UFSCar CAPES-PrInt Project (PII)

Edital Data

The Program aims the selection of Internationalization Institutional Projects of Higher Education Institutions or Research Institutes that have at least four Graduate Programs (PPG) recommended by the Capes in the triennial evaluation of 2013 and in the quadrennial of 2017, among which there must be at least two PhD courses.

Program –
Capes/PrInt

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DIAGNOSTICS

Strengths

Title – Extensive incentive for faculty training

Justification – UFSCar, since its creation, has a strong policy of encouraging and supporting the training of its faculty members. At the beginning of the 1980s, the focus was on Graduate formation, reaching highly satisfactory rates. Nowadays, UFSCar continues with board support for faculty training, through courses directed to the learning and/or recycling of new faculty members and learning methodologies, especially in active and participative methodologies, both in undergraduate and graduate levels. In the context of the research, UFSCar has an important policy of supporting for participation in missions, in the country and abroad, encouraging participation in events (conferences, symposiums, and educational fairs) as well as in post-doctoral studies. This support has been consistently expanded in recent years, due to the maintenance of the faculty members system of UFSCar, so that the faculty member in the process of qualification could count with the support of one substitute faculty member who, provisionally, would be hired to teach the undergraduate courses and activities, as well as supervising the undergraduate final papers. In addition, the Provost Office for Research (ProPq) has also provided financial support to the activities of the faculty members, especially in international missions, involving the presentation of papers in recognized scientific events. This aspect is particularly relevant, once approximately 50 percent of the faculty members of UFSCar have had medium and long periods of experiences in other countries. UFSCar currently has about 60 percent of its faculty members with less than eight years of employment in the Institution, mainly, due to the recent opening of the new Sorocaba and Lagoa do Sino campuses. The renewal of the faculty staff is continuous due to retirements. In that way, it is necessary to maintain this policy of incentive for training, especially for missions in countries that have a strategic relationship with the Institution. Finally, UFSCar has maintained the support for the training abroad for more experienced faculty members, and for this reason, sabbatical leave has also been used in the Institution, mainly to allow senior faculty members to aggregate new knowledge in different methods and practices as well as having the opportunity to contribute their academic-scientific experiences in other countries, sharing the accumulated knowledge and improving their teaching skills in other languages.

Title – Having several pioneer programs in the country, with emphasis on excellence and emphasis on national and international recognition

Justification:

UFSCar, since its creation, has highlighted its pioneering and strengths support to technological development and innovation. Among the Graduate Programs (GPs) created at UFSCar with such characteristics is the GP in Materials Sciences, that belongs to the Center for Exact Sciences and Technology, which is composed by faculties from the Department of Materials Engineering, responsible for the implementation of the first undergraduate major in Materials Engineering in Brazil and Latin America. This program, along with the GPs in Chemical Engineering and Chemistry, (the programs graded 7 at CAPES evaluation), presents topics focused on innovation and the strong relationship with companies, aiming at the development of new products and processes, with national and international emphasis and projection. Recently, two GPs in Biotechnology (one located in the campus of São Carlos and the other in the campus of Sorocaba) are also innovative programs with a prominent multidisciplinary interface. In the exact and technological areas, other GPs as Computing, Production Engineering, Urban Engineering and Structures and Civil Construction, Statistics, Physics, and Mathematics also stand out, covering and supporting themes related to innovation and generation of products and processes. In addition, UFSCar has other programs that give solidity to the needs and proposals of innovation and technology in the areas of Agricultural Sciences and Environmental Sustainability. In Health, the GP in Physiotherapy, which is also a pioneer in the country, is very important in Brazil and in the other countries and has recently been graded 7 at CAPES evaluation, being the only one with this score in the Evaluation subarea. Another pioneer program in Brazil that interfaces with the areas of Rehabilitation is the GP in Occupational Therapy, the only graduate program in Latin America. In the Education and Human Sciences Center, the GP in Special Education, created in 1978, an innovative program, was created from an intense demand for qualified human resources to work in this area, the program was graded 6 at CAPES. Another area of knowledge that has accumulated academic experience for 20 years, and created in 2007 a GP was Sociology, that has currently been graded 6 at CAPES evaluation. Recently, the GP in Psychology has been graded 6 at CAPES, becoming part of the GPs of excellence at UFSCar. Therefore, from the 53 GPs at UFSCar, 7 are part of the group of programs of excellence, 7 GPs were graded 5 and 20 were graded 4 at CAPES. It is also noteworthy that from the 53 GPs, 20 of them have less than 10 years of existence.

