security, i.e., regular and permanent access of the population to foods in quantity and quality (i.e., nutritional, free of contaminants and sensorially well-accepted). Thus, the main goal is to study new food sources, such as unconventional food plants, byproducts of the food agro-industry, edible insects, native Brazilian fruits. The interdisciplinarity characterizes the proposal of the PGPAN, because the faculty acts in different research areas on food.

Postgraduate Program 7 – MECHANICAL ENGINEERING

Capes evaluation (2017 evaluation grade) – 5

Justification – The proposed project is fully linked to the priority theme "Project and development of products and processes," proposing the development of research in advanced manufacturing processes of various products.

Theme 13 - Frontiers of Mathematics, the Natural Sciences and Engineering: Challenges of the 21st Century

Postgraduate Program 1 – MATHEMATICS

Capes evaluation (2017 evaluation grade) – 7

Justification – The lines of investigation of this project are set at the frontier of geometry knowledge, is of great interest for both issues of mathematical nature and intersections and frontiers with other knowledge areas, such as physics, engineering, information theory and biological sciences.

Postgraduate Program 2 – CIVIL ENGINEERING

Capes evaluation (2017 evaluation grade) – 4

Justification – Strategy of international cooperation plans through collaborative networking and mobility of scientific teams, based on the following objectives: production of the environment built with materials, conception techniques, proper projects, resilient and sustainable operation of services. With the proposition of this project, the aim is to integrate the several concentration areas of the Postgraduation of Civil Engineering to search for intelligent, resilient and long-lasting solutions. The Postgraduate Program of Civil Engineering currently has agreements of international covenants with the Cardiff University, at Wales, in the United Kingdom. This project will intensify the Internationalization of the Postgraduate Program with the mobility of professors and students in the joint development of research projects. Around the world, large cities face challenges of logistic, sanitary, energetic, ecological and housing order. The migratory flow, in many cases, is induced by seismic and climatic factors. International institutes for support (e.g., ONU, OCDE), proposed measures and the debate on urban resiliency. At the same time, such factors have been the object of study of all specialties of Civil Engineering. Road constructions and transpositions are complex and dynamic works, constantly requiring adaptation to different requests and conditions of use. Therefore, the search for constructive systems, technology and materials for civil engineering that allow the adaptation and reinforcement of the construction to the new reality is a constant challenge. With the aging of cities, it becomes indispensable the verification of capacity and mitigation of damage in existing urban structures in the context of extreme events, mainly the ones related to natural disasters. In the resilient and sustainable city, the infrastructure and operation of urban transportations must be planned to allow their mobility and the social, environmental and economic inclusion of the human being into the society. The rapid and unplanned population growth of urban regions densely populated results in the deterioration and/or contamination of water resources. The search for adequate and sustainable technologies of water reuse in an urban environment is extremely important for both better water use and minimization of its harvesting in the drainage basin.

Postgraduate Program 3 – ARCHITECTURE, TECHNOLOGY AND CITY

Capes evaluation (2017 evaluation grade) – 5

Justification – The development of an intelligent, sustainable and resilient environment requires integrated and innovative approaches that combine research at the frontier of knowledge, particularly benefited from the collaboration and transfer of knowledge internationally. For this purpose, this program proposes to be the core of an international collaboration center (INSpIRE) and to strengthen the Postgraduate Program in Architecture, Technology and City (PGP ATC). The PGP ATC is a recent program, which just increased its grade to 5 in its first quadrennial CAPES evaluation. Thematic research developments are PA1 | Development of innovative design methods; PA2 | Algorithmic modeling and applied to architecture and urban planning with a focus on innovation and sustainability; PA3 | Studies of design practices for the preservation of pre-existence architectural and urban, that consider criteria of quality and sustainability; PA4 |Investigation of architectural projects as a contribution to permanence and conservation cultural heritage; PT1 | Design and development of

innovative methods for collaborative management of the process of delivering value to customers and users of buildings; PT2 |Simulation, development and use of innovative approaches to increase energy efficiency and environmental and urban comfort; PT3 | Information modeling of construction (BIM) and urban environments (MIC); and PT4 | Environmental and sustainability in the life cycle of buildings, neighborhoods and settlements humans; and (c) in the line and urban themes: PC1 | Development of "open design" methodologies and sustainable and resilient projects, focusing on the conservation of natural resources; application of visual and diagrammatic procedures for urban analysis; PC2 | Research comparisons between foreign territorial planning plans and master plans Brazilians in municipalities of environmental and social post-conflict; investigations into the geography of health and healthy urban planning.

Postgraduate Program 4 – AGRICULTURAL ENGINEERING

Capes evaluation (2017 evaluation grade) – 4

Justification – Biomechanical studies involve multidisciplinary research, using knowledge on Engineering, Biology and Information Technology to explain phenomena of nature. Biomechanics of threes, study area of this program of FEAGRI, involves application of engineering in the understanding, mediations and simulations of its complex mechanical behavior, associated to its biological structure.

Postgraduate Program 5 – APPLIED MATHEMATICS

Capes evaluation (2017 evaluation grade) – 6

Justification – Applied Mathematics is the best in making frontiers between development of mathematical contents and concepts and its applications, whether in sciences or in engineering branches. Our program has excellence in classical areas of applied mathematics, such as optimization, operational research and numerical analysis, as well as in applications oriented to geosciences, physics and biology, or yet in emerging areas, as computational intelligence and image processing.

Postgraduate Program 6 – PHYSICS

Capes evaluation (2017 evaluation grade) – 7

Justification – The postgraduate programs of the IFGW, IQ, Surgical Sciences and Medical Pathophysiology integrate research groups acting in several areas of the inter- and multidisciplinary research on the theme Frontiers of Mathematics, Nature Sciences and Engineering: challenges of the 21st century. Among the fronts of action, we can cite the development of semiconductor devices focused on application in solar cells; development of devices based on semiconductor nanostructures and/or nanomaterials to be used in systems of biological interest for applications in the diagnosis and treatment of degenerative diseases; use of computer science in the healthcare area, focused in computational simulations of transportation of radiation, molecular dynamics and image and signal processing; as well as brain analysis through reverse engineering for diagnosis and treatment of diseases These inter- and multidisciplinary studies have been producing solid technical and scientific knowledge and promoting a development of these areas in society, being intensely studied throughout the world and, in particular, by several teams associated to the PGPs involved in these theme. To act in

these research fronts, the consolidated groups perform in an interdisciplinary manner with a vast infrastructure dedicated to research. These groups are acting in their respective frontiers of knowledge and count with international partnerships with groups of excellence in several countries. These collaborations, with bilateral student exchange programs, are vital for quality maintenance of research and training of human resources for Brazil. Thus, we understand that the studies developed in these inter- and multidisciplinary areas by the professors of these postgraduate programs fit in the scope of this program.

Postgraduate Program 7 – SURGICAL SCIENCES

Capes evaluation (2017 evaluation grade) – 4

Justification – The postgraduate programs of the IFGW, IQ, Surgical Sciences and Medical Pathophysiology integrate research groups acting in several areas of the inter- and multidisciplinary research on the theme Frontiers of Mathematics, Nature Sciences and Engineering: challenges of the 21st century. Among the fronts of action, we can cite the development of semiconductor devices focused on application in solar cells; development of devices based on semiconductor nanostructures and/or nanomaterials to be used in systems of biological interest for applications in the diagnosis and treatment of degenerative diseases; use of computer science in the healthcare area, focused in computational simulations of transportation of radiation, molecular dynamics and image and signal processing; as well as brain analysis through reverse engineering for diagnosis and treatment of diseases These inter- and multidisciplinary studies have been producing solid technical and scientific knowledge and promoting a development of these areas in society, being intensely studied throughout the world and, in particular, by several teams associated to the PGPs involved in these theme. To act in these research fronts, the consolidated groups perform in an interdisciplinary manner with a vast infrastructure dedicated to research. These groups are acting in their respective frontiers of knowledge and count with international partnerships with groups of excellence in several countries. These collaborations, with bilateral student exchange programs, are vital for quality maintenance of research and training of human resources for Brazil. Thus, we understand that the studies developed in these inter- and multidisciplinary areas by the professors of these postgraduate programs fit in the scope of this program.

Postgraduate Program 8 – CHEMISTRY

Capes evaluation (2017 evaluation grade) – 7

Justification – The main axes of the proposal of the PGP of the IQ on this theme involve the development and application of tools for spectroscopic and chromatographic analysis of complex matrices of environmental and food nature and the study of biological and biochemical effects of new organic and organometallic molecules on living organisms, especially on the antitumor activity. Both axes fit the description of this theme because they result in a deepening of the knowledge on high-complexity chemical systems, in addition to providing means for new studies of other similar materials.

Postgraduate Program 9 – CHEMICAL ENGINEERING

Capes evaluation (2017 evaluation grade) – 6

Justification – The production of materials for biotechnological applications represents a major technical and scientific challenge, since that to be overcome, it requires integration of various areas of knowledge. In Brazil, the materials science is still limited, despite recent scientific advances. Given this, the development of research projects aimed at the manufacture of biomaterials from biomolecules, for example, natural polymers and lipids, allows the establishment of conditions capable of approximating modern frontiers of knowledge and, yet, strengthen strategic international collaborations within the university. Considering the production, characterization and applications of biomaterials, the interdisciplinarity between engineering branches, chemistry, physics and biology becomes extremely necessary to promote high-impact research.

Postgraduate Program 10 – CELLULAR AND STRUCTURAL BIOLOGY

Capes evaluation (2017 evaluation grade) – 6

Justification – The Postgraduate Program in Cellular and Structural Biology of the Institute of Biology of UNICAMP develops projects in collaboration with the PGP of the FEQ/UNICAMP, aiming to conciliate the knowledge of both areas to answer questions of biology that would not be possible to be answered under classic conditions. On this theme, the chemical engineering explores, more specifically, transfer areas of moment and mass and also the area of materials for the design and construction of microfluidic microdevices, knowledge concerning animal cell cultivation and its behavior allow to direct engineering projects to permit the development of projects that reflect more accurately on the need of biological application area. Thus, this interdisciplinarity allows the evaluation of the cell behavior under dynamic conditions, mimicking *in vivo* conditions. This will allow for, example, the construction of microdevices that allow the “screening” of drugs and the evaluation of cellular answers in mixed cultures and 3D cultures.

Postgraduate Program 11 – MEDICAL PATHOPHYSIOLOGY

Capes evaluation (2017 evaluation grade) – 7

Justification – The postgraduate programs of the IFGW, IQ, Surgical Sciences and Medical Pathophysiology integrate research groups acting in several areas of the inter- and multidisciplinary research on the theme Frontiers of Mathematics, Nature Sciences and Engineering: challenges of the 21st century. Among the fronts of action, we can cite the development of semiconductor devices focused on application in solar cells; development of devices based on semiconductor nanostructures and/or nanomaterials to be used in systems of biological interest for applications in the diagnosis and treatment of degenerative diseases; use of computer science in the healthcare area, focused in computational simulations of transportation of radiation, molecular dynamics and image and signal processing; as well as brain analysis through reverse engineering for diagnosis and treatment of diseases. These inter- and multidisciplinary studies have been producing solid technical and scientific knowledge and promoting a development of these areas in society, being intensely studied throughout the world and, in particular, by several teams associated to the PGPs involved in these theme. To act in

these research fronts, the consolidated groups perform in an interdisciplinary manner with a vast infrastructure dedicated to research. These groups are acting in their respective frontiers of knowledge and count with international partnerships with groups of excellence in several countries. These collaborations, with bilateral student exchange programs, are vital for quality maintenance of research and training of human resources for Brazil. Thus, we understand that the studies developed in these inter- and multidisciplinary areas by the professors of these postgraduate programs fit in the scope of this program.

Postgraduate Program 12 – MECHANICAL ENGINEERING

Capes evaluation (2017 evaluation grade) – 5

Justification – The group Solid Mechanics and Mechanical Design of the School of Mechanical Engineering of Unicamp acts, since its creation, in the development and optimization of products, structures and new materials, including the fundaments of intelligent structures, elasto-acoustic metamaterials and machinery and equipment integrated with the artificial intelligence and advanced control systems. This program conducts studies on the development of new methods for the design of products intensely involving mathematical modelling, numerical simulation and control techniques of mechatronic system in an integrated and competing manner. Techniques such as additive manufacturing at multiple scales with multi-materials are used for prototyping and later testing of materials and equipment developed. Among others, we highlight the following application areas: intelligent structures for aeronautical application, prediction systems of faults and repairs in aeronautical structures, design of high-performance rotary machines, modeling and design in biomechanics and biomedicine, acoustic metamaterial design, topological optimization of multiphysics and multiscale, high-performance internal combustion engines, design of microstructures, development of advanced control systems. The research group aims not only the incremental improvements of products, but also the proposition of new modeling and control methods of mechanical systems. Internationalization activities are crucial for complementation of the training of the human resources of the group and for updating of the lines of research aiming to consolidate an international level of excellence.

Theme 14 - Innovation and Sustainability

Postgraduate Program 1 – SCIENTIFIC AND TECHNOLOGICAL POLICIES

Capes evaluation (2017 evaluation grade) – 6

Justification – Understanding that technical and scientific advances involve paradoxical relationships between socioeconomic, institutional and political spheres and the natural sphere, the transition to sustainability is considered critical to refocus the development toward a viable future. The PGP-PCT has been acting on themes related to Science, Technology and Innovation for Sustainability (STIS), involving subjects such as Science, Politics and Global Justice, Responsible Research and Innovation, Green and Low-Carbon Economy, Bioeconomy, Solidarity Economy, Social Technology, Strategic Innovation Management in Public Research Companies and Institutions, Prospection and Evaluation on

the economic, social and environmental dimensions of the STIS, Indicators of ST&IS and S&TS and the relationships University and Society, Employment and Work and Sustainability, among others. Given the challenges to the advancement of a new development paradigm, this project aims the deepening and expansion of the internationalization activities of the PGP-PCT together with institutions of excellence abroad on themes and issues linked to the STIS. Therefore, the approaches and methods will be developed and implemented, under interdisciplinary perspectives on two fronts: i) Social Studies in Science and Technology (SSST) for sustainability, focused, among others, in production and use of knowledge; responsible innovation; bioeconomy; social movements; social and solidarity economy technologies;and ii) Policy and Management of the STI for transitions to sustainability, with a focus, inter alia, in innovation management; new technologies for adaptation and mitigation of climate changes; integration of sustainability and higher education; green technologies and new business models in different fronts – transportation, enterprise, smart cities, conservation and sustainable use of natural resources; renewable energies; low-carbon economy; food security; biotechnology.

Postgraduate Program 2 – ENVIRONMENT AND SOCIETY

Capes evaluation (2017 evaluation grade) – 6

Justification – The Postgraduate Program in Environment and Society is characterized by its interdisciplinary aspect – composed of two main Areas of Concentration (1) Biological Aspects of Sustainability and Conservation, and (2) Social Aspects of Sustainability and Conservation –, and results of the Inter-unities within the framework of the UNICAMP – Institute of Philosophy and the Humanities (IFCH) and the Center for Environmental Studies and Research (NEPAM). Therefore, Innovation and Sustainability aspects are at the heart of the objectives and profile of our Program. The analysis of sustainability in its several dimensions requires an inter- and multidisciplinary effort to face the challenges of the accelerated environmental and social change. In its human dimension, it includes issues relevant to demographic dynamics, natural heritages and resources, and knowledge and memories of the people interacting with the natural systems. On the political and institutional dimension, it involves processes of environmental and territorial governance. Finally, the economic dimension analyzes the externalities of environmental changes and new technologies that promote a low-carbon economy – green technologies, renewable energies –, and excel due to the quality of life of its citizens and with respect to other living beings in the rural and urban landscapes. Therefore, to achieve the sustainability in its multiple dimensions is a challenge that requires innovative tools and new technologies and methods to face the environmental problematics in the 21st century. The faculty and students of the Postgraduate Program in Environment and Society are intensely involved with this mission of pursuing sustainability through innovative tools and in cooperation with national and international partners.

Postgraduate Program 3 – BIOENERGY USP, UNICAMP and UNESP

Capes evaluation (2017 evaluation grade) – 4

Justification – The bioenergy chain involves agricultural, climatic, social, economic, engineering and biology aspects, among others. Due to high photosynthetic capacity and productivity, the sugarcane and

the energy cane are raw materials suitable for the obtainment of different biofuels, bioproducts, and energy. For this bioenergy production chain to reach the maximum degree of sustainability, it is necessary to study and innovate its various stages, from agricultural practices to final industrial operations. In this research proposal, the obtainment and processing large volumes of data by E-Science will be studied, to facilitate the interpretation of information raised by rural producers, helping them in the decision-making within the concept of precision agriculture. The optimization of sugarcane and energy cane yield through the management of nutrients and plant physiology will also be addressed. Strategies for genetic improvement will be devised to obtain cultivars with high coverage and photosynthetic capacity in a single genotype, resulting in greater agricultural yields. The aim is also investigating the use of lignocellulosic fraction from different biomasses. Different strategies of pre-treatment will be studied, both for obtaining second-generation ethanol as other higher value-added bioproducts. Strategies also include, for example, saccharification and fermentation. For this, we intend to build strains of the yeast *Saccharomyces cerevisiae* by inserting codifying cellulase genes and ancillary enzymes in industrial backgrounds and to study the better combination of enzymes and conditions for the obtainment of cello-oligosaccharides from cellulose, targeting a process in which yeasts directly ferment these molecules until ethanol. Regarding the hemicellulosic fraction of biomass, the use of pentose sugars such as xylose will also be studied. Within the concept of first-generation processes based on sucrose, the use of thermotolerant yeasts and the metabolic engineering of *S. cerevisiae* for obtaining different biomolecules will be topics covered. Finally, we intend to investigate the effect of different types of vinasse obtained in first- and second-generation processes on the quality of soils ferti-irrigated with these vinasses, both for sugarcane and energy cane.

Postgraduate Program 4 – ADMINISTRATION

Capes evaluation (2017 evaluation grade) – 4

Justification – This project deals with a theme of crucial importance to the dynamics of emergence and growth of new knowledge-intensive companies in developing and developed countries, directly related to the subject of business management and sustainability. Comparative analysis of organizations in these environments in countries at different levels of economic maturity represents a relevant scientific proposal in the Administration area. The notion of space – and its respective socioeconomic dimensions – as influential context in the organization sphere (from a systemic or ecosystemic perspective) reaches a corporate strategic level and promotes the study of elements critical to the public policy dedicated to fostering the entrepreneurial activity. This project is directly related to issues relevant to the economic and social sustainability of the new organizations, in special the survival of companies and the respective long-term enhanced value to the business.

Postgraduate Program 5 – ECONOMIC DEVELOPMENT

Capes evaluation (2017 evaluation grade) – 4

Justification – This program has the agricultural and environmental economy as one of its areas of concentration. The issue of sustainability has been widely examined, involving the discussion of global climate changes, impacts of the changes in the energy matrix of the countries and regions, the issue of

changes in agricultural activities, the question of innovation in production chains, including in the biotechnology, and the public policies on food security, the mitigation of negative environmental effects, the change in the energy matrix, in addition to reduction of economic and social inequalities. Its professors have been working in partnership with several international researchers and institutions and can contribute to the development of the theme.

Postgraduate Program 6 – ECONOMIC SCIENCES

Capes evaluation (2017 evaluation grade) – 6

Justification – The economic sciences program has been seeking to expand the theoretical and empirical knowledge about the ongoing changes in the global economy and its impact on developing countries. One of the most important themes is the issue of innovation and sustainability, thought widely. The complexity associated with these changes and their understanding requires a continued increase of dialogue and networking building with other teaching and research international institutions and their professors and researchers. The program has been searching to consolidate initiatives already initiated by professors in the programs of the Economic Sciences of the Institute of Economics of Unicamp. For example, they participate in the BRICS NU University and in the partnership with the TU Delft University, among other initiatives. Besides the possibility of student exchange programs on this theme, the establishment of international cooperations has been guided by the concern to seek partnerships with Institutions and researchers with thematic, theoretical and methodological approaches related to the ones of professors participating in the program.

Theme 15 - Social and Economic Development, Socio Demographic and Territorial Dynamics: Challenges Posed by the Transformations in the 21st Century

Postgraduate Program 1 – DEMOGRAPHY

Capes evaluation (2017 evaluation grade) – 6

Justification – Most of the social and economic challenges faced at global, national and local scale have a demographic dimension: growth rates of working-age population higher than the average rate of generation of new jobs; large population displacement caused by conflicts, environmental disasters and intolerance of different orders; educational, gender, generation and race/color inequalities that impact the living conditions, and even the average life expectancy. Thus, we understand that this issue is related, in a limited degree, with all investigation areas developed in the Postgraduate Program in Demography, namely: health, environment, spatial redistribution of the population, ethnicities, gender, family and social policies. The program already acts in international research networks and has been seeking to strengthen and expand its internationalization proposal. The central focus of the studies has been especially the Brazilian and Latin American populations, which makes us natural partners from other countries of the region. The approximation of European countries, Canada and United States have been happening due to methodological concerns. However, little by little, there is the possibility of participation in initiatives that attempt to cover the variety of situations experienced by populations

throughout the world, although direct comparisons must be conducted with certain caution because of historical trajectories and very different contexts.

Postgraduate Program 2 – ECONOMIC DEVELOPMENT

Capes evaluation (2017 evaluation grade) – 4

Justification – This program aims to analyze the ongoing changes in the contemporary economy and society, with emphasis on aspects related to impacts on social structure and world of work, as well as on issues related to urban territorial dynamics and regional development. The extent of historical understanding of these processes is also a fundamental issue in the Economic Development program. The need to advance in the internationalization emerges from the international comparative dimension, required to achieve theoretical and empirical results of wider reach. There already are important initiatives associated with the formation of networks of institutions: for example, through the Global Labour University and the network organized by the International Center for Development and Decent Work. In addition, there are other initiatives for the establishment of dialogue with important international centers on the aforementioned issues, as with the University of California (Berkeley), University College London and the National Autonomous University of Mexico.

Postgraduate Program 3 – ECONOMIC SCIENCES

Capes evaluation (2017 evaluation grade) – 6

Justification – The program has been seeking to broaden the theoretical and empirical knowledge about the ongoing changes in the global economy and its impact on developing countries, with emphasis on the international monetary and financial dimension, changes in the structure of production, technology and innovation and on the social impacts of these changes. The complexity associated with these changes and their understanding requires a continued increase of dialogue and networking building with other teaching and research international institutions and their professors and researchers. The program has been searching to consolidate initiatives already initiated by professors in the programs of the Economic Sciences of the Institute of Economics of Unicamp. For example, they participate in the BRICS NU University and in the network for Comparative Economic Development Studies, among other initiatives. Besides the possibility of student exchange programs on this theme, the establishment of international cooperations has been guided by the concern to seek partnerships with Institutions and researchers with thematic, theoretical and methodological approaches related to the ones of professors participating in the program.

Postgraduate Program 4 – GEOGRAPHY

Capes evaluation (2017 evaluation grade) – 6

Justification – The Postgraduate Program in Geography (PGPGeo) at Unicamp, more specifically the professors affiliated to line of research “Territorial dynamics: current technical systems and new socio-spatial practices” have been dedicated, in 15 years of existence, to research the new contents of the geographical space in the current stage of globalization, able to articulate different scales (global, national, regional and local), different subjects (State, organized social groups, companies, financial

systems, etc.) and determinations (social, economic, cultural, political and environmental). The objects of investigation of the world contemporary geography – respecting their spatial, methodological and theoretical specificities – have also been the objects and themes of investigation of the PGPGeo, putting the research at Unicamp in tune with the world geographic academic production, among which we highlight: the national sovereignty and fragmentation of political and administrative units; the new fundamentals of the region; the new roles of borders as well as the new connections of the constitution of the place/local with the global; the density of occupation and territorial uses; the density of technical networks installed and existing engineering systems (transportation, communication, energy etc.) in situation of an accelerated process of specialization of regions and localities; the industrial and agricultural circuits and production processes; the contemporary population dynamics (international and national); the production process of the urban space, noting their main structuring elements; the new meanings and uses for historical heritage; studies of landscape and territoriality of different matrices and their cosmogonies; the new directions for the school geographic knowledge and its role in the constitution of geographic reasoning; history and epistemology of geography. Another highlight of the identity of the program and of its internationalization has been the establishment of networks and student exchange programs between Latin America and Lusophone Africa, a result of the encouragement policies of student exchanges programs in recent years and, above all, the interests in objects and issues of research approaching the Brazilian reality.

Postgraduate Program 5 – TEACHING AND HISTORY OF EARTH SCIENCES

Capes evaluation (2017 evaluation grade) – 4

Justification – This research combines subjects from several areas of sciences, since the concept of geopark covers the population and the environment in a harmonic coexistence, because the legal, cultural, geological, archaeological and paleontological aspects, among others, on the territory are considered the heritage of such territory. The multidisciplinary scientific discoveries must be close to the understanding and perception of vulnerabilities and territorial potentialities. This involves an educational process for municipal public administrators and professors. The relevance of the issues is recommended by the United Nation Office for Disaster Risk Reduction (UNISDR), which aims to identify vulnerabilities and helps to formulate new territorial managements that increase the resilience conditions together with research on geoconservation. Thus, three are the keywords of this project: geopark, sustainability and resiliency.

Theme 16 - Studies on healthy systems, prevention, promotion and monitoring

Postgraduate Program 1 – HEALTH, INTERDISCIPLINARITY AND REHABILITATION

Capes evaluation (2017 evaluation grade) – 4

Justification – The project in a partnership with the Health, Interdisciplinarity and Rehabilitation, Child and Adolescent Health and Electrical Engineering Programs aims to enable strategies of promotion, prevention, diagnosis and intervention of the changes of the auditory and vestibular system in different

age groups, from the neonate to the older person, as well as develop and/or analyze the performance in tests and new triage procedures, assessment and rehabilitation.

Postgraduate Program 2 – CHILD AND ADOLESCENT HEALTH

Capes evaluation (2017 evaluation grade) – 5

Justification – The project in a partnership with the Health, Interdisciplinarity and Rehabilitation, Child and Adolescent Health and Electrical Engineering Programs aims to enable strategies of promotion, prevention, diagnosis and intervention of the changes of the auditory and vestibular system in different age groups, from the neonate to the older person, as well as develop and/or analyze the performance in tests and new triage procedures, assessment and rehabilitation.

Postgraduate Program 3 – ELECTRICAL ENGINEERING

Capes evaluation (2017 evaluation grade) – 6

Justification – The project in a partnership with the Health, Interdisciplinarity and Rehabilitation, Child and Adolescent Health and Electrical Engineering Programs aims to enable strategies of promotion, prevention, diagnosis and intervention of the changes of the auditory and vestibular system in different age groups, from the neonate to the older person, as well as develop and/or analyze the performance in tests and new triage procedures, assessment and rehabilitation.

Postgraduate Program 4 – COLLECTIVE HEALTH

Capes evaluation (2017 evaluation grade) – 5

Justification – The project is related to the priority theme because it proposes the investigation of several aspects of the Brazilian Health Care and the comparison of contexts of healthcare service in several levels of complexity in the country and abroad, establishing dialogue with research groups and enabling international joint publications. Among the participating institutions or with joint research abroad, we highlight: Yale University, University of Kansas, University of Massachusetts, in USA; National Autonomous University of Honduras; National University of Lanus, in Argentina; University of Porto, Portugal; University of Paris 8, in France; London College, England.

Postgraduate Program 5 – GYNECOLOGY AND OBSTETRICS

Capes evaluation (2017 evaluation grade) – 7

Justification – The maternal morbidity and mortality, its identification, characterization and prevention are important goals for the sustainable development of the United Nations. The burden of disease due to complications during pregnancy on the short-term health of women and their children, as well as the long-term for women’s lives is still very little known and is the focus of multiple international funding organizations and as line of action of several research groups around the world.

Postgraduate Program 6 – DENTISTRY

Capes evaluation (2017 evaluation grade) – 7

Justification – This proposal is related to the priority theme because the research projects developed in PGPD include the following aspects: 1) Development of public policies in oral health; epidemiological and health surveillance in oral health; and oral health education and promotion; 2) Monitoring the levels of fluoride in public water supply and clinical effectiveness of fluorinated dentifrices on prevention and control of dental caries; 3) Clinical studies to investigate the relationship between nutritional aspects and oral conditions, morphological and functional aspects of the masticatory system and the possible relationship with systemic conditions, as well as early caries in childhood. The results of these surveys may impact positively on the quality of life of the population.

Theme 17– Chronic emerging and overlooked diseases

Postgraduate Program 1 – INTERNAL MEDICINE

Capes evaluation (2017 evaluation grade) – 5

Justification – Diabetes mellitus type 2 has been increasingly growing in Brazil and in the world and is the cause of serious complications, being the main cause of cardiovascular disease. The studies of the PGP in Internal Medicine at Unicamp, in collaboration with the University of Pisa, on the effects of insulin in healthy subjects and in patients with diabetes mellitus type 2, are of great importance since the group of researchers of that university has a lot of experience in the metabolism of glucose, including diabetes, being recognized as the authority in the field.

Postgraduate Program 2 – ORAL MEDICINE AND ORAL PATHOLOGY

Capes evaluation (2017 evaluation grade) – 6

Justification – Mouth cancer is one of the most frequent malignant neoplasms. Despite the squamous cell carcinoma being the most common, there are several other tumors that affect this place, including the tumors of salivary glands, sarcomas and lymphomas. To know better the epidemiological, clinical, microscopic and biological aspects is crucial to establish and improve management strategies for patients.

Postgraduate Program 3 – MEDICAL SCIENCES

Capes evaluation (2017 evaluation grade) – 4

Justification – The Postgraduate Program in Medical Sciences has two projects within the theme of importance for the Brazilian population. First, it makes reference to the lack of proper diagnosis, the non-performance of susceptibility tests routinely to evaluate Aspergillus microorganisms, causing chronic patients to live with resistant microorganisms for many years, being treated unsuccessfully with antifungal medication to which agents already are resistant. Naming a few examples: cystic fibrosis patients with recurrent fungal pneumonia and candidates to lung transplant should be treated, patients with fungus ball (tuberculosis), chronic sinusitis, patients with bone marrow transplant that should

receive prophylactic treatment according to the profile of their colonies, or therapeutic treatment, when the infection has already installed, among many others. The second refers to the glaucoma, the leading cause of irreversible blindness. This project will address the combination of structural and functional data processed from machine learning systems, associated with genetic risk variants for developing the POAG identified both through the study of genome-wide association (GWAS) and evaluation of exomes using the zebrafish animal model.

Postgraduate Program 4 – GYNECOLOGY AND OBSTETRICS

Capes evaluation (2017 evaluation grade) – 7

Justification – The neoplasms are one of the main causes of morbidity and mortality among adults in modern societies, even in middle-income countries such as Brazil, where the epidemiological transition has favored the characterization of morbidity similar to high-income countries. The most typical example of this situation is precisely the gynecologic cancer, and especially the breast one, which now appear among the leading causes of chronic morbidity and mortality in the country. The integrated approach of clinical, pathological, metabolic and molecular aspects of this condition is crucial for the advancement of knowledge and the availability of therapeutic alternatives to face the condition.

Postgraduate Program 5 – DENTAL RADIOLOGY

Capes evaluation (2017 evaluation grade) – 5

Justification – Imaging tests are tools that can really help in the prevention, early diagnosis and treatment of chronic diseases. For the contribution of these tests to be effective, studies focused on the principles of image acquisition and quality and resources of diagnosis are of fundamental importance.

Postgraduate Program 6 – ORAL BIOLOGY

Capes evaluation (2017 evaluation grade) – 5

Justification – The biggest challenge of Dentistry is to control some of the most prevalent chronic diseases that affect the Brazilian and world population, which include dental caries, periodontal disease and mouth cancers. These oral diseases represent a high cost for public health systems and are associated to the risk (or progression) of other systemic chronic diseases. As an example, it is established that the access of oral microorganisms to the bloodstream by oral injuries may promote the progression of cardiovascular diseases, diabetes and arthritis. Also, the chronic inflammation caused by periodontopathogenic bacterial agents can act as a risk factor for oral cancer. FOP-UNICAMP has the tradition of applying basic research to identify diagnostic markers and therapeutic targets, and to develop new treatment protocols. These studies involve several methodologies of molecular biology, genetic recombination and genomic and epigenomic analysis aimed at tracking markers for diagnosis and prognosis of microbial diseases and oral cancers associated with clinical and epidemiological analysis.

Postgraduate Program 7 – HEALTH, INTERDISCIPLINARITY AND REHABILITATION

Capes evaluation (2017 evaluation grade) – 4

Justification – The cases of Zika Virus in 2015 caused in Brazil a Public Health Emergency of National Concern (ESPIN), as notified0 by the Ministry of Health (ordinance GM/MS no. 1.813, from 11/11/2015). Complications such as microcephaly, motor, visual and communication disorders involve national and international efforts of Health and Education for prevention, early diagnosis, treatment, rehabilitation and inclusive education in a perspective of integral and humanized health care. Educational activities with family members and professionals, devices of Augmentative and Alternative Communication, adaptations of toys, teaching and furnishing materials (parapodium, stand tables, chairs, etc.) of accessible and low cost, evaluation of clinical signals for detection of seizures are essential to comprehensive health care, rehabilitation and social and educational inclusion of these children.

Postgraduate Program 8 – MEDICAL PATHOPHYSIOLOGY

Capes evaluation (2017 evaluation grade) – 7

Justification – The epilepsies of non-monogenic or complex inheritance still represent a big challenge considering the identification of genetic predisposition factors. Nowadays, it is a consensus that collaborative and multicenter studies and application of advanced statistical methods of analysis are required for the advancement in studies on epilepsies of complex inheritance.

Postgraduate Program 9 – NUTRITION, SPORTS AND METABOLISM SCIENCE

Capes evaluation (2017 evaluation grade) – 4

Justification – Obesity is currently recognized as one of the chronic diseases with highest prevalence in the world population. Such disease is often associated with high rates of morbidity and mortality. The mechanisms of association between obesity and environmental, genetic and behavioral changes have not yet been fully elucidated. Given the lack of totally effective methods for the treatment of obesity, the identification of new therapeutic targets becomes indispensable for the control and prevention of this disease, responsible for severe impacts on the quality and life expectancy of the individuals affected.

Postgraduate Program 10 – CHILD AND ADOLESCENT HEALTH

Capes evaluation (2017 evaluation grade) – 5

Justification – The Systemic Lupus Erythematosus (SLE) is a chronic connective tissue disease of unknown etiology and characterized by periods of remission and exacerbation with intense involvement of the immune system. The clinical manifestations in SLE are diverse and range from constitutional symptoms to severe dysfunction of multiple organs. About 15 to 20% of SLE patients develop the disease in the childhood and adolescence, named juvenile SLE (jSLE). Children with SLE have higher prevalence and severity of some manifestations, mainly in relation to nephritis and manifestations of central nervous system (CNS), thus demanding higher doses of corticosteroids and immunosuppressants. In the last decades, the survival rate has increased from approximately 5 years in 50-60% of cases to 10 years in 80-90% of cases. Given the frequency of NP manifestations in association with the smile of poor prognosis, it is imperative that the Pediatric Rheumatology experts

develop instruments for neuropsychiatric involvement so there is opportunity for intervention and early treatment with the aim of preventing the sequelae (damage).

Postgraduate Program 11 – NURSING

Capes evaluation (2017 evaluation grade) – 5

Justification – In the Postgraduate Program in Nursing, different research groups have been developing basic research, clinical trials and population-based studies whose central theme are strategies for the facing of different chronic diseases, either through new treatments or change of behaviors aiming health promotion and rehabilitation. These actions justify the linking of the project to the priority theme “Chronic diseases”, aiming the encouragement to the improvement of research, training of human resources and promotion of exchange programs of researchers and students between Brazil and countries with tradition of excellence in the area.

Theme 18 – Therapeutic and pharmacological innovations

Postgraduate Program 1 – DENTISTRY

Capes evaluation (2017 evaluation grade) – 7

Justification – This research proposal is linked to the priority theme because the project involves structured or unstructured systems with natural, semi-synthetic or synthetic assets for studies, development and tests with new resources and therapeutic products for dental application.

Postgraduate Program 2 – DENTAL MATERIALS

Capes evaluation (2017 evaluation grade) – 6

Justification – The PGP-DM has been developing research lines and projects with the prospect of consolidation of the quality of the program. In this sense, we have sought together with international universities the consolidation of the proposals. The line of research highlighted in the PGP-DM is: RESIN, CERAMIC AND BIOACTIVE MATERIALS OF DENTAL USE as the main part of this project. As a result of this process, since 2013 we have consolidated 20 Research Projects, 25 Term Papers, 163 Productions, of which 76 were full articles published in journals, in addition to national and international awards, only in this line of research.

Postgraduate Program 3 – INTERNAL MEDICINE

Capes evaluation (2017 evaluation grade) – 5

Justification – The PGP-IM has been developing research lines and projects with the prospect of the consolidation of the quality of the program. In this sense, we have been seeking, along with international universities, as the Cancer Center (USA) and the University of Bonn (Germany), worldwide recognized in the research of radioisotopes for diagnosis in prostate cancer, the consolidation of proposals of cooperation.

Postgraduate Program 4 – MEDICAL SCIENCES

Capes evaluation (2017 evaluation grade) – 4

Justification – The partnership between Unicamp and George Mason University began through the conference organized by BRAINN-CEPID-FAPESP. The two groups of GMU have experience in multi-channel electrophysiology in neural cell culture and in several animal models, as well as in methods of analysis of biological signals with algorithms based on machine learning in artificial neural networks. The Zebrafish Laboratory (LabZeb) at Unicamp focuses on genetic and molecular analysis in animal models (zebrafish) that mimic human neurological diseases. Particularly, the model of epilepsy is being investigated by the three groups, and therefore, collaboration is complementary and extremely interesting for future joint studies. This experience of different areas (genetics, biomedical engineering and computer science) will provide students with a multidisciplinary learning. With the CAPES-PrInt, we aim to establish regular trips between the two countries to strengthen cooperation through PhD students and postdoctoral researchers.

Postgraduate Program 5 – CLINICAL DENTISTRY

Capes evaluation (2017 evaluation grade) – 7

Justification – This proposal is related to the priority theme, because some research projects developed in PGP-DC have been aiming to evaluate new therapeutic resources and the improvement of existing technologies.

Postgraduate Program 6 – PHARMACEUTICAL SCIENCES

Capes evaluation (2017 evaluation grade) – 4

Justification – The postgraduation of the Faculty of Pharmaceutical Sciences has been acting intensely on subjects closely related to the theme 'Therapeutic and pharmacological innovations'. The project aims to obtain, develop, evaluate and optimize new inputs and natural, biotechnological and synthetic pharmaceuticals, for the prevention and treatment of diseases. To achieve these goals, the sub-projects include: discovery and characterization of molecular targets to combat infectious diseases, cancer, chronic diseases; identification and synthesis of new pharmaceutical raw materials (natural products, synthetic inhibitors, biotechnological products, etc.); development of traditional and innovative formulations (nanotechnology, sustained release and other delivery systems combined); pharmacological and toxicological analysis, including pre-clinical and clinical tests; health technology assessment (summaries of scientific evidence of effectiveness, safety and cost); assistance and pharmaceutical care. An intense exchange program of postgraduate students, post-doctoral fellows and professors between the Postgraduate Program in Pharmaceutical Sciences and Universities abroad are essential to the effective complementation directed to specific technologies, allowing the overcoming of limitations found in the current context of the research program and related searches.

Theme 19– Global environmental changes/climate changes and landscape dynamics

Postgraduate Program 1 – ENVIRONMENT AND SOCIETY

Capes evaluation (2017 evaluation grade) – 6

Justification – Human activities are at the heart of the debate on global environmental changes, being configured as unprecedented challenges to contemporary society, in the transition to the Anthropocene epoch. Global climate changes pose challenges to various countries, which must combine economic, social and technological development to mitigate greenhouse gas emissions. Environmental governance must be promoted at different levels (local, national and global), based on development of Science, Technology and Innovation, and with the participation of various social actors, in the search for environmentally responsible development. This theme fits into the debate of the economic, social, political and environmental dimensions of climate change, focusing on the question of how the State and society respond to the risks arising from these changes in different spheres in interconnected analyses that are able to stimulate the dialogue between the human and natural dimensions of the process, which must include different multifactorial and multi-scale methods of research and analysis.