Title – The existence of consolidated partnerships in strategic countries of CAPES

Justification

UFSCar has several cooperation agreements with educational and research institutions and it has been committed to maintain and expand existing partnerships in strategic countries. Thus, new partners were identified that could cooperate in a mutual way, adding new knowledge and seeking to further strengthen existing research. As already mentioned, this movement had been happening in an individual way among researchers, research groups, and graduate programs until 2016. More recently, administrative efforts have been undertaken to prioritize new partnerships in strategic countries. Altogether, the University currently has 168 agreements of academic-scientific cooperation, most of them with strategic countries: Germany (6%), Argentina (6%), Australia (2%), Canada (3%), China (2%), Denmark (1%), Spain (14%), United States (9%), Finland (1%), France (10%), Ireland (1%), Italy (2%), Japan (4%), Mexico (1%), Netherlands (3%), United Kingdom (4%) and Portugal (9%), in other words, more than 70% of total. It reinforces that many of these agreements are assured to enable the broad partnership and the possibility that the students can attend courses at the partnership Institution. Therefore, we could notice that UFSCar is aligned with CAPES aspirations, searching to create and maintain cooperation networks with institutions located in strategic countries, as can be seen from the history of the existing partnership. In addition, we can reinforce that more than 25 joint supervision agreements and 02 double degrees agreements have been signed in the last four years. The objective with the SIP will be, along with the strengthening of existing partnerships, establishing new agreements, especially double degrees in strategic countries within the priority themes listed in the Institutional Project.

Title – High qualification of the faculty members, hiring of the faculty members with full-time exclusive dedication and high-level training center in human resources.

Justification - UFSCar is distinguished by the high-level of academic qualification of its faculty members and by the hiring of almost all its faculty members in an exclusive dedication work type. UFSCar has 99 percent of the faculty members with a Ph.D. degree, which is one of the highest qualifications of the faculty members among the Higher Education Institutions in Brazil. These strategies associated with the implementation of the effective inseparability among teaching, research and extension have an impact on the scientific production of the University. It is important to observe that, in recent years, the Federal Universities have highly contributed to the faculty members' training, and UFSCar, in a prominent way, when compared to the other Higher Education Institutions. Another aspect to be highlighted is the significant rate of human resources training, especially in the campus of São Carlos, which contributes along with USP-São Carlos (University of São Paulo), transforming the city in the municipality with the highest number of Ph.D. titled inhabitants in Latin America. In all, there are 1,700 Ph.D. titled inhabitants in a

municipality with 230 thousand inhabitants, which represents one Ph.D. titled person for every 135 inhabitants. In Brazil, the national ratio is one Ph.D. titled person for every 5,423 inhabitants. Several industries from different economic sectors have sought to establish themselves in the region by recognizing the qualification of the trained professionals, aiming at the easier recruitment. Thus, it is well known the transformative potential of UFSCar, for economic, cultural, scientific, technological and social development in the city of São Carlos and the region. Therefore, this characteristic makes the city of São Carlos particularly attractive, given its own characteristic of being a university city, center of education, research and culture, besides being a city in the countryside of the state of São Paulo that counts on high rates of quality of life.

Weaknesses

Title - The lack of airport in the city of São Carlos, need to expand the hotel network and need of housing for foreign students at UFSCar

Justification –

The campus of São Carlos has the largest number of consolidated GPs compared to the other campuses, however, the city does not have airport support to facilitate the movement of foreigners. Thus, there is a need for ground transportation for the visiting faculty members and foreign students to regional and international airports (São Carlos is 150 km far from Viracopos International Airport in the city of Campinas and 230 km far from GRU (Guarulhos International Airport - São Paulo). Although the state of São Paulo has the best roads in the country, the road trip becomes tiring for the foreigner and costly for the Institution/GP. Another situation is that the offer of hotels in the city is still incipient in relation to the spaces for events, which makes it difficult to hold international events. However, it is worth noting that the 67th Annual Meeting of the Brazilian Society for the Advancement of Science (SBPC) was held in São Carlos campus in 2015, with the construction of a temporary infrastructure in the campus. In addition, there is a small supply of internal housing for foreigners, which means that several students must install themselves outside the campus, independently or with support from the International Relations Office. In this sense, there is a need to expand housing for foreigners, especially for Graduate students and visiting researchers.

Title - Need for financial resources and flexibilization of PROAP resources, among others from CAPES, to expand strategies for language teaching and revision of texts in English

Justification –

Although UFSCar supports the activities of the Languages Institute (LI) and there are resources of MEC to support the Languages without Borders Program (IsF), there is a need for the Institution

to increase their financial resources to support the offering of language courses for students and faculties. Institutional funding resources have been systematically reduced in recent years. In addition, in relation to PROAP resources administration, and due to the processes and laws regulating the use of these resources, it is not possible to fund certain expenses of the Languages Institute, since such contributions may cause administrative improbity (payment for the administrative unit itself). The solution found, which does not always offer the most economical and agile way, is the conducting of price quotations and auctions for hiring services of version and translation of academic texts. For the Institution, these are services that could be carried out more efficiently and with better quality, if it would be possible to do so by the Languages Institute of the university. Such weaknesses, which are not concerning only UFSCar administration but all the processes of financial resources administration in public institutions, complicate institutional actions, impede procedures to increase support for programs, and do not satisfactorily consider the advantages of consolidating experiences to internationalization support.

Title - Lack of bilingual staff members

Justification -

UFSCar, though being a Federal Institution of Higher Education (HEIs) with almost 50 years of existence, counts on a number of staff members (TA) much lower than the other federal HEIs in the country, especially when compared to other institutions in the state of São Paulo. The relation of UFSCar faculty/staff members is one of the lowest among federal universities, in other words, 0.7, compared to the expected, or recommended rate, which is 2/1. Therefore, there is a need to rearrange this framework, to increase the faculties/staff members numbers at UFSCar. For this reason, we expect to establish a strategic policy from CAPES aligned with the support of the Ministry of Education and Culture (MEC), so that there would be an increase of the staff member numbers, especially a staff member who would be qualified and fluent in foreign languages, once the numbers of the Institution are worrying to support the expected level of internationalization. The lack of staff members often impacts on the difficulty of maintaining and expanding internal capacity building strategies, as it makes it difficult to make administrative actions more flexible. Therefore, it is observed that the situation is revealed by the indicator related to knowledge/language proficiency, as it was verified that only 3 percent of the staff members has had experience abroad and/or has been proficient in a foreign language. This fact worries the Institution because the rearrangement and expansion of the number of these staff members are still not aligned with the rearrangement of the board of officials proposed by MEC. Although this indicator has shown the reflexes of years of absence of a hiring policy, UFSCar currently offers regular courses for specific training to staff members in the Languages Institute and in the courses offered by the Languages without Borders Program (IsF).