Postgraduate Program 2 – HISTORY

Capes evaluation (2017 evaluation grade) – 6

Justification – Human activities are at the heart of the debate on global environmental changes, being configured as unprecedented challenges to contemporary society, in the transition to the Anthropocene epoch. Global climate changes pose challenges to various countries, which must combine economic, social and technological development to mitigate greenhouse gas emissions. Environmental governance must be promoted at different levels (local, national and global), based on development of Science, Technology and Innovation, and with the participation of various social actors, in the search for environmentally responsible development. This theme fits into the debate of the economic, social, political and environmental dimensions of climate change, focusing on the question of how the State and society respond to the risks arising from these changes in different spheres in interconnected analyses that are able to stimulate the dialogue between the human and natural dimensions of the process, which must include different multifactorial and multi-scale methods of research and analysis.

Postgraduate Program 3 – GEOGRAPHY

Capes evaluation (2017 evaluation grade) – 6

Justification – The Postgraduate Program in Geography (PGPGeo) at Unicamp, more specifically the professors affiliated with the line of research “Geographic information systems, analysis of the natural components of the landscape and of the transformations resulting from the use and occupation” have been devoted, in 15 years of existence, to investigate and analyze morphopedogenetic processes ruling the organization and structure of the landscape and the impacts related to the use and occupation of the territory in these environments. Also, these studies can contribute in the mitigation of environmental risks related to economic and social activities, especially when they are associated with the application of innovative geotechnologies in quaternary coverage. Environmental risks have become an emerging

theme in studies of the dynamics of nature in the international geographical community, as well as in other fields of knowledge that have the environment as the object of study. Another research topic developed in PGPGeo and of great importance to Brazil and the planet is the climate change and its environmental impacts, which have been becoming intense in different scales of analysis (from local to global), and may affect the local, regional, national and even the international development if there is no capacity for reaction, mitigation and prevention. Thus, it is important to consider the risk to natural disasters associated to the severe atmospheric instabilities for the monitoring of extreme events and natural disasters in several scales of territory. This program has also been researching the abundance and the use of the country's natural resources that require strategic policies, as well as with energy resources whose consumption affects not only the economic issues, but also the political life of the countries, at a moment of large discussion on the growing energy scarcity, establishing important topics in the research agenda of the Brazilian geography. Associated with these themes, we also highlight the studies on the treatment of geographic information with emphasis on Remote Sensing and Geographic Information Systems.

Postgraduate Program 4 – GEOSCIENCES

Capes evaluation (2017 evaluation grade) – 6

Justification – The Postgraduate program in Geosciences integrates its lines of research with research centers of excellence on the themes of evolution of the lithosphere, hydrosphere, atmosphere, biosphere and planetary analogs, in addition to the man before the natural disasters. Regarding the global environmental changes, we consider the risk and natural disasters associated to the severe atmospheric instabilities for the monitoring of extreme events and natural disasters in several scales of territory. On this theme, we also consider the country's abundance of natural resources that require strategic use, as well as the energy resources whose consumption affects not only the economic issues, but also the political life of the countries, at a moment of large discussion on the growing energy scarcity. This project implies integrated knowledge of evolution in both internal (plate tectonics, crustal evolution, mineral deposits, etc.) and external dynamics of the planet (life, climate, climate change, evolution of relief and soils, water , natural, oil and gas disasters, etc.). These vast fields of research can be understood through the geological history of the planet and of life, can have their phenomena described by geophysical methods and accessed using geotechnology and other methods of analysis, including methods of mathematical, chemical, physical and biological sciences. In this sense, Brazil, due to its geological peculiarities and continental size, allows the development of a wide range of research on several approaches of geoscientific knowledge, which can be correlated and understood together with geological phenomena that occur in other parts of the world. Taking into account the high degree of scientific and technological development at UNICAMP, the Postgraduate Project in Geosciences offers valuable opportunities of student exchange programs with prestigious centers abroad.

Theme 20 – Teaching challenges in the 21st century

Postgraduate Program 1 – MATHEMATICS

Capes evaluation (2017 evaluation grade) – 7

Justification – This project was born from a recurring concern: how to improve the knowledge of inferential thought of basic education teachers, so that it reflects positively on their teaching practice of probability and statistics. The education of the mathematician, generally, and of the professor of mathematics, particularly, is typically insufficient regarding mathematical concepts of uncertainty and inductive thinking, both in content and in teaching techniques. This absence can be due to several factors, of which the most relevant, in our view, relate to the education of the students undergoing an Education degree in Mathematics, mainly in the following aspects: (a) the content of probability and statistics is usually seen in a single semester, which is little for a correct apprehension of the concepts involved; (b) the syllabus of the course of probability and statistics is generally extensive and inappropriate for the teaching practice, because it aims to educate a user of statistical tools, and not a professor with knowledge on the subject; and finally, (c) professors of this course in graduation typically do not develop specific pedagogical practices, which could be further explored by the future professor to adequately prepare him/her for his/her teaching practice. The successful experiences of research orientation on the proposed methodology naturally leads us to the expansion of academic discussions with other research centers in the area of mathematics education, particularly outside of Brazil.

Postgraduate Program 2 – SCIENCE AND MATHEMATICS EDUCATION

Capes evaluation (2017 evaluation grade) – 4

Justification – The PPG Multi-unit on Science and Mathematics Education (PECIM) has, in its own right to exist since its creation in 2011, the issue of education and its current challenges. Therefore, the theme Challenges of the 21st Century is one that clearly compasses it.

Postgraduate Program 3 – EDUCATION

Capes evaluation (2017 evaluation grade) – 5

Justification – We consider as principle the action of teaching/educating and its implications on the education of professors and other social actors; on the production of knowledge; on the practices of memories and stories; on the work and professionalization of the professor; on the formal (basic and higher education) and non-formal education contexts. Thus, we highlight the importance of research on these themes, as well as the relevance of studies on psychological, sociological, anthropological, philosophical and creative processes implicated in the complexity of educational, social and cultural phenomena aiming the development and the learnings of all people involved in several educational practices. We believe that the production of knowledge on the subject proposed is enriched when in dialogue with the problematizations from the studies on differences, diversities and inequalities, as well as the transversal dialogues involving art and language and transdisciplinarity. Art, culture and languages/literatures have been increasingly revealing their vocation to a transversality that is manifested not only on the artistic and cultural scope, but also is expanded by symbiotic associations

with different areas such as the health sciences, computer science, engineering, education, philosophy, history, anthropology and sociology. In this context, research on a type of inclusion that overcomes inequalities while respecting and preserving differences, and on forms of dialogue between the different ones is urgent. In this process, the education, the arts, the languages and the literatures of different populations are privileged starting points and means of mutual understanding for the joint search for spaces of inclusion. Therefore, we aim at intercultural and transdisciplinary research on the cultural collection of populations traditionally excluded and marginalized (in their local and global dimensions) and their direct effects on education, public policies and social movements.

Theme 21– Aging: a global challenge

Postgraduate Program 1 – GERONTOLOGY

Capes evaluation (2017 evaluation grade) – 5

Justification – Fragility is a syndrome that overlaps the normative losses resulting from aging. It is characterized as loss of ability to manage stressors and, in the medium and in the long term, as increased risk of disease, disability, falls, hospitalization and death. In 2008 and 2009 the PGPG/FCM/Unicamp evaluated 3,748 older people (+65 years), in probabilistic samples of 7 cities chosen by convenience (CNPQ 555082/2006-7). In 2016, a follow-up study of samples was initiated in Campinas (n=900) and in the subdistrict of Ermelindo Matarazzo, São Paulo (n=384). We added variables of life history, personality and self, cognition, functionality, nutrition and self-perceived quality of life, aiming to meet the objective of testing its effects on fragility, cognition, death, in cross-sectional, prospective and longitudinal studies. The additional objectives consist of testing models of: psychological resilience integrated by psychosocial variables and new models of fragility integrated by clinical, genetic, imaging, cognitive, and anthropometric variables; functionality, health, sociability, life history, subjective well-being and psychological, socioeconomic and demographic adjustment. Regarding the sub samples (+80 years), this project is shared by PGPG/FCM-Unicamp/UCB/UPF (project CAPESP/PROCAD 2972/2014), comparing the older people in the community, in long permanence institutions and in ambulatory care facilities. Our follow-up studies were supported by FAPESP and CNPq. Since 2012, a group of professors of this project works in a Brazilian Longitudinal Study of Aging (ELSI-Brazil), with representative sample of 9,412 individuals (+50), funded by MS and CNPQ. Part of an international effort for the conduction of longitudinal studies is coordinated by Maria Fernanda de Lima Costa. Professors of PGPG/FCM/Unicamp respond by module of psychosocial variables. Therefore, we have a considerable history of interdisciplinary and multicenter research, with a strong presence in about a hundred publications. We wish to broaden its scope by a resulting process of internalization supported by CAPES and by universities and research partners outside Brazil, with which we maintain contact: University College London; University of Michigan; Heidelberg University; German Centre of Gerontology; Heriot-Watt University, University of Edinburgh, University of Padova; University of East Anglia e University of Illinois.

Postgraduate Program 2 – PHYSICAL EDUCATION

Capes evaluation (2017 evaluation grade) – 4

Justification – The age limit between the adult and the older person is 65 years in developed nations and 60 years in developing countries. We highlight that the life expectancy in human beings has increased drastically throughout the world. The estimate is that Brazil will have approximately 30.9 million people with more than 60 years in 2020 and, in 2050, these will be 30% of the population, whereas life expectancy above this age group gradually increases (IBGE, 2009). Thus, the time of exposure to the physiological decline related to aging will also expand, raising the need for healthcare with the quality of life. This process implies major challenges involving the health and socioeconomic issues. Therefore, to understand the physiology of aging is of great importance to allow the healthy aging of the population with good quality of life. In this regard, we highlight the importance of evaluating the biological mechanisms involved in the aging process, because the body has several particularities that differ in the different stages of life. Considering the international partnerships linked to this project, the Universities of the European Community, United States of America (USA) and Japan have a long experience on this theme, since these countries have a high incidence of the older population. Regarding the Kyoto University, Japan, it was founded in 1897, and is the second oldest university in Japan and one of the most prestigious in the world, having produced five winners of the Nobel Prize and two of the Fields Medal. The University of Coimbra was founded in 1290, being Portugal's oldest university and one of the oldest in the world; with an unquestionable historical heritage, it celebrated 725 years in 2015. Since 2013, it is considered a UNESCO World Heritage Site. The University of Texas at Austin (UTA), USA, received the designation of R1 by the Carnegie Classification of Institutions of Higher Education. Such designation puts the University in an elite group of 115 institutions, including Harvard University, MIT and Johns Hopkins University. The Nova Southeastern University, USA, was founded in Fort Lauderdale, Florida, in 1964, during a historical period of social and cultural changes, and is classified as a University with "high research activity" by the Carnegie Foundation for the Advancement of Teaching, being one of only 50 universities around the country to be also awarded the Carnegie Community Engagement Classification.

Theme 22 - Transversal dialogues: art, language, knowledge

Postgraduate Program 1 – APPLIED LINGUISTICS

Capes evaluation (2017 evaluation grade) – 5

Justification – The current four lines of research conducted by the Postgraduate Program in Applied Linguistics (Languages and Technologies; Languages and Language Education; Languages, Cultures and Identities and Language and Translation) have been consolidated as transdisciplinary lines of investigation. This vocation, as verified by funded projects that resulted in publications and theses of reference in the field, has been achieved through cross-sectional dialogues primarily established with

the anthropology, the computer science, the education, the history, the linguistics (discourse analysis, pragmatics, sociolinguistics), the psychoanalysis, the semiotics and the sociology.

Postgraduate Program 2 – VISUAL ARTS

Capes evaluation (2017 evaluation grade) – 4

Justification – The Postgraduate Program in Visual Arts considers the relationships between art and its different modalities in the contemporary dimension of space and time, admitting studies from the theoretical field to the development of different processes of creation, in areas such as the two-dimensional and three-dimensional visual poetics, studies in the extended fields of three-dimensionality and its relationships with space and body, collective actions, architecture and city, the field of theories of image, history, criticism and art theory. The lines of action of the program take into account the epistemological perspectives from the field of visual arts, incorporating the traditional modalities and the new technologies of the artistic practice, without a distinction of value of supports. The program aims to articulate and promote critical and theoretical thinking, as well as research and practice in the context of contemporary artistic production. The different lines of investigation that cover the studies conducted by the faculty will participate in the theme: 1. The visual arts in its interface with the technology; 2. The visual arts, migration and cultural transfers; 3. The visual arts in its intersections, intertextualities and hybrids with other areas of knowledge. The first investigative front proposes the reflection on the relationship between art and technologies, in particular on the different approaches offered by these technologies in the field of recent visual culture, considering the expansion and hybridization of the expression fields and their repercussions from the perspective of art history, art and image theory. The second aims the analysis of the consequences of migrations and displacements, not only of objects and works, but also themes and concepts for art and artistic production. It will reflect, therefore, on the migration of images, concepts and objects between different regions, institutions and countries throughout history and its repercussions in the field of art. The third front, in turn, will investigate the connections and intertextualities of the visual arts, in their traditional modalities (drawing, painting, sculpture and engraving), with the photography, the cinema, the literature, the architecture and the design, starting from texts, iconographic inventories and accurate case studies and understanding that these connections, in the contemporary scene, are marked by reciprocal hybrids.

Postgraduate Program 3 – PERFORMING ARTS

Capes evaluation (2017 evaluation grade) – 5

Justification – The Postgraduate Program in Performing Arts has as objective the training of qualified personnel to act in research and teaching in the field of the performing arts – theater, dance and performance, in dialogue or not with other in-person arts. It is based on a conception of contemporary art as critical perspective of the present, which drives a confrontation of dilemmas experienced in the field of the performing arts by contemporary artists. Therefore, the production of knowledge in performing arts must also be investigated according with historical, regional and topological experiences, leading to the production of multiple perspectives that nourish a theoretical thinking in tune with basal and emerging issues from the artistic practice itself. By understanding art as interdisciplinary

in its essence, the master and PhD courses have been educating artists/researchers based on the overlapping of the frontiers of dance, theater and performance, recognizing this crossing as a reflection of a larger evolutionary and revolutionary movement in the performing arts in Brazil and in other countries. This Program has three lines of research: (i) Techniques and Training Processes for the Performing Artist; (ii) Scene Languages and Poetics; and (iii) art and Context, which operate transversely establishing a dialogue between dance, performance and theater in a radial structure, having the subject – body on stage – as the center, forming and being constituted by the language that it radiates and that circumscribes the poetic scene. Both, poetics and subject, generate and are generated in the vast fabric of cultures, faced as contexts, and make it based on research in the field of technique that leads to the education of the performing artist as a thinking and acting being, in a social context that is reflected in it and that the artist, when producing art, also reflects. Therefore, the Program proposes a transversal perspective for the understanding of the lines of research. The choice of the theme “Transversal dialogues: art, language, knowledge” points to a deepening of the vocation of the Postgraduate Program in Performing Arts: to investigate the contemporary scene, its processes and insertions in the field of arts and culture; to investigate the artistic productions, both in their roots and regional and topological manifestations, and in the amplitude of the general fields in which they fit to, anchored in the overlapping of cultures, historical trajectories, episteme and artistic procedures, based on techniques, systems and methods of thinking and action.

Postgraduate Program 4 – MUSIC

Capes evaluation (2017 evaluation grade) – 6

Justification – The current context of the Brazilian public universities causes the indispensable reflection on the role of the Universities before society in which it operates, justifying their actual missions – that, beyond providing education of professionals qualified for the job market, complies with this task in close connection with the dimensions of research and innovation, which, in turn, require from the university actors (especially professors and researchers) constant reviewing of the structures of their education courses and, often, resizing of the epistemic fields in which (and including) such training takes place. Consequently, if universities are generally structured in teaching units designed by areas of knowledge, these same areas are under process of constant redefinition given the inter- and transdisciplinary frictions that appear for researchers when, during development of research, they meet the other – the other researcher, the other area of knowledge. In this context, this project aims to encourage new ways of conducting interdisciplinary research involving the performing arts, music and technology, so these new ways are not restricted to the mere development of apparatus to be used in the artistic creation, but so they put researchers in different areas of knowledge effectively on the jump. For this purpose, the theme of Digital Humanities, which are expensive to overcome the dichotomies between the humanities and the engineering and computer science areas and the social and anthropological appropriation of technologies, is a fruitful territory to conduct this project, namely: by holding hands and with eyes wide open, to help reinventing the university mission when disregarding the specific locus and providing researchers (professors and students) the development of technology, producing art whether being engineers, technicians or technologists. We live, after all, at a time that

demands from us the reinvention of our missions as researchers towards new ways of making science in the creation and in the creation in science.

Postgraduate Program 5 – LINGUISTICS

Capes evaluation (2017 evaluation grade) – 7

Justification – Through joint research with international centers of excellence, this transdisciplinary project starts from a linguistic perspective aiming to collaborate in the international scope for a better understanding of the phenomenon of human knowledge, in its esthetic, ethical and political dimension. For this purpose, we must approach, on one side, the "art" or "technique" (*ars* in Latin; *techné* in Greek) of the verbal language, whereas, ethical aspects – i.e., the implication regarding the customs (ethos) and actions – that involve those who produce and receive texts (spoken or written) in the most diverse periods and contexts. On the other hand, under this same perspective, we must approach the relationship between verbal language and the other employed both in other arts (for example, body and visual) and in other kinds of knowledge produced (scientific, political, journalistic, etc.).

Postgraduate Program 6 – THEORY AND HISTORY OF LITERATURE

Capes evaluation (2017 evaluation grade) – 7

Justification – The theme aims the discussion of some critical categorizations, both Italian and Brazilian, that shaped and defined the courses of the art, language and knowledge in their relations with the literature. The comparative interest is based on the approaches and distances that these discussions bring for both critical perspectives.

Activities Linked to the Themes

Theme 1– Food, Health and Society

Goal 1 – Studying food in relation to its production, technology, consumers, market and bioactivity

Activity 1 – To qualify abroad professors in the area; participation in events abroad; develop projects focused on the theme

Start date – 08/2018 **End date – 07/2022**

Description – To conduct study mission and post-doctoral research abroad; Participate in conferences, workshops, international fairs related to the theme; conduct missions and research in partnership with foreign partner universities.

Activity 1 – Indicator 1

Type – Quantitative

Indicator – Number of articles published in international cooperation per year

Current situation – 40

Goal for the 2nd year – 45

Final goal – 60

Activity 1 – Indicator 2

Type – Qualitative

Indicator – Training of the technical staff and graduate students in foreign languages

Current situation – limited regarding the technical staff and at intermediate level regarding the student body

Goal for the 2nd year – Increase training

Final goal – Increase training

Activity 1 – Indicator 3

Type – Quantitative

Indicator – Number of disciplines taught exclusively or partially in another language

Current situation – 4

Goal for the 2nd year – 6

Final goal – 8

Activity 1 – Indicator 4

Type – Quantitative

Indicator – Number of visiting professors every two years

Current situation – 1

Goal for the 2nd year – 2

Final goal – 4

Activity 1 – Indicator 5

Type – Qualitative

Indicator – Organization of workshops/meetings formed by focus (themed) groups to assess the progress of the goals related to qualitative and quantitative indicators and make potential adjustments.

Current situation – Indicators unavailable

Goal for the 2nd year – 4

Final goal – 16

Activity 1 – Indicator 6

Type – Quantitative

Indicator – Number of published articles indexed to JCR per year

Current situation – 70

Goal for the 2nd year – 80

Final goal – 90

Activity 1 – Indicator 7

Type – Quantitative

Indicator – Number of projects in international cooperation

Current situation – 4

Goal for the 2nd year – 7

Final goal – 9

Activity 1 – Indicator 8

Type – Quantitative

Indicator – Number of professors with experience abroad

Current situation – 12

Goal for the 2nd year – 14

Final goal – 16

Theme 2– Investigation of Complex, Natural and Artificial Systems

Goal 1 – Analysis and development of theoretical models and computational tools for studying the structure and evolution of complex systems.

Activity 1 – To qualify faculty and graduate students abroad and consolidate existing international partners, encouraging and establishing new partnerships and international projects

Start date – 08/2018 **End date – 07/2022**

Description – To organize study missions for faculty and graduate students; Encourage post-doctoral internship abroad; Participate in international congresses and workshops related to the theme; conduct research missions; conduct research in partnership with foreign universities; establish new and strengthen and consolidate collaborations with foreign researchers; attract young talent from abroad for the graduate program and high-level post-doctoral students; human resources training through the participation of students in research group courses and internships abroad; arrange short visits of lecturers from universities abroad for graduate courses in English and interaction with the groups involved; encourage the participation in conferences to be accompanied by short visits to renowned institutions; develop projects focused on the theme; ensure regular flow of visitors; strengthen and broaden ties and collaborations with other research traditional groups from Spain, Italy, United Kingdom, Germany, France, United States, Canada, Japan, among others.

Activity 1 – Indicator 1

Type – Quantitative

Indicator – Number of professors with experience abroad

Current situation – 57

Goal for the 2nd year – 59

Final goal – 62

Activity 1 – Indicator 2

Type – Quantitative

Indicator – Number of Brazilian students in study mission abroad

Current situation – 17

Goal for the 2nd year – 20

Final goal – 22

Activity 1 – Indicator 3

Type – Quantitative

Indicator – Number of published articles indexed to JCR

Current situation – 152

Goal for the 2nd year – 187

Final goal – 227

Activity 1 – Indicator 4

Type – Quantitative

Indicator – Number of visiting professors

Current situation – 33

Goal for the 2nd year – 35

Final goal – 40

Activity 1 – Indicator 5

Type – Quantitative

Indicator – Number of articles published in international cooperation

Current situation – 84

Goal for the 2nd year – 111

Final goal – 140

Activity 1 – Indicator 6

Type – Quantitative

Indicator – Number of projects in international cooperation

Current situation – 35

Goal for the 2nd year – 45

Final goal – 62

Activity 1 – Indicator 7

Type – Qualitative

Indicator – Training of the technical staff and graduate students in foreign languages

Current situation – limited regarding the technical staff and at intermediate level regarding the student body

Goal for the 2nd year – Increase training

Final goal – Increase training

Activity 1 – Indicator 8

Type – Qualitative

Indicator – Organization of workshops/meetings formed by focus (themed) groups to assess the progress of the goals related to qualitative and quantitative indicators and make potential adjustments.

Current situation – Indicators unavailable

Goal for the 2nd year – Elaborate qualitative indicators with appointment of intermediate indicators

Final goal – Appointment of final indicators

Activity 1 – Indicator 9

Type – Quantitative

Indicator – Number of disciplines taught exclusively or partially in another language

Current situation – 3

Goal for the 2nd year – 6

Final goal – 9

Theme 3– Science and Information Technology

Goal 1 – Developing the theoretical fundaments and exploring techniques, methods and tools aimed at the understanding of information sciences and technology

Activity 1 – To qualify faculty and graduate students abroad. Consolidate existing international partners, encouraging and establishing new partnerships and international projects.

Start date – 08/2018 **End date – 07/2022**

Description – To conduct study missions for faculty and graduate students. Encourage post-doctoral internship abroad, as well as sandwich doctorate in order to improve academic training in a research environment of excellence. Develop projects in partnership focusing on the theme, increasing the number of publications co-authored with foreign researchers in international journals. Ensure regular flow of visitors and experts and post-doctoral students from abroad to work in joint research; strengthen and broaden ties and collaborations with other traditional research groups from Spain, Italy, United Kingdom, Germany, France, United States, Canada (especially U. of Alberta), Denmark (U. Copenhagen), Scotland (Edinburgh Center for Robotics), Japan, Luxembourg, among others. Participate in international congresses and workshops related to the theme; establish new and

strengthen and consolidate collaborations with foreign researchers. Attract young talent from abroad for the graduate program and high-level post-doctoral students. Arrange short visits of lecturers from international universities for graduate courses in English and interaction with the groups involved. Encourage the participation in conferences abroad to be accompanied by short visits to renowned institutions. Create new research projects about related themes aiming at joint financing. Establishment of agreements for double doctorate degree, and agreements in the framework of the Erasmus+ program.

Activity 1 – Indicator 1
Type – Qualitative
Indicator – Organization of workshops/meetings formed by focus (themed) groups to assess the progress of the goals related to qualitative and quantitative indicators and make potential adjustments.
Current situation – Indicators unavailable
Goal for the 2nd year – Elaborate qualitative indicators with appointment of intermediate indicators
Final goal – Appointment of final indicators

Activity 1 – Indicator 2
Type – Quantitative
Indicator – Number of projects in international cooperation
Current situation – 8
Goal for the 2nd year – 16
Final goal – 28

Activity 1 – Indicator 3
Type – Quantitative
Indicator – Number of published articles indexed to JCR
Current situation – 63
Goal for the 2nd year – 94
Final goal – 139

Activity 1 – Indicator 4
Type – Quantitative
Indicator – Number of disciplines taught exclusively or partially in another language
Current situation – 5
Goal for the 2nd year – 8
Final goal – 12

Activity 1 – Indicator 5

Type – Quantitative

Indicator – Number of visiting professors

Current situation – 11

Goal for the 2nd year – 22

Final goal – 42

Activity 1 – Indicator 6

Type – Quantitative

Indicator – Number of articles published in international cooperation

Current situation – 23

Goal for the 2nd year – 48

Final goal – 94

Activity 1 – Indicator 7

Type – Qualitative

Indicator – Number of professors with experience abroad

Current situation – 42

Goal for the 2nd year – 50

Final goal – 55

Activity 1 – Indicator 8

Type – Quantitative

Indicator – Training of the technical staff and graduate students in foreign languages

Current situation – limited regarding the technical staff and at intermediate level regarding the student body

Goal for the 2nd year – Increase training

Final goal – Increase training

Activity 1 – Indicator 9

Type – Quantitative

Indicator – Number of Brazilian students in study mission abroad

Current situation – 6

Goal for the 2nd year – 8

Final goal – 10

Theme 4– Nanotechnology

Goal 1 – Nanotechnology and new materials.

Activity 1 – To qualify faculty and graduate students abroad. Consolidate existing international partners, encouraging and establishing new partnerships and international projects.

Start date – 08/2018 **End date – 07/2022**

Description – To conduct study missions for faculty and graduate students. Encourage post-doctoral internship abroad, as well as sandwich doctorate in order to improve academic training in a research environment of excellence. Develop projects in partnership focused on the theme, increasing the number of publications co-authored with foreign researchers in international journals. Ensure regular flow of visitors and experts and post-doctoral students to work in joint research; strengthen and broaden ties and collaborations with other traditional research groups. Participate in international congresses and workshops related to the theme; establish new and strengthen and consolidate collaborations with foreign researchers. Attract young talent from abroad for the graduate program and high-level post-doctoral students. Arrange short visits of lecturers from international universities for graduate courses in English and interaction with the groups involved. Encourage the participation in conferences abroad to be accompanied by short visits to renowned institutions. Create new research projects about related themes aiming at joint financing.

Activity 1 – Indicator 1

Type – Quantitative

Indicator – Number of professors with experience abroad

Current situation – 65

Goal for the 2nd year – 66

Final goal – 67

Activity 1 – Indicator 2

Type – Quantitative

Indicator – Number of projects in international cooperation

Current situation – 5

Goal for the 2nd year – 11

Final goal – 21

Activity 1 – Indicator 3

Type – Quantitative

Indicator – Number of articles published in international cooperation

Current situation – 315

Goal for the 2nd year – 345

Final goal – 416

Activity 1 – Indicator 4

Type – Quantitative

Indicator – Number of visiting professors

Current situation – 1

Goal for the 2nd year – 4

Final goal – 7

Activity 1 – Indicator 5

Type – Qualitative

Indicator – Organization of workshops/meetings formed by focus (themed) groups to assess the progress of the goals related to qualitative and quantitative indicators and make potential adjustments.

Current situation – Indicators unavailable

Goal for the 2nd year – Elaborate qualitative indicators with appointment of intermediate indicators

Final goal – Appointment of final indicators

Activity 1 – Indicator 6

Type – Quantitative

Indicator – Number of Brazilian students in study mission abroad

Current situation – 11

Goal for the 2nd year – 21

Final goal – 47

Activity 1 – Indicator 7

Type – Qualitative

Indicator – Training of the technical staff and graduate students in foreign languages

Current situation – limited regarding the technical staff and at intermediate level regarding the student body

Goal for the 2nd year – Increase training

Final goal – Increase training

Activity 1 – Indicator 8

Type – Quantitative

Indicator – Number of published articles indexed to JCR

Current situation – 363

Goal for the 2nd year – 406

Final goal – 489

Activity 1 – Indicator 9

Type – Quantitative

Indicator – Number of disciplines taught exclusively or partially in another language

Current situation – 3

Goal for the 2nd year – 5

Final goal – 11

Activity 1 – Indicator 10

Type – Quantitative

Indicator – Number of foreign postdocs

Current situation – 2

Goal for the 2nd year – 2

Final goal – 3

Theme 5– The challenges of democracy

Goal 1 – Understanding democracy and democratic processes based on the new challenges being faced in the 21st century from an interdisciplinary approach.

Activity 1 – To increase the presence of professors and students in foreign universities, aiming at training, joint research and international publication.

Start date – 08/2018 **End date – 07/2022**

Description – To conduct work mission abroad; Scholarships of senior and junior professors; Enable professors and students to take short courses abroad; Send students abroad for sandwich doctorate internship.

Activity 1 – Indicator 1

Type – Quantitative

Indicator – Number of work missions abroad, in accumulated years. Current status refers to one year.

Current situation – 3

Goal for the 2nd year – 5

Final goal – 9

Activity 1 – Indicator 2

Type – Quantitative

Indicator – Number of scholarships for sandwich doctorate internship abroad, in accumulated years. Current status refers to one year.

Current situation – 7

Goal for the 2nd year – 20

Final goal – 33

Activity 2 – To increase the presence of foreign professors and students in our University, aiming at teaching, training, joint research and international publication.

Start date – 08/2018 **End date – 07/2022**

Description – To attract professors of excellence from international universities to conduct short courses; Increase the number of seminars and events in international Programs; Attract young talent with international experience; Attract researchers with experience abroad for post-doctoral research; improve the international disclosure of public notices (selection process, post-doctoral research and competitions of Programs); provide training in a foreign language to the professional staff; Offer courses in English.

Activity 2 – Indicator 1

Type – Quantitative

Indicator – Number of international events with foreign participants, in accumulated years. Current status refers to one year.

Current situation – 2

Goal for the 2nd year – 3

Final goal – 5

Activity 2 – Indicator 2

Type – Qualitative

Indicator – The staff will be trained specially in English and/or Spanish in order to meet the needs of students and foreign professors of our programs.

Current situation – non-existent

Goal for the 2nd year – offering of vacancies in language courses for employees

Final Goal – offering of vacancies in language courses for employees

Activity 2 – Indicator 3

Type – Qualitative

Indicator – Translation and disclosure of public notices to the priority countries on this theme

Current situation – non-existent

Goal for the 2nd year – our public notices are known by one part of the network of foreign universities that are part of this theme.

Final goal – that our public notices become known by all the network of foreign universities that are related to this theme.

Activity 2 – Indicator 4

Type – Qualitative

Indicator – Number of visiting professors in Brazil, in accumulated years, to teach short- and long-duration courses. Current status refers to one year.

Current situation – 3

Goal for the 2nd year – 5

Final goal – 8

Activity 2 – Indicator 5

Type – Quantitative

Indicator – Number of eventual and regular disciplines offered in English, per year, in programs related to the theme.

Current situation – 1

Goal for the 2nd year – 2

Final goal – 4

Theme 6

Theme 6– Difference, diversity and inequality

Goal 1 – Studying production processes in their relations with diversity and inequalities and bodily practices in/of cities and their impacts on the urban setting and on public spaces.

Activity 1 – To increase the presence of professors and students in foreign universities, aiming at training, joint research and international publication.

Start date – 08/2018 **End date – 07/2022**

Description – To conduct work mission abroad; Scholarships of senior and junior professors; Enable professors and students to take short courses abroad; Send students abroad for sandwich doctorate internship.

Activity 1 – Indicator 1

Type – Quantitative

Indicator – Number of workshops for students and professors focused on scientific writing (in foreign language) in the areas and lines of research of the programs.

Current situation – 0

Goal for the 2nd year – 2

Final goal – 4

Activity 1 – Indicator 2

Type – Quantitative

Indicator – Number of scholarships for sandwich doctorate internship abroad, in accumulated years. Current status refers to one year.

Current situation – 10

Goal for the 2nd year – 25

Final goal – 40

Activity 1 – Indicator 3

Type – Quantitative

Indicator – Number of work missions abroad, in accumulated years. Current status refers to one year.

Current situation – 13

Goal for the 2nd year – 16

Final goal – 19

Activity 2 – To strengthen the academic relations between Postdocs/Graduate students and Undergraduates

Start date – 08/2018 **End date – 07/2022**

Description – To strengthen the academic relations between Postdocs/Graduate students (mainly foreigners and with international experience) and Undergraduates through faculty internships – PED scholarships – and participation in boards of undergraduate research, for example, as well as encourage greater participation of Post-doctoral students, Graduate students and Undergraduates in the organization (scientific and/or work committee) of activities involving international partnerships.

Activity 2 – Indicator 1

Type – Qualitative

Indicator – Integration of undergraduate and graduate students

Current situation – non-existent

Goal for the 2nd year – It is important not only to maintain but also to increase the number of scholarships for PED (Faculty Internship Programs) and raise graduate students' awareness on the importance of their participation in academic activities involving graduation.

Final goal – To consolidate and expand the number of PED scholarships in the programs, systematize the participation of graduate students in academic activities. To stimulate the undergraduates to know the practice of a more advanced research.

Activity 3 – To increase the presence of foreign professors and students in our University, aiming at teaching, training, joint research and international publication.

Start date – 08/2018 **End date – 07/2022**

Description – To attract professors of excellence from international universities to conduct short courses; Increase the number of seminars and events in international Programs; Attract young talent with international experience; Attract researchers with experience abroad for post-doctoral research; improve the international disclosure of public notices (selection process, post-doctoral research and competitions of Programs); provide training in a foreign language to the professional staff; Offer courses in English.

Activity 3 – Indicator 1

Type – Quantitative

Indicator – Number of eventual and regular disciplines offered in English, per year, in programs related to the theme.

Current situation – 2

Goal for the 2nd year – 4

Final goal – 7

Activity 3 – Indicator 2

Type – Quantitative

Indicator – Number of visiting professors in Brazil, in accumulated years, to teach short- and long-duration courses. Current status refers to one year.

Current situation – 11

Goal for the 2nd year – 18

Final goal – 30

Activity 3 – Indicator 3

Type – Qualitative

Indicator – Translation and disclosure of public notices to the priority countries on this theme

Current situation – non-existent

Goal for the 2nd year – that our public notices become known by one part of the network of foreign universities that are part of this theme.

Final goal – that our public notices become known by all the network of foreign universities that are part of this theme.

Activity 3 – Indicator 4

Type – Quantitative

Indicator – Number of international events with foreign participants, in accumulated years. Current status refers to one year.

Current situation – 2

Goal for the 2nd year – 5

Final goal – 8

Theme 7– Methodology, epistemology and language

Goal 1 – Encouraging cutting-edge researches and optimal training in innovative techniques and methods in the humanities and language studies

Activity 1 – To increase the presence of professors and students in foreign universities, aiming at training, joint research and international publication.

Start date – 08/2018 **End date – 07/2022**

Description – To conduct work mission abroad; Scholarships for a foreign country granted to senior and junior professors; Enable professors and students to take short courses abroad; Send students abroad for sandwich doctorate internship.

Activity 1 – Indicator 1

Type – Quantitative

Indicator – Number of work missions abroad, in accumulated years. Current status refers to one year.

Current situation – 12

Goal for the 2nd year – 15

Final goal – 18

Activity 1 – Indicator 2

Type – Quantitative

Indicator – Number of workshops for students and professors focused on scientific writing (in foreign language) in the areas and lines of research of the programs.

Current situation – 0

Goal for the 2nd year – 2

Final goal – 4

Activity 1 – Indicator 3

Type – Quantitative

Indicator – Number of scholarships for sandwich doctorate internship abroad, in accumulated years. Current status refers to one year.

Current situation – 13

Goal for the 2nd year – 30

Final goal – 52

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Activity 2 – To strengthen the academic relations between Postdocs/Graduate students and Undergraduates

Start date – 08/2018 **End date – 07/2022**

Description – To strengthen the academic relations between Postdocs/Graduate students (mainly foreigners and those with international experience) and Undergraduates through faculty internships – PED scholarships – and participation in boards of undergraduate research, for example, as well as encourage greater participation of Post-doctoral students, Graduate students and Undergraduates in the organization (scientific and/or work committee) of activities involving international partnerships.

Activity 2 – Indicator 1

Type – Qualitative

Indicator – Integration of undergraduate and graduate students

Current situation – non-existent

Goal for the 2nd year – It is important not only to maintain but also to increase the number of scholarships for PED (Faculty Internship Programs) and raise the graduate students' awareness of the importance of their participation in academic activities involving graduation.

Final goal – To consolidate and expand the number of PED scholarships in the programs, systematize the participation of graduate students in the academic activities. To stimulate the undergraduates to learn the practice of a more advanced research.

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Activity 3 – To increase the presence of foreign professors and students in our University, aiming at teaching, training, joint research and international publication.

Start date – 08/2018 **End date – 07/2022**

Description – To attract professors of excellence from international universities to teach short courses; Increase the number of seminars and events in international Programs; Attract young talent with international experience; Attract researchers with experience abroad for post-doctoral research; improve

the international disclosure of public notices (selection process, post-doctoral research and competitions of Programs); provide training in a foreign language to the professional staff; Offer courses in English.

Activity 3 – Indicator 1

Type – Quantitative

Indicator – Number of visiting professors in Brazil, in accumulated years, to teach short- and long-duration courses. Current status refers to one year.

Current situation – 12

Goal for the 2nd year – 15

Final goal – **1**8

Activity 3 – Indicator 2

Type – Quantitative

Indicator – Number of international events with foreign participants, in accumulated years. Current status refers to one year.

Current situation – 14

Goal for the 2nd year – 18

Final goal – 22

Activity 3 – Indicator 3

Type – Qualitative

Indicator – Translation and disclosure of public notices to the priority countries on this theme

Current situation – non-existent

Goal for the 2nd year – that our public notices become known by one part of the network of foreign universities that are part of this theme.

Final goal – that our public notices become known by all the network of foreign universities that are part of this theme.

Activity 3 – Indicator 4

Type – Qualitative

Indicator – The staff will be trained specially in English and/or Spanish in order to meet the needs of students and foreign professors of our programs.

Current situation – non-existent

Goal for the 2nd year – offering of vacancies in language courses for employees

Final Goal – offering of vacancies in language courses for employees

Activity 3 – Indicator 5

Type – Quantitative

Indicator – Number of eventual and regular disciplines offered in English, per year, in programs related to the theme.

Current situation – 2

Goal for the 2nd year – 5

Final goal – 5

Theme 8– State, policies and education

Goal 1 – Investigating the interfaces of public education policies with the State and society.

Activity 1 – To increase the presence of professors and students in foreign universities, aiming at training, joint research and international publication.

Start date – 08/2018 **End date – 07/2022**

Description – To conduct work mission abroad; Scholarships of senior and junior professors; Send students for sandwich doctorate internship abroad.

Activity 1 – Indicator 1

Type – Quantitative

Indicator – Number of work missions abroad, in accumulated years. Current status refers to one year.

Current situation – 8

Goal for the 2nd year – 9

Final goal – 11

Activity 1 – Indicator 4

Type – Quantitative

Indicator – Number of scholarships for sandwich doctorate internship abroad, in accumulated years. Current status refers to one year.

Current situation – 13

Goal for the 2nd year – 15

Final goal – **18**

Activity 2 – To strengthen international partnerships.

Start date – 08/2018 **End date – 07/2022**

Description – We will seek to strengthen our international partnerships through the formalization of agreements.

Activity 2 – Indicator 1

Type – Quantitative

Indicator – Number of formalized agreements.

Current situation – 2

Goal for the 2nd year – 14

Final goal – 86

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Activity 3 – To increase the presence of foreign professors and students in our University, aiming at teaching, training, joint research and international publication.

Start date – 08/2018 **End date – 07/2022**

Description – To attract professors from international universities of excellence to teach short-and long-duration courses. The arrival of foreign professors is fundamental to academic exchanges, aiming at the generation of research and joint publications. The arrival can occur through scholarships in the country, as visiting professor, young talent and postdoc with experience abroad.

Activity 3 – Indicator 1

Type – Quantitative

Indicator – Number of eventual and regular disciplines offered in English, per year, in programs related to the theme.

Current situation – 1

Goal for the 2nd year – 2

Final goal – 4

Activity 3 – Indicator 2

Type – Quantitative

Indicator – Number of visiting professors in Brazil, in accumulated years, to teach short- and long-duration courses. Current status refers to one year.

Current situation – 0

Goal for the 2nd year – 1

Final goal – 2

Activity 3 – Indicator 3

Type – Quantitative

Indicator – Number of international events with foreign participants, in accumulated years. Current status refers to one year.