Title - Need to improve internal processes to support internationalization (infrastructure, personnel, and support from information technologies) in the multi-campus structure

Justification –

As previously mentioned, there is a compelling need to increase the number of staff members and, thus, expand the Strategies for Internationalization, mainly, in the following sectors: International Relations Office (SRInter) and Provost Office for Graduate Programs (ProPG). It is necessary to create new positions, so that the new staff member would work in the reception and global monitoring of foreign students, foreign faculties, and academic researchers, and in the expansion of strategic agreements. For this purpose, it is expected the new staff members to be bilingual to support those activities. In addition, there is a need to modernize the physical infrastructure of SRInter and ProPG, as well as the Languages Institute, with the implementation of technical support information, which can operationalize integrated information systems related to internationalization. The integration of these systems will allow real-time indicators, assuring promptness in the processes and quick decision-making. The current multi-campus administration makes access to this information difficult, so it is imperative to have the aid of efficient information systems to help the teams involved in different support branches. Although the Languages Institute and the Language without Borders Program are established and in operation, there is a need to expand the support of personnel trained to act in a multi-campus manner in relation to language support for students, staff members, and faculties, considering the different internationalization strategies from each of the four UFSCar campuses.

Title - Asymmetric and insufficient supply of English courses in the programs

Justification –

The registrations of the academic control system of the GPs (ProPGWeb) from 2013 to 2016 revealed 112 courses registered and offered in English for the Graduate Programs. Although this number can be considered expressive, we could observe that the courses had been mostly offered by international visiting scholars and there is a great asymmetry among the programs. In other words, these courses were concentrated in programs graded 6 and 7 at CAPES evaluation. Consequently, despite much experience abroad from many faculties, they do not feel stimulated to extend this specific action of internationalization in the Institution. In addition to opening opportunities for foreign students, this would also allow Brazilian students to start having academic experiences in other languages in their own Institution. UFSCar wants to expand internationalization strategies by encouraging their faculty members to teach their own courses in English, as well as to make temporary contracts for visiting foreign scholars to come to teach courses in their own language.

Does it have a well-defined institutional vocation?

Yes

UFSCar focuses on research as well as graduation excellence. In the technological area, it excels in scientific development and strategic materials innovation. In Health, in the use of technologies applied to prevention and rehabilitation of chronic diseases. In environmental area, sustainability and public policies for rural development. In Humanities, current issues of Brazilian society such as equity in access to education as well as policies for educational organization.

Describe your institutional vocation

During 48 years of its existence, UFSCar has become one of the most accredited Brazilian and Latin America Higher Education Institution. In 2018, it was ranked by QS World University Rankings number 10 among the best universities in Brazil; being also 10 according to RUF (Folha University Ranking). As far as internationalization is concerned, Brazil ranks 15, being 8 in international citations by professor and 9 in researches. UFSCar ranks 18 among the best Latin American institutions according to Times Higher Education. It has several research groups with national and international presence. In 2017, 454 faculty members had official authorization for their sabbatical abroad: post doctorate researches, short term researches and missions granted by development agencies. Around 50% of faculty have either post doctorate or doctorate done abroad. More than 50% of faculty has been at the institution for less than 10 years, since teaching staff was expanded by REUNI and has been renewed in recent years. UFSCar has more than 300 research laboratories whose infrastructure as well as equipment compare to the international excellence ones. As for international counterparts, UFSCar has 168 academic-scientific cooperation agreements, being more than 70% signed with strategic countries. It should be mentioned that the cooperation agreements ensure a broaden collaboration enabling students and faculty take courses at the counterpart institution free of cost. International scientific production indicators show that in 2017 1209 articles were published in international journals, with 0.63 average impact factor. However, 154 were published in joint authorship with international researchers which resulted in a 100% leap for the impact factor of publishing. Several researchers are editors for international range journals. Several researchers were internationally awarded for the quality of their research and others are members of important international associations, mainly related to selected themes seen as priorities by UFSCar.