Current situation – 1

Goal for the 2nd year – 3

Final goal – 4

Theme 9– Genomics, Metabolomics and Proteomics

Goal 1 – Obtaining, storing, analyzing, interpreting and processing biological data on a large scale.

Activity 1 – To qualify professors in the area abroad; participation in events abroad; develop projects focused on the theme

Start date – 08/2018 **End date – 07/2022**

Description – To conduct study mission of post-doctoral research abroad; Participate in conferences, workshops, international fairs related to the theme; conduct missions and research in partnership with foreign partner universities.

Activity 1 – Indicator 1

Type – Quantitative

Indicator – Number of articles published in international cooperation

Current situation – 486

Goal for the 2nd year – 520

Final goal – 600

Activity 1 – Indicator 2

Type – Quantitative

Indicator – Number of projects in international cooperation

Current situation – 210

Goal for the 2nd year – 230

Final goal – 250

Activity 1 – Indicator 3

Type – Quantitative

Indicator – Number of Brazilian students in study mission abroad

Current situation – 50

Goal for the 2nd year – 60

Final goal – 80

Activity 1 – Indicator 4

Type – Quantitative

Indicator – Number of professors with experience abroad

Current situation – 140

Goal for the 2nd year – 150

Final goal – 160

Activity 1 – Indicator 5

Type – Quantitative

Indicator – Number of articles published with JCR

Current situation – 1900

Goal for the 2nd year – 1728

Final goal – 2200

Activity 1 – Indicator 6

Type – Quantitative

Indicator – Number of articles with foreign co-authorship

Current situation – 486

Goal for the 2nd year – 520

Final goal – 600

Activity 1 – Indicator 7

Type – Quantitative

Indicator – Number of students with fluency in another language

Current situation – 426

Goal for the 2nd year – 520

Final goal – 600

Activity 1 – Indicator 8

Type – Quantitative

Indicator – Percentage of technical staff with fluency in another language.

Current situation – 15

Goal for the 2nd year – 20

Final goal – 30

Activity 1 – Indicator 9

Type – Qualitative

Indicator – Organization of workshops/meetings formed by focus (themed) groups after approval of the project to develop the qualitative indicators, assessment of these indicators at the end of the second year and at the end of the project

Current situation – Indicators unavailable
Goal for the 2nd year – Elaborate qualitative indicators with appointment of intermediate indicators
Final goal – Appointment of final indicators

Activity 1 – Indicator 10
Type – Quantitative
Indicator – Percentage of classes taught in a foreign language
Current situation – 10
Goal for the 2nd year – 15
Final goal – 20

Theme 10– Study and use of Biodiversity

Goal 1 – Description and characterization of biological organisms and studies aimed at strategies for the maintenance and sustainable use of biodiversity.

Activity 1 – To qualify professors abroad; doctoral students and experts in the area; participation in events abroad; develop projects focused on the theme
Start date – 08/2018 **End date – 07/2022**
Description – To conduct study mission and post-doctoral research abroad; Participate in conferences, workshops, international fairs related to the theme; conduct missions and research in partnership with foreign partner universities.

Activity 1 – Indicator 1
Type – Qualitative
Indicator – workshops/meetings formed by focus (themed) groups after approval of the project to develop the qualitative indicators, assessment of these indicators at the end of the second year and at the end of the project
Current situation – Indicators unavailable
Goal for the 2nd year – Elaborate qualitative indicators with appointment of intermediate indicators
Final goal – Appointment of final indicators

Activity 1 – Indicator 2
Type – Quantitative
Indicator – Number of articles with foreign co-authorship
Current situation – 301
Goal for the 2nd year – 320
Final goal – 400

Activity 1 – Indicator 3

Type – Quantitative

Indicator – Percentage of classes taught in a foreign language

Current situation – 10

Goal for the 2nd year – 15

Final goal – **20**

Activity 1 – Indicator 4

Type – Quantitative

Indicator – Number of projects in cooperation

Current situation – 105

Goal for the 2nd year – 110

Final goal – 120

Activity 1 – Indicator 5

Type – Quantitative

Indicator – Number of articles published with JCR

Current situation – 620

Goal for the 2nd year – 650

Final goal – 1000

Activity 1 – Indicator 6

Type – Quantitative

Indicator – Number of students with fluency in another language

Current situation – 320

Goal for the 2nd year – 350

Final goal – 480

Activity 1 – Indicator 7

Type – Quantitative

Indicator – Number of professors with experience abroad

Current situation – 102

Goal for the 2nd year – 110

Final goal – 115

Activity 1 – Indicator 8

Type – Quantitative

Indicator – Percentage of technical staff with fluency in another language.

Current situation – 15

Goal for the 2nd year – 20
Final goal – 30

Activity 1 – Indicator 9
Type – Quantitative
Indicator – Number of articles published in international cooperation
Current situation – 301
Goal for the 2nd year – 320
Final goal – 400

Activity 1 – Indicator 10
Type – Quantitative
Indicator – Number of Brazilian students in study mission abroad
Current situation – 15
Goal for the 2nd year – 20
Final goal – 30

Theme 11– Energy sources and Energy Matrices: Development, Integration, Sustainability and Technological Innovation
Goal 1 – Advancing scientifically and technologically in the development, sustainability and innovation of procedures and processes related to energy sources and energy arrays.

Activity 1 – To qualify professors abroad, doctoral students and experts in the area; participate in events abroad and stimulate short-duration visits of lecturers outside the country; develop projects focused on the theme, attract professors of international universities of excellence to teach short- and long-duration courses; attract young talent with international experience.
Start date – 08/2018 **End date – 07/2022**
Description – To conduct study mission of post-doctoral research abroad; participate in conferences, workshops, international fairs related to the theme; conduct short-duration missions and research in partnership with foreign partner universities.

Activity 1 – Indicator 1
Type – Quantitative
Indicator – Number of articles published in international cooperation
Current situation – 52
Goal for the 2nd year – 81
Final goal – 112

Activity 1 – Indicator 2

Type – Quantitative

Indicator – Number of professors with experience abroad

Current situation – 50

Goal for the 2nd year – 55

Final goal – 60

Activity 1 – Indicator 3

Type – Quantitative

Indicator – Attraction of foreign postdocs

Current situation – 5

Goal for the 2nd year – 11

Final goal – 18

Activity 1 – Indicator 4

Type – Quantitative

Indicator – Number of visiting professors

Current situation – 3

Goal for the 2nd year – 5

Final goal – **8**

Activity 1 – Indicator 5

Type – Qualitative

Indicator – Training of the technical staff and graduate students in foreign languages

Current situation – limited regarding the technical staff and at intermediate level regarding the student body

Goal for the 2nd year – Increase training

Final goal – Increase training

Activity 1 – Indicator 6

Type – Quantitative

Indicator – Percentage of disciplines taught exclusively or partially in another language

Current situation – 10

Goal for the 2nd year – 20

Final goal – 30

Activity 1 – Indicator 7

Type – Qualitative

Indicator – Organization of workshops/meetings formed by focus (themed) groups to assess the progress of the goals related to qualitative and quantitative indicators and make potential adjustments.

Current situation – Indicators unavailable

Goal for the 2nd year – Elaborate qualitative indicators with appointment of intermediate indicators

Final goal – Appointment of final indicators

Activity 1 – Indicator 8

Type – Quantitative

Indicator – Number of projects in international cooperation

Current situation – 30

Goal for the 2nd year – 36

Final goal – 48

Activity 1 – Indicator 9

Type – Quantitative

Indicator – Number of Brazilian students in study mission abroad

Current situation – 25

Goal for the 2nd year – 28

Final goal – 30

Activity 1 – Indicator 10

Type – Quantitative

Indicator – Missions of professors abroad

Current situation – 0

Goal for the 2nd year – 2

Final goal – **5**

Theme 12– Design and development of products and processes

Goal 1 – Researching and establishing new strategies and technologies related to the design of innovative products and production processes

Activity 1 – To qualify professors abroad, doctoral students and experts in the area; participate in events abroad and stimulate short-duration visits of lecturers outside the country; develop projects focused on the theme, attract professors of international universities of excellence to teach short- and long-duration courses; attract young talent with international experience.

Start date – 08/2018 **End date – 07/2022**

Description – To conduct study mission of post-doctoral research abroad; participate in conferences, workshops, international fairs related to the theme; conduct short-duration missions and research in partnership with foreign partner universities.

Activity 1 – Indicator 1

Type – Qualitative

Indicator – Organization of workshops/meetings formed by focus (themed) groups to assess the progress of the goals related to qualitative and quantitative indicators and make potential adjustments.

Current situation – Indicators unavailable

Goal for the 2nd year – Elaborate qualitative indicators with appointment of intermediate indicators

Final goal – Appointment of final indicators

Activity 1 – Indicator 2

Type – Quantitative

Indicator – Number of disciplines taught exclusively or partially in another language

Current situation – 1

Goal for the 2nd year – 3

Final goal – 5

Activity 1 – Indicator 3

Type – Quantitative

Indicator – Number of visiting professors

Current situation – 1

Goal for the 2nd year – 6

Final goal – 12

Activity 1 – Indicator 4

Type – Quantitative

Indicator – Missions of professors abroad

Current situation – 0

Goal for the 2nd year – 2

Final goal – 4

Activity 1 – Indicator 5

Type – Quantitative

Indicator – Number of articles published in international cooperation

Current situation – 13

Goal for the 2nd year – 38

Final goal – 96

Activity 1 – Indicator 6

Type – Qualitative

Indicator – Training of the technical staff and graduate students in foreign languages

Current situation – limited regarding the technical staff and at intermediate level regarding the student body

Goal for the 2nd year – Increase training

Final goal – Increase training

Activity 1 – Indicator 7

Type – Quantitative

Indicator – Number of projects in international cooperation

Current situation – 7

Goal for the 2nd year – 12

Final goal – 18

Activity 1 – Indicator 8

Type – Quantitative

Indicator – Number of Brazilian students in study mission abroad

Current situation – 3

Goal for the 2nd year – 8

Final goal – 19

Activity 1 – Indicator 9

Type – Quantitative

Indicator – Number of professors with experience abroad

Current situation – 18

Goal for the 2nd year – 19

Final goal – 27

Theme 13– Frontiers of Mathematics, the Natural Sciences and Engineering: Challenges of the 21st Century

Goal 1 – Combining different fields of knowledge in the areas of Mathematics, Natural Sciences and Engineering to answer scientific and technological issues of relevance.

Activity 1 – To qualify professors abroad, doctoral students and experts in the area; participate in events abroad and stimulate short-duration visits of lecturers outside the country; develop projects focused on the theme, attract professors of international universities of excellence to teach short- and long-duration courses; attract young talent with international experience.

Start date – 08/2018 **End date – 07/2022**

Description – To conduct study missions and post-doctoral internship abroad; participate in conferences, workshops, international fairs related to the theme; conduct short-duration missions abroad and research in partnership with foreign partner universities; Maintain regular flow of foreign researchers.

Activity 1 – Indicator 1
Type – Qualitative
Indicator – Organization of workshops/meetings formed by focus (themed) groups to assess the progress of the goals related to qualitative and quantitative indicators and make potential adjustments.
Current situation – Indicators unavailable
Goal for the 2nd year – Elaborate qualitative indicators with appointment of intermediate indicators
Final goal – Appointment of final indicators

Activity 1 – Indicator 2
Type – Quantitative
Indicator – Number of projects in international cooperation
Current situation – 75
Goal for the 2nd year – 87
Final goal – 105

Activity 1 – Indicator 3
Type – Quantitative
Indicator – Number of Brazilian students in study mission abroad
Current situation – 15
Goal for the 2nd year – 30
Final goal – 60

Activity 1 – Indicator 4
Type – Quantitative
Indicator – Number of articles published in international cooperation
Current situation – 176
Goal for the 2nd year – 209
Final goal – 272

Activity 1 – Indicator 5

Type – Quantitative

Indicator – Percentage of disciplines taught exclusively or partially in another language

Current situation – 2

Goal for the 2nd year – 5

Final goal – 15

Activity 1 – Indicator 6

Type – Quantitative

Indicator – Number of visiting professors

Current situation – 36

Goal for the 2nd year – 40

Final goal – 47

Activity 1 – Indicator 7

Type – Quantitative

Indicator – Missions of professors abroad

Current situation – 9

Goal for the 2nd year – 15

Final goal – 21

Activity 1 – Indicator 8

Type – Qualitative

Indicator – Training of the technical staff and graduate students in foreign languages

Current situation – limited regarding the technical staff and at intermediate level regarding the student body

Goal for the 2nd year – Increase training

Final goal – Increase training

Activity 1 – Indicator 9

Type – Quantitative

Indicator – Number of professors with experience abroad

Current situation – 79

Goal for the 2nd year – 83

Final goal – 91

Theme 14– Innovation and Sustainability

Goal 1 – Discussing instruments to evaluate and promote innovation in renewable energy. These elements must contribute to thinking of policies (public, but not only) for an “energy transition

Activity 1 – To carry out work and study mission and post-doctoral studies abroad. To attract professors and researchers from universities to Unicamp. Organization of events. Technical trainings

Start date – 08/2018 **End date – 07/2022**

Description – Because the themes are interdisciplinary, as well as the participation of the programs, we will not be able to separate the indicators from the programs or compute them partially, the current situation (zero) will be the beginning of the participation of the theme in the PRINT. The work missions involve both prospecting trips for setting partnerships with foreign universities and the participation in congresses, encounters and meetings; We will seek to attract professors of universities with which we have established partnerships, as well as professors who are references in their fields of research to share their findings with our faculty and students; Seminars and international events in our university not only allow the exchange of information and research, but are also tools to establish or strengthen partnerships with foreign universities; The scholarships allow our professors to be qualified abroad, in addition to establishing partnerships for research and improve their conditions of international publications; The training, in short time, of professors and students; The young talent with international experience will be integrated to our programs for the development of research together with our professors and students, besides the offer of disciplines; Researchers with international experience will be integrated to our programs for the development of joint research with our faculty and students and offering of seminars and short courses; It is necessary to expand the amount of students that make sandwich doctorate abroad, aiming at a further qualification and development of joint research with universities and the establishment of partnerships; Improve the international disclosure of public notices (selection process, post-doctoral research and competitions of the Programs). We will establish partnerships with foreign universities and agencies for the international disclosure of our public notices for their students and professors; The employees will be trained specially in English and/or Spanish to meet the needs of foreign students and professors of our programs. To do so, we will seek to establish partnerships with the Pro-Rectory of Graduate Studies and with the language schools linked to Unicamp; Eventual and regular disciplines will be offered in English. In some cases, these disciplines are expected to be transmitted online to students of universities with which we maintain partnerships.

Activity 1 – Indicator 1

Type – Quantitative

Indicator – Percentage of employees of the graduate programs connected to the theme with capacity to meet the needs of foreign students and professors at least in English or Spanish.

Current situation – 0

Goal for the 2nd year – 10

Final goal – 20

Activity 1 – Indicator 2

Type – Quantitative

Indicator – Number of work missions abroad

Current situation – 0

Goal for the 2nd year – 3

Final goal – 5

Activity 1 – Indicator 3

Type – Quantitative

Indicator – Percentage of disciplines offered in English in the program related to the theme

Current situation – 10

Goal for the 2nd year – 20

Final goal – 30

Activity 1 – Indicator 4

Type – Qualitative

Indicator – Number of events with foreign participants

Current situation – 2

Goal for the 2nd year – 5

Final goal – 8

Activity 1 – Indicator 5

Type – Quantitative

Indicator – Number of visiting professors in Brazil

Current situation – 2

Goal for the 2nd year – 4

Final goal – **8**

Activity 1 – Indicator 6

Type – Quantitative

Indicator – Number of scholarships granted to students for sandwich doctorate internship abroad

Current situation – 5

Goal for the 2nd year – 10

Final goal – 40

Activity 1 – Indicator 7

Type – Qualitative

Indicator – Disclosure of public notices to the priority countries on this theme

Current situation – non-existent

Goal for the 2nd year – that our public notices become known by one part of the network of foreign universities that are part of this theme.

Final goal – that our public notices become known by all the network of foreign universities that are part of this theme.

Theme 15– Social and Economic Development, Socio Demographic and Territorial Dynamics: Challenges Posed by the Transformations in the 21st Century

Goal 1 – Analyzing the transformations in the world economy and impacts on economic development.

Activity 1 – To promote mobility and exchange for faculty and students; Increase the number of disciplines taught in English; Promote knowledge of English for the administrative-technical staff.

Start date – 08/2018 End date – 07/2022

Description – Because the themes are interdisciplinary, as well as the participation of the programs, we will not be able to separate the indicators from the programs or compute them partially, the current situation (zero) will be the beginning of the participation of the theme in the PRINT. To conduct studies and post-doctoral research abroad; Participate in congresses and international workshop in the area; conduct research in partnership with foreign partner universities, attract foreign professors and postdocs; Promote student exchanges; Participate in international congresses and workshop in the area; conduct research in partnership with foreign partner universities; Stimulate professors to teach courses in English; Encourage the learning of a foreign language by the administrative-technical staff and encourage mobility of staff for internships abroad.

Activity 1 – Indicator 1

Type – Quantitative

Indicator – Percentage of disciplines offered in English

Current situation – 5

Goal for the 2nd year –10

Final goal – 15

Activity 1 – Indicator 2

Type – Quantitative

Indicator – Percentage of employees with proficiency in English

Current situation – 20

Goal for the 2nd year – 30

Final goal – 40

Activity 1 – Indicator 3

Type – Quantitative

Indicator – Number of students in a sandwich program abroad

Current situation – 5

Goal for the 2nd year – 14

Final goal – 16

Activity 1 – Indicator 4

Type – Qualitative

Indicator – Organization of workshops/meetings formed by focus (themed) groups after approval of the project to develop the qualitative indicators, assessment of these indicators at the end of the second year and at the end of the project

Current situation – Indicators unavailable

Goal for the 2nd year – Elaborate qualitative indicators with appointment of intermediate indicators

Final goal – Appointment of final indicators

Activity 1 – Indicator 5

Type – Quantitative

Indicator – Number of missions abroad

Current situation – 0

Goal for the 2nd year – 2

Final goal – 5

Activity 1 – Indicator 6

Type – Quantitative

Indicator – Employees in mobility programs abroad

Current situation – 0

Goal for the 2nd year – 1

Final goal – 2

Activity 1 – Indicator 7

Type – Quantitative

Indicator – Number of visiting professors in Brazil

Current situation – 1

Goal for the 2nd year – 4

Final goal – **7**

Theme 16– Studies on healthy systems, prevention, promotion and monitoring

Goal 1 – Developing international exchanges related to the study of health systems, promotion, surveillance and prevention

Activity 1 – To qualify professors in the area; participation in events abroad; develop projects focused on the theme

Start date – 08/2018 **End date – 07/2022**

Description – To carry out study missions and post-doctoral research abroad; Participate in conferences, workshops, international fairs related to the theme; conduct research in partnership with foreign partner universities.

Activity 1 – Indicator 1

Type – Qualitative

Indicator – Organization of events with participation of international collaborators (workshop/seminars/meetings formed by research groups)

Current situation – 3 events per year (seminar, open class, lecture)

Goal for the 2nd year – 5 events per year (seminar, eventual discipline in English, minicourses)

Final goal – offering of at least one eventual discipline featuring foreign professor, in addition to at least 8 annual events (workshop/seminars/meetings formed by research groups, open class, lecture)

Activity 1 – Indicator 2

Type – Quantitative

Indicator – Number of projects in cooperation

Current situation – 91

Goal for the 2nd year – 120

Final goal – 150

Activity 1 – Indicator 3

Type – Quantitative

Indicator – Number of articles published in international cooperation

Current situation – 111

Goal for the 2nd year – 150

Final goal – 180

Activity 1 – Indicator 4

Type – Quantitative

Indicator – Number of foreign visiting professors

Current situation – 35

Goal for the 2nd year – 42

Final goal – 50

Activity 1 – Indicator 5

Type – Quantitative

Indicator – Percentage of classes taught in a foreign language

Current situation – 5

Goal for the 2nd year – 10

Final goal – 20

Theme 17– Chronic emerging and overlooked diseases

Goal 1 – Developing international exchanges related to the study of chronic, emerging and overlooked diseases

Activity 1 – To qualify professors in the area; participation in events abroad; develop projects focused on the theme

Start date – 08/2018 **End date – 07/2022**

Description – To conduct study missions and post-doctoral research abroad; Participate in conferences, workshops, international fairs related the theme; conduct research in partnership with foreign partner universities.

Activity 1 – Indicator 1

Type – Qualitative

Indicator – Organization of events with participation of international collaborators (workshop/seminars/meetings formed by research groups)

Current situation – 3 events per year (seminar, open class, lecture)

Goal for the 2nd year – 6 events per year (seminar, eventual discipline in English, minicourses)

Final goal – offering of at least one eventual discipline featuring foreign professor, in addition to at least 10 annual events (workshop/seminars/meetings formed by research groups, open class, lecture)

Activity 1 – Indicator 2

Type – Quantitative

Indicator – Percentage of classes taught in a foreign language

Current situation – 15

Goal for the 2nd year – 20

Final goal – 25

Activity 1 – Indicator 3

Type – Quantitative

Indicator – Number of foreign visiting professors

Current situation – 37

Goal for the 2nd year – 42

Final goal – 50

Activity 1 – Indicator 4

Type – Quantitative

Indicator – Number of projects in cooperation

Current situation – 100

Goal for the 2nd year – 120

Final goal – 150

Theme 18– Therapeutic and pharmacological innovations

Goal 1 – Developing international exchanges related to the study of therapeutic and pharmacological diseases

Activity 1 – To qualify professors in the area; participation in events abroad; develop projects focused on the theme

Start date – 08/2018 **End date – 07/2022**

Description – To conduct study missions and post-doctoral research abroad; Participate in conferences, workshops, international fairs related to the theme; conduct research in partnership with foreign partner universities.

Activity 1 – Indicator 1

Type – Quantitative

Indicator – Number of projects in cooperation

Current situation – 91

Goal for the 2nd year – 120

Final goal – 150

Activity 1 – Indicator 2

Type – Quantitative

Indicator – Number of articles published in international cooperation

Current situation – 111

Goal for the 2nd year – 150

Final goal – 180

Activity 1 – Indicator 3

Type – Qualitative

Indicator – Organization of events with participation of international collaborators (workshop/seminars/meetings formed by research groups)

Current situation – 3 events per year (seminar, open class, lecture)

Goal for the 2nd year – 5 events per year (seminar, eventual discipline in English, minicourses)

Final goal – offer of at least one eventual discipline featuring foreign professor, in addition to at least 8 annual events (workshop/seminars/meetings formed by research groups, open class, lecture)

Activity 1 – Indicator 4

Type – Quantitative

Indicator – Number of foreign visiting professors

Current situation – 35

Goal for the 2nd year –37

Final goal – 42

Activity 1 – Indicator 5

Type – Quantitative

Indicator – Percentage of classes taught in a foreign language

Current situation – 5

Goal for the 2nd year – 15

Final goal – 20

Theme 19– Global environmental changes/climate changes and landscape dynamics

Goal 1 – Studying biogeophysical and environmental processes governing the organization of the landscape and the impacts related to the use and occupation of territories

Activity 1 – To carry out work and study mission and post-doctoral studies abroad. To attract professors and researchers from universities to Unicamp. Organization of events. Technical trainings

Start date – 08/2018 **End date – 07/2022**

Description – Because the themes are interdisciplinary, as well as the participation of the programs, we will not be able to separate the indicators from the programs or compute them partially, the current situation (zero) will be the beginning of the participation of the theme in the PRINT. The work missions involve both prospecting trips for setting partnerships with foreign universities and the participation in congresses, encounters and meetings; We will seek to attract professors of universities with which we have established partnerships, as well as professors who are references in their fields of research to share their findings with our faculty and students; Seminars and international events in our university not only allow the exchange of information and research, but are also tools to establish or strengthen

partnerships with foreign universities; The scholarships allow our professors to be qualified abroad, in addition to establishing partnerships for research and improve their conditions of international publications; The training, in short time, of professors and students; The young talent with international experience will be integrated to our programs for the development of research together with our professors and students, besides the offer of disciplines; Researchers with international experience will be integrated to our programs for the development of joint research with our faculty and students and offering of seminars and short courses; It is necessary to expand the amount of students that make sandwich doctorate abroad, aiming at a further qualification and development of joint research with universities and the establishment of partnerships; Improve the international disclosure of public notices (selection process, post-doctoral research and competitions of the Programs). We will establish partnerships with foreign universities and agencies for the international disclosure of our public notices for their students and professors; The employees will be trained specially in English and/or Spanish to meet the needs of foreign students and professors of our programs. To do so, we will seek to establish partnerships with the Pro-Rectory of Graduate Studies and with the language schools linked to Unicamp; Eventual and regular disciplines will be offered in English. In some cases, these disciplines are expected to be transmitted online to students of universities with which we maintain partnerships.

Activity 1 – Indicator 1
Type – Quantitative
Indicator – Number of work missions abroad
Current situation – 0
Goal for the 2nd year – 1
Final goal – 3

Activity 1 – Indicator 2
Type – Quantitative
Indicator – Number of scholarships granted to students for sandwich doctorate internship abroad
Current situation – 7
Goal for the 2nd year – 10
Final goal – 15

Activity 1 – Indicator 3
Type – Quantitative
Indicator – Number of events with foreign participants
Current situation – 0
Goal for the 2nd year – 5
Final goal – 10

Activity 1 – Indicator 4

Type – Quantitative

Indicator – Percentage of employees of the graduate programs connected to the theme with capacity to meet the needs of foreign students and professors at least in English or Spanish.

Current situation – 0

Goal for the 2nd year – 10

Final goal – 20

Activity 1 – Indicator 5

Type – Quantitative

Indicator – Number of visiting professors in Brazil

Current situation – 1

Goal for the 2nd year – 2

Final goal – 4

Activity 1 – Indicator 6

Type – Qualitative

Indicator – Disclosure of public notices to the priority countries on this theme

Current situation – non-existent

Goal for the 2nd year – that our public notices become known by one part of the network of foreign universities that are part of this theme.

Final goal – that our public notices become known by all the network of foreign universities that are part of this theme.

Activity 1 – Indicator 7

Type – Quantitative

Indicator – Number of disciplines offered in English in the programs related to the theme

Current situation – 0

Goal for the 2nd year – 3

Final goal – 5

Theme 20– Teaching challenges in the 21st century

Goal 1 – Training of Primary Education teachers: mathematical and statistical aspects; psychological, socio-cultural processes; and inequality, difference and inclusion.

Activity 1 – To qualify faculty and graduate students abroad and consolidate existing international partners, encouraging and establishing new partnerships and international projects

Start date – 08/2018 **End date – 07/2022**

Description – To conduct study missions for faculty and graduate students. Encourage post-doctoral internship abroad, as well as sandwich doctorate in order to improve academic training in a research environment of excellence. Develop projects in partnership focusing on the theme, increasing the number of publications co-authored with foreign researchers in international journals. Ensure regular flow of visitors and experts and post-doctoral students to work in joint research; strengthen and broaden ties and collaborations with other traditional research groups. Participate in international congresses and workshops related to the theme; establish new and strengthen and consolidate collaborations with foreign researchers. Attract young talent from abroad for the graduate program and high-level post-doctoral students. Arrange short visits of lecturers from international universities for graduate courses in English and interaction with the groups involved. Encourage the participation in conferences abroad to be accompanied by short visits to renowned institutions. Create new research projects about related themes aiming at joint financing.

Activity 1 – Indicator 1
Type – Quantitative
Indicator – Number of visiting professors, in accumulated years. Current status refers to one year.
Current situation – 1
Goal for the 2nd year – 2
Final goal – 4

Activity 1 – Indicator 2
Type – Quantitative
Indicator – Number of scholarships for sandwich doctorate internship abroad, in accumulated years. Current status refers to one year.
Current situation – 8
Goal for the 2nd year – 14
Final goal – 21

Activity 1 – Indicator 3
Type – Quantitative
Indicator – Number of formalized agreements.
Current situation – 5
Goal for the 2nd year – 17
Final goal – 64

Activity 1 – Indicator 4

Type – Quantitative

Indicator – Number of work missions abroad, in accumulated years. Current status refers to one year.

Current situation – 11

Goal for the 2nd year – 13

Final goal – 15

Theme 21– Aging: a global challenge

Goal 1 – Ageing as a global challenge must have as objective researches in different fields of knowledge both with regard to the health sciences as to the humanities

Activity 1 – To carry out work and study mission and post-doctoral studies abroad. To attract professors and researchers from universities to Unicamp. Organization of events. Technical trainings

Start date – 08/2018 End date – 07/2022

Description – Because the themes are interdisciplinary, as well as the participation of the programs, we will not be able to separate the indicators from the programs or compute them partially, the current situation (zero) will be the beginning of the participation of the theme in the PRINT. The work missions involve both prospecting trips for setting partnerships with foreign universities and the participation in congresses, encounters and meetings; We will seek to attract professors from universities with which we have established partnerships, as well as professors who are references in their fields of research to share their findings with our faculty and students; Seminars and international events in our university not only allow the exchange of information and research, but are also tools to establish or strengthen partnerships with foreign universities; The scholarships allow our professors to be qualified abroad, in addition to establishing partnerships for research and improve their conditions of international publications; The training, in short time, of professors and students; The young talent with international experience will be integrated to our programs for the development of research together with our professors and students, besides the offer of disciplines; Researchers with international experience will be integrated to our programs for the development of joint research with our faculty and students and offering of seminars and short courses; It is necessary to expand the amount of students that make sandwich doctorate abroad, aiming at a further qualification and development of joint research with universities and the establishment of partnerships; Improve the international disclosure of public notices (selection process, post-doctoral research and competitions of the Programs). We will establish partnerships with foreign universities and agencies for the international disclosure of our public notices for their students and professors; The employees will be trained specially in English and/or Spanish to meet the needs of foreign students and professors of our programs. To do so, we will seek to establish partnerships with the Pro-Rectory of Graduate Studies and with the language schools linked to Unicamp; Eventual and regular disciplines will be offered in English. In some cases, these disciplines are expected to be transmitted online to students from universities with which we maintain partnerships.

Activity 1 – Indicator 1

Type – Quantitative

Indicator – Number of scholarships granted to students for sandwich doctorate internship abroad

Current situation – 3

Goal for the 2nd year – 6

Final goal – 12

Activity 1 – Indicator 2

Type – Quantitative

Indicator – Number of work missions abroad

Current situation – 0

Goal for the 2nd year – 1

Final goal – 2

Activity 1 – Indicator 3

Type – Quantitative

Indicator – Number of events with foreign participants

Current situation – 1

Goal for the 2nd year – 2

Final goal – 5

Activity 1 – Indicator 4

Type – Quantitative

Indicator – Number of visiting professors in Brazil

Current situation – 2

Goal for the 2nd year – 2

Final goal – 4

Activity 1 – Indicator 5

Type – Quantitative

Indicator – Number of disciplines offered in English in the programs related to the theme

Current situation – 0

Goal for the 2nd year – 3

Final goal – 5

Activity 1 – Indicator 6

Type – Qualitative

Indicator – Disclosure of public notices to the priority countries of this theme

Current situation – non-existent

Goal for the 2nd year – that our public notices become known by one part of the network of foreign universities that are part of this theme.

Final goal – that our public notices become known by all the network of foreign universities that are part of this theme.

Activity 1 – Indicator 7

Type – Quantitative

Indicator – Percentage of employees of the graduate programs connected to the theme with capacity to meet the needs of foreign students and professors at least in English or Spanish.

Current situation – 0

Goal for the 2nd year – 10

Final goal – 20

Theme 22– Transversal dialogues: art, language, knowledge

Goal 1 – Consolidating and expanding the existing internationalization efforts and the visibility of PPGs Theory and Literary History, Linguistics, Applied Linguistics, Visual Arts, Music and Art on Stage.

Activity 1 – Promotion of faculty and student mobility for academic training and consolidation of institutional partnerships.

Start date – 08/2018 **End date – 07/2022**

Description – The action aims to increase the number of international missions for the professors of the Programs, aiming to make collaborative research agreements, joint supervision and international research projects linked to our Programs; increase the number of sandwich internships for doctoral students of our Programs in centers and international research groups of high intellectual productivity, as well as to receive doctoral students from partner institutions; increase the number of research internships abroad for professors of our Programs in institutions of recognized excellence; expand the number of doctorates held in joint supervision with foreign graduate programs; promote reciprocal research missions, with exchange programs for improvement, in the case of the professors, and with a formative character, in the case of students, among our Programs and partner institutions; and encourage the articulation among research groups to generate collaborative networks in international scope around the subjects and objects of the projects proposed.

Activity 1 – Indicator 1

Type – Qualitative

Indicator – Stimulus to coordination among research groups in order to generate collaborative networks in international scope around the subjects and objects of the projects proposed.

Current situation – Indicators unavailable

Goal for the 2nd year – Qualitative indicators to be developed from the resource forecasting

Final goal – Qualitative indicators to be developed from the intermediate indicators (at the end of the 2nd year)

Activity 1 – Indicator 2

Type – Quantitative

Indicator – Expansion of the number of doctorates held in joint supervision with foreign graduate programs.

Current situation – 12

Goal for the 2nd year – 24

Final goal – 48

Activity 1 – Indicator 3

Type – Qualitative

Indicator – Promotion of reciprocal research missions, with exchange program for improvement, in the case of professors, and with formative character, in the case of students, among our Programs and partner institutions.

Current situation – Indicators unavailable

Goal for the 2nd year – Qualitative indicators to be developed from the resource forecasting

Final goal – Qualitative indicators to be developed from the intermediate indicators (at the end of the 2nd year)

Activity 1 – Indicator 4

Type – Qualitative

Indicator – Increase in the number of international missions for professors of the Programs, aiming to make collaborative research agreements, joint supervision and international research projects linked to our Programs.

Current situation – Indicators unavailable

Goal for the 2nd year – Qualitative indicators to be developed from the resource forecasting

Final goal – Qualitative indicators to be developed from the intermediate indicators (at the end of the 2nd year)

Activity 1 – Indicator 6

Type – Qualitative

Indicator – Number of sandwich internships for the doctoral students

Current situation – 10

Goal for the 2nd year – 25

Final goal – 50

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Activity 2– Strengthening of the academic-formative axis, thinking in the training of future professors, researchers and administrators in higher education, Linguistics, Literature and Arts.

Start date – 08/2018 End date – 07/2022

Description – The action aims to systematize the practice of inviting foreign experts to participate in boards of Master's Thesis and Doctoral Dissertation with our Programs in cases of non-joint supervision; introduce disciplines or short courses taught by visiting professors, in foreign language, in a systematic way in our Programs; offer courses (disciplines or workshops) opened for students and professors of all levels (Undergraduate Research, Master's and Doctorate degree) focused on scientific writing (in Portuguese and foreign language) in the various areas and lines of research of the Programs; increase the participation of our master's and doctorate students in short courses abroad focused on themes, objects, theories or research methods that aid their dissertations and theses; promote inter-institutional education practices, such as shared courses and short courses; systematize the practice of attracting foreign readers to carry out research activities and teach language courses relevant to the partnerships established; and strengthen academic relations between postdocs/foreign post-doctoral students or with international experience and undergraduates through faculty internships provided for in Unicamp legislation (Faculty Internship Program) and through the participation in boards of undergraduate research and final research project, for example.

Activity 2 – Indicator 1

Type – Qualitative

Indicator – Systematization of the practice of inviting foreign experts to participate in boards of Master's Theses and Doctoral Dissertation with our Programs in cases of non-joint supervision.

Current situation – Currently, none of the Programs has resources for this.

Goal for the 2nd year – To have resources for such invitations.

Final goal – Ensure that at least 20% of the boards have the participation of foreign professors.

Activity 2 – Indicator 2

Type – Qualitative

Indicator – Promotion of inter-institutional education practices, such as shared disciplines and short courses.

Current situation – Indicators unavailable

Goal for the 2nd year – Qualitative indicators to be developed from the resource forecasting

Final goal – Qualitative indicators to be developed from the intermediate indicators (at the end of the 2nd year)

Activity 2 – Indicator 3

Type – Qualitative

Indicator – Increase in the participation of our master's and doctoral students in short courses abroad focused on themes, objects, theories or research methods that aid their theses and dissertations.

Current situation – Indicators unavailable

Goal for the 2nd year – Qualitative indicators to be developed from the resource forecasting

Final goal – Qualitative indicators to be developed from the intermediate indicators (at the end of the 2nd year)

Activity 2 – Indicator 4

Type – Quantitative

Indicator – Introduction of disciplines or short courses taught by visiting professors, in a foreign language, in a systematic way in our Programs.

Current situation – 2

Goal for the 2nd year – 4

Final goal – 6

Activity 2 – Indicator 5

Type – Qualitative

Indicator – Systematization of the practice of attracting foreign readers to carry out research activities and teach language courses relevant to the partnerships established.

Current situation – Indicators unavailable

Goal for the 2nd year – Qualitative indicators to be developed from the resource forecasting

Final goal – Qualitative indicators to be developed from the intermediate indicators (at the end of the 2nd year)

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Activity 3 – Sharing of partial research results by promoting international scientific events.

Start date – 08/2018 **End date – 07/2022**

Description – The action aims to systematize the conferences and courses taught by professors of foreign universities along with our Programs; increase the amount of events organized by professors from our Programs and from foreign graduate Programs; increase the participation of professors and students in international events, with the possibility of publication in qualified journals and/or annals and artistic performances in international cultural events qualified by Qualis Artístico; increase the reciprocal research missions, with exchange programs to promote collaborative actions that are not restricted to

the particular context of the institutions and events organized and promoted in partnership; and increase the participation of post-doctoral students, graduate students and undergraduates in the organization (scientific and/or work committee) of activities involving international partnerships.

Activity 3 – Indicator 1

Type – Qualitative

Indicator – Systematization of conferences and courses taught by professors from foreign universities along with our Programs.

Current situation – Currently, this has occurred based on the calls addressed directly to the professors involved, without possibility of significant financial support from the Programs.

Goal for the 2nd year – Possibility of financially supporting such activities, ensuring that at least 2 professors from each program offer courses in foreign universities per semester.

Final goal – Possibility of financially supporting such activities, ensuring that at least 2 professors from the Program offer courses in foreign universities per semester.

Activity 3 – Indicator 2

Type – Qualitative

Indicator – Increase in the participation of post-doctoral students, graduate students and undergraduates in the organization (scientific and/or work committee) of activities involving international partnerships.

Current situation – Indicators unavailable

Goal for the 2nd year – Qualitative indicators to be developed from the resource forecasting

Final goal – Qualitative indicators to be developed from the intermediate indicators (at the end of the 2nd year)

Activity 3 – Indicator 3

Type – Qualitative

Indicator – Increase in the amount of events organized by professors from our Programs and from foreign graduate Programs.

Current situation – The events of such character have been organized with constancy, but by initiatives of the faculty centers from the Programs

Goal for the 2nd year – Assurance of specific resources, enabling the systematization of this activity with at least two events of such character per semester.

Final goal – Assurance of specific resources, enabling the systematization of this activity with at least two events of such character per semester.

Activity 3 – Indicator 4

Type – Qualitative

Indicator – Increase in the reciprocal research missions, with exchange programs to promote collaborative actions that are not restricted to the particular context of the institutions and events organized and promoted in partnership.

Current situation – Indicators unavailable

Goal for the 2nd year – Qualitative indicators to be developed from the resource forecasting

Final goal – Qualitative indicators to be developed from the intermediate indicators (at the end of the 2nd year)

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Activity 4 – Increase in the impact of the intellectual production of our professors and students.

Start date – 08/2018 **End date – 07/2022**

Description – The action aims to increase the amount and qualification (impact indices) of international intellectual production of professors and students from the six Programs; increase the qualification of the international artistic and intellectual production of faculty and students from the six Programs; and promote the dissemination of partial project results through the participation of researchers, professors and students in international scientific and artistic forums and publications in international coverage.

Activity 4 – Indicator 1

Type – Qualitative

Indicator – Increase in the amount and qualification (impact indices) of the international intellectual production of professors and students from the six Programs.

Current situation – Indicators unavailable

Goal for the 2nd year – Qualitative indicators to be developed from the resource forecasting

Final goal – Qualitative indicators to be developed from the intermediate indicators (at the end of the 2nd year)

Activity 4 – Indicator 2

Type – Qualitative

Indicator – Promotion of the dissemination of partial and final project results through the participation of researchers, professors and students in international scientific and artistic forums and publications in international coverage.

Current situation – Indicators unavailable

Goal for the 2nd year – Qualitative indicators to be developed from the resource forecasting

Final goal – Qualitative indicators to be developed from the intermediate indicators (at the end of the 2nd year)

Activity 4 – Indicator 3

Type – Qualitative

Indicator – Increase in the qualification of the international artistic and intellectual production of professors and students from the six Programs.

Current situation – Indicators unavailable

Goal for the 2nd year – Qualitative indicators to be developed from the resource forecasting

Final goal – Qualitative indicators to be developed from the intermediate indicators (at the end of the 2nd year)

STRATEGIES

1. Strategy for the consolidation of existing international partnerships, as well as the construction of new partnerships and cooperation projects to increase the relationship between the brazilian institution and research groups abroad.

Internationalization of higher education has been highlighted in several situations within academia and necessary for the qualitative advancement of the activities carried out by Higher Education Institutions (HEI). Currently, the ease of visibility, with sharing of information and globalized knowledge, as a principle and work mission of this HEI, have boosted the internationalization of the several segments of the university, as verified in its strategic planning. One of these segments is the Postgraduate Program. The CAPES-PrInt program was the "**shot in the arm**" to leverage more detailed analyses of internationalization information collected for our internationalization plan of the postgraduate program and the discussion, mostly, about our international partnerships and development of focused strategies for partnerships. Currently, we have over 680 signed agreements, and among these strategic partners will be chosen using, as one of the bases, the ongoing partnerships with good results. We can mention some of the good results obtained, with the São Paulo Excellence Chairs Program of FAPESP, in which at least 4 (out of 12) professors are in Unicamp to create research centers, such as Dr. Emilio Federico Moran of the National Research Council — NRC and the National Science Foundation (NSF); Dr. Nicholas Spyridon Vonortas, from George Washington University, who has been helping to place the Department of Political Science and Technology of Unicamp in the global map; Dr. John Joseph Sheehan, who organized a project on Bioenergy with GSB initiative (Global Sustainable Bioenergy); and Roberto Docampo, from the University of Georgia, with experience in parasitology of *Trypanosome*. From this diagnosis, we seek, with the implementation of the institutional internationalization project of

UNICAMP, CAPES-PrInt, to consolidate existing partnerships, making them more symmetrical, seeking excellence and new partnerships that are, in fact, important for developing themes defined as priorities for the internationalization of the postgraduate programs, in accordance with the strategic planning of the university in force. All the steps for the development of the proposal to be sent to PrInt and some of the indicators suggested for evaluating the "Unicamp PII" may be monitored by accessing the link https://www.geplanes.cgu.unicamp.br/geplanes/detalhes.html?id=xFyDQuP8tEWb3LXWIUnGiWQAFBR9.

2. Strategy to attract foreign students to Brazil.

The attraction of foreign postgraduate students is one of the "**key elements**" of the internationalization of HEI. The proportion of regular foreign students has been increasing and accounts for 6.2% of students in postgraduate programs in specialized fields (Master's Degree or PhD) On the other hand, exchange students usually enroll in subjects as special students. The participation of students of the 5 leading countries (USA, Germany, England, France, and Japan) between special postgraduate students is still very shy, corresponding to 0.5%. Our aim is to increase the representativeness of these students, especially those from countries leaders in the fields of science and technology. Within this perspective, the Institutional Internationalization Project of UNICAMP, CAPES-PrInt, based on the Strategic Planning of Unicamp, has as guidelines and priorities: to provide an increase the number of programs and elective and mandatory subjects (if applicable) taught in English for postgraduate programs; curricular flexibility and the use of active methodologies to improve the teaching-learning process; to teach a second language for all students by increasing the provision of foreign languages classes so that they can take subjects provided in such languages; language support for foreign students by broadening Portuguese classes for foreigners; and to change the teaching methodology with case studies or work projects. Campus sustainability as a central process in the life of Unicamp, gives priority to people's quality of life and management of physical, financial, and environmental resources providing the insertion of sustainability in the daily educational activities; communication with society made with appropriate forms of language for each type of speaker, incorporating the concept of accountability and the processes of inclusion and respect for diversity based on decisions and action plans of the university favor the establishment of an environment more academically plural and attractive.

3. Strategy to attract faculty and researchers with international experience.

UNICAMP has 5% foreign professors among its staff. Most of these professors have permanent employment relationship. Our strategy consists in increasing the share of foreign professors hired by UNICAMP as well as expanding the share of foreign visiting professors in postgraduate programs. The Postdoctoral Program of UNICAMP is part of the internationalization process of Postgraduate Programs. It is an important mean for attracting foreign researchers who may work in postgraduate programs because these researchers are very active both in research and in teaching. Nowadays, however, the proportion of foreign postdoctoral students is approximately 10% in Teaching and Research Units of UNICAMP. For postdoctoral fellows, who in most cases receive local funding, our strategy will be to encourage an increasingly broad dissemination of public notices abroad in order to attract foreign candidates. Several studies have shown that the qualification of the faculty and researchers is one of the main aspects of HEI internationalization. Professors and researchers are the actors who exert direct influence on the internationalization processes because of their relationship networks, which directly contribute to the quantitative and qualitative progress of the three pillars of the university – teaching, research, and extension. Such influence becomes even more significant when it comes to conducting joint research with foreign HEI, since this process progresses more quickly when there are technical affinities and relationships between the involved researchers. Here, CAPES-PrInt presents itself as a unique opportunity for increasing the number of professors with international experience, and for internationally disseminating the university when including in its benefits the possibility of postdoctoral scholarships, visiting professors, young talents, postdoctoral with experience abroad, in addition to the work missions abroad. In addition, Unicamp will support professors who submit proposals for São Paulo Researchers in International Collaboration (SPRINT), São Paulo Excellence Chairs (SPEC), and São Paulo School of Advanced Studies (ESPCA) of FAPESP.

4. Strategy to prepare the scholarships for the period abroad as well as for their return, specially in order to increase the knowledge appropriation by the institution.

UNICAMP already has an internationalization policy that includes mechanisms to facilitate the preparation of professors/students for mobility abroad. These mechanisms provide language classes and preparatory courses offered by the CEL (Center of Languages Studies), teacher and student mobility public notices, curricular flexibility, support for professors to create

multimedia education materials that can be used in classes and activities. All these mechanisms should promote both mobility and the exchange of ideas and knowledge as well as establishing partnerships. To make professors, researchers, and students go study abroad is the main support to promote the mobility offered by state and federal funding agencies. Through the CAPES-PrInt project, UNICAMP will support projects that had previously defined solid internalization strategies concerning the knowledge acquired during the stay abroad. Professors and researchers will have to promote new educational activities, or incorporate new research methods, new partnerships, or improve the existing ones, which may be appropriated by the postgraduate program that receives them by the university.

5. Describe innovative strategies that will be used by the institution that were not mentioned above.

In 2013, UNICAMP acquired the so-called Fazenda Argentina (Argentina Farm), an area with 1.4 million m2 allocated to its larger campus (located in Campinas), increasing its area in 60%. This allows the university, which has in its staff great technical and creative potential, to innovate, dare, and act in order to make feasible the exploration of initiatives to promote sustainable and equitable development, committed to the aspirations of society, and thus strengthening the strategic agenda of Brazil. In this respect, UNICAMP proposes to deploy in that area an International Hub for Sustainable Development (from Portuguese, Hub Internacional para o Desenvolvimento Sustentável – HIDS), which will include among its activities the training of postgraduate students. Postgraduate Program in bioenergy, highly internationalized program in partnership with 3 universities in São Paulo, will be the pilot for creating this Hub.

In this context, UNICAMP is open to headquarter innovative experiences in the postgraduate programs in cooperation with leading institutions according to the themes chosen as priorities. These experiences will enable obtaining the joint-supervision title between the two universities, increasing joint-supervision agreements with foreign universities of excellence in teaching and research.

In addition to proposing to diversify funding sources, seeking partnerships that can finance part of the research carried out at UNICAMP with the private initiative; opening new doors of communication, using social media for dissemination of the university and its internationalization programs; incorporating more sustainable thinking in discussion topics of

postgraduate programs; improving the feedback of postdoctoral programs and home-and-abroad scholarships, using these actors to monitor the quality of the programs; proposing a table of conversion of grades for monitoring the quality of the acquired knowledge.

POLICIES

1. Selection of foreign partners policy, considering that 70% (at least) of the resources should be earmarked for partnerships with institutions based on countries that Capes maintains effective cooperation (listed in Annex I of the call).

The choice of foreign partners of the CAPES-PrInt project is guided by the pursuit of excellence and academic and scientific pioneering. Our objective will be to concentrate efforts to establish or strengthen links of cooperation with foreign institutions that occupy a prominent position at international level in the priority themes chosen by the project of UNICAMP. This policy will widely vary according to the group of 26 countries selected as priorities by CAPES, which are all present in the projects of UNICAMP, in compliance with the criteria set out in the public notice of the Institutional Program for Internationalization CAPES-PrInt to earmark at least 70% of the resources of CAPES for those countries. There are partners with which UNICAMP cooperates for a long time, in addition to having settled such partnership by cooperation agreements between Unicamp and the partner university and by international cooperation agreements funded by FAPESP, which already accounts for 125, with 73 in the last 10 years. With BRICS, we have cooperation within Brics Network University – Brics studies and Brics Economy – and efforts for new links are under development. Other countries, which form a group of 26 countries, including many Latin American and African countries with which UNICAMP has cooperation ties, will also receive special attention within the PrInt Project to intensify the collaboration with the university. This group of countries is quite heterogeneous and brings together countries that are home to leading institutions with which UNICAMP intends to establish fruitful cooperation links such as Portugal, Israel, Taiwan, Singapore, Iran, Turkey, among others. These countries follow a logic of cooperation very close to that of the previous group. However, in this group there is also a set of countries whose national systems are not yet mature and many conform to Latin American and African countries. In such cases, the selection of the partner institution follows other criteria according to the principles of the South-South cooperation, which includes scientific excellence and local innovation power. Furthermore, the history the partnership of UNICAMP with the foreign institution is

considered as being an important element to be taken into account in deciding the continuity of the partnership. Hence, this policy of choice should be based on a comprehensive diagnosis of the partnerships being undertaken or that which have been completed.

2. Internal selection process of specific actions and grants policy, within the funding lines of the Capes-PrInt program. In case of cooperation projects with foreign institutions, the proposer should send an application of funds, the plan of activities, reciprocal funding, academic mobility, technical - scientific production, counterparts of the partner institutions, among others.

Criteria to be adopted in the selection of beneficiaries are merit and the quality of the proposals, its appropriateness, and its insertion in one of the priority areas and in one of the PrInt projects, the concept of the program proponent in CAPES, the quality of the institution and the link established with it, the advisor's experience abroad, the counterpart funding capacity of the foreign institution when necessary, the revalidation of credits completed abroad in the home program when necessary, and expected contribution to the institution after the return to the country. In the case of researchers coming to Unicamp, the quality of the research developed by the researcher and its possible impact on the postgraduate program that will welcome them will be considered. In the case of South-South cooperation projects, the ability of development in the institution will be considered. The proposals will be forwarded to the Management Committee of CAPES-PrInt project, which will be in charge of selecting them. The dissemination of opportunities for funding missions and scholarships within the CAPES/PrInt program will be made on the websites of the Dean's Office of Postgraduate Programs (from Portuguese, *Pro-reitoria de Pós-graduação* – PRPG) and of the Executive Board of International Relations (the aforementioned DERI) and on the website of the programs. Public notices for internal selection of the beneficiaries must consist of, generally, the overall principles of the PrInt, general provisions; vacancies; implementation activities; requirements for application; ineligibility; benefits and obligations of professors/students; proof of reciprocal funding, implementation plan of resources and counterparts of partner institutions, when necessary; applications; evaluation and selection; dissemination of results, schedule; interpose an appeal, accountability, and final provisions.

3. Policy for hiring faculty with recognized scientific performance in international level.

UNICAMP has established a very explicit policy to attract foreign professors for its faculty. Public notices for selecting new professors were internationally disseminated; public tenders were undertaken, in certain cases, in a foreign language, which has allowed to attract many foreign candidates. Thus, the number of foreign professors with an employment contract with UNICAMP has increased from 68 to 131 from 2012 to 2017, practically duplicating in a five-

year period. Our intention is that, as soon as the economic conditions of the country and the state of São Paulo allow, a policy of new hires should be established, in which the aim is to increase the proportion of new foreign professors. This policy will count with the aid of young talents from outside CAPES and with the Programa de Jovem Pesquisador da FAPESP [Young Researcher Program of FAPESP] to attract young foreign researchers of great potential so that they can be settled in the country and, subsequently, be hired to work at UNICAMP. The currently existing legislation governing public tenders for the professorship career, allows the employment of foreigners. In this sense, public tenders directed to PhD Professors provide for conditions that facilitate the application of foreign professors. Indeed, on the website of the General Secretary (GS), on useful links, you can find the model of the public notice for the PhD Professor post. According to item 3.1 of the Public Notice, applications may be made by a proxy (power of attorney); as for item 3.2, a) the candidate who has obtained the title of Doctor abroad, if approved, may obtain, during the probationary period, the recognition of that title for national validity; and according to item 3.2.3, at the time of application, candidates may demonstrate, in writing, the intention to do tests proving the knowledge on the English language. The contents of the tests carried out in English and Portuguese language will be the same. Experts of recognized value and proven scientific activity in specific areas, member or not of the faculty of UNICAMP; holder for 5 (five) years, at least, of the title of Associate Professor Emeritus-Lecturer, obtained by tender of posts in official institution, duly recognized by UNICAMP, and who meets the profile of Full Professor of the unit may also participate in tenders for the position of Full Professor of the professorship career at Unicamp.

4. Policy to increase proficiency in foreign languages for students, postgraduate facultys and technical staff that has direct relationship with the proposed Internationalization Project.

The Center of Languages Studies (CEL) is the organ responsible for teaching language subjects of the university. Its objective is to contribute to the student's education through the teaching of foreign languages, primarily meeting the Undergraduate Program syllabus of Unicamp, in addition to promoting the education of critical and active professionals in a multicultural and multilingual world. Subjects are offered in the following languages: German, Spanish, French, Hebrew, English, Italian, Japanese, Russian, Portuguese for foreigners, and Portuguese for Spanish speakers. Regarding university extension, CEL meets the internal and external

community of Unicamp by promoting events and language classes, classified as “university extension programs,” at the Extension School of Unicamp (from Portuguese, *Escola de Extensão da Unicamp* – Extecamp). In addition, it offers foreign language proficiency exams for some postgraduate programs of this university: Foreign Language Reading Proficiency (German, Spanish, French, English, and Italian); Proficiency Exam (comprising 4 skills) in English and French; Preparatory Courses for Exams such as TOEFL, ZERTIFIKAT DEUTSCH, and DELE (basic and intermediary). Currently, Unicamp participates in the second stage of the program Languages without Borders (from Portuguese, *Idiomas sem Fronteiras* – IsF), offering several free on-site programs aimed at internationalization in two languages (English and Portuguese for foreigners), directed to the public formed by the internal community of students (undergraduate and postgraduate programs), faculty and staff, in addition to the external community, consisting of English teachers of public schools, accredited to teach English and Portuguese for Foreigners classes for a period of four years. To this end, the university created the Languages Center (NucLi-IsF) with the support of DERI (Executive Board of International Relations), CEL (Center of Languages Studies), and IEL (Institute of Language Studies). This center is also responsible for administering the Toefl iBT exam, which assesses the English proficiency. The Celpe-Bras exam (only certificate of proficiency in Portuguese as a foreign language officially recognized by the Brazilian Government) is applied at Unicamp since 1998. Although Unicamp has already made a great effort aimed at the proficiency of students and professors, there are still a lot of repressed demands; therefore, we intend to expand these initiatives to meet, mostly, the requirements of CAPES-PrInt.

5. Policy of recognition of academic and scientific activities performed by facultys and students abroad.

It has already been established in the Brazilian legislation a set of mechanisms seeking to facilitate the recognition of academic activities undertaken abroad. The Apostille Convention is currently in force, excluding the requirement of legalization of foreign documents by Brazilian consular offices abroad to signatories countries of the agreement. In order to have effect in Brazil, foreign documents must be accompanied by the corresponding apostille, which should be obtained along with the competent body in the country of origin of the document. For countries which are not signatories of the agreement, the requirement of consular legalization remains. In addition to the legalization, documents issued abroad must

accompany sworn translation made in Brazil, according to Decree no. 13,609, from October 21, 1943 (Chapter III, Article 18). In case of Revalidation request/Recognition of Certificate, there is need for consulting the teaching unit responsible for the program concerning the need of sworn translation, since exceptions are made to documents issued in France, which are exempt from legalization procedures and sworn translation due to an agreement with Brazil, and documents issued in Argentina, which may present the authorization of its Chancellery Official as an alternative to legalization. Unicamp exempts the requirement of presenting and submitting legalizations and translations of academic documents issued abroad from university exchange students in or from foreign institutions, which have partnerships with Unicamp, and who had their application approved by DERI. Unicamp favors the recognition of postgraduate degrees for refugees through its Chair of Refugees. In order to have national validity, foreign degrees must be registered by Brazilian universities that have the same or similar program. Recognition of Postgraduate Degree and Revalidation of Undergraduate Degree are regulated by Decisions of the University Council. On the website of the Academic Board of the University (from Portuguese, *Diretoria Acadêmica da Universidade* – DAC) you find all the procedures for the recognition and revalidation of degree abroad and sending documents abroad. The university, the academic board, and the Dean's Office of Postgraduate and Undergraduate Programs are already working together in order to make the academic processes less bureaucratic.

6. Host and support policy of foreign facultys, researchers and students.

The reception of foreign professors, researchers, and students who come to UNICAMP will be given by the Executive Board of international Relations (DERI). This board is responsible for the International Relations Office, which has been conducting the efforts of internationalization within UNICAMP, encouraging and managing institutional arrangements that provide exchange programs for students and professors. The International Office has a team of advisers, secretary, administrative support, communication professional, and a web designer. Moreover, it has a team of six technicians responsible for identifying priority partnerships, signing agreements, and managing the in-and-out mobility of students, faculty, and staff. The team supports the UNICAMP community by establishing international partnerships and also monitoring developments of signed agreements. Moreover, DERI supports the initiatives of its partners at UNICAMP such as *Instituto Confúcio* and *Instituto*

King Sejong. In addition, it is in frequent contact with the teaching and research units and the Dean's Offices of UNICAMP, aiming at the coordination of internationalization actions of the university. Monitoring of professors, researchers, and students will be performed by the committees of postgraduate programs that will welcome professors/students and by the Management Committee of the CAPES-PrInt project. The guest lecturer and their responsible for the program shall draw up a report of activities that will be adopted in these instances. This report shall contain the results in scientific terms and in terms of impact on the host institution with the purpose of broadening appropriateness and dissemination of the acquired knowledge.

7. Policy for the appropriation of the knowledge and experience acquired abroad by the beneficiaries of the actions of the Institutional Project of Internationalization.

UNICAMP will intensify the appropriation of the results of the knowledge generated by the CAPES-PrInt projects by disseminating the results of these projects on the websites of postgraduate programs and by incorporating new content in postgraduate teaching and research activities. Programs will register on their websites the activities under development within the framework of their respective projects that makes up the CAPES-PrInt Project, such as home-and-abroad PhD programs, welcoming foreign postgraduate and postdoctoral students, researchers and professors with their respective research in English and in Portuguese. Participants of the CAPES-PrInt project, mostly Brazilian and foreign lecturers, will add to the programs new lines of research, new research methods, new themes, new postgraduate subjects, and/or new partnerships. Unicamp has an Institutional Policy of Intellectual Property for the protection of research presented as dissertations and scientific and intellectual research ensured by the University Board (CONSU) Its formulation considers specificities of HEI in general, those of UNICAMP, in particular, and its commitment to teaching, production, and dissemination of knowledge. The identification and legal protection of results of the academic activity and other activities that have heritage or commercial value meets the interests and legal obligations of the university and of the creators and inventors linked to it at any position. In this sense, this policy aligns UNICAMP with the national legal framework on intellectual property and with state and federal innovation laws. The Clearinghouse of Scientific and Intellectual Production of Unicamp is the official instrument for collection, organization, dissemination, and preservation of all knowledge produced at the

university by professors, researchers, undergraduate and postgraduate students, and technical administrative servants linked to UNICAMP. All research results should be deposited, in order to provide open and public access to scientific and intellectual production, increasing its visibility, accessibility, and dissemination. These initiatives of Unicamp, combined with the CAPES-PrInt Program, will favor the management and access to information about the scientific and intellectual production by providing reliable and validated indicators, in addition to establishing qualified and normalized integration standards and protocols.

8. Management and operationalization policy of the Institutional Project of Internationalization.

The management and operationalization policy of the project will be carried out by the PRPG according to the DERI (Executive Board of international Relations), PRP (Dean's Office of Research) and PRG (Dean's Office of Undergraduate Programs). PRPG will have the support of the Management Committee, which will always be consulted on management and operationalization procedures of the project. Since decisions on the internationalization of the Institutional Planning of UNICAMP are directly related to the project, PRPG will forward to governing bodies the decisions requiring broader resource mobilization of the university. To this end, UNICAMP has the Institutional Strategic Planning Committee (from Portuguese, *Comissão de Planejamento Estratégico Institucional* – COPEI). According to the decision of CONSU, it was established that COPEI coordinates the proposals for developing the Institutional Strategic Planning of UNICAMP. Its responsibility is to analyze and approve actions to the Strategic Management process of the university. These strategic planning actions must be combined with the mechanisms of institutional evaluation of all units and organs, and contemplate goals, procedures, and lines of action aimed at constructing the future of the university with medium and long-term horizons.

9. Monitoring and internal evaluation of the goals policy of the Institutional Project of Internationalization.

The monitoring policy of the CAPES-PrInt Project shall be in charge of the Management Committee that will be chaired by PRPG. This Committee shall be in charge of detailing the criteria, to be established in the public notices of the different modalities of support, based on the guidelines drawn up by the project, and of preparing the notices with the aid of the administrative staff of PRPG. PRPG will be in charge of disseminating the public notices. The

proposals will be centrally forwarded to PRPG, which will be responsible for forwarding them to the members of the Management Committee. Eventually, due to the large number of submissions, members of the Management Committee can resort to the assistance of external evaluators. Projects will be evaluated according to their quality and compliance with the general criteria of the CAPES-PrInt Project and with those set out in the Public Notices. The Management Committee will annually meet to take stock of the achievement of the goals of the project and to propose the necessary adjustments due to the evolution of concrete actions of the postgraduate programs and other university organs. The Committee shall draw up an annual report taking stock of the period and pointing out the most relevant aspects to be reformulated in the project. Suggestions will be considered in the reformulation of the projects of postgraduate programs, which will be forwarded to the Management Committee for approval. Aiming at making the policy of internal monitoring and evaluation of the goals and the implementation of the Institutional Internationalization Project CAPES-PrInt more dynamic and transparent, we will alternatively manage the project "O Planner – Microsoft," which allows sharing activities and files between the Management Committee, higher bodies of the university, and the advisory team of CAPES-PrInt. This manager is part of the GEPlanes Platform, organized by the strategic management advisory of Unicamp, which has information for monitoring projects, clearinghouse of knowledge, and indicators.

10. Policy for the conciliation of national development programs supported by Capes to the internationalization effort.

In Unicamp, only 3 out of the 75 postgraduate programs have not joined the Institutional Internationalization Project CAPES-PrInt, in such a way that all development programs funded by CAPES, Visiting Professor in Brazil, Young Talent with experience abroad, and PhD with experience abroad will be linked to the Internationalization Project. Activities carried out by professors and researchers with this fund may or should, whenever possible, be recorded or have online streaming through the Computer Center of Unicamp (from Portuguese, *Centro de Computação da Unicamp* – CCUEC). CCUEC comprises web conferences, provides infrastructure of virtual rooms that allow the sharing of audio, video, text, images, and computer screen. With CCUEC/RNP web conferences, participants may interact with each other, even though far apart geographically, using a computer or a mobile device. There is need to have an installed browser, a headset, and connection to the internet to organize and

participate in meetings with high-tech communication and collaboration capabilities. The activities may also be conducted by video conference, and events related to these supports can be transmitted via web. To carry out these activities, the CCUEC also relies on physical infrastructure and technical and operational support.

11. Describe here other innovative policies that will be adopted by the institution that were not addressed before in the above items.

Fapesp has a prominent position in the promotion of research and postgraduate studies throughout the state of São Paulo, and this feature is applied to Unicamp. In 2016, this funding support amounted to R$ 144.5 million, representing more than the funding supports of CAPES and CNPq together. In addition to the other funding lines that encourage mobility, Fapesp has other lines of the same kind, which Unicamp will encourage and support the research groups to submit proposals to the programs: **SPRINT** - São Paulo Researchers in International Collaboration, a funding model in which there are simultaneous announcements of opportunities for international collaboration with several partners in addition to FAPESP; **Jovens Pesquisadores [Young Researchers] (JP**), which funds for 5 years researchers in early career, enabling work conditions for them or for groups of young researchers of great potential; **São Paulo Excellence Chair** (SPEC), providing the coming of foreign renowned scholars to create research centers; São Paulo School of Advanced Studies (ESPCA), which allows the supply of resources for the organization of short programs in advanced research, in the different areas of knowledge. Several of these development programs funded by Fapesp are already a reality in Unicamp and have had highly positive impacts with regard to internationalization.

– Proposing to higher instances of UNICAMP legal instruments that can guarantee tenders for all departments/units that can approve a JP FAPESP funding line.

– In addition, supporting professors to set up projects for public notices such as H2020 (Horizon 2020-EU Research and Innovation Programme), RCUK(Research Councils UK), NSF(National Science Foundation), and DFG(Deutsche Forschungsgemeischaft).

– With the experience of the International Postgraduate Program in Bioenergy, fully taught in English and using videoconferencing to connect students and professors from different places in the world, Unicamp will propose new postgraduate programs with these characteristics.

– And finally, from the CAPES-PrInt Project, identifying the challenges and barriers to implementation of internationalization at the university and work in partnership with all stakeholders and decision makers to propose, share and discuss the applicability of (new) solutions.

FURTHER INFORMATION

1. Number of postgraduate courses taught in English between 2013 and 2016.
Quantity of courses 176

2. Number of cotutela postgraduate programs between 2013 and 2016.
Quantity of programs 37

3. Number of double degree postgraduate programs between 2013 and 2016.
Quantity of programs 37

4. Number of bilateral postgraduate programs between 2013 and 2016.
Quantity of programs 37

5. Number of Capes development programs for which the institution has benefited between 2013 and 2016.
Quantity of programs 13

6. Number of derived products contributions for database of international research projects.
Quantity derived products 10.855

7. Insertion of materials, themes and subjects in foreign language in the postgraduate program curricular structure.

Description

UNICAMP already accumulates the experience of an International Postgraduate course in Bioenergy, which is entirely taught in English and using videoconferences, to connect students and teachers from different parts of the world. Our purpose will be to carry out new proposals of Postgraduate Programs with these characteristics. Starting from CAPES-PrInt, with the identification of the priority themes for the Postgraduate and Institution, there will be in the different postgraduate programs an extension of the topics that must be approached and taught in English during the four years of the project.

EXPECTED BENEFITS

INTERNATIONAL COOPERATION PROJECTS

Theme 1– Food, Health and Society

Goal 1 – Studying food about its production, technology, consumers, market and bioactivity

1. Name of the project Food science for well-being population and development scientific and technological

Start date **End date**

01/08/2018 31/07/2022

Description

The project entitled "Food science for the well-being of the population and scientific and technological "understanding of major national problems related to food quality and the power supply. The project permeates, from the specialty of its faculty, aspects related to the analysis, chemistry, biochemistry, toxicology and microbiology to enable responsible prospect food, apply and develop technologies, processes and products that culminate in the scientific and technological development in Brazil. Developments in the area of Food Science can impact in other areas of the economic sector, in addition to improving the quality of life and well-being of the Brazilian population. The training of researchers with comprehensive knowledge and qualifications in the field of Food Science will constitute another benefit of this project. The project is comprehensive, involving food studies from the time they are obtained in the field, through processing and consumption. Modern tools such as nutrigenomics, proteomics, lipidomics, metagenomics, transcriptomics and metabolomics, among others "omics," will be used to obtain the detailed information on the chemical, biochemical and microbiological aspects of food and its relations with the environment, processing and human health. The research project will consist of 5 main pillars: 1) Advanced tools for chemical characterization of food: use of methods "Omics" and high-performance analytical methods, and environmentally friendly for the study of minority and major chemical components in food; 2) Prospecting and biotransformations to obtain compounds of high added value and / or beneficial to health, from components of food and its processes; 3) Emerging and environmentally friendly techniques, combined with "omics" technologies, aiming at reducing food loss through contamination, field to table, and guarantee their microbiological safety. Modern strategies for modulating intestinal microbiota and its beneficial effects on human health.

2. Name of the project Food Production: from the field to the consumer

Start date **End date**

01/08/2018 31/07/2022

Description

In this project will be carried out lines of research that contemplate the study of the processing chain of (grains, fruits and vegetables), animal (poultry, pigs, cattle and aquatic animals), as well as the impact of mineral compounds (salts of sodium, calcium, phosphates etc), from the field, passing processing and production of ingredients, including the use ofproducts, also considering the whole system of

packaging and logistics for distribution to the and the study was carried out within the norms of Brazilian and / or international legislation and within microbiological, technological and nutritional quality standards. The main lines are: A) Ingredients: cereal and pseudocereal flour production, integral use fruit, vegetables, tubers, roots and stems for the development of new products; B)Product development: fermented or non-fermented beverages, animal products, based products lipid, protein or carbohydrate; C) Pilot and industrial scale tests for feasibility assessment commercial; D) Study of packaging systems, stability and logistics of product distribution.

3. Name of the project Selective antimicrobial additives obtained from natural sources: insulation, effect, stability, application in food, acceptance and perception of consumer

Start date **End date**

01/01/2019 31/07/2022

Description

The microorganisms present great relevance in safety (pathogens) and food preservation (deteriorators) as well as health promoters (probiotics). For the control of some synthetic additives are used to the food shelf. However, its use is antagonistic to the most Cheers. There is a great diversity of natural compounds with proven antimicrobial activity and which could be exploited to replace synthetic additives. These compounds may have a series of possible advantages over synthetic additives, such as higher efficiency, lower health risk, the more favorable perception of the consumer as well as allowing the reuse of waste in the development of more sustainable products. Since probiotic microorganisms can also be susceptible to antimicrobial agents, it is necessary to evaluate their survival in the products which exploit its beneficial effects. Thus, this project consists of studying the application in products of selective antimicrobial compounds obtained from natural sources and agro-industrial wastes by through efficient, sustainable and innovative extraction and isolation processes using solvents "Greens" like water and supercritical fluids. Different extraction conditions will be evaluated and the coupling between modern extraction and purification techniques for the isolation of the compounds and their selective antimicrobial potential will be assessed by minimal inhibitory activity and toxicity compounds in cell culture. Compounds which have desirable results will be applied in different dairy and bakery products for shelf-life assessment and compliance with legislation in force. These products will be evaluated using effective sensorial tests comparing the indices of acceptability and mapping of preference encompassing consumer perception of the ingredients used. The intention to purchase will be evaluated in a closed manner with subsequent modeling of the structural equation. Thus, this is a multidisciplinary project encompassing engineering, technology and sciences of food, considering physical-chemical, nutritional and consumer behavior innovative solutions to contribute to the sustainable development of the food sector.

4. Name of the project Global Sustainable Bioenergy Initiative: geospatial and environmental analysis of intensification of pasture for bioenergy

Start date **End date**

01/08/2018 31/07/2022

Description

Research on a global scale, such as intensification of pasture, under spatial and environmental relevant for the production of biofuels.

5. Name of the project New food sources of nutrients and bioactive compounds: prospecting, processing, quality and health

Start date **End date**

01/08/2018 31/07/2022

Description

This proposal is based on Food Security, that is, the regular and permanent access of the population to the foods in quantity and quality (eg nutritional, contaminant-free and sensorially well-accepted).Thus, the main objective is to study new food sources such as conventional, food agroindustry byproducts, edible insects, Brazilian native fruits. The interdisciplinarity characterizes the proposal of PPGAN, since its faculty works in different areas of research in food. In this way, the proposal has different approaches: Analytical studies by chromatography, mass spectrometry, magnetic resonance imaging, etc., to determine nutrients and bioactive compounds in food. Knowing the composition of these foods is essential for the development of new ingredients and products, expanding the possibilities of technological application; Biotransformation and encapsulation techniques will be applied in the development of ingredients aiming at the prolonging the useful life of foods and maximizing the availability of nutrients and compounds bioactives, implying quality improvement and value added. This will make it possible to food changes during food processing and storage; In terms of effects beneficial to health, to evaluate the bioaccessibility and bioavailability of such nutrients and / or compounds bioactives is essential to develop foods for different needs, health pathologies, seeking the prevention of chronic degenerative diseases. In this way, vitro, in vivo and preclinical studies that will provide answers for a better understanding of how these compounds act by modulating the gene and / or protein expression of important markers of the metabolic pathways (epigenetics), for the maintenance of people's health and quality of life; • Beyond quality nutritional, safety and sensorial characteristics, it is necessary to understand the eating habits and research on social representations, the effect of information purchase (eg, food labeling, value perception, purchase intent) and food taboos (eg, plants and animals not eaten as food in a culture and neophobia) fundamental, because understanding their behavior, preferences and constraints will generate value information for educational campaigns on food and nutrition.

Theme 2– Investigation of Complex, Natural and Artificial Systems

Goal 1 – Analysis and development of theoretical models and computational tools for studying the structure and evolution of complex systems.

1. Name of the project The Paradigm of Randomness in Complex Systems: Aspects Theoretical and Applied

Start date **End date**

01/08/2018 31/07/2022

Description

Complex systems happen naturally in many areas of knowledge. Models that can be generalized or that they present a wide spectrum of applications demand a rigorous characterization of aspects of causality and randomness. Under this paradigm of intrinsic randomness, it is possible to construct probabilistic models with a wide range of (biology, physics, genetics, engineering, medicine, etc.). Its empirical aspects can be precisely predicted by the models, and statistical methodologies are created and implemented to scientific or exploratory verification of hypotheses, properties and the adherence of theories to the world real. This project aims to develop new models and statistical methodologies for the advance of state of the art in the analysis of complex systems. For this, a team of researchers in Biostatistics, Applied Statistics, Mathematical Statistics and Probability and Stochastic Processes. Many project participants are recognized researchers internationally in their respective areas of activity. The problems investigated in the areas of Probability and Stochastic Processes and Mathematical Statistics concentrate naturally on more theoretical characteristics of probabilistic models and / or statistical methodologies. At investigations in Biostatistics and in Applied Statistics deal with hypothesis fields of knowledge such as biology, physics, genetics, engineering and medicine.

2. Name of the project Structure and dynamics of systems complexes: condensed matter and biological systems

Start date **End date**

01/08/2018 31/07/2022

Description

This project addresses several problems associated with the science of biological materials and systems having in common the strong interaction between its components that determines its dynamics and its equilibrium or structural properties. The performance in the area of complex systems in PPG-IFGW, forms a research area with a strong international presence and includes: 1) Study of fermions and strongly interacting bosons in the weak-to-strong coupling regime and at various scales of such as ultra-cold atomic gases, via Monte Carlo quantum methods; 2) Microscopic scale study of the processes that control the plastic deformation of materials crystallines such as i) ice and ii) solid helium-4, via atomistic simulation using dynamics molecular and quantum Monte Carlo methods; 3) Study of thermodynamic properties of glasses (BMG), with emphasis on the CuZr and CuZrAl alloys, via "Modified Embedded Atom Method "(MEAM) for modeling the interactions between atoms;" Large-scale

Atomic / Molecular Massively Parallel Simulator (LAMMPS) for molecular dynamics simulations. For the thermodynamic properties will be used the "Adiabatic Switching" and "Reversible Scaling "; 4) Study of complex quantum systems, such as compounds containing elements which are transition metals, lanthanides or actinides of open d or f layer, and which present phenomena of superconductivity, various magnetic behaviors and metal-insulating transition. 5) Speciation processes and phylogenetic trees. The objective of the project is to conditions in which a population can be divided into different species, considering different mechanisms, such as geographic isolation, genetic incompatibilities and competition for resources, via agent-based models where one can control several parameters and obtain the phylogenies corresponding to each simulated situation and process mapping. 6) Correlation study between the geometric properties of neural bundles and the topological properties of the neural network structure of the brain of mice. These properties will be studied and correlated with geometric properties and compared with random neural network models, with the objective of to identify general principles that organize the structural network of the brain, using network analysis.

3. Name of the project Dynamic Systems and Equations Partial Differentials

Start date **End date**

01/08/2018 31/07/2022

Description

In this project, we will analyze Dynamic Systems (SDs) and Partial Differential Equations (PDEs) of various types and structures and which model a range of phenomena in the biological, physical, engineering, biophysics and mathematical finance. We are interested in developing new techniques and results that allow us to obtain qualitative properties of an analytical, geometric and numerical data for SDs and EDPs and those natural complex systems to which they are intrinsically connected. Examples of these are the complex motion of natural particle systems and fluxes, analysis of biological systems, geometry / topology of complex orbits / sets, behavior analysis of quantum models (describing the movement of atoms and molecules), stochastic and fractal structures. Topics to be studied are: (1) Non-soft dynamic systems and soft: chaotic behavior analysis; ergodic analysis; structural stability and bifurcations;existence of limit cycles and other invariant minimal sets; thermodynamic formalism; Gibbs-balance measures; ergodic optimization. (2) Analysis of fluids, flows and biological and of quantum mechanics: Navier-Stokes and Euler (and variants), dynamic models of interfaces via phase field, systems with memory and nonlocal terms, biological models of the Keller-Segel type, magnetic-hydrodynamic and convection models, Cosserat-Binghame type fluids, type Korteweg-de Vries (KdV) and Schrödinger (and variants), among others. We will consider the analysis of singularities, regularity, well-defined or chaotic flows, shocks in complex systems, asymptotic behavior, optimal control, controllability, local / global symmetries and patterns, and self-similarity.(3) Stochastic Systems and Models: Analysis of stochastic solutions; aspects numerical, in particular, techniques with random instants; Lyapunov exponents and bifurcations in systems generated by delay in equations driven by Levy and fBm (fractional Brownian motion); stochastic stability of dynamic systems; discrete KAM solutions for models of almost crystalline interactions; extreme standards for bundles of grouped fibers.

(4) Complex systems of celestial mechanics; orbits of consecutive collisions; homology of Floer and Rabinowitz-Floer and its applications; flow curves in different geometries (Riemannian and Finsleriana).

4. Name of the project Theoretical and Computational Chemistry: methods and applications in biology molecular and material science

Start date **End date**

01/08/2018 31/07/2022

Description

This project intends to advance the understanding of complex systems through the application of theoretical and computational methods. The systems of greatest interest are biological in nature (structure and function of proteins, sugars, nucleic acids, membranes), and new materials (surfaces, nano-particles, polymers). From a theoretical point of view, based on statistical mechanics and quantum chemistry for the modeling of properties structural and dynamic materials. The models are used to model, computationally, the structure, dynamics and thermodynamics of the systems, aiming the understanding of their properties in a fundamental level and the proposition of functional improvements with potential applications biochemical and technological aspects. Specifically, some systems of study are: 1) Understanding and enhancement of proteins involved in converting sugars into bioethanol. 2) Membranes biomolecular. 3) Activity of enzymes in non aqueous media. 4) Modeling the structure of using experimental distance restrictions. 5) Plasmid surfaces. 6) Defects in metal surfaces.

Theme 3– Science and Information Technology

Goal 1 – Developing the theoretical fundaments and exploring techniques, methods and tools aimed at the understanding of information sciences and technology

1. Name of the project Supported Computing Models Adaptivity in Real-Time Embedded Systems

Start date	**End date**
01/08/2018	31/07/2022

Description

With the development and maturation of technologies in the area of reconfigurable systems, a new embedded system classification called "adaptive embedded system" has been gaining increasingly attention of the scientific-technological community as an alternative to embedded with real-time constraints, hardware area, performance, power consumption, different levels of criticality, and runtime reconfiguration requirements. A Adaptive Embedded System can reconfigure itself at the hardware level based on the current state of the system and its inputs. Avionics systems are an example of an application for such system, and can be implemented in heterogeneous SoCs with reconfiguration capability. However, increasing the complexity of heterogeneous SoCs causes embedded systems face difficulties in the design of these systems mainly testing and verification. The literature does not yet present a single and systematic method for the design of embedded systems that guarantees its operation without a significant number of tests and verifications. Specifically, it is intended to apply the above concepts to monitoring of structural integrity, as a key part of a new generation. Based on this context, this research project proposes the development of a methodology for the design of adaptive embedded systems based on formal models of computation and machine learning, aiming at the implementation of sets of classifiers cooperatives. The basic idea is to take the project to a high level of abstraction with a formal model of the specification that guarantees the necessary functionalities for the system and, through refinements, obtain an implementation model that ensures the correctness of the functionalities described in the model of the specification, thus aiming at minimizing traditional testing needs.