INSTITUTIONAL PROJECT REGISTRY - PII

Institution of the Project Coordinator

UNIVERSIDADE FEDERAL DE SÃO CARLOS

General objectives

Consolidate and expand research networks, increase the visibility of graduate programs and respond to the needs of society and the scientific community regarding the themes "Health technologies for integral care: from rehabilitation prevention", "Strategic Materials" , "Biodiversity, Ecosystem Functions and Sustainability", "Revolution in Industries and Cities - Industry 4.0 and Intelligent Cities" and "Education and Human Processes for Social Transformations". Insert UFSCar among the 100 best in the world in research and scientific production related such strategic topics abovementioned.

THEMES AND SPECIFIC OBJECTIVES OF THE PROJECT

Theme 3 - <u>EDUCATION AND HUMAN PROCESSES FOR SOCIAL CHANGES</u>

Partner countries- Argentina; Austria; Canada; Germany; Cabo Verde; Colombia; France; Italy; Mexico; Mozambique; Norway; Portugal; United Kingdom (U.K); United States (USA).

Justification - This proposal integrates the research areas of the Graduate Programs related to Human Sciences at UFSCar and other interface areas. Its general goal is to develop researches that bridge knowledge gaps, maximizing experiences abroad to understand and face both local and global reality challenges and, at the same time, to build complementarity that reduces asymmetries between both parts and increases knowledge level through mutual contribution coming from different competences of the national and international partner institutions. The proposal has an innovative character both on its theme and its way to approach it searching for consolidating priority areas as well as spurring the areas with international potential. This reflects in the competitive subtopics composition which being able to be generalized, may be inserted in research fields attractive to international interest. This will allow the construction of a research and knowledge production network in the sphere of graduation that is aligned with the institution's competences and with central issues in Brazilian society: knowledge production and scientific dissemination; new epistemologies of science in the training of scientists; equity in access to education and knowledge; policies, educational organization and inclusion; development and evaluation of educational, instructional and teaching technologies. These topics refer to trends in Brazilian public policies and are aligned with the objectives set for education, science and social technologies. The objective is to produce and disseminate innovative solutions, as well as to create indicators to elaborate and to base public policies that guarantee inclusion, considering socioeconomic and cultural aspects and the improvement in the quality of life of the population. The proposal is aligned with the Brazilian public policy which says: “Universities and research institutions must be encouraged to incorporate the social dimension to their research agenda, to promote citizenship formation; a further integration of Social and Human Sciences to Brazilian public policies must be pursued.” (Estratégia Nacional de Ciência, Tecnologia e Inovação 2016/2022, p. 98s). The proposal implementation will contribute to UFSCar move forward towards internationalization actions either ongoing or to be institutionalized.

Goals

Goal 1 – Developing and evaluating educational, instructional and teaching technologies

Description –

Effective education as a tool for both the scientist and citizen’s formation calls for a radical change in traditional ways of teaching which has shown insufficient in face of social demands. Education

for science, uses of technology and information production depend on offer of an integrated education since kindergarten to higher education and professionalization. For the achievement of this goal, it is fundamental to ensure the teachers a qualified pre-service and in-service teacher training, added the experience in several international contexts, who have got practices in teaching at hybrid environment in order to articulate the acquired knowledge in a practical way in everyday life. That requires pluralizing knowledge in contemporary competences such as development of software, app, programming, diagrams, digital technologies, cyberbullying, innovation ecosystems, collaborative use of intellectual property, cybernetic security and real-time learning.

Goal 2 - Expanding equity in access to education and knowledge

Description

Transnational relations point at the need for establishing of public policies designed to all population segments. Ethnic-racial, gender, sexualities, social class, accessibility, special education disability inequalities are internationalized themes which demand scientific based and social oriented actions to eradicate conflicts resulting from these inequalities. Adopting measures for promoting diversity within the institutions contributes for academic quality as shown by the most internationally accredited institutions that established policies for diversity promotion in academy and development of researches on this theme. To reach these goals, this proposal comprises the investigation and testing of successful models that may be full-scale applied as well as measures to promote ethnic-racial, socioeconomic, cultural and gender diversity.