2. Name of the project Simulation platform as testbed for high control and low level of the prospecting robot water lunar Sorato in realistic conditions

Start date	**End date**
01/09/2018	31/09/2021

Description

The surface of the Moon proved to be covered by icy water, but not with great accuracy in terms of quantity and location. This feature, which serves as rocket fuel, is invaluable in space, and will be mined to reduce the cost of sending missions to Mars from a spaceport lunar, as announced by the Obama

administration. A detailed map of the location and amount of water on the moon is a necessary analysis tool, to establish the spaceport. To this end, a mobile robot with the objective of prospecting for ice water will be sent on 2020, by I-Space, with the collaboration of the Space Robotic Lab of Tohoku University. The laboratory of Professor Yoshida is developing a robotic platform that can handle mobility in the rough terrain of the moon. The robot to be sent on the moon will be equipped with a spectrometer that you can detect and estimate the amount of water around the robot. The University of Tohoku is developing the rover itself and its low-level control to follow a predefined path, testing the behavior of the rover in the fine-grained sand, similar to the regolith on the moon. Our group at Unicamp / Unesp, will be responsible for the development of a simulation framework for implement and test high-level drivers developed in partnership with the University of Luxembourg, producing the way to be followed, to map the lunar water, using camera and simulated rover sensors in realistic lunar visual conditions, since it is necessary to reproduce a realistic set of reference points for the robot to locate accurately. Besides the development of the planning algorithm, it will be necessary to test the robot in a large number of situations, changing their environment to ensure the success of the mission. The simulation framework will be used to accurately model the lunar topology using a random lunar terrain generator. In this environment, a simulated version of the robot can navigate using the same software as the of the real robot.

3. Name of the project	Photonics applied to Communication Information Theory

Start date	**End date**
01/08/2018	31/07/2022

Description

In the last 30 years, the consumption of communication and internet data has grown exponentially, creating the need for new information transmission and processing technologies, each time faster, more efficient and lower cost. To achieve this goal, the scientific community has to develop new materials and purely photonic devices and jointly understanding and control of the processes of light interaction with these new systems. In this sense, the Unicamp has invested heavily in the field of photonics applied to communications and information, both in fundamental and applied research. Emphasizing New Materials and Devices, Light-Matter Interaction and Quantum Information and Communication, the development of new photonic technologies for generation, transmission, processing and detection of optical signals. In the area of New Materials and Devices, we mention the development of new optical fibers and the development of integrated photonic devices. Using technology well-established microfabrication of electronic circuits, the integrated photonics seeks to develop lasers, faster and more efficient optical modulators, nano-antennas and several other structures to manipulate light and, in the future, create photonic circuits on a silicon chip. Research on semiconductor nanostructures have the potential for application as light sources, for example for a generation of single photon for quantum communication. Nonlinear optical processes in nanomaterials, wave nanowires and optical microcavities are examples explored in the area of Light-Material. The efficiency of these processes

depends critically on the properties and geometry of materials and can enable fully optical signal processing. We have explored the understanding of the dynamics of silicon nanowires, opening the way to create fully optical modulators. Nonlinear processes can still be used for the generation of entangled photons for quantum communication. Finally, various facts have occurred in recent years when considering quantum systems for of information - Quantum Information Science seeks to explore new algorithms that are more efficient and / or safe for the processing, storage and transmission of information, in addition to establishing new technological platforms for its implementation.

4. Name of the project	Challenges in Science and Technology of Information

Start date	**End date**
01/08/2018	31/07/2022

Description

The objectives of this project are: 1) to develop a platform and the optimizations needed to execution, in mobile and embedded devices, of inference operations in Neural models Networks trained through Machine Learning that can perform operations that minimize execution time and power consumption of the device; 2) propose and validate models, methods, techniques and tools in an international cooperation environment that contribute to the resilience and the reduction of the latency of future 5G communication network infrastructures, including communications components, software and services; 3) investigate, through the first models of the literature, proposed by members of this group, the basic conditions for the evolve from a computational perspective. The partner group experience in the UK in the area of cognitive robotics and performing experiments in complex scenarios will raise results of this subproject; 4) to develop an environment for intelligent, highly innovative, secure, interoperable, and service-sensitive. The joint proposal is to build a robust intercontinental cloud environment that by design, able to deal with the heterogeneity of distributed cloud systems and other services to the interaction of local communities; 5) design and analyze 5G radio access technologies using the paradigm of Software Defined Networks. Some challenges that will be considered in the project are: study and establish disciplines of physical layer abstraction for RAN, and abstraction for plane and control functions for 5G networks and study and explore programmability in wireless access. 6) investigate new systems that represent data semantics. The paper proposes the study of modeling solutions and development techniques to support software applications that the Active Database structure, with new storage and data recovery. 7) devising new approaches to support Verification and Validation (V & V) of Cyber-Physical Systems (CPS). The specific objective is to create an international collaboration on the subject of the V & V of "Cyber-Physical Systems". The interactions between partners will enable students and researchers to be trained in innovations in the V & V theme in "Cyber-Physical Systems" systems.

Theme 4– Nanotechnology

Goal 1 – Nanotechnology and new materials.

1. Name of the project	Nanotechnology and new materials

Start date	**End date**
01/08/2018	31/07/2022

Description

Nanometer-sized materials represent a new class of materials. Monolayers of carbon atoms organized as graphene, have electronic properties different from carbon atoms isolated or macroscopic blocks (graphite) formed by such monolayers, with repercussions on all its other properties. Transition metal dicalcogens, for example, change their electronic structure and emit light efficiently when in monolayers, while in multiple layers the emission is non-existent. Such changes in the properties of these materials have been intensively studied by several teams associated with PPG-IFGW. Has been sought to understand more fundamentally the relation between morphological and structural properties with other properties, such as luminescence or electronic transport. Thus, one can cite the synthesis of semiconductor membranes associated with two-dimensional nano-materials, such as graphene or BN, which has great potential for application in opto-electronic devices and also in flexible electronics. Such two-dimensional materials, whose optical properties have been largely studied, still lack studies related to its interface with biology. Aiming to fill this gap, the interaction of such nanomaterials with bacteria is being studied. In another interface with biology and medicine, magnetic nanoparticles are being studied in therapy based on hyperthermia. In this research front, magnetic nanoparticles local heating of tissues and potentially the destruction of tumor example. Semiconductor nanoparticles, or other forms of quantum dots, can also optical properties such as the emission of single photons, very important in quantum computing. Other materials, such as carbon nanotubes, exhibit exotic mechanical properties, such as negative Poisson ratio, and are being studied for applications in which such properties are interesting. In addition to optical properties, magnetic, mechanical and biological, some ultrathin films have electronic properties that allow to giving specificity to sensors. It is also worth mentioning researches that such as the modification of metal alloy surfaces by plasmas or ionic implantation aiming to improve mechanical properties such as hardness or resistance to both vital to the industry.

2. Name of the project	Nanostructured materials: synthesis, characterization and applications.

Start date	**End date**
01/08/2018	31/07/2022

Description

The purpose of this proposal is the study of several innovative approaches to the preparation of nanostructured materials, as well as the use of instrumental techniques of analysis capable of elucidating both the composition and the morphology of materials of pharmaceutical and industrial interest at the nanostructures level. It proposes the following activities: - Study of the properties of

bimetallic nanoparticles of gadolinium oxide nanoparticles co-doped with ytterbium and of metal nanostructures through femtosecond spectroscopy, micro-spectroscopy by non-linear upward conversion, optical tweezers and stochastic dynamics simulations. – Study of rotational diffusion in colloidal systems, involving the synthesis of colloidal clusters and other colloidal non-spherical particles and fundamental investigations of rotational diffusion in using optical microscopy and simulations. - Elucidation by computational methods based on the theory of density functional (DFT) the structural and thermodynamic aspects of nucleation and growth of metal nanostructures when semiconductors are exposed to electron or laser irradiation through the analysis of its electronic structure for assist in the design of materials with desirable properties. - Synthesis and characterization of materials nanostructured lamellar - in particular, zeolites - through ADOR (Assembly- Disassembly-Organization-Reassembly), and with an initial focus on zeolites based on germanosilicates. - Investigate semiconductor nanomaterials (mixed titanium oxides, bismuth, tungsten, silver and copper) for solar energy conversion applications. These will be synthesized by different methodologies and will be evaluated as photoanodes or photocathodes - Production study of cellulose and nanolignin nanoparticles through fractionation of the plant cell wall of some types of biomass. Simultaneously, the same substrates will be evaluated in the preparation polymer nanocomposites, aerogels and films with UV protection. - Obtaining information physical and chemical analyzes on nanometric scale of pharmaceutical pellets by AFM-IR and imaging of the samples for the chemometric treatment of the data.

3. Name of the project Development of Nanomaterials and devices for nano and microelectronics, storage of Energy and Biomedicine

Start date **End date**

01/08/2018 30/06/2021

Description

In this project we will develop nanomaterials such as graphene, nanotubes, fullerenes etc that have excellent electrical conductivity and chemical stability, serving as excellent components in electrical systems, electrochemical sensors and biological platforms with possible application in vitro and / or in vivo. Such materials will also receive functionalization by nanoparticles (Ru, Ni, Fe, RuO2, NiCo2O4, LiFePO4) and nanostructured polymers to increase their activity such as collectors, barriers and load exchange in several applications. At the nano microelectronics will develop in this project transistors, supercapacitors, batteries, sensors electrochemical and biomedical platforms. Also, integrated circuit nano-interconnections process of introducing new materials and structures to meet the performance of next technologies. Such materials and structures will be studied and modeled during the project.

Theme 5– The challenges of democracy

Goal 1 – Understanding democracy and democratic processes based on the new challenges being faced in the 21st century from an interdisciplinary approach.

1. Name of the project Crossed views on democracy: advances, flows, setbacks and contradictions

Start date **End date**

01/08/2018 31/07/2022

Description

The notion of 'democracy', its trajectory as a concept and social model, and the flow of ideas and concepts and the concrete developments in the social life of democratic processes one of the great themes of the human and social sciences. From the perspective of Political Science, the of democratic states with the third wave of re-democratization has boosted the studies of regime types, of their institutions, of the conditions that would enable states to consolidate themselves as democracies, to the need to deepen democratic relations within and between States. In addition, the numerical advancement of democratic states is surrounded by expectations in the various spheres of life social, which can be summed up in the idea that we would have a fairer, more equal, more inclusive world. The dynamic of democracies faces obstacles in the face of disparities in political and economic power between states and the dynamics of the international system, in which the United States plays a structural role. Although advances at the end of the 20th century and the beginning of the 21st century, as in the question of social rights, these they were not without contradictions. The most obvious is that between the democratic ideal and representative democracy or liberal democracy. We have democratic states with more inclusive social policies, but without equality in fact among citizens and this is revealed in economic, political, social and cultural terms. These contradictions are fundamental raw material for sociological or anthropological studies. Advances in recognition of diversity in various national contexts, which allowed both the recognition of and traditional populations in terms of affirmative ethnic-racial sexual and gender diversity have been a fundamental part of recent democratic processes, and today social tensions that pose dilemmas for democracy. Within a broader framework of Nation states, especially Latin American countries, still stand out because of the precarious way memory of State crimes has been addressed, with timid revisions and even regret in the context of the rise of fascist ideologies, which has gained votes and parliaments. The international cut is imposed by the very theme that is best understood from a comparative multidisciplinary approach.

Theme 6– Difference, diversity and inequality

Goal 1 – Studying production processes in their relations with diversity and inequalities and bodily practices in/of cities and their impacts on the urban setting and on public spaces.

1. Name of the project Linguistic constructions of difference, diversity and equality

Start date **End date**

01/08/2018 31/07/2022

Description

Several linguistic perspectives collaborate in the investigation of the subject, among them, the Language, Historical Linguistics; History of Linguistic Ideas; Speech analysis. Among the themes are: the institutionalization of the Portuguese language in school in Brazil; interculturality in the Portuguese of Angola and Mozambique; the feminine and women's discourse, the memory of urban discourse and about urbanity (and the concept of ambiance), language and democracy. It is, therefore, transnational phenomena also relevant to international and national collaborators institutions. The project provides, among other activities and events, the offering of disciplines undergraduate and postgraduate electives and the holding of scientific events with online and availability of the material on the youtube channel of the IEL and the research centers involved.

2. Name of the project History Networks

Start date **End date**

01/08/2018 31/07/2022

Description

The contemporary world presents a series of challenges for the human sciences, such as the emergence of new social actors who rightly claim to include their narratives and experiences in the debate academic. Within this panorama, interculturality has a central role, either to deal with these new realities, whether to reinterpret the past through a new perspective, that is, to rethink history in terms of cultural interactions. Peter Burke, in a recent book on cultural hybridity (BURKE, Hybrid Renaissance, 2016), speaks precisely about the concept of 'displacement' as one of the main innovation tools. As we move concepts, people or traditions, new ideas and analytical perspectives. Working with the concept of interaction networks allows us to deal with two problems central to the study of history: the relations between change and continuity and between different groups, they are distinguished by ethnicities, by geography, by social conditions or even for generations. Such a proposal also presents an inflection in the question of teaching, either in the training of research impact on Basic Education and communication with broader publics (history public, extension to non-formal educational spaces, reach to the general population). The project on the one hand, to finance research that focuses on themes related to diversity, and on the movement of people, ideas and objects. On the other hand, it is intended to invest in a greater interaction of its participants with foreign institutions, making cultural diversity not only a practice of research, but also an academic policy. The History department, which today counts

two postgraduate programs (the Professional Master's in History - ProfHistory and the Post-Graduate in History - PPGH), since its foundation has given rise to several research groups that regularly generate thematic projects and obtain financing with FAPESP and CNPq, with one of its central axes in international interaction. Following this tradition, we will thus be able to take advantage of already active or working agreements and collaborations, concomitantly, we will seek new opportunities for international cooperation. In this sense, scholarships and funding for the displacement of researchers and students for missions and internships in different universities will be fundamental to the good development of the project.

3. Name of the project	Body practices in cities

Start date	**End date**
01/08/2018	31/07/2022

Description

The research investigates the body practices in the cities agreed in this research project. The initial assumption is that the place of enjoyment of corporal practices in the city was primarily the space public. However, with the advancement of modernity, new ways of living the city and sociability were gaining strength by imputing dilemmas to these spaces. Today the public space is identified as a place of tensions, violence and emptying. Authors such as Killian (1998) identify the death of public life in contemporary society, since in the city there was the expansion of the exploitation of the soil by the private initiative. This fact has produced the loss of community life, of the time and spaces previously associative life and, consequently, has impacted on the way of being a citizen and enjoying the city, that is, citizenship. However, it is possible to perceive corporal practices in the city that this emptied and still impute identity marks to public spaces. Thus, the objectives of the study the evolution of the urban morphology of Campinas and other cities and their impacts on public spaces intended or appropriate for the experience of bodily practices. Second Magnani (2001), the ethnographic view allows us to find new meanings, as well as the univocity of interpretation of the urban industrial societies, considering the conceptions that each group possesses of practices.

4. Name of the project	Difference and diversity: Challenges for the Social Sciences

Start date	**End date**
01/08/2018	31/07/2022

Description

Given its contemporary centrality, the theme of difference in articulation with the production of inequalities diversity is based on researche of different disciplinary traditions in the Social Sciences, interdisciplinary dialogue and powerful international interlocution. Traditionally, the issue of inequalities in Social Sciences gathered studies on work, social classes and the State, in investigations focused on the understanding of labor relations in the country, its transformation processes and the policies that the

accompany. The aspects related to economic and social development in the country, taking into account Latin America and the way the region articulates with global changes in work, have also gained relevance in the debate on inequalities. Studies on race and ethnicity were central to this debate, just as the study of political participation and collective action took place understanding of the social dynamics surrounding labor relations and the organization of social classes in Brazil, expressing themselves in the investigations on social movements, political parties, unions etc. In recent decades, interest in work and social classes as social world - and therefore the inequalities they engender - has divided space with the relations that involve gender, sexuality, generation (youth and aging), racialized social relations, ethnicity, nationality, social thought as categories concerning the production of difference and that operate in articulation. The debate on prejudice, violence and discrimination is also incorporated, as well as such as the analysis of the policies involved and the production processes of subjects and categories. Beyond In addition, the discussion on social inequalities has been accompanied by theoretical perspectives understanding of social and cultural diversity. In this context, the knowledge, the role of the intellectuals, the conflicts between different worldviews and the relations between nature, culture and technology in analyzes of conflict in indigenous contexts, contexts rural and urban. The theme of difference combined with how it produces inequality and diversity process at different scales, which could hardly be understood without the adoption of an international research perspective.

Theme 7– Methodology, epistemology and language

Goal 1 – Encouraging cutting-edge researches and optimal training in innovative techniques and methods in the humanities and language studies.

1. Name of the project Episteme and scientia of Language

Start date **End date**

01/08/2018 31/07/2022

Description

The project covers the following fields of study (in alphabetical order): Discourse Analysis, Phonetics and Speech Therapy, History of Linguistic Ideas, Classical Letters, Neurolinguistics, Sociolinguistics and Theory of Philology. Here, approaches to various aspects of languages, languages and texts (ancient and modern) are only developed and applied to the respective objects of study, but also have their concepts and problematized assumptions. This should occur through dialogue with international institutions, in particular by: (a) the results of the surveys themselves, insofar as they require a review of the adopted parameters; b) the questions posed by the intrinsic methodological contrast to transdisciplinarity; c) more specifically epistemological research, such as the oriented to the key concepts, as well as the mode of argument and the history of each discipline.

2. Name of the project Methodology and Teaching: challenges and innovations in the human sciences

Start date **End date**

01/08/2018 31/07/2022

Description

The field of Human Sciences has advanced significantly in the use of analysis and teaching. With the evolution of technology it is possible to aggregate a large universe of information and refine the mechanisms of data collection and analysis. New tools allow the collection and the crossing of data with speed and precision unthinkable 20 years ago. To develop their work, researchers of the different areas of the human sciences constantly update classical methods of analysis, but also, creatively, create new ways of understanding social reality. Given the need to train researchers connected with advanced research techniques, IFCH's graduate programs propose a project in methodology in Human Sciences focused on research and teaching. The project focuses on qualitative and quantitative methodologies and has a multidisciplinary format of 10 PPGs of the Institute. The design framework allows each technique to be exploratory research, contributing to the training of researchers and offering the opportunity of learning of innovative techniques with broad application in the various areas of Human Sciences. At Multidisciplinary methodologies are also aimed at improving teaching at the higher level and, the society's access to university research results, dialogue with teacher education, the challenges of Basic Education and the need to speak increasing public awareness. Furthermore, the project will allow the establishment of international researchers empowering the process of internationalization of

the Brazilian humanities, stimulating international collaborations, giving visibility to research and graduate programs of IFCH / Unicamp and making possible the international consolidation of already existing centers and research centers at the institute Initially we propose the deepening of methodologies such as: Historical Analysis of Events, Sources and Archives, Public History and Digital History, Population Projections, Multilevel Analysis applied to the Human Sciences, Qualitative Analysis and Mixed Methods, Game Theory, Experiments in Social Sciences, Digital Ethnography, Ethnography of images and spellings, Ethnography in archives and Kinship.

3. Name of the project	The Transformations of Philosophy

Start date	**End date**
01/08/2018	31/07/2022

Description

This project integrates ongoing research in PPG in Philosophy. The objective is to investigate Philosophy in its history, that is, the identity or permanence of the project of Philosophy over time and its place in the order of knowledge in different cultures. It is structured in three conceptual frameworks: (a) Metaphysics, Predication and Philosophy of Nature in Aristotle and his reception. Covers the History of Philosophy Ancient, dedicated to classic authors of Greek Philosophy, and investigates, with the aid of the philological analysis of the Greek text, fundamental philosophical themes around which the philosophy of the period is organized. It deals, in History of Medieval Philosophy, from the reception of philosophical antiquity, with emphasis on the period of the School of Alexandria and the thirteenth and fourteenth centuries, dealing especially with the philosophy of Latin and Arabic. Lastly, reaches the beginning of the History of Modern Philosophy, which includes the sixteenth and seventeenth centuries, with an emphasis on rationalistic continental tradition and empiricism. b) The historical heritage of Ethics and political thought contemporary. It covers the systematic investigation of classical themes of Practical Philosophy. Prioritize relations between Ethics and Politics and its reference to the category of State. It covers the State Theory of Law and Democracy, taking as a starting point the concepts of popular sovereignty and representation as foundational categories of contemporary democracy. Investigate the contradictions and complementarities among these categories, the references to human rights and the revision of democratic-liberal doctrines, and the updating of Practical Philosophy in contemporary debates. (c) Logic and language. Covers Language, Epistemology, and Fundamentals of Formal Science. We investigate the application of the theory of acts illocutionary developed in the century. XX. It is hypothesized that linguistic acts play a theoretical arsenal of mathematics, with possible implications for ontology. We investigate the application of logic to the knowledge problem, with attention to the analysis of notions of belief and knowledge made through modal logic. The connection between logic and theory of probabilities, tools in the formal study of reasoning applied in philosophy, intelligence artificial, mathematical and cognitive science. Finally, it develops the area of foundations of the formal sciences, combining logic with probability theory, seeking common generalization.

Theme 8– State, policies and education

Goal 1 – Investigating the interfaces of public education policies with the State and society.

Name of the project Public policies of education, State and Society: reverberations in human training

Start date **End date**

01/08/2018 31/07/2022

Description

To inventory and analyze policies and programs in different social and cultural contexts that education for human training. Research will dialogue with developing countries (South-South cooperation), as well as reference research and international excellence. The investigations will be based on the literature that supports the understanding of the subject and is articulated to the data collection and complementary empirical procedures. The relevance of the theme is Universal Declaration of Human Rights, adopted 1948, a fundamental framework in the recognition and consolidation of education as a fundamental social right in the human, demanding of the State elaboration and implementation of public policies.

2. Name of the project Training of trainers in the university context and professional: knowledge and competencies for practical intervention

Start date **End date**

01/08/2018 31/07/2022

Description

Before the appreciation of the sports coach in the century. XXI, there has been an increase in coaching in the world. The training system of coaches in Brazil undergraduate courses in Physical Education / Sport and Sports of the courses offered by sports federations and by the Brazilian Olympic Committee (MILISTETD et al., 2016). International research in this area has respect to the curricular structure (CALLARY et al., 2014), the development of courses (PAQUETTE et al., 2014) and the analysis of the perception of trained trainers (JONES; Allison, 2014). On the other hand, Brazilian research has focused on identifying and improvement of the curricular structure (CORTELA et al., 2013, MILISTETD et al., 2017). It is research, as a differential, proposes an investigation based on the design of training of sports coaches in the university and non-formal context (coaches experienced). Therefore, the objective of the study is to develop and analyze training in the university and professional context, to contribute to the development of knowledge and skills for practical intervention. It is about qualitative research, aimed at diagnosis and intervention through formative actions with students in Unicamp's Sports Sciences and with modal trainers sports in Campinas and Limeira and in the cities of partner universities: Winnipeg, Ottawa, Madrid and Carceres. Procedures with coaches and students: perception of knowledge and skills; the Rappaport Time Line (RTL); focus group; participant observation and semi-structured interview; a reflective diary. Data analysis: thematic analysis by software Nvivo 11 (QSR Nvivo).

Theme 9– Genomics, Metabolomics and Proteomics

Goal 1 – Obtaining, storing, analyzing, interpreting and processing biological data on a large scale.

1. Name of the project	Biomarkers in diseases inflammatory bowel disease.

Start date **End date**

01/08/2018 31/07/2022

Description

Inflammatory bowel diseases (IBD) are chronic intestinal conditions of multifactorial etiology that has been showing an increase in incidence in the last three decades. In addition, it is multigenic and complex, mainly involving defects in the inflammatory pathways. More recently, biomarkers in intestinal mucosa that may aid in diagnosis, prognosis and response therapy. However, few studies that address genetic biomarkers, both mucosa in the early and late phases of the disease. In the present project we intend to identify new (transcriptional) genetic signatures associated with the area of intestinal mucosa affected by IBD, in the phases of activity and remission, as well as in the initial and late stages of it. In this way, the molecular research may identify differences in transcriptional expression of genes that may result in the future, biomarkers of phenotypes and disease activity. Also, we can determine tissue-specific characteristics in the early and late stages of disease development, constituting potential targets of pharmacological agents, and individualizing therapies depending on the phenotype and stage of the disease

2. Name of the project	Investigating genetic diversity, physiology and development in plants

Start date **End date**

01/08/2018 31/07/2022

Description

Recent developments in areas such as genetics and molecular biology have made it possible to knowledge generated in these different disciplines to obtain a better understanding of the cell phone. The whole of these "atomic" sciences (genomics, metabolomics and proteomics) lies on the border of scientific knowledge, with methodologies still in development. In this context, PPG / BV has teachers who develop projects in the area in partnership with international institutions. The project here proposed is divided into two main axes. Axis 1: Plant Physiology and Development – East axis has three projects that seek to investigate different aspects of development, ecophysiology and nutrient use of plant species. The first project, coordinated by Profs. Marcelo C. Dornelas and Rafael V. Ribeiro, will investigate the mechanisms controlling the growth and development of angiosperms from the use of model and cultivated plants. The second project, coordinated by Prof. Rafael V. Ribeiro, proposes an integrative approach to study ecophysiological and cultural aspects related to the photosynthesis of sugarcane. A third project, coordinated by Prof. Paulo Mazzafera and Profa. Sara A.L. Andrade, aims to elucidate the physiological and molecular mechanisms of uptake and remobilization of the phosphorus element (P) in cultivated species of Eucalyptus, and as the endogenous concentration of the plant's

phosphate interacts with its root symbioses and the microbiota of the rhizosphere. Axis 2: Diversity and genetic improvement - This axis has three projects focused on the study and mapping of genetic diversity in model, cultivated and wild plants. Two projects will be coordinated by Prof. Michel G.A. Vincentz and seek to investigate how the energy of a plant model (Arabidopsis thaliana) is managed to optimize growth and development in a changing environment. We will investigate the molecular mechanisms involved in the of energy homeostasis using genetic, biochemical and metabolomic approaches. The other project, coordinated by Prof. Anete P. Souza, aims to compare and study the genetic diversity between genotypes of wild and cultivated species, as well as the mapping of characteristics of interest of cultivated species, from molecular markers such as microsatellites and SNIPs.

3. Name of the project Application of the "omics" sciences in the knowledge of processes pathological and regenerative.

Start date **End date**

01/08/2018 31/07/2022

Description

The chronic inflammatory diseases that affect the periodontal and endodontic tissues are among the more prevalent infectious diseases, being the main cause of dental public health. In the last 15 years, advances in knowledge of the etiology and the healing process of periodontal and endodontic lesions are due to laboratories and clinics, involving methodologies that provided a better understanding of the cellular and molecular mechanisms involved in pathological processes as well as regeneration processes tissue. In this context, large-scale data from DNA, RNA, protein and other metabolites has allowed the expansion of knowledge in the field of microbiology, immunology and the biological processes involved in the formation and regeneration of dental tissues. Therefore, this research project aims to apply large-scale technologies to: 1) establish new tools diagnosis for aggressive periodontal diseases and for patients who do not respond to therapy 2) define the microbiome involved in endodontic-periodontal lesions, 3) describe the signatures of gene and tissue expression / periodontal cells, 4) identify molecules keys to control the formation of periodontal structures, and 5) apply the knowledge acquired in the objectives, in order to define new therapeutic approaches to promote the reconstruction of periodontal and endodontic tissues. It is worth mentioning that, within this area, PPGCO already exchanges with foreign institutions with current research funding such as: 1) Agreement of Cooperation - University of Birmingham & University of Nottingham (Process FAPESP # 2017 / 07944-5) and 2) called OSU (Ohio State University) / Fapesp (Processes # 2015 / 50248-4 and # 2015 / 50264-0).

4. Name of the project Use of genomics, metabolomics and proteomics for obtaining, development and use of bioactive products

Start date **End date**

01/08/2018 31/07/2022

Description

The projects involve the obtaining, chemical and biological characterization of different compounds bioactives to verify its potential biological and technological effect. The objectives of the projects are: 1) seek new therapeutic targets using systems focused on the genesis, function, and neuroimmunoendocrine regulation and establishment of mimetic models minimizing the use of laboratory animals, using genomic and proteomic tools for structural and molecular modeling studies with focus on the design and improvement of molecules with potential for pharmacological use; 2) obtaining and biological evaluation of molecules and products of pharmaceutical interest from bioprospecting (isolation and purification), biotechnological processes and / or synthesis and in vitro study, in vivo and ex vivo aiming at the determination of biological activity and toxicity; and 3) development of inputs and outputs pharmaceuticals: design of pharmaceutical forms and release systems; quality assessment (physical-chemical and biological quality control of inputs, drugs and medicines); stability; pharmacology and studies on the use of drugs.

5. Name of the project Molecular, structural and molecular functional processes associated with biochemical and physiological

Start date **End date**

01/08/2018 31/07/2022

Description

The PPG-BFM project covers two major areas of Biological Sciences including Physiology and Biochemistry. In the area of Physiology we are seeking molecular targets for the prevention and control of metabolic diseases with emphasis on targets associated with mitochondrial dysfunction and injury, atherosclerosis, neural and cardiac changes. Enabling the development of new drugs and drug strategies. combat / control of diabetes, obesity, inflammation, cancer and cardiovascular diseases. Our Researchers also conduct projects aimed at understanding the interaction between nutrients provided in the diets or formed during the digestion process (bacterial metabolism) on the ability to the response of the immune system to inflammation associated with obesity. As well as understanding the relationship between physical activity, nutrition and molecular aspects associated with disease prevention metabolic, cardiovascular, tumor and neural. Another very important line is the study of the exosome-mediated peripheral tissue signaling and microRNAs in the context of metabolic and degenerative. Finally, the professors in the field of bioinformatics have acted in collaboration with our students in the elaboration of models that explain the relationship between signaling mediated by protein / protein interface, microRNA / mRNA, protein / DNA. The diversity of themes is mark of the area of Biochemistry. The projects range from approaches to human diseases, to development of computational tools and genetic

improvement, and even at the most elementary levels of biochemistry. Some of the diseases addressed are the most debilitating humanity: cancer, brain disorders, vascular diseases and tropical diseases. Studies around the improvement of microorganisms for the production of enzymes with biotechnological application are also in progress, as well as the creation of bioinformatics tools geared towards teaching. In the field of basic science, the study of the function and structure of biological membranes and proteins are strengths of the program.

6. Name of the project Study of interaction mechanisms between pathogens (human and plants) and their hosts and relevance of environmental factors to the quality of life.

Start date **End date**

01/08/2018 31/07/2022

Description

The present proposal aims at elucidating, through a molecular approach, the mechanisms involved in the microorganisms of plants of economic interest that cause pests or related to processes of fermentation and production of alcohol, as well as for application in the oil industry. The actions of human disease-causing microorganisms including tropical diseases with a strong impact on society, as well as its relationship with the host understanding of the associated pathogenesis, the production of vaccines, drugs (focusing mainly on protein kinases) and kits for diagnosis. Still in the biomedical area, markers will be investigated molecular mechanisms of tumors and their association with the immune system both in physiological pathological conditions. The association of environmental factors, including diet and microbiota, in the regulation of the system immune and aging will also be the target of this research. We believe that the search for these markers and molecular patterns will allow not only the implementation of new partnerships international organizations, but above all the consolidation of already established partnerships, of students and teachers, aiming at the formation of quality human resources and the generation of highly competitive science.

7. Name of the project Molecular and functional investigation of hematological diseases and predictors of gravity and new treatments for bone marrow neoplasms

Start date **End date**

01/08/2018 31/07/2022

Description

The use of new molecular research technologies, such as new generation sequencing (Next Generation Sequencing, NGS) represents a major advance in the understanding and management of hematological diseases. In this group, we highlight the pathologies of hereditary etiology, resulting from germline mutations and acquired diseases, involving somatic mutations, such as oncohematological diseases, which are aggressive diseases with low cure potential. Knowledge of mutations treatment of choice and directly impacts the prognosis of these patients. Our group is a national reference in the diagnosis and treatment of hereditary hemorrhagic many of the cases evaluated depend on a thorough molecular

investigation to elucidate diagnosis. The objective of this project is molecular research using NGS technology to the determination of the mutations involved in the diagnosis of hemorrhagic and onco-hematological diseases. From these results, we intend to extend the research, including the functional studies and the best characterization of the pathophysiology of these diseases. In addition, the study will address new therapies and predictors of severity that may aid in therapeutic decision-making in the following bone marrow neoplasms: acute myeloid leukemia (AML), myelodysplastic syndromes (MDS), multiple myeloma (MM) and primary myelofibrosis (MFP). All these diseases common characteristic is the fatal course and the lack of effective therapeutic options, being the transplantation of bone marrow to be the only therapy curative or capable of prolonging survival, although not indicated for older patients or with many comorbidities. For such investigation, we will perform preclinical tests, using animal models with leukemias, myelodysplastic syndromes and xenogeneic tumors, and Phase I and II clinical studies. Genomic, metabolomic and proteomic studies will be carried out in the of the treatments with the objective of verifying markers of responses to the recommended treatments and modulation of the genomic architecture. The proposed treatments are dendritic cell vaccines with antigens of leukemia and myeloma, metformin for bone marrow fibrosis, epigallocatechin with Ara C in low doses for acute leukemias of elderly or myelodysplastic syndromes with an excess of blasts in patients not candidates for bone marrow transplantation.

8. Name of the project Implication of intra and extracellular processes gene expression, signaling, cell proliferation and differentiation

Start date	**End date**
01/08/2018	31/07/2022

Description

The organizational and functional aspects of cellular structures have been studied, as well as the roles of macromolecules, peptides, and RNAs, with implications for cell function. One of the projects in progress studies the importance of non-coding RNAs in the control of differentiation, proliferation, migration and cell death. Further research is involved in the humanization of the plasma membrane of yeast, to know how drugs enter the cells and how they cross the blood-brain barrier. Yeasts are also being modified to express different parasite targets tropical species, to be used to identify inhibitors of parasite targets. In studies, with diabetes mellitus, the molecular mechanisms involved in compromising the epithelial barrier have been analyzed. In another work, involving analysis of the sexual chromosomes of a group of anurans will be performed the sequencing of genomes of males and females and of chromosomes to investigate the presence of sex-specific markers to know the genes involved in the sexual determination and evolution of sex chromosomes of that group of anurans. In another project dealing with cellular, molecular and genetic transformations involved in the aging and cancer, stroma and prostate epithelium will be evaluated during the cell proliferation, angiogenesis and inflammation. It will also be performed, morphological characterization of prostate cancer using a transgenic mouse model for prostate adenocarcinoma. Still with another prostate project deals with the

mechanism of regulation of globin genes in muscle cells with a focus on the regulation of focal adhesion kinase activation (FAK). Other search studies the effect of natural products on rodent testis development. In another project that the role of focal adhesion kinase (FAK) in cardiac cell signaling, the importance of this signaling in the regulation of hypertrophy and survival of exposed cardiac myocytes to mechanical and genotoxic stress. The importance of signaling pathways is also being studied during the formation of skeletal muscles. Another study analyzes some pathways of acid action valproic acid as an antidepressant and inhibitor of histone deacetylases.

9. Name of the project	Genomic, Metabolic and Proteomics: advances in sport and physical activity and health

Start date	**End date**
01/08/2018	31/07/2022

Description

System biology began to be used in the mid-2000s, and has been increasingly being explored, bringing a vision of an integrated approach to organic systems, metabolic pathways and finding a comprehensive response to the functioning of the organism, contrary to the reductionist approaches (FERNIE et al., 2004). An example of this natural interconnection of biological systems is the metabolism, which can not be considered just a set of reactions chemical interactions, but rather a complex network of connected interdependent pathways (OLIVER A. JONES, 2014). From this advance in the biology of systems, using the "omics" (genomics, proteomics, transcriptomics and metabolomics), and analytical technologies, it is possible and to have an overall understanding of the organism (GOODACRE et al., 2004). The field of metabolomics is directly related to new discoveries in the area of health (LINDON; HOLMES; NICHOLSON, 2007). The metabolomics makes the identification and quantification of metabolites, and is used efficiently in several clinical conditions, such as cancer, diabetes, cardiovascular diseases and others (BRINDLE et al. 2002; FERNIE et al., 2004) and also in sport. Metabolic concentrations vary with the responses of genetic, pathological, physiological conditions, through nutrition and also through exercise physical, which generates a destabilization in the cellular balance (Mo et al., 2009). With the use of metabolomics it is possible to have a momentary biochemical analysis of the organism, and repeat these analyzes throughout the time to observe changes in metabolism by metabolic changes (OLIVER A. H. JONES, 2014). The use of this approach facilitates the study of the metabolic interconnection of individuals, which is restricted use of punctual biochemical markers (WISHART, 2005). The atomic approaches using sophisticated analytical techniques such as nuclear magnetic resonance (NMR) spectroscopy and mass spectrometry (MS), which can be coupled to other techniques, e.g. liquid or gas chromatography. Thus the project aims to innovate in the evaluation and intervention performance of athletes and in the concept of uniting the diverse scientific areas that work in sport, as well as in the practice of physical activity aimed at health promotion and rehabilitation in various conditions (hypertension, obesity, diabetes, heart disease, among others).

10. Name of the project Pharmacotherapeutic monitoring of cancer patients undergoing treatment with oral antineoplastic drugs capecitabine and sorafenib: correlation between genetic polymorphisms of the enzymes of metabolism TS and CYP3A5

Start date **End date**

01/08/2018 31/07/2022

Description

The year 2012 registered 14.1 million new cases of cancer and 8.2 million deaths caused by the disease. In Brazil, there has been an expressive increase in the number of cancer patients attended by the highly complex units of SUS. This reality demonstrates the need to monitor the quality and safety of antineoplastic therapy. Pharmacotherapeutic monitoring, in patients treated with oral antineoplastics is essential to promote the response to chemotherapy. In relation to advanced head and neck cancer, the treatment consists of radiotherapy concomitant with cisplatin. However, its use is limited due to its toxicities caused by oxidative stress. There is a need to identify new biomarkers as microRNAs and oxidized biomolecules. In addition to these possible CYP2E1 biomarkers, ABCB1 and ABCC2 appear to be related to oxidative stress and nephrotoxicity induced by cisplatin. It is an analytical, experimental, clinical, single arm, prospective, quantitative, whose sampling will be non-probabilistic of the consecutive type. Patients with cancer of the head and neck that initiate treatment with cisplatin and radiotherapy. The nephrotoxicity, gastrointestinal toxicities and myelotoxicity, expression of plasma miRNAs and urinary, measured the plasmatic and urinary oxidative stress.

11. Name of the project Evaluation of circulating microRNAs, oxidized biomolecules and polymorphisms in the CYP2E1, ABCB1 and ABCC2 genes as possible biomarkers of toxicities induced by cisplatin in patients with head and neck cancer neck

Start date **End date**

01/08/2018 31/07/2022

Description

The year 2012 registered 14.1 million new cases of cancer and 8.2 million deaths caused by the disease. Among them, colorectal cancer is the third most common type in men and the second most common type common in women, involving the colon, rectum and anal canal, and hepatocellular carcinoma (HCC) is the fifth most common in the world and considered the second largest cause of cancer mortality. In Brazil there has been an expressive increase in the number of cancer patients attended by the units of high SUS complexity. This reality demonstrates the need to monitor the quality and of antineoplastic therapy. This project aims to correlate the genetic polymorphisms of metabolizing enzymes of capecitabine (TS) and sorafenib (CYP3A5) oral antineoplastic drugs with safety and efficacy of the treatments, in addition to performing the pharmacotherapeutic follow-up of these patients with colorectal and hepatocellular carcinoma. Pharmacotherapeutic monitoring, in patients with oral anti-neoplastic drugs is essential to promote the response to chemotherapy. The study will be performed

with patients attended at the Hospital Oncology Outpatient Clinic of UNICAMP, determining demographic data, tumor characteristics, parameters specific characteristics of the treatment, as well as the effectiveness of antineoplastic therapies. Patients will be monitored pharmacotherapeutic allowing the evaluation of the quality of life, adhesion to oral antineoplastic agents and classification of toxicities. About head and neck cancer, Advanced neck treatment consists of concomitant cisplatin radiation therapy. However, its use is due to its toxicities caused by oxidative stress. There is a need for identification of new biomarkers such as microRNAs and oxidized biomolecules. In addition to these possible biomarkers CYP2E1, and the ABCB1 and ABCC2 transporters appear to be related to oxidative stress and cisplatin-induced nephrotoxicity. This is an analytical, experimental, clinical study of the single, prospective, quantitative, whose sampling will be non-probabilistic of the consecutive type. Will be included patients with head and neck cancer who started treatment with cisplatin and radiotherapy. Nephrotoxicity, gastrointestinal toxicities and myelotoxicity will be an assessed expression of plasma and urinary miRNAs, measured the plasmatic and urinary oxidative stress.

12. Name of the project Key developments in tools for analysis and relevant cases in Chemistry and Biochemistry of Proteomes and Metabolomics

Start date **End date**

01/08/2018 31/07/2022

Description

Here we intend a series of actions with the objective of a better understanding of the proteomes and metabolomes relevant to health and agriculture. The activities are organized in two main axes: development of techniques and devices for the application and study of the biochemistry of proteins and metabolites previously isolated or with actions already known: - Design of analysis microdevices with application in the determination of secondary metabolites. Photolithographic techniques and alternative strategies (paper devices, 3D printing), coupled to optical and / or electrochemical detection and applied to saliva, plasma and urine samples for detection of markers of hypertension, diabetes, renal failure, arthritis, etc. - Development of analytical microsystems with materials based on ionic liquids and prototypes for Chromatography Multidimensional Gas for determination of metabolites in biological matrices. The application of these systems will be focused on samples associated with patients with leukemia and on the genetic grape. - Development of approaches involving proteomic, metabolomic and metallomics analyzes applied to samples of patients with mood disorders for the biomolecules that are related to the disease. These biomolecules with biomarker activity shall be established using mass spectrometry and eventually the data will be used in the microfabricated analysis. - To study the correlation between biochemical and biophysical factors and the evolution of enzymes of human pathogenic bacteria (Carbapenem Hydrolysing Class D enzymes), associated with the resistance of Acinetobacter baumannii strains to beta-lactam antibiotics. These studies will employ Nuclear Magnetic Resonance combined with Calorimetric Titration Isothermal to determine parameters of thermodynamics of interactions. - Explore different approaches to access metabolites of endophytic Streptomyces sp. isolated from Citrus. Enzymes from the genome of these species will also be characterized focusing on the ability to degrade lignocellulose, lignin and cellulose. It is also intended,

by employing the genome analysis associated with mass spectrometry, molecular networking and imaging, confirming the production of metabolites of these strains and the development of chemoenzymatic methodologies for the conversion and degradation of lignocellulosic biomass.

13. Name of the project "OMICS" in the Parasite-Host

Start date	**End date**
01/08/2018	31/07/2022

Description

The PPG-BA, for the proposed area, aims to investigate the impact of parasitism from different models of the parasite-host relationship. The lines of research fall into a dynamic scenario, where it is increasingly imperative to recognize the elements of the epidemiological triad: Pathogen-Host-Environment. Changes in urbanization patterns, local and global scale migration, and terrestrial heating may affect the interaction between parasites and their hosts. The importance of understanding the basic aspects of the biology of disease-transmitting vectors has never been more discussed in our daily lives. One of the study strands of Parasitology deals with the understanding of the interaction between parasites and their vectors, including survival strategies and transmission mechanisms to other hosts. Combining such information with the distribution dynamics of the vectors, it is possible to understand the epidemiological aspects of the distribution of important diseases such as leishmaniasis, arboviruses (dengue, Zika, Chikungunya), filariasis, Chagas disease, spotted fever and schistosomiasis. With the use of the techniques and principles employed in the "Omic," it is possible to study organisms, starting with a broader investigation of gene transcripts, proteins and signaling molecules in the life cycle of these organisms. The results in the will lead to the understanding of its biological aspects, as mechanisms of control of the gene expression, characterization of epigenetic mechanisms, pathogenicity and infection, validation of target expression previously determined by other molecular techniques, molecular diagnosis and characterization different groups of organisms. Large-scale analyzes of parasites, for example, will be conducted for the evaluation of new therapeutic candidates and molecular mechanisms that explain patterns of resistance and susceptibility. Added to that, molecular characterizations using new generation sequencing and metagenomics/metabarcoding genotyping of protozoa and metazoa, identification of vectors and reservoirs, as well as determining the genetic structure of vector populations and parasites.

Theme 10– Study and use of Biodiversity

Goal 1 – Description and characterization of biological organisms and studies aimed at strategies for the maintenance and sustainable use of biodiversity.

1. Name of the project	Experimental, laboratory and clinical trials in humans and animals

Start date	**End date**
01/08/2018	31/07/2022

Description

In this project, the participating researchers will develop techniques for analysis of respirometry and kinematics, as well as biomechanical evaluation of the skull and kinesiological behavior and muscular and skeletal systems. Researchers will also have the opportunity to establish partnerships with international universities for the application of the XROMM instrument and muscular architecture, in addition to laboratory and clinical studies related to the morphological and functional characteristics of the masticatory system and swallowing in experimental and human models. Expected that high-impact publications are derived from established partnerships and that the resources human beings involved are enabled to lead investigations with innovative methodologies. The results of scientific research will serve as the basis for the improvement of the scientific knowledge directly and indirectly, contribute with new perspectives of intervention in the cases of structural, functional and physiological changes of the muscular and skeletal systems.

2. Name of the project	Ecological interactions, biodiversity and functioning of ecosystems tropical

Start date	**End date**
01/08/2018	31/07/2022

Description

This project covers several areas of ecology. Moreover, it is divided into four axes, contemplating different lines of research within PPG: Axis 1: Animal-plant interactions and their influence on community structure It encompasses the works with herbivory, seed dispersion and interaction networks. Aims understand how animal-plant interactions are structured and what mechanisms are behind it. There are several subprojects: 1) chemical ecology of insect-plant interactions; 2) network structure and food specialization in herbivores; 3) Importance of herbivores in the structure of tropical forests; 4) Biotic interactions and the role of latitude, altitude and climate Axis 2: Ecosystem functioning It groups several teachers working with tropical forests (Amazônia and Floresta Atlantic) and Cerrado. The axis consists of subprojects: 1) Influence of latitude and aquatic subsidies on niche breadth and community structure; 2) Functional diversity in food webs; 3) Climate and global patterns of predation; 4) diversity of mechanisms of use and acquisition of nutrients in resource-poor tropical environments. Axis 3: Evolution and systematics subprojects that aim to understand mechanisms and evolutionary relations: 1) Systematics and evolution of neotropical butterflies; 2) signatures of evolutionary mechanisms in phylogenetic trees; 3) Paper the selection of distinct habitats for the maintenance of the integrity of plant species in hybridization. Axis 4: Climate change and biodiversity One of the main

threats to biomes natural and anthropogenic are the environmental changes caused by the human being. Several PPG has been researching how natural ecosystems and socio-ecological systems respond to stresses caused by global changes. This axis includes the following subprojects: 1) Effect of Atmospheric CO2 in water use efficiency and growth of tree species; 2) fire effect on ecology and dynamics of Cerrado vegetation in the transition with the Atlantic Forest; 3) vegetation world-wide: biodiversity, degradation and restoration; 4) ecosystem capacity intact and regenerated to provide social benefits; 5) vulnerability of Brazilian biomes to climate changes; 6) resilience of the Amazon Forest to the increase of atmospheric CO2; 7) mechanisms and processes that provide resilience in tropical forests and savannas to changes climate change.

3. Name of the project Animal Biodiversity from the perspective of taxonomy and phylogenetic systematics

Start date **End date**

01/08/2018 31/07/2022

Description

To understand the evolutionary history of any group of living beings, it is necessary to create a context for comparison, either through a molecular and / or morphological bias. Thus, the PPG-BA, for the area of Biodiversity, aims to broaden the taxonomic knowledge and the patterns of distribution of living beings, essential for understanding the process of biodiversity identification. Therefore, up-to-date and in-depth information in the literature is indispensable, which, however, are available to many groups of organisms. Gastrotricha, Annelida, Crustacea, insects coleopterans and Hemiptera, arachnids, mollusks, Echinodermata, as well as terrestrial vertebrates and should be studied in depth to understand their biology and positioning taxonomy, using molecular tools and morphological analysis. With the use of these models, it will be possible to recruit and train human resources in taxonomy, with relevant international partnerships. In the lines of research: SYSTEMS AND BIOGEOGRAPHY and ANIMAL BIOLOGY TERRESTRES AND AQUATICS, the great project is framed: "Taxonomy and phylogenetic systematics of invertebrates and vertebrates: Expansion of Animal Biodiversity Studies ", from which possible to: - Encourage studies on different ecosystems, with emphasis on the biology and ecology of organisms that compose the ecosystem, besides the study of phylogenetic patterns and organization animals, as well as the investigation of evolutionary processes leading to patterns, subsidizing modern systematics. This systematics has the objective of understanding the evolutionary relations between different species; thus, the classification strategy should take into characteristics which, in fact, represent phylogenetic relationships; - Investigate and understanding the role of biogeography as a tool capable of catalyzing strategic actions to spatial patterns of organization. Because it is a multidisciplinary area, integrate studies on other aspects of biology, in line with biodiversity at the national level; - Understand how the ethology of organisms contributes to the understanding of biodiversity and, consequently, contributes to its conservation and management; - To study the conservation and management of animal biodiversity for the implementation of policies to scientific demands of the area in Brazil.

4. Name of the project Investigating the biodiversity of neotropical plants: an integrative approach

Start date	**End date**
01/08/2018	31/07/2022

Description

Brazil is megadiverse, but there are still gaps in knowledge about the total number of species, and their special distribution, ecology and physiology. Due to the size of the chosen theme, the project is divided into three axes. Axis 1: Knowledge and organization of biological diversity - Seven projects are planned to broaden the knowledge of the plants, fungi and microorganisms. Of these, six are concentrated in taxonomic and phylogenetic studies of angiosperm families and are coordinated by Profs. André O. Simões, Ingrid Koch, João Semir, Maria do Carmo E. do Amaral, Maria Fernanda Calió, Renato Goldenberg, Vidal F. Mansano and Vinícius C. Souza. The last project, coordinated by Profa. Sara A.L. Andrade, will study the communities microbial soil and how they are affected by growth-promoting bacteria and fungi mycorrhizal. Axis 2: Diversity and mechanisms of speciation - In this axis are inserted two projects, coordinated by Prof. Fábio Pinheiro and Profa. Samantha Koehler, focused on the detection of processes of biological speciation. For this, the consequences of the phenomenon will be studied. Polyploidy and the role of selection by distinct habitats as a barrier of reproductive isolation in species of orchids and bromeliads. Axis 3: Biological diversity in an ecophysiological approach – East axis seeks to understand the diversity of organisms and communities from ecological data, physiological, anatomical and genetic. Of the six research projects, two are coordinated by Prof. Rafael S. Oliveira and aim to study the ecophysiological response of plants to water deficit and their strategies of acquisition and use of nutrients. Another project, coordinated by Prof. Ricardo R. Rodrigues, aims to study strategies of ecological restoration in forests, native and fragments of degraded forests. Two projects coordinated by Prof. László K. Nagy seek to investigate the dynamics of tropical montane forests, both on the impact of reforestation with exotic species of Pinus and associated with the contribution of montane forests to the regional and global carbon and water. Finally, the project coordinated by Prof. Peter S. Groenendyk seeks to join data to reconstruct the growth and physiology of tropical trees and role of increasing CO2 rates in their water use efficiency and growth.

Theme 11– Energy sources and Energy Matrices: Development, Integration, Sustainability and Technological Innovation

Goal 1 – Advancing scientifically and technologically in the development, sustainability and innovation of procedures and processes related to energy sources and energy arrays.

1. Name of the project	Integration of new technologies future electrical systems

Start date **End date**

01/08/2018 31/07/2022

Description

In the context of the future electrical systems, this project aims to develop new applications, concepts and methodologies of analysis and control of electric energy systems in the presence of emerging technologies to realize potential benefits, improve the operation of these networks and increase the use of renewable and alternative energy sources. The goal is to make scientific advances (with the respective production of articles), technological (with the transfer of technology to the sector productive) and to train highly qualified human resources to lead the development of this sector (via scientific initiation guidelines, master's degree, doctorate and post-doctorate). As objectives specific objectives of this project are: (a) To develop a new generation of models and tools to analyze the electrical systems of the future as well as to test new concepts. Such developments will be accomplished not only with the updating of established methodologies, through the insertion of new computational models of emerging technologies, but also with the implementation of new tools that are still at an early stage of maturation, such as are the cases of the co-simulators of electrical and communication systems, which allow to investigate the performance of the integration of communication and electrical networks in detail, and simulators electrical and behavioral, which allow to integrate to the electrical analysis the behavior of the consumer. Another important objective is to develop computational tools and models that allow simultaneous and efficient simulation of transmission and distribution networks (b) Develop new supervisory, control and protection methodologies based on recent technologies of measurement, extracting information and adding values to these devices. Here, for example, the applications of the data provided by phasor measurement (PMUs) in the context of state estimators and the system's dynamic security and applications of smart meter data in the context of tasks performed by modern Distribution Management Systems; (c) Developing new methodologies for the control of renewable generators, aiming at maintaining safety, reliability and quality of operation of the national interconnected and distribution systems, as well as the extraction of the most from these sources from the energy point of view.

2. Name of the project	Advanced Energy Storage in Electrical Devices

Start date **End date**

01/08/2018 30/06/2021

Description

In this project we will mainly develop supercapacitors and hybrid systems with batteries electrochemistry, including flexible devices, which are powerful Energy. Such devices are emerging technology and may be considered complementary to batteries in charge and discharge power. Our development will be the application of a new class of carbon-based hybrid materials, such as graphene, nanotubes, fullerenes, etc. excellent electrical conductivity and chemical stability, serving excellent to receive metal oxides and nanostructured polymers to increase their activity electrochemistry.

3. Name of the project	Sustainability assessment of expansion of bioenergy in the energy

Start date **End date**

01/08/2018 31/07/2022

Description

The project aims to evaluate the most appropriate way for the use of biomass energy considering the three pillars of sustainability. Special attention will be given to the Brazilian case, account of its history and great aptitude for bioenergy, but other regions where the potential of bioenergy is also relevant. Different conversion technologies will be analyzed, options for the production of the first generation and advanced biofuels, as well as the generation of electricity. Similarly, different biomasses will be considered, energy crops to agroindustrial and urban waste. The search will combine different tools to assess the technical, economic, social and environmental performance associated with each route (resulting from the combination of biomass with a conversion technology). Simulation models will be constructed to evaluate the technical-economic performance of the technologies industrial scale, covering both commercial options and development. Demand scenarios and technology profile will be drawn by national and international energy sources, from which socio-economic impacts will be assessed through Input-Output and General Equilibrium models. With the help of geospatial tools, biomass supply potential studies will be developed taking soil and land use. Finally, the assessment of the environmental performance of each route and scenario will encompass the entire bioenergy supply chain, by the Life Cycle Assessment (LCA). The project will be developed in collaboration with research groups international organizations of great prestige, with which collaboration activities have been maintained for over one of each. In this context, the present project foresees the exchange of students, researchers and for the execution of the activities, as well as the offering of short courses conducted in Brazil aimed at training the Brazilian team.

4. Name of the project	Strategies for the development of new energy technologies

Start date **End date**

01/08/2018 31/07/2022

Description

Advanced energy storage strategies are being analyzed at FEQ with the collaboration of Stanford and NYU universities, aiming to develop new electrodes and characterization methods in electrochemical devices based on Lithium-Ar technology, which surpasses the energy density of Li-ion batteries up to an

order of magnitude. The consolidation of this line of research and the proposed association will make it possible to deepen the understanding of the device and for the construction of robust technology. The yeast Rhodotorula toruloides as a producer of microbial oil and carotenoids in hemicellulosic hydrolysates, using concepts of adaptive engineering and multi-omics studies, in cooperation with the University of Tartu-Estonia. The production of carotenoids is important for its applications and for integrating into the production of lipids, making the whole process economically viable. In this subject, the objectives are: 1) to carry out proteomic, phosphoproteomic and metabolomic studies of yeast cultivated under stress using different substrates, to understand the metabolic bottlenecks in the production of carotenoids; and 2) develop methodology for the editing of the cellular genome aiming at the increase of oil production, specifically, of carotenoids. Another study focuses on the experimental determination of equilibrium of phases and thermophysical properties, as well as the thermodynamic modeling of the same systems involving both biofuels and by-products (or co-products) as alternative green solvents. Techniques for quantification of phases in the adequate balance of fatty compounds are also of interest to the project, having selected the Denmark Technical University for this study. The sequestration and storage of CO2 in reserves with a competitive technology for the reduction of CO2 emissions. Blends hydrocarbon complexes with water, electrolytes and CO2, confined or not, are still a challenge. For thermodynamic and transport modeling. In this project, the behavior of CO2-containing mixtures in confined media (rocks found in geological reserves) and free by simulations of molecular dynamics and the development of models based on in collaboration with the University of Notre Dame, Imperial College London, Delft University of Technology, Università Ca'Foscari and PLAPIQUI-CONICET.

5. Name of the project Innovations in Exploitation of Natural Resources and its Rational Use and Sustainable in Oceanic Energies

Start date	**End date**
01/08/2018	31/07/2022

Description

Researches in marine systems have been developed for several years, in the PPG in Sciences and Engineering of Petroleum at Unicamp (PPG-CEP) collaborating with renowned institutions: Graduate School of Frontier Sciences - University of Tokyo (UT) and National Maritime Research Institute (NMRI) in Japan; Norwegian University of Technology and Science (NTNU) in Norway; École Centrale de Lyon, France. Since 2016, UNICAMP, USP, UFRJ, UFPE, UFSC, U. of Tokyo, Nihon U., Yokohama N.U., Kyushu U. and NMRI participate in an international collaborative course, financed by the Ministry. Education, Science and Technology (MEXT). Disciplines are taught in semi-presidential real-time use of the Internet. Each university has coordinators under the general coordination of Prof. Toru Sato (UT). The best students exchange between the two countries. The course covers maritime technology for the use of marine natural resources as part of the training of students to search. The CAPES Print project would consolidate and expand these partnerships and include other universities, such as UFC, Osaka U. and others. Since 2013, there are initiatives for joint research in technology the bilateral agreement between Brazil and Norway, with NTNU through SINTEF with support from the Norwegian Research

Council (NRC) through the ReNobra and BN-SOC projects. PPG-CEP participates in two collaboration agreements, working on maritime petroleum and advances in these cutting-edge technologies and their rational use to exploit ocean energies (winds, seawater temperature difference, sea currents, waves, tides, geothermal etc). CAPES-Print support would intensify and consolidate internships and participation of graduate students and undergraduate, researchers and professors in these researches with NTNU. In 2015, with Prof. Abdel Malek Zine (E.C. de Lyon) at PPG-CEP through the French Chairs Program, a collaboration on riser for the abstraction of seawater for the cooling of oil plants in platforms on deep water depths. Participates also Prof. Alexandre Kawano from USP with a project of the Fapesp (Sprint 2015) under his coordination, and Prof. Mohamed Ichchou (E.C. of Lyon). The result of this initiative was a master's degree and joint publications in progress. The CAPES program Print would promote the expansion of these researches for power generation taking advantage of the difference of temperatures.

6. Name of the project Power Generation: Development in the production and use of renewable sources and waste

Start date	**End date**
01/08/2018	31/07/2022

Description

The effective insertion of renewable sources into the Brazilian energy matrix is of great importance because contributes to reducing economic, environmental and social impacts and thereby ensuring the energy security, sustainability and security of the national energy supply. Renewable sources of energy and waste from processes and systems have participation in the Brazilian energy matrix. However, this increase is mainly due to the processes and systems, such as ethanol from sugarcane and wind power generation. For sustaining the increased coverage of renewable energy systems is still of the great development of processes, equipment and systems. In the case of biomass as source of energy, the expansion of its use depends on progress in the development of processes of conversion of lignocellulosic materials to biofuels, either through the biotechnological route or through the thermal route (gasification, pyrolysis) or even in the conversion to bioelectricity, where biomass residues and urban waste present major challenges arising from their intrinsic characteristics. Another source of great importance for the country is the development of generators with national technology especially for small and medium power generation up to 500 kW. This requires aerodynamic research, development of profiles, generators and pre-demodulated towers. Also, the increased exploration and development of solar systems for the application can replace electrical energy in systems such as air conditioning, refrigeration, comfort thermal and other applications. There are great needs to develop projects and manufacture of concentrated collectors and tube collectors evacuated for high temperatures, including photovoltaic panel cooling systems to increase the life and efficiency of panels. This project involves research and development of processes, products and systems for generation of electricity and fuels from the exploration, efficient and sustainable use of renewable sources.

Theme 12– Design and development of products and processes

Goal 1 – Researching and establishing new strategies and technologies related to the design of innovative products and production processes

1. Name of the project Advanced Manufacturing

Start date **End date**

01/08/2018 31/07/2022

Description

The research project provides for activities in the following subjects: Structuring a platform for the automation and self-management of a machining process, Model for the integration of production management tools through discrete event simulation, management model proposal implementation of the Industry 4.0 architecture in the Brazilian industrial context, Management model of the virtual life of the product, Additive Manufacturing of Structural Biomaterials Based on Titanium Alloys, Project of composite and cellular materials using topological optimization for additive manufacturing, residual stresses in the ferrous alloy hybrid manufacturing process, Life machining tools through machine vision, System Development for energy efficiency Evaluation of surface integrity of parts generated by additive manufacturing on machined base, Simulation of the hybrid manufacturing process via CAM, Monitoring and detection of faults in machining processes, Computer simulation of the metal additive manufacturing process, Machining of components produced by additive manufacturing and hybrid manufacturing, Failure and Fatigue Criteria in New Materials and Optimization of Projects and Processes of Components generated by Additive Manufacturing.

2. Name of the project Design and development of products and processes using different types of biomasses as raw materials and inputs

Start date **End date**

01/08/2018 31/07/2022

Description

The design and development of products and processes have been carried out at FEQ for almost five decades, with particular attention to obtaining products from plant biomass. One of the research groups is dedicated to fractionate lignocellulosic biomass and recover its components, lignin and sugars. Pretreatment, production of enzymes, enzymatic hydrolysis, fermentation of pentoses and / or hexoses and production of high value-added bioproducts are evaluated to operations. In this regard, we intend to collaborate with TU Delft, Imperial College London and Universitat Autónoma de Barcelona. Another team focuses on bagasse pretreatment, exploring ionic liquids (LIs) or deep eutectic solvents (DES) and their purification before recycling to the system, to increase the economic attractiveness, intending to collaborate with Prof. Lars Rehmann of the University of Western Ontario at obtaining solid-liquid, liquid-liquid and solubility equilibrium data of biomass components in different LIs and DES. Another group develops niobium-based catalysts for processes that lead to molecules, such as xylose, a pentosan for

which biorefineries do not yet have a consolidated use. By catalytic dehydration and hydrogenation of xylose, get furfural and furfuryl alcohol, compounds that can be converted into more valuable ones. On this matter, the selected contacts were the Profas. Dominique Richard and Léa Vilcocq, from LGPC / CNRS-CPE-University of Lyon. Other plants besides sugar cane are the focus of FEQ. In these studies, aqueous extracts and different plants can be characterized by chromatography and solubility and equilibrium to investigate the presence of phenolic compounds with pharmacological applications. This is being done in collaboration with the University of Aveiro and Aristotle University of Thessaloniki. The biomass can also be attractive in the removal of micropollutants and emerging pollutants pharmaceuticals, acting as efficient and low-cost non-conventional inputs, as well as algae, clays and vermiculite. New treatments are investigated and improved by the use of adsorptive processes associated or not too advanced oxidative processes, intending to evaluate, together with the University of Curtin, the removal of chemotherapeutics, antibiotics and anti-inflammatories, among others.

3. Name of the project	Strategies for the processing of healthier foods and sustainable

Start date	**End date**
01/08/2018	31/07/2022

Description

The significant increase in chronic non-communicable diseases in the last decades, highly associated with nature of the diet, has motivated changes in the food legislation of several countries, supported by important global health agencies. Based on this, food technology seeks to define consistent alternatives to ensure the processing and consumption of healthier products in the global context of food security. To this end, the main technological strategies with a healthier and more sustainable food products, applied simultaneously: i) NEW INGREDIENTS. Research on new functional ingredients from bioactive compounds and fibers; modification of conventional ingredients of the food industry to differentiation of physical-chemical and functional properties, increased stability and bioavailability of bioactive compounds; ii) NEW PRODUCTS. Developed by reformulations aimed at reducing sodium, saturated fat, trans fats and additives, fiber incorporation; iii) NEW PROCESSES. Innovations technologies for increasing the bioavailability of nutrients and nutraceuticals in food, in the context of emerging technologies, nanotechnology applications, ingredient engineering and reverse engineering; based on new technological routes for greater sustainability and environmental protection; iv) STABILITY AND SAFETY. Considered in the scope of shelf life extension and food safety processed foods, in the scope of an innovative and comprehensive view of food technology. In the scenario of innovations in food technology, this project proposes, therefore, an interface that contemplates different fields of knowledge in an integrative view of food processing, with a multidisciplinary and effective reach for healthier and sustainable food.

4. Name of the project FOOD4LIFE: DEVELOPMENT OF (BIO) PROCESSES AND (BIO) PRODUCTS

Start date **End date**

01/08/2018 31/07/2022

Description

Future planned international cooperation will be directed to the following lines: BIOENGENHARIA E BIOTECHNOLOGY: Development of sustainable strategies to obtain functional biocomposites applied in the food industry through fermentative and enzymatic processes, besides the integration of technologies for waste reuse. PROCESS ENGINEERING: Development of new functional bioproducts, biofilms, minimally processed and food processes involving mainly microencapsulation, membranes, fluidization and drying, besides non-destructive analytical techniques. ECOLOGICAL ENGINEERING AND ECODESENVOLVEMENT: Proposals for equipment, processes and policies for sustainable development, techno-economic systems analysis REFRIGERATION: Processes of cooling or freezing of food products in various strategies and shelf life in refrigerated storage and cold chain. PHYSICAL PROPERTIES: Evaluation of new techniques for refining vegetable oils, obtaining and enriching rich vegetable extracts in biopharmaceuticals, production of biofuels and bioproducts. In this context, this project will plus the internationalization of the program through: - internationalization of teaching through the offer of courses taught by program teachers and / or visiting professors with the aim of attracting foreign students for the courses of the Program, with the incorporation of current themes and methodologies in PG classrooms; - intensification of the sending of doctoral students to foreign institutions with great recognition in related areas, for internship abroad; - carrying out international missions to collaborative research projects, as well as lectures to work, sending senior and junior teachers to the receiving visiting professors, young talents and foreign postdoctoral students; - intensification of the reception of foreign doctoral students, for cooperation / co-orientation work aimed at promote co-tutela agreements; - Training and qualification of teachers and technicians in short courses duration; - Production of material disseminating the program in English, Spanish and French, such as videos, folders, website, etc; -Promotion of events such as workshops, congresses, short courses ("Summer / winter school") in English.

5. Name of the project Innovative projects and controls systems for the animal production

Start date **End date**

01/08/2018 31/07/2022

Description

The study of the animal environment 'is a highly relevant subject since it compromises animal welfare besides compromising the productive indexes and profitability. In this sense, become essential for the control of the environment, being necessary the accomplishment of projects of climatization efficient. In this way the CFD (Computational Fluid Dynamics), already used in other fields of engineering, as well as techniques of precision zootechnics, has been applied in the study of the environment for production animal. The present project aims to determine ideal airflow and cooling simulation of innovative air

conditioning projects as well as the study of heat transfer and optimization of the production environment of poultry, swine and cattle using animals as biosensors, through the study of its behavior, aiming the production in scale along with the thermal comfort and animal welfare.

Theme 13 – Frontiers of Mathematics, the Natural Sciences and Engineering: Challenges of the 21st Century

Goal 1 – Combining different fields of knowledge in the areas of Mathematics, Natural Sciences and Engineering to answer scientific and technological issues of relevance.

1. Name of the project Physics and scientific and technologies: applications in sustainability, health and research in devices and materials

Start date	**End date**
01/08/2018	31/07/2022

Description

Research in physics in inter- and multidisciplinary areas, especially applied to engineering, has significant development of knowledge and technological domains of interest, highlighting the areas of sustainability, health and characterization of material Among the projects developed, it is possible to mention the development and investigation of structural and optoelectronic properties of semiconductors and semiconductor alloys doped with rare earth elements, especially photoluminescence and chemical in photonic devices, visible LEDs and conversion of solar energy. On this research front, among other topics, hybrid organic-inorganic perovskite solar cells are thin film photovoltaics due to high performance and low cost. In another interface with biology and medicine, different objectives have been highlighted: exploring the challenges in the interface nanoscience / neuroscience with possible applications in nanostructures, development of to assist in the rehabilitation of neurological patients, I use optical technologies aimed at monitoring and / or non-invasive treatment of patients in the clinic, I use numerical methods to study the interaction ionizing radiation with DNA and materials of biological interest, and the development of the new generation of hybrid X-ray detectors for new 3D imaging techniques. On this front, it is expected that apply/develop tools at the nanoscale to understand degenerative diseases, validate the optical technology together with clinical studies in different pathological situations (such as stroke and cancer), use computer simulation approaches to study the process of DNA breakdown, to develop new three-dimensional voxelized models for dosimetry in images. Another area of research refers to the study of complex phenomena of interest in the condensed matter, such as superconductivity, magnetoresistance, thermoelectricity, complex magnetic multiferroic, etc. which are strongly affected by the dimensionality of the system. On this front, we intend to study the evolution of these phenomena in systems of reduced dimensions, either by their size or by the dimensionality of its properties.

2. Name of the project Frontiers of Mathematics and applications

Start date	**End date**
01/08/2018	31/07/2022

Description

Each line has its specifics. It is a great looking umbrella project for support for bigger internationalization of our research environment. The groups, responsible for the lines, typically have foreign collaborators (and even members), which should greatly facilitate the search for visitors and in the implementation of fellowships and missions.

3. Name of the project Physics of Particles and Cosmology

Start date **End date**

01/08/2018 31/07/2022

Description

Particle physics, high energy nuclear physics and cosmology seeks to study and understand laws of fundamental elements of nature and its elementary components, the origin of specific properties and consequences. We are participateing in the LariAT and proto-DUNE experiments that occur in the FERMILAB / CERN and we are involved in the DUNE experiment that will test neutrino properties. These experiments use the technique of using temporal projection chambers using argon which we are involved in the development of an innovative device - ARAPUCA - for the collection and detection of liquid argon scintillation light. In the aspect of phenomenology we are one of the major groups in neutrino phenomenology in Brazil. On the existence of cosmic rays of extremely high energy, we are currently participating in the Auger Observatory which is the largest detectors dedicated to the study of cosmic rays. The data taken with the Auger Observatory at over the last decade have led to important discoveries in the area of ultra-high energies. Another aspect that we are investigating is the effects of high magnetic Earth within the LAGO experiment. In the last decades we have reserved some surprises like that the universe is expanding rapidly. One of the major challenges of today's cosmology is discovered the reason for the cosmic expansion of the Universe and this we are in the DES experiment. The UNICAMP participates in the ALICE experiment dedicated to the study of heavy ions in the LHC accelerator. One of the of the physics being studied by the ALICE experiment is the behavior of nuclear matter in extreme conditions of temperature and energy, to have a better understanding of the
phases of QCD. In the theoretical aspect, the functions of Green are the elementary blocks that describe the physical degrees of freedom of theory. We are studying the non-perturbative mechanisms that generate a dynamic mass for the gluons and quarks and their relation to the chiral symmetry breaking. At the in the field of highly interacting nuclear matter we are interested in rewriting hydrodynamics as a field theory, with distances from the microscopic degrees of freedom, the evolution of the fluid such as the infrared.

4. Name of the project New Approaches in quantitative and synthetic studies in biological and environmental chemistry, food and pharmaceutical

Start date **End date**

01/08/2018 31/07/2022

Description

This proposal aims to support actions for the development of chemical tools for complex systems. Specifically, it is intended to: - Evaluate new approaches in Spectroscopy of Nuclear Magnetic Resonance - pure-shift homonuclear decoupling methods, NMR (DOSY) experiments to separate signals from different species and apply them to the analysis of complex mixtures. Studies will be done to evaluate the conformational preference for small molecules and the influence of stereo-electronic interaction on the chemical displacement of 13C for molecules containing heavy atoms, in addition to the influence of the stereo-electronic interaction in spin-spin coupling constants, evaluation of the mechanism of reactions and determination of stereochemistry of products with the application of pure-shift experiments and DOSY for analysis blends complex. - Develop methodologies for chemical speciation and stable isotopes of mercury and arsenic and to apply them in the study of their biogeochemical cycle, evaluating environmental factors that about the dynamics of these elements. This will be done with analyzes of the stable isotopes of Hg in samples and vegetation of the Amazon region and chemical speciation for which chemical processes are related to the identified isotopic signatures. Parallel developments should be carried out to the chemical and isotopic collected in the Pantanal region. - Evaluation of miniaturized extraction techniques for determination of antibiotics and neonicotinoid insecticides. Several strategies of preconcentration will be studied optimized for LC-MS / MS analysis. The methodologies will be used to veterinary antibiotics in waters, as well as in fish samples. It should also be explored, using the methodologies developed, the determination of pesticide residues in pollen, nectar and plants. - Study the activity of molecules with the antitumor action already synthesized and of molecules more selective and effective for both the treatment of cancer and inflammatory processes. Besides the chemical development itself, it is intended to synthesize more efficient forms of prototypes already identified, within vitro and in vivo biological evaluation studies. - To study how metal complexes, their interactions with key molecules in the development of tumors and their potential to act as drugs.

5. Name of the project	Buildings, Materials, Technologies and Sustainability

Start date	**End date**
01/08/2018	31/07/2022

Description

In the search for employment and application of construction materials that cause reduced environmental impact and promote sustainability of the finished constructed environment, the following themes should be developed: • Study of innovative construction systems, based on pre-fabrication and production off-site, also using computerized systems to enable better for buildings that match the demands of performance. • Research mechanical properties of materials (a concrete example of ultra-high performance) in temperature environment, at high temperature, subject to extreme actions. Investigations to be carried out both in the local laboratories as well as in the Laboratories of the partner University. At the same time, Numerical models that can leverage the knowledge and understanding of the structure execution and recovery. • Development of fragility curves, which describe the conditional

probability of reaching or exceeding a certain state of damage for different intensities of an extreme request source, for the key structures of the urban network, such as transport lines, bridges and viaducts. • Studies of planning and control techniques of ventures to enabling resource flow and waste reduction. • To study low-impact solutions in minimizing contamination of water bodies in densely • Application of techniques that result in improved accessibility and mobility of users of the urban road and public transport systems. Public transport systems by buses and by train will have revised design practices to increase the quality of their use by the user. These higher quality standards should be characterized by objective variables and quantified. • Studies of implementation of areas of environmental protection and social interest, respectively, for the recovery of water production and for the detention of floods and consolidation of scenarios with the use of provisional grant and suspension of grant as tools for the reallocation of water.

6. Name of the project	Geometry and its Applications

Start date **End date**

01/08/2018 31/07/2022

Description

In this project, we consider modern lines of research in geometry relevant both in the context of its applications and borders with other areas of knowledge. We will investigate topics in differential, complex and algebraic geometry and Lie theory, such as control systems, homogeneous spaces, calibration theory, M theory, string theory, real and complex varieties, geometric structures in vector bundles, bundle module spaces, connections and structures in differential, complex and algebraic varieties, as well as connections and applications of the geometry, information theory, error-correcting codes and cryptography (in their meanings broad) and their theoretical and applied relations with genomics, transmission and image processing and sensor networks, among others.

7. Name of the project	Development of micro and nanostructured materials for applications of biomedical interest

Start date **End date**

01/08/2018 31/07/2022

Description

At FEQ, it is active and innovates in the production, from natural polymers and lipids, of films, membranes, tubes, hydrogels, particles and capsules, whether or not surface modified, for example, the treatment of lesions, the controlled release of molecules of interest and the bioresensoriamento, associated or not with cells, nanoparticles and nanoparticles of metal oxides. We have specialists in systems particulate, self-organized, microfluidic, micro and nanostructured coatings, membranes asymmetric and polymer blends, with national and international collaborations. The collaborations include Prof. Bradley Olsen (Massachusetts Institute of Technology), for materials with the biological

functionality of proteins and the versatility and flexibility of the Layer-by-layer coating technique for the selective capture of tumor cells and release controlled drug, and Prof. Fernando J. Monteiro (University of Porto) for the study of characteristics of biomaterials and their effect on cell viability. Collaborations in the development of Vascular and device substitutes useful in bone regeneration include teachers Diego Mantovani (Laval University, Canada), Ketul Popat (Colorado State University), Veerle Bloemen (Catholic University of Leuven). In collaboration with CTI Renato Archer and Prof. Daniel Kelly (Trinity College) and Lorenzo Moroni (University of Maastricht) work with biomaterials to Cartilaginous tissues (thermally responsive injectable hydrogels and implantable solid by 3D printing and electro-spinning, associated or not with stem cells). In the field of microfluidic explores nanoparticulate systems to deliver drugs and genetic material, monitor behavior during transfection with cationic liposomes and to develop drugs and alternatives for personalized medicine, with the collaboration of Prof. Nicolas Szita (University College London), Pedro Fardim (KU Leuven University), Patrick Tabeling (ESPCI), Vijay Rajagopal (University of Melbourne) and Jon O. Fossum (Norwegian University of Science and Technology), in addition to Prof. Dr. Hernandes F. Carvalho of the IB / UNICAMP. There is also the collaboration of the Prof. Udo Fritsching (Universität Bremen) to model and simulate the production of oxide nanoparticles using flaming spray pyrolysis using CFD coupled to the multivariate population balance.

8. Name of the project	Biomechanics of targeting trees fall risk analysis

Start date	**End date**
01/08/2018	31/07/2022

Description

Arborization has been seen as necessary to humanize cities, to prevent floods, to improve air quality and also aesthetics. However, climate change and the extremes resulting from them have caused a great number of tree falls, often with tragic results. These accidents have, in many parts of the world, created conflicts between benefits of trees and the safety of urban equipment and people. In forest areas, The fall of trees, mainly as a result of winds, has caused economic losses significantly. Thus, there is a current focus on studies that allow more effective risk fall of trees. However, this topic involves multidisciplinary issues, causing simplistic and immediate results do not allow conclusive and feasible results to be transferred to the community. Thus, this project intends to address this issue through the association of Biology, Engineering and Information Technology, with a focus on the definition of risk classes and tree inspection protocol. This approach requires group action multidisciplinary and with different experiences and theoretical contributions. Thus, the objective of the project is to risk of falling trees under the biomechanical perspective, aiming at the proposition of risk classes. The methodology provides for analyzes and trials in live trees (field trials) and the laboratory, including use of different methodologies and tools for inspection and deterioration detection (wave propagation techniques, puncture resistance, optical techniques, images and vision computational); the characterization of loads and forces at the roots, branches and trunk; The physical and mechanical characterization of the wood of the different organs (root, trunk and branches), responsible maintenance of tree equilibrium, and the proposition of representative models of behavior structure of the tree, with which it is possible to model

different situations to obtain the classes of risk. The project proposes to boost the joint work that has already been taking place between researchers from Brazil and Spain, whose training and experience complement to meet this great challenge.

9. Name of the project MODELING, OPTIMIZATION, MANUFACTURE, AND CHARACTERIZATION OF NEW MATERIALS AND STRUCTURES

Start date **End date**

01/08/2018 31/07/2022

Description

The project aims to consolidate and integrate the international cooperation activities of the Project Group and Mechanics of Solids of the Faculty of Mechanical Engineering of Unicamp. It is intended to implement the exchange of teachers and students with leading research centers in the following areas: development and optimization of products, design of intelligent machines, structures and new materials, design of new metamaterials, development of machines and equipment integrated with intelligence engineering, design of new advanced control systems, design of high-speed rotary performance, modeling and design in biomechanics and biomedicine, multi physical topology optimization and high-performance internal combustion engines, microstructure design, among others.

10. Name of the project Algebra and its Applications

Start date **End date**

01/08/2018 31/07/2022

Description

We will study the following search problems. 1. Geometric, asymptotic and combinatorial theory of groups. Here we will study, in addition to the intrinsic problems of the area, as the problem of words and analogs, applications in information theory (code complexity). 2. Theory of rings and algebras. In this area of research, we will study, through algebraic and combinatorial methods, polynomials in algebras, gradations, invariants, and the asymptotic behavior of identities polynomials in algebras. 3. Lie algebras and their generalizations. This topic is of utmost importance not only for mathematics but also for applications in theoretical physics. It intends to study, through algebraic, geometric and analytical methods, representations of Lie algebras and structures more general. 4. Algebraic geometry on finite bodies. The main problems of this area of research are important for the development of mathematics, and also for the applications in more precisely in code theory. We intend to study curves with extremes on finite bodies from the theoretical point of view, as well as for applications. We study codes of Algebraic Geometry that produce a correction of quantum error codes by the construction of the CSS. These provide sequences of self-orthogonal and formally self-orthogonal codes that can be used to produce quantum codes. We try to give sufficient conditions for self-duality and to study in detail some families of curves and specific codes.

11. Name of the project International Research Center on Sustainable, Innovative and Resilient Built Environments (INSpIRE)

Start date	**End date**
01/08/2018	31/07/2022

Description

The following thematic developments and respective projects are projected: (a) in the line and themes of process: PA1 | Development of innovative design methods that consider inclusion of users and their preferences and requirements, to promote the humanization of the built environment; PA2 | Algorithmic modeling and digital fabrication applied to architecture and urbanism with a focus on innovation and sustainability; PA3 | Studies of design practices for the preservation of pre-existences architectural and urban, that consider criteria of quality and sustainability; PA4 | Investigation of architectural projects as a contribution to the permanence and conservation of cultural heritage; (B) on the line and technology themes of architecture and urbanism: PT1 | Design and development of innovative methods for the collaborative management of the process of delivering value to customers and users of buildings; PT2 | Simulation, development and use of innovative approaches to increase energy efficiency and environmental and urban comfort; PT3 | Construction Information Modeling (BIM) and urban environments (CIM); and PT4 | Environmental and sustainability assessment integrated in the life of buildings, neighborhoods and human settlements; and (c) in the line and urban themes: PC1 | Development of open design methodologies and sustainable and resilient projects, with a focus on conservation of natural resources; application of visual and diagrammatic procedures for urban; PC2 | Comparative studies between foreign territorial planning plans and plans Brazilian directors in post-conflict environmental and social councils; investigations into the geography of health and healthy urban planning. The distribution of resources between projects and thematic will be the target of a competitive process coordinated by external banking to the Program, which will observe proficiency in the language appropriate to the institution of interest, and alignment of proposals for collaboration the research demands of the international scientific community and the partnership with institutions capable of leveraging the Program's production on topics at the frontier of knowledge, making it attractive for researchers and foreign students.

12. Name of the project Mathematical Frontiers of Quantum Theory

Start date	**End date**
01/08/2018	31/07/2022

Description

The most striking feature of Quantum Theory (a theoretical framework in which Quantum) is inherently probabilistic. Who guarantees this inherent are the concepts of contextuality and non-locality. In recent years, these concepts have gained new foundations, either concerning Graph Theory or through Beam Theory. The mathematics involved in these concepts is reasonably new, which allows developments to occur concomitantly.in mathematics and in the new grounding of physical concepts. This project has

been developed important contributions of different groups, several of them having an active collaboration with the group that proposes this project.

Theme 14– Innovation and Sustainability

Goal 1 – Discussing instruments to evaluate and promote innovation in renewable energy. These elements must contribute to thinking of policies (public, but not only) for an “energy transition

1. Name of the project From biomass to final product: improvement of the bioenergy from sugarcane and cane energy

Start date **End date**

01/08/2018 31/07/2022

Description

Due to high photosynthetic capacities and yields, sugar cane and energy cane are raw materials suitable for obtaining different biofuels, bioproducts and energy. For that this bioenergy production chain reaches a maximum degree of sustainability, it is necessary to study and innovate in its diverse stages, from the agricultural practices to the final industrial operations. In the present research proposal, obtaining and treating large volumes of data using EScience will be studied to facilitate the interpretation of different information rural producers, assisting them in decision-making within the concept of precision agriculture. The optimization of the yield of sugarcane and sugar cane through the nutrient management and plant physiology will also be addressed. Strategies for genetic improvement programs will be designed, aiming to obtain cultivars with high coverages and photosynthetic capacities in a single genotype, resulting in higher yields agricultural activities. It is also intended to investigate the utilization of the lignocellulosic fraction of different biomass. Different pretreatment strategies will be studied, both to obtain ethanol of the second generation, as well as to obtain other bioproducts with higher added value. At strategies include for example simultaneous saccharification and fermentation. For this, it is intended to construct Saccharomyces cerevisiae yeast strains by insertion of genes coding for cellulases and accessory enzymes in industrial backgrounds. It is also intended to study the best combination of enzymes and conditions, to obtain cello-oligosaccharides from cellulose, targeting a process in which the yeast directly ferments these molecules to ethanol. As regards hemicellulosic fraction of biomass, the use of pentoses, such as xylose, will also be studied. Within the concept of first-generation processes, based on sucrose, the use thermotolerant yeasts and the metabolic engineering of S. cerevisiae to obtain different biomolecules, will be addressed. Finally, we intend to investigate the effects of the different types of vinasse obtained in the first and second generation processes, in the quality of ferti-irrigated soils with these vinasas, both for sugarcane and for energy.

2. Name of the project Social Dynamics, Demographics, Policies and Territorial of the Sustainability and the Challenges of Innovation for the New Millennium

Start date **End date**

01/08/2018 31/07/2022

Description

Sustainability in its various dimensions requires a multidisciplinary and interdisciplinary effort to address the challenges of accelerated environmental and social change. In its human-social dimension, it issues

related to demographic dynamics, heritage and natural resources, knowledge and memories of people interacting with natural systems. In the political-institutional dimension, involve environmental and territorial governance processes that permeate the political and the production of multiple knowledge. The economic dimension analyzes the externalities of environmental change and new technologies that green technologies, renewable energies, etc.), and which emphasize the quality of life of citizens and concerning other living beings present in rural and urban landscapes. Therefore, achieving sustainability in its multiple dimensions is a challenge that demands technologies and innovative methods to address environmental issues in the 21st century. The faculty and student of the Program on Environment and Society are intensively involved in this mission of seeking the sustainability through innovative tools and in cooperation with international partners already in development and others in the process of construction in projects to come.

3. Name of the project	ECONOMIC GEOGRAPHY OF ECOSYSTEMS OF ENTREPRENEURSHIP

Start date **End date**

01/08/2018 31/07/2022

Description

This is a proposal to undertake world-class research in the field of knowledge-intensive entrepreneurship, with a special focus on the evaluation of the evolutionary dynamics business ecosystems in developing countries, such as Brazil, as well as in developing countries. The main objective of this research is oriented to the identification of determinants the multidimensional nature of entrepreneurial ecosystems and their respective socioeconomic impacts on local economic systems. The main research question behind this approach is the knowledge gap regarding entrepreneurial management based on innovation, especially in the developing countries. It is expected that the identification of the relevant vectors influencing the dynamics of agglomeration and dispersion presents substantial contributions to both academia and for public policy managers. For this, the formulation and application of econometrics, structural equations, and qualitative case studies (of particular places of interest).

4. Name of the project	Sustainable Development Challenges

Start date **End date**

01/08/2018 31/07/2022

Description

The project aims to assess issues related to environmental and social sustainability brought about by recent economic and social changes. The broadly-considered question of sustainability involves the discussion of global climate change, the impacts of transformations on the energy matrix of countries and regions, the issue of changes in agricultural activities, innovation in production chains, including biotechnology, and public policies focused on food security, mitigation of negative environmental effects, changes in the energy matrix, and reduction of economic and social inequalities.

5. Name of the project	Science, Technology, Innovation for the Sustainability

Start date **End date**

01/08/2018 31/07/2022

Description

The PPG-PCT (note 6 in the interdisciplinary area of Capes) has developed reflections, methods, arguments from an interdisciplinary and traditionally international from five lines of research: History and Theories of Science and Technology; S & T in the Development; S & T Strategies and Social Actors; Technological Change, Social Transformations and Environment; Management of S & T & Innovation. Understanding that technical and scientific advances paradoxical relations between the socio-economic, institutional and political spheres and the natural sphere, the PPGPCT considers the transition to sustainability to be critical to reorient development towards a viable future. Thus, the Program has been working on themes related to Science, Technology and Innovation for Sustainability (CTIS), involving themes such as Science, Policy and Global Justice, Research and Innovation, Green Economy and Low Carbon, Bioeconomics, Economics Solidarity, Social Technology, Strategic Management of Innovation in Companies and Public Institutions of Research, Prospecting and Evaluation in the economic, social and environmental dimensions of ITC, Indicators, S & T and the relation University-Society, Employment and Work and Sustainability, among others. Against challenges to the advancement of a new development paradigm, this project is deepening and expanding the internationalization activities of the PPG-PCT - via missions, workshops, technical visits, visiting fellowships, doctoral sandwiches and postdoctoral fellowships - institutions of excellence abroad in themes and subjects related to the theme of CTIS. It will, therefore, to develop and apply approaches and methods, under interdisciplinary perspectives in two fronts: i) Social Science and Technology Studies (ESCT) for sustainability, focusing on others in the production and use of knowledge; responsible innovation; bioeconomics; social movements; social technologies and solidarity economy; and ii) CTI Policy and Management for transitions to the sustainability, with a focus, among others, on innovation management; new technologies for adaptation and mitigation of climate change; integration of sustainability and higher education; technologies green and new business models on different fronts - transportation, company, cities, conservation and sustainable use of natural resources; renewable energy; low carbon economy; safety to feed; biotechnology.

Theme 15– Social and Economic Development, Socio-Demographic and Territorial Dynamics: Challenges Posed by the Transformations in the 21st Century

Goal 1 – Analyzing the transformations in the world economy and impacts on economic development.

1. Name of the project Socio-Demographic and inequalities: present and future

Start date **End date**

01/08/2018 31/07/2022

Description

The global social and economic transformations in recent years are that cannot be neglected. In the specific case of Brazil, such transformations reflect intense inequality in the conformation of their society and the demographic dynamics of their distinct segments of the population, experienced throughout its history. The investigations seek not to map inequalities, past and present, and their interfaces with the dynamics to propose recommendations for public policies to address the problem. From the field of study of the relations between population and environment, in general terms, considered the socio-spatial dimension of the urbanization process, as well as the relations that establish between rural and urban, through comparisons of national and international situations, especially in the Americas. Specifically, issues such as socially sociodemographic vulnerability, perceptions and attitudes towards environmental issues, considering the context in which changes and climatic variations gain more and more importance. From the perspective of the spatial redistribution of population, the different migratory patterns present in international migrations, including refuge, migration and qualified, return, environmental, in the context of South-South migration processes; and, on the other hand, demographic specificities of these flows, including gender, race / color and social group. It is worth mentioning economic and social transformations are, at the same time, responsible for the production of wealth, and, contradictorily, also by widening social inequalities. Independently the social belonging of individuals, family relations, in particular, and kinship, of an in general, they are responsible for structuring social ties. As fundamental links in life question, what role do they play in mitigating the effects of inequalities or aggravation or accentuation? Some elements are particularly relevant: fecundity, gender relations and hierarchies and their articulation with the characteristics and hierarchies age or generation. As the inequalities reverberated in the field of health, morbidity, mortality and aging is another promising front for this project.

2. Name of the project GEOPARQUES, COMMUNITIES AND CITIES RESILIENT - MAPPING AND MANAGEMENT NATURAL AND CULTURAL HERITAGE AND OF THE TERRITORIAL VULNERABILITIES

Start date **End date**

01/08/2018 31/07/2022

Description

This project is linked to PEHCT's latest line of research "Geoethics, Geoconservation / Geopatrimônio, citizenship and environmental legislation ". To with foreign countries were raised and contacts were

made with foreign universities areas that need to have their assets raised to depend on actions and dissemination surveys and education of municipal managers. These also involve vulnerabilities that require instruments to promote resilience. In all of them, researchers already raise data and use different research methodologies. The selected sites were: Coumbataí River Basin, areas micro basins of the Metropolitan Region of Campinas (Orozimbo Maia Basin and Piracambaia). The project has four stages: 1. meetings to discuss experiences and exchange experiences. Visits to research centers abroad and visits of external professors (assembly of graduate classes, workshops and workshops). Visits to the study areas. 2. study in the Region Metropolitan of Campinas, in the city of Campinas, and in Resilient communities (workshops and workshops; work / field visits) a. selected topics: i. Territorial Planning ii. Research geological, geotechnical and hydrological / hydrogeological - risk mapping iii. Resilience and Sustainability - Resilient and Sustainable Cities 3. Analysis of results and products in centers (Cardiff, Barcelona, Seville, Trás os Montes and Alto Douro) and researchers and external students at Unicamp a. characterization of vulnerabilities and assets b. selection and work with communities and exchanges of experiences - getting to know the environment in which they live c. proposals for improvements and incentives for creating social organizations and efficient and simple systems for communities in fragile situations d. monitoring and continuity of projects - effective implementation of programs and systems in the medium to long-term. 4. Process of participatory articulation for the dissemination of knowledge using the existing training of Education and Dissemination of Earth Sciences. This means broadening the channels to interact and prepare civil defense personnel b. Develop and implement dynamics to knowledge about the environment and the planet directly with the population.

3. Name of the project	Globalization and socio-spatial dynamics

Start date	**End date**
01/08/2018	31/07/2022

Description

Considering the diversity of thematic and theoretical-methodological interests of the faculty and students of the research line "Territorial dynamics: current technical systems and new socio-spatial practices" of PPGGeo, the proposed internationalization project presupposes the development of routine research and teaching activities with prestigious international institutions that also reveal this diversity, aiming to promote the advancement of geographical science in the main themes that involve the Brazilian geography and the contemporary world. Projects underway in the program point to the continuity of knowledge and research networks, exchanges and joint projects with countries with a long tradition of partnership with teachers, such as the French, English and American. In recent years there has also been a growing interest in establishing knowledge and research with Latin American countries, Lusophone Africans, as well as Iberian countries, in particular Spain and Portugal. With French geography, there are already strong established networks, with agreements and post-doctoral studies on the part of the teachers, as well as the realization of doctoral (PDSE), resulting in research projects and joint publications and several (PPGGeo-France-PPGGeo). With Anglo-Saxon Geography, recently,

the Institute of Geosciences has established an intense partnership with Cardiff University, enabling the production of new research projects involving research networks and the planning of joint activities between PPGGeo and the Cardiff University Master's Program in Environment and Development. With Ibero-American countries, a project is underway with the University of Atioquia (UDEA) whose objective is to rescue the concept of territory in different disciplines, as well as its use by militants. There is also a strong link between PPGGeo teachers and the Latin American Researchers of Geography Didactics (Redladgeo). About the Spanish Universities (the University of Madrid and Universitat de Valencia), there are agreements signed between them and Unicamp, with partnerships with the University of Madrid where several between these two universities, joint publications, doctoral the offer of concentrated discipline.

4. Name of the project Economic and Social Development and Transformation in the 21st Century.

Start date	**End date**
01/08/2018	31/07/2022

Description

The project aims to analyze the changes in courses in the economy and contemporary society, with emphasis on aspects related to the impacts on the social structure and the world of work, as well as issues associated with urban territorial dynamics and regional development. The size of the historical understanding of these processes is also a fundamental theme of this project. The need to move forward in internationalization arises from the international comparative dimension necessary to achieve more far-reaching theoretical and empirical results. Within this project, there are already important initiatives associated with the establishment of networks of institutions, for example through Global Labor Unversity and the Network organized by the International Center for Development and Decent Work. Also, other initiatives for the establishment of a dialogue with major centers of excellence in the subjects described above, such as the University of California (Berkley), University College London and Universidad Autonoma do Mexico. These initiatives involve the offering of shared courses, the holding of international seminars, the exchange of teachers and students, and the conduct and joint research.

5. Name of the project Transformations in the world economy and impacts on economic development

Start date	**End date**
01/08/2018	31/07/2022

Description

The project aims to increase theoretical and empirical knowledge about the ongoing changes in the global economy and its impacts on developing countries. Development, with emphasis on the international monetary-financial dimension, the changes in the productive structure, technology and

innovation and the social impacts of these changes. The complexity associated with these transformations and their understanding requires a continuous increase of interlocution and networking with other international teaching and research institutions and their teachers and researchers. The project seeks to consolidate initiatives already initiated by professors from the programs of Economic Science and Economic Development of the Institute of Economics of Unicamp, for example through participation in BRICS NU University and Network for Comparative Economic Development Studies, among other initiatives. In addition to the possibility of exchanging on the issues in the establishment of international cooperation has been guided by the concern to seek partnerships with institutions and researchers with thematic, theoretical and methodological approaches adhering to the approaches of the teachers participating in this project.

Theme 16– Studies on healthy systems, prevention, promotion and monitoring

Goal 1 – Developing international exchanges related to the study of health systems, promotion, surveillance and prevention

1. Name of the project LABORATORY, OBSERVATIONAL AND CLINICAL STUDIES IN ORAL HEALTH

Start date **End date**

01/08/2018 31/07/2022

Description

The epidemiological changes related to oral health in Brazil and the world over the last 20 years are due to laboratory, observational and clinical research that enabled the use and development of methodologies for implanting strategies to promote oral health, comparability of interventions, transfer of technology and the improvement of translational research. This allowed for changes in the work process that improved both in the population and in the individual context. Brazil is a country of continental dimensions and average income, with a universal public health system that finances the offer of services, which makes it a very relevant study object for international exchanges. The great heterogeneity of Brazil regarding epidemiology, HDI and social vulnerability also pose challenges and constraints that can best be addressed by international research collaboration. Cultural singularities and Brazilian social diversity, as well as the Brazilian pioneerism about the promotion and prevention interventions in relation to some diseases (eg STD / AIDS, smoking, dental caries, peridontal disease, etc.) make Brazil a partner with great potential to consolidate international partnerships. In this context, Unicamp already has experience in international exchanges related to the theme. This research project aims to develop public policies and health surveillance for oral health education and promotion. It is also the objectives of this research project to carry out intervention studies from the clinical area. The studies of the evaluation of the possible relationship between nutritional aspects and oral conditions, morphological and functional aspects of the masticatory system and the possible relation with systemic conditions, as well as early childhood caries. The effects of these aspects on the quality of life of the population will be considered. As a result of laboratory, observational and clinical methodologies, this project aims to generate new knowledge, technology transfer and generation of patents, which may provide benefits to the population.

2. Name of the project Hearing and Balance: Screening, Diagnosis and Rehabilitation of the Auditory and Vestibular System

Start date **End date**

01/08/2018 31/07/2022

Description

The project developed between FCM and FEEC / Unicamp, departments of Human Development and Rehabilitation, Pediatrics, Otorhinolaryngology, Neurology and Communications; international institutions and Enterprise Communicate. In the last decade, accompanied by significant technological

advances in the area of health that increase the sensitivity of evaluation procedures, which may favor the early detection of auditory system alterations and vestibular, in different life cycles and assertive diagnosis and more effective rehabilitation. In this intends to develop and / or analyze new screening and diagnostic procedures, both behavioral and electrophysiological aspects of the auditory and vestibular system. A battery of hearing screening will be developed, through an interactive online platform geared towards the school context. The pass/fail criteria to be adopted will be determined from the comparison with the diagnostic evaluation complete. Considering the complexity of the functioning of the auditory and vestibular nervous system, new procedures are being studied, among them spatial processing. The Listening in Spatialized Noise-Sentences (LISN - S) has gained prominence in the international scenario as a test that evaluates the spatial processing of individuals with complaints related to the difficulty of localization and sound lateralization and to the Processing Disorder central auditory, and is not yet available in Brazil. Therefore, the project also aims to develop a Portuguese database for LISN-S, aiming at normative data in different age groups (test and retest). In addition, children and adults with a history of otitis media, human communication disorders and / or body balance complaints will be evaluated. After the diagnostic evaluations, innovative methods of rehabilitation will be studied, based on the creation and application of strategies and / or computer games, motivating and interactive, considering peripheral hearing loss, central auditory processing disorder and balance disturbances. Finally, it is intended to apply the approach proposed by the International Classification of Functioning, Disability and Health, of the World Health Organization (CIF), based on the creation and dissemination of an online form to assist professionals in the evaluation and rehabilitation of auditory and vestibular alterations.

3. Name of the project Evaluative studies of the Brazilian health system, comparative systems studies and implementation research on therapeutic strategies and preventive

Start date **End date**

01/08/2018 31/07/2022

Description

This is deployed in evaluative studies on several fronts, linked to specific subprojects and to diverse research groups that have articulated themselves to different international groups. 1) One of them is the evaluation of the operation, use and quality of the Basic Health Care, as well as access to Specialized Care for chronic conditions and mental health, in four Brazilian metropolitan regions: Fortaleza (CE), Brasília (DF), São Paulo (SP) and Porto Alegre (RS). It is multicentric research that integrates researchers and research groups of seven universities: USP, UNICAMP, UNB, UFRGS, UFC, UECE and UNIFOR. The survey uses methods, integrating the quantitative and qualitative approaches. 2) In the area of mental health subproject that addresses the priority spa has the objective of validating and adapting Patient autonomy assessment ("Recovery") allowing comparison and monitoring in mental health services in Brazil. This subproject is partnered with Yale University in the United States, where there are already joint work and already consistent exchanges. 3) Another subproject in this thematic line of evaluation of services addresses the attention to HIV / AIDS in metropolitan areas in Brazil (Campinas) and Portuga (Porto and Lisbon), comparing the impact attention on patient survival and

epidemiological aspects of the epidemic in the study areas. He is associated to the research group of the University of Porto, Portugal.

4. Name of the project	Characterization, Management and Surveillance of maternal morbidity and mortality and prematurity

Start date	**End date**
01/08/2018	31/07/2022

Description

A line in full development and with partnerships with the World Health Organization (WHO, Geneva), the London School of Hygiene and Tropical Medicine of the University of London (UK), the Harvard School of Public Health (Boston, USA), the University of Adelaide (Australia), University of British Columbia (Canada), University of Leicester (UK), University of Cork (Ireland), University of Auckland (New Zealand), Bill and Melinda Gates Foundation, and others Brazilians Universities.

Theme 17– Chronic emerging and overlooked diseases

Goal 1 – Developing international exchanges related to the study of chronic, emerging and overlooked diseases

1. Name of the project GENETICS OF EPILEPSY OF COMPLEX HERITAGE

Start date **End date**

01/08/2018 31/07/2022

Description

The research group on epilepsy of the RCSI integrated by Profs. Cavaleri and Henshall have been developing multidisciplinary research in the area of molecular genetics applied to neuroscience that is complementary to that done by the group at UNICAMP. In this way, there is great mutual interest in the collaboration and exchange of students from both groups.

2. Name of the project Brazil in Emergence in Public Health of National Importance (ESPIN): Comprehensive care, Rehabilitation, Accessibility and Inclusion of children with microcephaly associated with Zika Virus

Start date **End date**

01/08/2018 31/07/2022

Description

The project aims at comprehensive health care and the inclusion of children with microcephaly associated with ZV in a city of Bahia with motor, visual and language impairments, and, in other places, with ZV and other pathologies. An international cooperation network was formed with Portland State University (PSU, USA) to create Supplementary and Alternative Communication (CSA) software and support from INTEL (USA) with designer Pete Denman for the creation of sensors for clinical conditions and the motorization of furniture with IFBA (BH), UBS with the support of the City Hall, in which the children are served, Dr. Silvia Ferrite of ISC (UFBA) and members of ISAAC-Brazil and the Association of Families with Angelman (Portland) . Our PPG participates in all processes and particularly, from linguistic-cultural adaptation to Portuguese, the creation of basic vocabulary and implementation of the intervention device with the author of the software (Dr Samuel Sennot and team, PSU) and the physiotherapist Graciele Nobre educational actions with families and health and education professionals. Dr. Maria de Lourdes from PPG Saúde da Criança and Adolescente advises on clinical issues. The project is in phase 2. It is expected that, by 2025, the results may benefit other children with ZZ microcephaly and pathologies, in other Brazilian cities and countries.

3. Name of the project Effect of insulin on maximal renal tubular reabsorption capacity of glucose

Start date **End date**

01/08/2018 31/07/2022

Description

The maximum capacity of glucose transport (Tm) is variable between individuals, being that in nondiabetic, all the filtered glucose is reabsorbed. In individuals with diabetes, T1DM and T2DM, hyperglycemia results in an increased filtered glucose load with consequent glycosuria. Few and incomplete studies in humans suggest that in diabetics the Tm for glucose is higher than in healthy controls. Moreover, that under conditions of hyperglycemia, the infusion of insulin decreases the Tm and increases glycosuria in diabetic patients. The expression of the sodium-glucose co-transporter in the renal tubule, SGLT2, the target of new therapies hypoglycemic agents, is increased in diabetic patients. Thus, the primary objective of this study is to determine whether an acute infusion of insulin exerts some effect on urinary glucose excretion (CGU) in patients with T2DM. Methods: 15 patients T2DM will undergo a pancreatic clamp with simultaneous hyperglycemia, to reach levels plasma levels of glucose around 360mg / dl. Somatostatin will be infused to inhibit endogenous secretion (basal period - 3h). During the 3 hours insulin will be infused at the dose of 1mUI / kg/min (INS period). Renal excretion of glucose will be compared between the two periods and also that of healthy subjects who will be submitted to the same protocol in Pisa, Italy.

4. Name of the project Clinical, pathological, metabolic and molecular aspects of gynecological and breast cancer

Start date **End date**

01/08/2018 31/07/2022

Description

These lines are in full partnership with the Center for Human Immunobiology, Department of Pediatrics, Texas Children's Hospital and Baylor College of Medicine, Houston, Texas, and Cellular Oncology Group, Biodonostia Health Research Institute, San Sebastian, Spain.

5. Name of the project Western diet and obesogenic state as determinants of molecular and functional alterations

Start date **End date**

01/01/2019 31/07/2022

Description

Obesity and / or consumption of diets rich in saturated fatty acids (GA) are related to the development of comorbidities that affect different biochemical and physiological processes. Inflammatory activation has been widely studied and is responsible for the cellular and molecular alterations in different tissues that can trigger both the self-perpetuation of this state and the permissiveness to many other chronic disorders of high prevalence among obese individuals. Among these, type 2 diabetes mellitus and hepatic metabolic disorders have been of interest to different research groups. In addition, obesity, as well as the condition subclinical inflammation due to excess circulating GA, has also been related to chronic pain conditions, tissue regeneration process, wound healing and angiogenesis, deregulation in

the central control of energy homeostasis and of the brain circuits that codify food behavior, control of the immune system and anti-inflammatory mechanisms. It is known that the consumption of unsaturated AG can prevent damage caused by diet due to the blockage of inflammatory signaling. Associated with eating behavior, physical activity seems to play an important role in preventing molecular changes related to the described damages. On the other hand, the presence of polymorphisms may further predispose the individual to the development of metabolic diseases or to assist in the identification of predisposed organisms, potentiating the effect of the obesogenic environment. The group of researchers associated to the PPG in Nutrition Sciences and Sports and Metabolism and the PPG in Medical Physiopathology has developed different projects that investigate the molecular mechanisms aspects involved in the genesis of associated with obesity. The group intends to use animal and human models, as well as make use of molecular tools of in vitro studies to advance the understanding of the molecular, cellular and physiological mechanisms involved. It is also in the group's interest to carry out prevention studies using physical exercise and dietary components. The laboratories involved in the project have maintained interactions with recognized foreign groups in the area that contribute to the technical / scientific improvement and increase the impact of the results produced.

6. Name of the project Health promotion and rehabilitation in chronic diseases: from basic research to the translation of knowledge.

Start date	**End date**
01/08/2018	31/07/2022

Description

The impact of chronic diseases has led to the creation of programs for prevention and control of these diseases in different countries. In Brazil, the Ministry of Health published in 2011 the Strategic Action Plan for Coping with Noncommunicable Chronic Diseases 2011-2022, whose purpose is to promote the development and implementation of integrated, sustainable and evidence-based public policies for the prevention and control of CNCDs and their risk factors. The central issues surrounding health promotion and chronic disease prevention related to the relative responsibilities of all actors whose actions influence the health of others. These agents include citizens, health professionals, governments, companies and entities. Nurses play a key role in the development / implementation of actions involved in health promotion and rehabilitation programs. Most of these actions are focused on the change of risk factors and health-related behaviors, as well as the development of new technologies for treatment and the follow-up of those with disease already in place. These strategies can be developed with excellence by nurses, considering their competence in the knowledge of basic research to clinical practice, its holistic approach to the patient and their involvement in educational activities. This project has as general objective to develop and implement actions/strategies of intervention that subsidize public policies in the promotion of health and rehabilitation in chronic diseases. It involves qualitative and quantitative studies (basic research, randomized clinical trials and intervention studies) and the exchange between researchers from national and international institutions - Université Laval / Canada and Mennonite College of Nursing - Illinois State University, as well as involving partnerships with nuclei

of international excellence - CEPID / OCRC. The development of the proposal also includes postdoctoral supervision, training of Doctors and Masters (nurses, nutritionists, physiotherapists and psychologists, considering the interdisciplinarity of the Nursing Postgraduate Program). It is hoped that the product of this proposal can be used in the improvement of new technologies for the treatment of chronic diseases and in the proposal of public policies and health promotion programs that can be applied on a wide scale and at all levels of healthcare of the population.

7. Name of the project Longitudinal relationship between cognitive disturbance, inflammatory markers and magnetic resonance imaging findings in juvenile systemic lupus erythematosus: Implications for development

Start date **End date**

01/08/2018 31/07/2022

Description

At UNICAMP, the research group on Autoimmune Diseases has been working to determine the prevalence of cognitive disorders and changes associated with magnetic resonance imaging in SJS. The multicentric approach proposed in this study allows the inclusion of a larger number of patients and comparison of data with several centers, including international ones, since each center involved accompanies between 50 and 70 patients. Also, prior contacts with US Dr Prof. Brunner have granted us the translation and validation license of Ped-ANAM to assess the prevalence of cognitive disorders in SLE. The inflammatory markers will be analyzed in a collaborative project of NYU Prof Timothy Niewold that was until last year contemplated with a Visiting Researcher project during the three year period.

8. Name of the project EVALUATION OF STRUCTURAL, FUNCTIONAL AND GENETIC DAMAGES IN GLAUCOMA AND ITS IMPACT ON EARLY DIAGNOSIS

Start date **End date**

01/01/2019 31/07/2022

Description

Glaucoma is the leading cause of irreversible blindness. It is manifested by reducing the thickness of the retinal nerve fiber layer (CFNR), increased optic disc (OD) and visual field (CV) changes. Primary open-angle glaucoma (PAGA) risk factors are elevated intraocular pressure (IOP), aging, black race, and familial aggregation. Its diagnosis is made based on structural tests related to anatomical aspects of the NRW and OD, functional tests including CV, in addition to the evaluation of risk factors such as family history and IOP. Early diagnosis and initiation of treatment prevent blindness caused by this condition. This project will address the combination of structural and functional data processed from machine learning systems, associated with genetic variants of risk for the development of GPAA identified by both the genome amplitude association study (GWAS) and the exome evaluation. The zebrafish animal model will be used as a platform for investigating new therapies. The data will be translated into algorithms that increase the diagnostic accuracy of the disease. A cross-sectional cohort

will be set up including 2000 individuals with APPA and 2000 controls for genetic studies. Of these, 200 patients with initial PUFA and 200 controls will undergo CV examinations and optical coherence tomography. It is important to note that five international centers involved in the project.

9. Name of the project Evaluation of the clinical, microscopic and molecular characteristics of malignant neoplasms of the mouth

Start date **End date**

01/01/2019 31/07/2022

Description

Project 1 - In collaboration with the University of Sheffield - UK : Sub project 1 Tumor microenvironment in metastatic oral cancer. The general objective of this study is to determine the role of the tumor microenvironment about intranodal deposits of metastatic oral squamous cell carcinoma (CECO) and to correlate stromal changes with metastasis and extracapsular invasion (CEC). Although advances have occurred about CECO understanding, the biology of IEC ECS is poorly understood and little is known about the mechanisms by which metastatic tumor cells spread and infiltrate beyond the lymph node capsule and the diagnosis can only be identified in the material of the emptying of the neck. Even with high imaging exams resolution, preoperative imaging accuracy, the diagnosis of IEC has not improved, with the results of 33% false-negative. Therefore, a better understanding of the biological process involved in metastasis and IEC could contribute to identifying potential diagnostic biomarkers, thereby improving treatment and prognosis. Sub project 3: Expression of plunc / bpif proteins and fusion of MECT1-MAML2 products in mucoepidermoid carcinoma cells. Project 2 - In collaboration with the University of Michigan - USA Project 3 - In collaboration with the University of Pretoria - South Africa The objective of this work is to describe the degree of involvement of oral side effects in HIV positive patients with CCP treated by RDT. The relationship between treatment toxicities, patient survival, HPV presence, viral load, CD4 lymphocyte count and the use of Highly Active Antiretroviral Therapy (HAART) will be investigated. The medical records (ICESP) and the Steve Biko Academic Hospital (University of Pretoria) will be retrospectively selected and evaluated.

10. Name of the project Image examination as a means of assisting in the prevention, diagnosis and treatment of diseases

Start date **End date**

01/08/2018 31/07/2022

Description

The technological development observed in recent years has greatly contributed to the appearance and improvement of imaging tests. Thus, this research project will surveys that assess the technical principles of equipment, image quality and features for increased diagnostic accuracy. Although the foreign universities presented in this project do not have a formal agreement with UNICAMP, PPG-Radiologia Odontológica already presents a history of a partnership through exchanges with the

development of scientific works with these universities and intends to discuss the possibility of formalization.

11. Name of the project Investigation of Chronic Oral Diseases with High Incidence in the Brazilian Population

Start date **End date**

01/08/2018 31/07/2022

Description

Two research fronts are proposed in this project: 1. This project involves in vitro models and in vivo model. In the in vitro assays we applied molecular and cellular biology methodology to elucidate mechanisms of action and effect of conjugated therapies using agents that demethylate the DNA molecule (5-aza-2-deoxycytidine) and chemotherapeutic (cisplatin) in oral squamous cell carcinoma cell strain SCC9). Our main goal is to reduce the resistance acquired by the cells to the chemotherapeutic and for this, we test the conjugated therapy to 5-aza-2dC using different approaches. Tumorigenicity assays are performed using an orthotopic model of tongue cancer. In these assays, the animals develop the tumor and are treated for 3 weeks with conjugated therapy proposed using 5-aza-dC and cisplatin. After sacrifice, the tumor is dissected, weighed, formaldehyde for histopathological analysis and processed for molecular analysis. 2. This project involves molecular studies to evaluate the interactions of oral microorganisms with their hosts and their implications for the development of chronic microbial diseases (caries and periodontal disease and bacteremias of oral origin), as well as non-microbial diseases (oral cancer and cardiovascular diseases). Several tools of molecular biology, immunoassays and genetic analyzes will be applied to study these interactions from microbial, cellular and tissue samples of patients affected or not by these diseases.

12. Name of the project Surveillance of resistance to antifungal agents in Aspergillus species isolated as causal agents of infections in patients treated at a tertiary hospital

Start date **End date**

01/08/2018 31/07/2022

Description

Aspergillus spp. are opportunistic fungi responsible for systemic infections and high mortality rates in immunocompromised patients. Voriconazole is the first therapeutic choice and the emergence of A.fumigatus isolates resistant to this and other azoles are being investigated in several countries. These isolates show mutations in the cyp51A gene. In HC of the UNICAMP are attended numerous patients of high risk and susceptible to these opportunistic pathogens. Thus, this study aims to evaluate the occurrence of different Aspergillus species in this hospital; elucidate the antifungal susceptibility profile and standardize a practical methodology for the early detection of the emergence of resistant isolates. The presence of mutations in the cyp51A gene should be evaluated, in principle, in phenotypically resistant isolates of A. fumigatus. To date, about 420 isolates have been selected. Isolates considered

to be resistant to one or more of the evaluated azoles will be screened for mutations in the cyp51A gene. This work aims to continue the study of Professor Angelica Z. Schreiber at the Centers for Disease Control and Prevention - Atlanta-USA. Published data (Mycoses, 2018 Feb 22. doi: 10.1111 / myc.12759) demonstrate the presence of mutations related to azoles resistance confirmed by "in vitro" phenotypic resistance more evident in more recent isolates. Isolated from 2014 to 2016 were studied, also in the CDC in Sanduiche Doctoral Scholarship of Franqueline Reichert Lima. Since then, more than 200 microorganisms have been isolated, being 91 already classified morphologically as Aspergillus fumigatus and 96 only as species belonging to the genus Aspergillus. During work, more isolated should be included. The need for vigilance for the possible emergence of resistant strains is more and more pressing, especially in an institution that has recently been replaced by voriconazole, the prophylaxis of fungal infections previously performed with fluconazole. With such studies, the institution can benefit both from retrospective data and from the implementation of an accessible methodology to identify and determine the antifungal susceptibility of this group of clinically important pathogens at an earlier stage..

Theme 18– Therapeutic and pharmacological innovations

Goal 1 – Developing international exchanges related to the study of therapeutic and pharmacological diseases

1. Name of the project THE IMPACT OF THE THERANOSTIC NUCLEAR MEDICINE IN BRAZIL

Start date **End date**

01/08/2018 31/07/2022

Description

The concept denominated Teranóstico refers to the therapy applied to the light of the knowledge through the diagnostic image. Currently, the positron emission computed tomography (CT) CT scan has gained importance in the diagnosis of various diseases. The images made in the PET / CT equipment are due to the capture of the radiation emitted from positron-emitting radioactive substances (radiopharmaceuticals). Radiochemical applications, in nuclear medicine, have advanced by stride. The development of new positron emitting radiopharmaceuticals allows for more accurate diagnosis. In the thermostatic concept, altering the structure of the molecule and coupling a radioisotope with therapeutic properties it is possible, besides diagnosing, to treat several pathologies. With the new synthesis module that will be installed soon in the Laboratory of Radiopharmacy of the Nuclear Medicine Service of UNICAMP, it will be possible to develop new tracers that can be applied in various diseases, thus contributing to the various areas of the institution. Here are some of the many possibilities for diagnosis and treatment through Nuclear Medicine. It is important to note that new radiotrators are not available for routine use in Brazil. In this way, it will be of great benefit for the Brazilian population this advance. Also, international collaboration will enable faster, more effective exchange of information, learning and development. The assistance of CAPES will be important to efficiently and expeditiously leverage national researchers with due collaboration and international partnership. The following are the descriptions and applicability of these tracers in UNICAMP to be elaborated, developed and tested: 1.PSMA-68Ga: evaluation of prostate, breast, kidney, lung, thyroid and multiple myeloma cancers. 2. PSMA-177Lu: In the same line as described above, in the thermostatic context, PSMA will be labeled with lutetium-177 to treat neoplasms of the tumors described above potentially. 3.PBR111-18F: evaluation of neuroinflammation in patients with epilepsy 4.Acetato-18F: patients with hepatocarcinoma 5.FES-18F: patients with breast cancer and also in the evaluation of women with endometriosis 6.Herceptin-68Ga: patients with breast cancer 7. Analogs of somatostatin-68Ga: patients with thyroid cancer, neuroendocrine tumors.

2. Name of the project Development, improvement and applicability of products and therapeutic protocols in dentistry.

Start date **End date**

01/08/2018 31/07/2022

Description

The project aims at the development, applicability and safety of biomaterials, evaluation and improvement of new products, as well as establishments of clinical and therapeutic protocols, aiming at

the best treatment for institutionalized or elderly patients, studies of temporomandibular dysfunctions and bruxism, and proposition and application of new techniques for the rehabilitation of these patients, evaluating their efficacy, costs and benefits of the treatments, besides the quality of life evaluation. In this context, PPG-CO has established partnerships with foreign institutions aimed at: 1) evaluating the efficacy and safety of different agents used in tooth whitening, as well as their effect on the physical properties of dental tissues; 2) to develop bioactive composites and to evaluate their physical properties and anticariogenic effect; 3) to develop and verify the efficacy of desensitizing agents and conditioners of dental tissues; 4) developing nanotherapies to prevent the formation of bacterial biofilms and to assist in the treatment of inflammatory diseases; 5) to evaluate the accuracy of the thresholding image segmentation methods to integrate the scanned dental models with the CBCT, aiming for a greater precision and safety in the workflow of the virtual planning of surgical procedures; 6) to evaluate the best therapies for institutionalized elderly or not and fragile elderly, focusing on quality of life and patient satisfaction, as well as costs and benefits for public policies; 7) to investigate temporomandibular dysfunctions and bruxism in wakefulness or sleep and modern therapies, in addition to prevention to avoid the development of both dysfunctions; 8) to evaluate the effectiveness of the use of extremely reabsorbed lip implants within the new range of existing implants, as well as proposed modifications in these implants to provide a better biological response, antimicrobial effect and triboelectrochemical stability. As a result of laboratory methodologies and clinical studies, this project aims to generate new knowledge and patents, resulting in benefits for the population.

3. Name of the project Pharmaceutical and technological innovation: From new targets and therapeutic inputs

Start date	**End date**
01/08/2018	31/07/2022

Description

The project aims to obtain, develop, evaluate and optimize new raw materials and natural pharmaceuticals, biotechnological and synthetic products for the prevention and treatment of diseases. To achieve these objectives, the subprojects involve: discovery and characterization of molecular targets to combat infectious diseases, cancer, chronic diseases; identification and synthesis of new pharmaceutical inputs (products synthetic inhibitors, biotechnological products, etc.); development of traditional and innovative formulations (nanotechnology, sustained release and other combined release systems); pharmacological and toxicological analysis, including pre-clinical and clinical tests; evaluation of health technologies (syntheses of scientific evidence of effectiveness, safety and costs); care and pharmaceutical care. An intense exchange of graduate students, postdoctoral students and teachers between the Postgraduate Program in Pharmaceutical Sciences and Universities abroad is essential to the effective and targeted complementation of specific technologies, allowing the overcoming of limitations found in the current context of program research and related research.

4. Name of the project Investigation of molecular and electrophysiological aspects of epileptic seizures and new therapeutic targets using the zebrafish model

Start date **End date**

01/01/2019 31/07/2022

Description

Epilepsy is a neurological disease that affects the quality of life of approximately 1% of the world's population. Approximately 30% of patients do not respond to pharmacological therapies. Therefore, several animal models have been proposed and are commonly used to test new therapies and to deepen our understanding of this neuropathology. Among the animal models used for studies of this type, zebrafish presents many advantages, among them the ease of genetic manipulation and its use for the screening of therapeutic drugs. Also, the small size of this fish and its rapid external development is phenotypic observation and parallel evaluation of many animals, accelerating data acquisition and subsequent observation of behavioral and electrophysiological outcome in many animals simultaneously. Four international groups linked to the universities GMU and Unicamp, and led by LabZeb (FCM / Unicamp) have been working collaboratively to form a research structure to investigate epilepsy from different perspectives. So far we have carried out the initial collaboration through preliminary electrophysiological experiments on larvae and published the development of an algorithm that classifies electroencephalography patterns. We also present an article with results of serial processing of video frames for electrocardiographic analysis in larvae during epileptic seizures. This project aims to perform the functional study of genes and microRNAs related to epileptic seizures using zebrafish as an experimental model. The use of electrophysiological techniques and concomitant images may provide a correlation between the role of these genes and microRNAs in epileptogenesis and behavior of zebrafish larvae during epileptic seizures, thus evidencing the effects of therapeutic drugs in the suppression of epileptic seizures. This enables the use of concepts of biomedical engineering and computer science that until now have not been explored by any group in the world. Collaboration with groups specialized in multichannel electrophysiology and video analysis with artificial neural networks offers a transdisciplinary perspective of the research area and enriches the learning options for the postgraduate students involved in this project.

5. Name of the project Consolidation and exploration of new internationalization parameters for scientific and technological development

Start date **End date**

01/08/2018 31/07/2022

Description

The focal points of importance are the qualification / qualification of teachers, training of high-level graduates for insertion in the labor market, and strengthening in research and development in strategic areas, focusing on biomaterials. In this sense, therapeutic and pharmacological innovations have been developed in the internationalization process of the Postgraduate Program in Dental Materials, through the exchange of students and teachers since the year 2000. These partnerships have resulted in

products of a high technical-scientific level, such as patents, high-impact publications, as well as the training of graduates, impacting on the quality of the PPG-MD. Among the IES partners, the most outstanding are Oregon Health Science University (USA), receiving eight students and three teachers from the PPG-MD, most notably the credentialing of an OHSU faculty member as a PPG-MD faculty member. Also, the University of Florida in Gainesville has already received 1 PPG-MD Teacher and four students. The project aims to narrow the process of internationalization, increasing research and scientific-technological development in the PPG-MD, proposing the continuation of this process through the exchange of teachers and students and solidification of research on the following topics: synthesis and physical characterization chemical and biological processes of functionalized nanostructures for use as drug delivery systems, as well as the development of materials containing such structures, as materials for the controlled release of biomodifiers, drugs and devices for regeneration, restoration and replacement of soft and hard tissues. In addition, it is intended to develop Bisphenol-A-free polymer materials and / or low polymerization contraction for the dental area and the like. These projects span several areas of knowledge, ranging from the development of new substances to the discovery of new uses for drugs, materials and devices for dental use. Other activities have been carried out less frequently with other universities such as the University of Tennessee and the University of Colorado, among others, resulting in high-impact products. Other partnerships, such as the one being established with Cardiff University / United Kingdom, are being considered as a positive partner, with the National Faculty of Chemical Engineering at Unicamp for the development and optimization of biomaterials.

6. Name of the project	Research and development of new therapeutic resources in Dentistry
Start date	**End date**
01/08/2018	31/07/2022

Description

The advancement of oral health over the last ten years has been possible thanks to therapeutic innovations in the development of new materials, drugs, drugs and diagnostic and therapeutic approaches, which is nowadays the state of the art of dental treatment and, consequently, Life expectancy. This project aims to evaluate new therapeutic, diagnostic and pharmacological technologies for the development of new materials, drugs, inputs and correlates with greater preventive, diagnostic, pharmacological and restorative potential with less collateral effect and longevity and resilience, exploring sources of Brazilian biodiversity natural resources, in addition to synthetic and semi-synthetic chemical matrices. The technologies applied to this project involve the use of atomic tools (proteomics, metagenomics, transcriptomics and secretomics, among others), high resolution analytical (LS-ESI-QTOF-MS), in silico models (docking, meta-drug and others). The goal of this project, from basic to translational research, is to generate new knowledge, technology transfer, patents and product and process development.

Theme 19– Global environmental changes/climate changes and landscape dynamics

Goal 1 – Studying biogeophysical and environmental processes governing the organization of the landscape and the impacts related to the use and occupation of territories.

1. Name of the project Human and Ecological Dimensions of Environmental and Climate Change and Public Policies

Start date	**End date**
01/08/2018	31/07/2022

Description

It addresses the human and ecological dimensions of multiscale environmental changes (local, regional and global) that involve climate change, alternative technologies and renewable energy sources and sustainable consumption. The human dimensions of environmental change involve a multitude of variables and analytical methods. One must consider the history of the changes in which human activity or action has a direct and indirect effect on the functioning of ecosystems. In addition, analyzing the behavior of individuals and collectivities with respect to the environments in which they live or with which they interact are fundamental for understanding changes in rural or urban landscapes; and as decision-makers - via public policies - act in the face of accelerated climate change, inadequate waste disposal and deforestation, accelerated and uncontrolled urbanization, food and commodity production challenges simultaneously to safety assurance to feed. The ecological dimensions are intended to contribute to the understanding of changes in the landscape - land use patterns and the dynamics of the vegetation cover - the concentration of greenhouse gases (CO_2, CH_4, N_2O, etc.) and loss and conservation biodiversity, and other ecological processes of relevance for the elucidation of environmental changes and, in particular, climate change. Among the tools of multitemporal and multispace analysis, will be used geotechnologies, analysis of social networks and agent-based models, institutional analysis and analysis of scenarios. In short, this project involves the analysis of the challenges of multi-scale environmental governance (global, national and local), which encompass the processes of restoration of degraded environments, either through forest restoration or water recovery, new sources of energy of reduced environmental impact, the co-production of knowledge among the various social actors and analysis of public policies. Many teachers and their respective students are involved in the themes of this project in cooperation with international institutions and others are in the process of sealing these cooperations in future projects.

2. Name of the project Analysis of natural components and their transformations.

Start date	**End date**
01/08/2018	31/07/2022

Description

Considering the theoretical-methodological diversity and themes of interest of the body of teachers and students of the research line "Geographical information systems, analysis of the natural components of the landscape and of the transformations arising from the use and occupation", of the PPGGeO, as well as of the geographical science world, the internationalization project that is presented presupposes the development of routine research and teaching activities with prestigious international institutions that also reveal such diversity to promote the advancement of geographic science in the main themes involving Brazilian physical geography and the contemporary world. Research conducted in partnership with Lomonosov Moscow State University results from a discussion network started 3 years ago, when the researcher Alexander Makeev, an international reference on the studies and research on paleopedological and paleontological Quaternary was at Unicamp, teaching a course of postgraduate program for students of the Graduate Program in Geography and Geology, with resources from the DERI-Unicamp. The project entitled "Landscape as a unit of spatial analysis under a Geosystemic approach: the Coast of the State of São Paulo / Brazil and the Coast of Havana / Cuba", financed by FAPESP, process n.2015 / 18347-2, has as objectives , based on specific methodological treatment, define the environmental status of both study areas and consider the analysis of the institutional models of coastal management assisted in the countries and their relation to action in situations of vulnerability. The project brings together two groups of studies - Group of Environmental and Coastal Studies (Unicamp) and Research Group of the Geoecology of the Landscape of the University of Havana / Cuba. With the University of Kansas (Lawrence-KA, USA) the objective of the work in partnership with PPGGeo has been to improve the environmental analysis by incorporating methodologies that consider environmental valuation, a specialty of the work group coordinated by Prof. Dr. J. Christopher Brown. With the University of Rostock (Germany), the main objective is the study of methodologies applied to environmental planning, having as one of the variables the approach of the sound landscape, subject of specialty of the research group led by Prof. Dr. Holger Behm.

3. Name of the project Frontiers of knowledge in Geosciences: contemporary challenges and global impact

Start date	**End date**
01/08/2018	31/07/2022

Description

They follow the research related to Planet Earth and the changes derived from its evolution. TRANSFORMATIONS OF LAND IN THE NEOARQUEAN - PALEOPROTEROZOIC TRANSITION: IMPLICATIONS FOR LIFE. It is intended to combine field evidence with high analytical and spatial resolution tools in rocks and minerals from Brazil associated to this transition between 2.8 and 1.6 Ga; contributing to the understanding of the processes responsible for tectonic, metallogenetic and paleoenvironmental changes. IMPACT CROPS AND PLANETARY GEOLOGY. South America has the lowest number of craters in impact, which results in a great potential for discoveries of these structures. It will study craters and evidence that lead to the discovery of new craters, contributing to studies of planetary analogs. EXTREME DEPOSITIONAL SYSTEMS. Study of extreme environments, or

nonexistent, from pre-Cambrian and / or current records in Brazil, India and Spain to define the geometries of sedimentary bodies. To predict changes after drastic variations of the vegetation cover, atmosphere and global temperature, and its comparison with extraterrestrial depositional systems. EVOLUTION AND FOSSILIAGENESIS OF PALEOZOIC COMMUNITIES. Study of fossil communities, bioassinaturas and icnofósseis. The research will be carried out with an innovative approach and may develop equipment for capturing morphological information. Will be applied different techniques of chemical analysis for fossil-genetic characterization: GEOCHEMICAL, MINERAL AND MICROBIOLOGICAL EVOLUTION OF TROPICAL SOILS IN THE WETLANDS. The evolution of tropical soils influences the evolution of the planet. Plintosolos from Brazil and Africa will be investigated in agricultural activities. There are two research fronts, one related to mineralogical and geochemical studies with Synchrotron radiation and the other related to anaerobic microorganisms and organic compounds with the use of nuclear magnetic resonance and MRI. COMMUNITIES AND RESILIENT CITIES – MAPPING AND MANAGEMENT OF TERRITORIAL VULNERABILITIES. The study of vulnerabilities and the history of the populations in areas of risk allows providing resilience and improvement of the places that they inhabit. The objective is to understand the resilience of natural disasters in Campinas, SP, through the construction of diagnosis and prognosis, with the participation of the local population, as well as the implementation of monitoring programs.

Theme 20– Teaching challenges in the 21st century

Goal 1 – Training of Primary Education teachers: mathematical and statistical aspects; psychological, socio-cultural processes; and inequality, difference and inclusion.

1. Name of the project Educational practices, learning and teacher training in different contexts and languages

Start date	**End date**
01/08/2018	31/07/2022

Description

The research project involves a broad set of strategic nations (BRICS, a community of Portuguese-speaking countries - CPLP, strategic countries of the European Union and the United Kingdom, Latin America and North America, and African continent, as well as countries such as Australia and New Zealand, and several PPGs. The professors from all FE / UNICAMP research lines and research groups, with the potential of incorporating researchers from various institutes and colleges of UNICAMP, which has studied topics related to education. It involves a complex and varied methodological approach, of a qualitative nature including bibliographic and documentary research, case studies and field research. It aims to strengthen existing partnerships, expand and consolidate horizons of partnership and cooperation, to build responses to contemporary challenges with contributions to curricular innovations that may be valuable to education. The research will be conducted through actions that involve the mobility of teachers, students and employees. At the same time we want to be recognized in the knowledge produced in other realities, intended to disseminate successful Brazilian experiences and enhance publications, increasing the possibility of dissemination of Brazilian productions in English and other languages, impacting the scientific field beyond linguistic boundaries (lusófonas). Important actions are foreseen in the institutional project of internationalization of UNICAMP and require investments in the following areas: 1. Technical support and in-service training to support activities related to research, partnership and cooperation projects; 2. Strengthening of foreign language improvement for teachers, students and staff; 3. Effective support for the insertion of foreign teachers and students in teaching, learning and research situations within the unit and PPG; 4. Creation of strategies for teachers, students and employees to socialize their experiences of exchanges after internships in other countries; 5. Guarantee of operation of the technology and EAD sectors in periods different from Brazil (night, for example); 6. Objective PPG strategies in the dissemination of research and texts from international cooperation and partnership; 7. Consolidate horizons of partnership and cooperation, mapping embryonic actions and strategies to strengthen them.

2. Name of the project Mathematical aspects of decision making and teacher training

Start date **End date**

01/08/2018 31/07/2022

Description

In this project, we intend to analyze the impact of the introduction of aspects of the Statistical Theory of Decision as motivating element of the learning of probability and statistics in Basic Education. The calculation of probabilities, based on set theory, goes beyond the mathematical reasoning found in analysis or algebra, in which well-placed statements are either true or false (Principle of the Third Excluded), and in which traditional logic plays a role well defined. In probability, a well-placed statement has a truth value, not dichotomous as 0 or 1, but a real number between 0 and 1, which reflects the observer's degree of uncertainty. Hence, we can speak of probability relative to the observing subject and their level of information. With this subjectivist interpretation of the concept of probability, it is necessary to introduce an axiomatic that allows a correct construction of this measure of uncertainty. The key concept is coherence. Because it is a more primitive concept for the student, the condition of coherence allows constructing the calculation of probabilities in a natural and not arbitrary way. Based on this, if we define as random everything that we do not know exactly, then random experiments related to the lack of complete information, that is, almost everything can be considered a random experiment. With this approach, we can make sense of the probabilistic mathematical model and approach it in the student's daily life. Since uncertainty situations are modeled mathematically, the next step is their use for decision making based on the concept of utility or associated loss. Typical statistical analysis procedures (estimation, hypothesis testing, and forecasting) are examples of decision functions. An optimal decision is one that maximizes, in some sense, the associated utility, or, equivalently, that minimizes, in some sense, the associated loss. These concepts have a precise definition of the decision theory, while reflecting, in their terminology, situations familiar to the student. Hence, the facility that we have found in previous projects to work such concepts with students of Basic Education. Some of these results are described in the works of Scientific Initiation, in the master's dissertations of PROFMAT and of master's and a doctorate of PECIM already oriented in this area.

3. Name of the project International Collaborations in Research in Science and Mathematics Education

Start date **End date**

01/08/2018 31/07/2022

Description

Research in Teaching Science and Mathematics has a long tradition at the international and national levels. However, the deficiencies and problems of this teaching remain and have been the object of attention of several types of research. The research lines and the work developed in the Post-Graduation Program in Science and Mathematics Teaching - PECIM since its beginning in 2011 have focused on the teaching-learning challenges, as well as the teacher training, which is articulated in a way intense Although recent, PECIM has a qualified Faculty, which mixes highly experienced

professors (many Pq-CNPq fellows) and younger colleagues, united in the challenge of promoting research and training of human resources of excellence at the postgraduate level. This proposal represents a valuable opportunity for exchange with border research to promote and expand academic collaborations with those responsible for some of the most significant lines of research at the international level. This will allow us to improve our performance with clear reflexes in future CAPES evaluations. In this last period of globalized capitalism there has been an intrinsic articulation between science, politics and capital and, therefore, the teaching of science and mathematics must problematize the naive view that only an 'adequate' scientific culture can and should promote citizenship and democracy. The complex socio-economic-environmental problems extrapolate the world of scientific and technological rationality and are inserted in a context of socio-cultural diversity. Thus, today there is a need for new goals for scientific education. It is important to highlight the challenges that communication and information technologies impose on teaching and learning processes in all modalities and amplitudes, that is, face-to-face, distance learning, formal schooling, informal, etc. Challenges that can be opportunities or threats. There is an urgent need for research that must be international since the technological phenomenon is worldwide and inevitable. With the accomplishment of the present project we intend to contribute to advance the research, the formation and contribute to the improvement of the practice in the scope of Science and Mathematics Education in a broad perspective (methodological and conceptual), helping the understanding of the articulation between science and technology and the social, political, economic and environmental contexts. Thus, we seek the theoretical basis for the consequent actions in educational practices.

Theme 21– Aging: a global challenge

Goal 1 – Ageing as a global challenge must have as objective researche in different fields of knowledge both about the health sciences as to the humanities

1. Name of the project Fragility of the Elderly, Cognition and Psychology of Aging: an Epidemiological Approach

Start date	**End date**
01/08/2018	31/07/2022

Description

The PPG / FCM / UNICAMP research group participates in or coordinates large population-based research projects in which fragility, socioeconomic and demographic variables, health and mortality variables can be extracted. This information, in each study, will allow establishing relationships between health parameters and cognitive functioning, predictors of mortality, general characteristics of populations at more advanced ages, and factors associated with quality of life and longevity. In Brazil, there was significant progress in the study of frailty among the elderly. A study of the FIBRA pole network UNICAMP conducted in seven Brazilian cities involving 3,478 older adults found a prevalence of 9.1% of fragile, 51.8% of pre-fragile and 39.1% of non-fragile. (Neri et al., 2013). In a recent study, Fibra et al. (2002) found that the genetic variability associated with fragility and its biological markers (Yassuda et al., 2012; Cohort follow-up studies will generate information on long-term factors predicting embryo fragility among those identified in the baseline data as non-fragile. More importantly, cohort follow-up may identify the outcomes of frailty among older individuals initially identified as fragile or pre-frail. Thus, this investigation will evaluate the follow-up of 7 years after the first data collection in Campinas (n = 900) and Ermelino Matarazzo (n = 384). It is intended to answer the following research questions. 1. Among the robust elderly, what is the rate of conversion to pre-fragile and fragile after seven years, and what factors, among a set of sociodemographic, psychological, social and health measures, predict embryo fragility? 2. The fragility and pre-fragility identified in the previous collection wave (2008-2009), in a portion of the original sample, are associated to which health outcomes after seven years (death, immobility, functional dependence, dementia, hospitalization, others)? 3. Among the robust, pre-frail and fragile elderly, those who developed major or minor neurocognitive disorders and which factors, among a set of measures socio-demographic, psychological, social and health conditions predict these conditions? 4. What are the socio-demographic, psychological, social and health predictors for cognitive losses in a longitudinal follow-up, considering the income and educational characteristics that permeate our population?

2. Name of the project Active aging: the role of physical activity in promoting the health of the elderly

Start date	**End date**
01/08/2018	31/07/2022

Description

Aging is a multifaceted process involving social and cultural conditions, as well as the accumulation of several deleterious changes in biological systems over time. There is evidence that the aging process is dependent on genetic programming, reactive species of oxygen and hydrogen, low-grade chronic inflammation, shortening of telomeres and environmental factors (YU et al., 2012; JOVE et al., 2016). Numerous changes related to aging have been investigated in the last years and some of them will be analyzed in the present research, being the disorders in the cardiovascular system, neuromuscular, central and peripheral nervous system, immune and metabolic system, among other aspects. Sedentary lifestyle seems to be one of the main factors associated with comorbidities (eg hypertension, cardiovascular diseases, diabetes, sarcopenia and fragility syndrome, among others) and mortality index. Physical activity may contribute to attenuating the cycle of degenerative effects of aging. Therefore, physical exercise has been widely recommended for the maintenance of health, considering the various positive adaptations such as functional, morphological, cognitive and social aspects, which are the fruit of physical exercise programs (ACSM, 2011). In addition to the research and methodologies proper to the biological sciences, the human sciences have a relevant role in the study of aging, since the initial use of this term has the purpose of delimiting a process that is not only biologically determined but also "socially produced" (Debret, 2006). In the international literature, the historian Pat Thane (2003) reports that old age, for example, allows the observation of multiple representations that vary in space and time, and it is difficult to find homogeneity. Thus, we intend in a dialogue with the biological and human sciences to understand some particularities of Brazilian society that provide different appropriations. Thus the objective of this project is to study the mechanisms involved in aging and the role of physical activity in the prevention and promotion of elderly health, however, in two perspectives: biological and cultural.

Theme 22– Transversal dialogues: art, language, knowledge

Goal 1 – Consolidating and expanding the existing internationalization efforts and the visibility of PPGs Theory and Literary History, Linguistics, Applied Linguistics, Visual Arts, Music and Art on Stage.

1. Name of the project The discussion of Modernity in Italy and Brazil

Start date	**End date**
01/08/2018	31/07/2022

Description

The project has as its starting point the uncontested discussion of the presuppositions of modernity in Brazil and Italy in its developmentalist and nationalist version in which, literature is not only seen as a sealed and immobile body as the geographical and cultural boundaries are worshiped as limits.

2. Name of the project "IDA-E-VOLTA" between research territories and reflection in the arts of the scene

Start date	**End date**
01/08/2018	31/07/2022

Description

This project was built based on a previous survey of isolated internationalization initiatives that have been carried out by the program's teachers, together with universities and several foreign researchers. From this survey, three main axes were identified, subdivided according to the official language of countries of common interest: Axis 1 - Spanish Language; Axis 2 - English language; and Axis 3 - French language. In Axis 1 - Spanish Language, PPG Artes de la Cena de Unicamp is already part of the Red Latinoamericana de Creación y Investigación Teatral Universitaria (Red CITU, http://redcitu.com), an organization created in 2008 in Mexico, which brings together ten universities from Latin America (Mexico, Colombia, Brazil, Argentina and Chile) with the objective of working for the development of the performing arts through joint research, creation, circulation and publication projects. Axis 2 - English Language covers American, British and Canadian institutions for which some teachers of the program have already gone on to study and participate in academic events. Of particular note is the interest in the Artistic Doctorates in Europe project: Third Cycle Provision in Dance and Performance (ADiE, https: //www.artisticdoctorates.com), which relies on the Research as Research (PaR) research model of artistic doctorates in the area of Dance and Performance, working in partnership with two English universities, Middlesex University and University of Chichester. Axis 3 - French Language brings together French and Canadian universities. It is the axis that has produced, to date, a more consolidated action, with the holding of the seminar "IDA-E-VOLTA, Dance Brazil-France" (São Paulo, Ceará), which brought together a total of ten universities, (PUCRGS, UFBA, UFC, UFF, UFMG, UFPE, UFRGS, UNICAMP) and two French universities (Universités de Bordeaux Montaigne and Paris 8). The event was organized by researchers Cássia Navas (UNICAMP) and Isabelle Launay

(Paris 8) and culminated in the publication of the book "Dance, History, Teaching and Research: Brazil-France, Ida-e Volta" organized by them. The 2nd. part of the action is in progress, with the visit of the teacher of the PPG Arts of the Scene to the French university. IDA-E-VOLTA has as its intention to produce research and reflection in the arts of the scene in a dynamic that is built in the inter-territories of its interlocutors-researchers, teachers, students, institutions.

3. Name of the project	Metamorphoses of literature in the time of images

Start date **End date**

01/08/2018 31/07/2022

Description

The dialogue between letters and the visual arts has been fundamental for the reconfiguration of these fields in modernity and contemporaneity. Texts are often incorporated into plastic works; images become fundamental in some literary texts. Literary studies and artistic studies, especially from the so-called iconic turn, have to operate in zones of convergence where the old critical categories are often called into question and new categories are tested. This project wants to produce one of these zones of convergence.

4. Name of the project	Languages of culture: between art, language and knowledge through the ages

Start date **End date**

01/08/2018 31/07/2022

Description

The transdisciplinary character of this project is shown in the variety not only of the areas of Linguistics that focus on the theme of the transversal dialogues (from Psycholinguistics, analyzing the phenomena of the perception of time and verbal aspect, to Semantics and Lexicography, with emphasis in the analysis of the language in use and in the circulation of texts in society, in a contrastive perspective between Portuguese, Spanish, French and German, through the dialogues between Greece and Rome in Classical Studies and the social functioning of the Guarani, in the cultures of peoples in contacts during the Jesuit Missions of Modernity). This variety is also evident in the other fields of knowledge involved in each research (eg, Chronobiology and Psychology, Sociology, History of Education, Psychoanalysis, History and Literary Theory, Rhetoric, Aesthetics, Philosophy).

5. Name of the project	Poetics of sound and body in the interdisciplinary dialogue between art and technology: research study of creation in Digital Humanities

Start date **End date**

01/08/2018 31/07/2022

Description

This project intends to integrate researchers of music, scene arts and engineering in the search for new epistemes, based on multimodal creation (based on communication processes that choose "modes of coexistence" between different communicative modalities) with technology. It also intends to deepen an existing agreement between the State University of Campinas and McGill University, Canada, to carry out research involving technological support and aimed at capturing and analyzing the relationship between movement and sound, with a view to the creation of artistic works in a transdisciplinary perspective in the areas of music, performing arts, electrical engineering and computing. Therefore, it is necessary to increase existing collaborations among researchers of the Post-Graduation Program in Music of Unicamp, the Interdisciplinary Nucleus of Sound Communication (NICS-Unicamp), the Department of Body Arts of Unicamp and the Center for Interdisciplinary Research in Music Media and Technology (CIRMMT), Schulich School of Music, McGill University, Montreal, Canada. Based on similar research objectives, the interdisciplinary philosophical perspective that the present proposal entails is in tune with the CIRMMT proposal. Among the objectives of the project, we highlight: research methodologies and processes for multimodal creation based on the dialogue between art and technology; develop a research program based on the generation, detection and combination of multimodal signals (sound, motion and image) with interactive media support; develop studies on computational creativity mediated by devices such as sensors, motion capture and biosynthesis; develop studies on intermodal, perceptual and cognitively relevant settings that relate sound, image and movement. The recent agreement signed between the Department of Informatics of the University of Coimbra (UC) and the Interdisciplinary Nucleus of Sound Communication (NICS) of Unicamp is another further process that reiterates the internationalization of this proposal. This recent agreement aims at the use of European resources of the Eramus Plus proposal to facilitate the exchange of professors and students of the postgraduate courses of the two Universities. The subject of study is precisely the multimodal interaction in the process of creation and artistic performance based on resources and concepts related to the theme "Digital Humanities", which includes the project proposal presented here.

6. Name of the project	Visual arts, migrations, assimilations and cultural transfers

Start date	**End date**
01/08/2018	31/07/2022

Description

One of the central questions in the recent critical-historiographic debate in the visual arts concerns the consequences of migrations and displacements, not only of objects and works but also of themes and concepts, for art and artistic production. How can artifacts from other places and origins challenge the cultural patterns of a locality, or how did migrations shape different identities, while providing for different cultural exchanges and transfers? How can the movement and circulation of artists, art critics, collectors, dealers, and other cultural agents contribute to the interpretation and evaluation of the artistic object? Moreover, how did the circulation of artistic treatises, engravings and images in different geographical areas influence not only the production of new artifacts but also theories of art? Likewise, it is necessary to discuss the existence of conceptual, political and aesthetic transits between "centers

and peripheries", as well as the dialogues and specificities of the artistic discourses on gender issues in different contexts. These and other related issues have been debated by researchers working in the PGGAV, especially in its new line of research "History, Theory and Criticism", which aims to reflect on art, aesthetic perception, the construction of critical and historiographic discourse, as well as on the process of legitimation and institutionalization of artistic making and its epistemological systematics. Countries of interest to this project: SOUTH AFRICA, ARGENTINA, CANADA, SPAIN, FRANCE, ITALY, MEXICO, UNITED STATES, UNITED KINGDOM, CHILE, COLOMBIA and PORTUGAL (these last three countries with a maximum of 30 %). I would like to emphasize that the teachers involved in this project have great international experience, with constant participation in area congresses and have already established close partnerships with universities abroad for the organization of academic meetings, as well as recent postdoctoral internships in Europe and the United States.

7. Name of the project Musical Performance as a field of creation, research and transdisciplinary teaching/formation processes

Start date	**End date**
01/08/2018	31/07/2022

Description

Despite the diverse strategies and technologies of registration and / or support, music in its most varied cultural contexts is preserved as a primary living and performative manifestation, whose real and immediate event, immersed in its context, contains expressive cultural values and contents which exceed registration possibilities. This potential of music as a performance - not necessarily spectacular - unveils a multiplicity that opens space for diverse transdisciplinary investigations, which will be conducted in this project in order to pursue three objectives: (1) creation / development of performances, considering contemporaneity as emerging and innovative performative practices, (2) study of existing performative practices, considering their respective social, cultural and ethnological contexts, and (3) study of performative practice in training and teaching processes. It should be noted that these three emphases reverberate precisely the interests of the three Lines of Research of the Postgraduate Program in Music, which include musical practices, creation processes and articulations between music, culture and society (which also includes teaching processes and training). In all these Lines, the Graduate Program in Music presents important internationalization actions, which will be enhanced by the present project. At the same time, Queen's University (Belfast / Northern Ireland), through programs such as Cultural Studies, Music and Computing and the Creative Arts, as well as the SARC (Sonical Art Research Center / Queen's University) offers great potential interlocution and dialogue about the interests proposed here, covering a spectrum that covers both the musicological and ethnomusicological perspectives as well as the creative and pedagogical perspectives proposed by this project, in interface with other areas. Similarly, the University Franz Liszt (Weimar / Germany) has areas of training and research in performance, music education, musicology and ethnomusicology, with a special interest in Transcultural Studies in Music, to present itself as an important partner in research which is proposed here. It is therefore defined as a priority objective of the project to respect musical

performance as a territory around which a network of researchers with interest in the transdisciplinary articulation between music and other areas of knowledge.

8. Name of the project	Transversal Dialogues in Language Studies

Start date **End date**

01/08/2018 31/07/2022

Description

The project aims to consolidate and expand strategic plans for the internationalization of the research fronts under development in the PPG-LA in the face of the challenges imposed on the human being, especially the Brazilian citizen, for a world that is increasingly convulsed, even if full of new possibilities. These fronts investigate facets of the language-language phenomenon in use, in multiple contexts of sociocultural practice. In line with the applied nature of the subject and with the profile of our teachers, such research traditionally adopts inter and transdisciplinary research paths, a fact that distinguishes us about other Applied Linguistics programs in Brazil. In the Language and Linguistic Education line, research in the teaching and learning of native and foreign languages not only dialogues with Education, but also deal with youth protagonism through contributions from sociology, and popular and mass cultures via historiographic and anthropological approaches. In the line of Languages, Cultures and Identities, the works focus on linguistic, educational and activist policies of minority or marginalized social/ethnic groups, in dialogue with anthropology, gender theories, and post-colonial and postmodern approaches. The Language and Translation line includes active interfaces between linguistics, literature, psychoanalysis and philosophy, also generating subsidies for language teaching. Finally, the Line of Languages and Technologies investigates questions related to the appropriation of computation by the human sciences and language for the reinvention of their objects, as well as to the advancement of computational epistemologies on current discursive practices, producing subsidies for distance education, design digital interfaces, Internet studies and social communication. This interdisciplinary and transdisciplinary vocation mirrors, to a certain extent, an epistemological strategy of coping with the complexity of the contemporary already well developed in the international academic scene of the end. We have often received professors and students from universities belonging to international centers where this vision is implanted, offering summer courses or courses for our students. We are certain that this project will allow us to establish a more permanent and systematic exchange with these and other partners, which will result in a reinvigoration and better structuring and directing of our vocation.

9. Name of the project	The visual arts at their intersections, intertextualities and hybridity with other areas of knowledge

Start date **End date**

01/08/2018 31/07/2022

Description

The project will investigate the connections and intertextualities of the visual arts, in their traditional modalities (drawing, painting, sculpture and engraving), with photography, cinema, literature, architecture and design, starting with texts, iconographic inventories and of precise case studies and realizing that these connections in the contemporary scene are marked by reciprocal hybridisms. It will have different propositional axes, which are related to the researches developed by the professors of the program: 1. study of the relations and intertextual aspects between the plastic arts, photography, cinema and painting, with emphasis on the hybridity between these areas; 2. study of the interactions between the languages of art and design and discussion about the definition of their limits; 3. study of the teaching-learning problem of color in visual arts, architecture and design, based on the interdisciplinarity of Color Theory with Physics, Biology, Visual and Cultural Anthropology; 4. discussion on the coexistence in the field of contemporary engraving of new technologies and traditional techniques, and on the hybridizations that occur between graphic prints and other expressive mediums and / or languages; 5. study of the relationship between art and city and from issues related to extra-mural art and public art. Countries of interest for this project: ARGENTINA, CANADA, SPAIN, FRANCE, ITALY, MEXICO, UNITED STATES, UNITED KINGDOM, as well as CHILE, COLOMBIA and PORTUGAL (these last three countries with a maximum of 30% of resources). I would like to emphasize that the teachers involved in this project have great international experience, with constant participation in area congresses, exhibitions and artist residencies in several countries and have already established ad hoc partnerships with universities abroad for the organization of academic and artistic meetings.

10. Name of the project	Visual arts in its interface with technology

Start date	**End date**
01/08/2018	31/07/2022

Description

This research project has as its field of study the poetics of analog and digital media, taking into account its processes of occurrence and development and the aesthetic, social and political issues in them. It is proposed to reflect on the relationship between art and technologies, especially on the different approaches offered by these technologies in the field of recent visual culture, considering the amplification and hybridization of expressive fields and their consequences in the perspective of art history, of theories of art and image. It will have as its goals: 1. to identify, map and compare contemporary aspects of recent interactive technological art, especially collaborative/interactive environments, immersive supports and network experiences; 2. to carry out experiments and propositions in modalities such as drawing, installation, video, photography, performance and digital animations. Understanding that subjects' subjective immersions, in their daily life, allow connections with a specific imaginary, in a territory historically attributed to art, the project will, therefore, deal with the processes of articulation and construction of meaning in the visual arts, in a convergence applied to the modes of making contemporary. Countries of interest for this project: ARGENTINA, CANADA, SPAIN, FRANCE, ITALY, MEXICO, UNITED STATES, UNITED KINGDOM, as well as NIGERIA and PORTUGAL (these last two countries with a maximum of 30% of resources). I emphasize that the

teachers involved in this project have great international experience, with constant participation in area congresses and exhibitions and collective projects, and have already established ad hoc partnerships with universities abroad**.**

COUNTERPART

1. Internationalization of the curriculum - Incorporation of international themes in the undergraduate and postgraduate classes.

Teaching Excellence in Unicamp is a strategic area in its strategic planning, which involves, among others, the internationalization of Undergraduate and Postgraduate Education. In this context, the university is committed to broaden internationalization actions in undergraduate, postgraduate programs and technical schools, providing the syllabus of the subjects in English and Spanish; to increase the provision of courses/subjects taught in English in the units; to increase the provision of classes of Portuguese for Foreigners; to increase the provision foreign languages classes, aiming at the incorporation of international issues in undergraduate and postgraduate programs, thus complying with goals of the CAPES-PrInt Project. PRPG, by its postgraduate programs, aims to broaden these actions, within the CAPES-PrInt Project, with the participation of 113 projects drawn up by PPGs, disseminated in 22 priority themes, which support the internationalization project of UNICAMP. Seventy-two (72) postgraduate programs of UNICAMP were involved in this project. A significant portion of these programs will broaden the provision of English language subjects in order for them to be accessible to foreign students. The provision of these subjects will be centrally disseminated to make them more accessible to those interested.

2. International publicity materials production in other languages, including websites of the courses.

The International Office of Unicamp has a website, in English, with information for direct contact with the Office; map of the campus and of the district of Barão Geraldo, where Unicamp is located, in Campinas/SP; general information about undergraduate and postgraduate programs; indicators in research; scholarships; funding programs; interdisciplinary centers; extension programs; public notices of mobility for professors, students, and technical-administrative servants. On the link http://www.conveniosderi.gr.unicamp.br/ you can see all the countries and institutions with which UNICAMP has partnerships, and the content of the agreements can be consulted. The DERI (Board of International Relations) has a newsletter, with versions in Portuguese and in English, with general information about the university, undergraduate and postgraduate programs,

research, innovation agency, extension, and community issues, teaching and research, international relations, and interdisciplinary research centers. Flyers, in both languages, are also produced for each teaching and research unit. DERI has recently created an internal working group to plan communication actions of the Board. The dissemination of Public Notices and other information about the CAPES-Print Project will remain under the responsibility of DERI and the PRPG. Furthermore, there is a collective effort, on the part of PRPG, for the creation of websites of the Postgraduate Programs, in Portuguese, English, and Spanish. Most of the programs are already suitable to this effort. In addition, in 2015 the PRPG established that theses or dissertations must be written in Portuguese, provided the writing in English or Spanish, and the defense of the theses/dissertations may be carried out fully or partly in English or in Spanish.

3. Training and qualification of staff for the institution internationalization.

Unicamp created, in 2016, the Corporate Education School of UNICAMP (from Portuguese, Escola de Educação Corporativa da UNICAMP – EDUCORP), which aims to encourage the development of essential skills considered critical to the viability of its strategies in a consistent, strategic, and continuous way. Its main focuses are: qualification, to favor the development of servants' skills; transformation, in order to favor organizational change; and strategy of the university, to support the implementation of the institutional strategic objectives. To do so, EDUCORP identifies the development needs of technical and administrative servants for creating programs and courses, aiming at the improvement of work processes developed at the university. In addition, it also works, depending on the demand, in funding lines, which aim to provide the servants with very specific technical skills that may assist them in participating in external events (congresses, symposia, workshops, forums, and others); to support professionals in external programs; to do internal courses and trainings, organized by the school or in partnership; to support programs held by the units and organs; to grant scholarships in extension courses, in partnership with EXTECAMP. Regarding the internationalization process of Unicamp, in the last 3 years (2015-2017) Educorp enabled, in partnership with SENAC, 463 servants to learn the English language. There is also a repressed demand of 102 servants working in the departments of undergraduate and postgraduate programs and research that have not been met, being prioritized that who already had some knowledge of that language. In Spanish, 107 servants were qualified. With

these initiatives already carried out by Unicamp and the encouragement given by CAPES-PrInt, we intend, throughout the development of the CAPES-PrInt Project, to at least meet the repressed demand. In addition, we will encourage the training of professors in specific modules of knowledge and teaching strategies, such as academic writing in English and in the area of entrepreneurship and innovation to be provided by Inova.

4. Counterparties offered by foreign partnership institutions, when applicable.

The counterparties offered by foreign institutions are defined in the signed agreements, which may vary in certain specific aspects, but which generally include goals and forms of cooperation to professors/researchers, undergraduate and postgraduate students, and technical-administrative staff such as: period of activities, costs of health insurance with repatriation, payment of wages, pre-selection of students at the institution of origin, based on academic excellence and prior knowledge of the language. As for funding, the following terms are agreed: professors/researchers will not pay fees to the host institution, but they will be in charge of other expenses; for students, the payment of fees, if any, occurs only in their home institution, other expenses will occur by the student who must seek funding for such mobility. Partner institutions must work in reciprocity in the activities; at the end of the period of stay, the host institution must send an official document certifying the level reached by the student and the institution must recognize their academic results and respective credits/course load. Yet, institutions must offer adequate conditions of work and for the development of the activities. The parties may also provide funding for the projects (own resources or funding agencies) or favor the accommodation and use of facilities at the university. UNICAMP has already signed, because of the CAPES-PrInt Project, prior agreements with funding agencies and university institutions belonging to leading countries in science and technology to facilitate the mobility of both sides.

5. Other counterparts, when applicable.

UNICAMP has its own funding support to research and extension amounting to R$6.9 million in 2017. This fund is managed by PRP, which is directly engaged with the CAPES-PrInt Project at the university. Among the development lines of this fund, there is the Young Researcher Aid at UNICAMP, which funds a scholarship whose monthly value amounts to R$5,857.89 for researchers to settle in the university and form research groups. This development line aims to attract young researchers to develop new areas and the introduction and centralization of

new groups/areas of research. This support to researchers, which lasts for 3 months, is conditioned to the search for funding for development of research within the Young Researcher Program of Fapesp. This funding line was suspended, but the current management's intention is to take this development line and associate it with the projects of CAPES PrInt as well as the Young Researcher Program of FAPESP.

Campinas, 21 de maio de 2018.