Goal 3 - Formulating policies, educational organization and social inclusion.

Description

Education performance rates in Brazil oscillate alarmingly. Partly, this is due to the used model being based on epistemological concepts which presents structural changes. It is important to design policies and course syllabuses which are internationalized and integrated with global trends in education. Designing and guaranteeing equal opportunities at all levels of education (kindergarten, basic education, higher and vocational education) is fundamental for the improvement of a nation as well as to provide it with means to interact internationally. Thus, the objective focuses on the development of in-depth studies that enable the elaboration of plural methodologies based on scientific and technological interaction in line with an internationalized syllabus. This way, actions linked to this objective aim to develop studies proposing evasion reduction as well as increasement of interest in school; to create mechanisms for elaboration and technical and socio-emotional skill development (prototype and sustainable project development); studies on multi, inter and transdisciplinary project programs; to know and design internationalized syllabuses via teachers and students' real and virtual mobility.

Goal 4 - Promoting diversified actions for scientific dissemination.

Description

The theoretical and philosophical framework on which Social Science and Technology studies are based consider cultural internationalization, market globalization and economies around scientific and technological leadership, understanding them as fundamental characteristics for the current information and technological era impacting deeply in a very wide range of human practices. Nowadays, Science, Technology and Innovation are regarded as key factors for economic and social development of nations being part of countries economy agenda. Thus, it is important to increase both quantitative and qualitative levels of knowledge production and improve scientific dissemination process in order to share the produced knowledge with society. Structural inequality present in developing countries extends to scientific production and access. In order to equate differences between developing and developed countries it is crucial and urgent the development of plural strategies to bring different realities closer. This proposal is bound to the debate about smart cities with both intensive and integrate use of communication and information technology context-based (IoT), urban management and social data-driven action (Data-Driven Urbanism). The objectives regarding science dissemination actions aim at increasing scientific education levels as well as creating opportunities for a portion of the Brazilian population depleted from knowledge production, to participate in it by developing materials, products, contents, via digital platform allowing social science establishment and popularization. Thus, it is important to strengthen technology use and process to provide teaching and knowledge access, creating conditions of sustainability, increasing the population's living conditions regarding ethnic-racial, gender, sexualities, social conditions and ageing complexities.

Goal 5 - Creating conditions for elaboration of new epistemologies of science in the training of scientists.

Description

Science epistemology encompasses metaphysics of science and scientific theory justification areas. Professional training must be related to the understanding that scientists' training consider demands of contemporary knowledge production. Justification of training difficulties are related to the epistemologies underneath desired knowledge. In this case, the issue encompasses the capacity for operational field that must be understood as the ability to solve scientific problems, and mainly to understand knowledge as continuum. Thus, it is crucial that training is built upon understanding the historical processes that produce the epistemologies, concepts and methodologies that guide scientific production. The contemporary scenario for social relations has been requiring strategies to decrease conflicts which lead to change course paradigm into inter, multi and transdisciplinary perspectives. In this regard, it is necessary to train scientists in analytical and critical thinking skills considering spatial and temporal knowledge production development. Humanities may contribute this objective by creating actions for an environment attractive for children and young adults for the scientific career, promoting debate and interaction

with other areas of knowledge. The new scientists' training must take into account phenomena and social process plurality and complexity.

Theme 5 - <u>BIODIVERSITY, ECOSYSTEM FUNCTIONS AND SUSTAINABILITY</u>

Partner countries- Belgium; Canada; Czech Republic; France; Germany; Japan; Netherlands; Spain; Switzerland; United Kingdom (U.K); United States (USA).

Justification –

According to the recent publication of the Regional Diagnosis on Biodiversity and Ecosystem Services in the Americas, prepared by the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), it is estimated that about 30% of the biodiversity populations of the Americas have already declined since the beginning of European colonization and this number should increase in the coming years. At the axis of this scenario is the human and his disordered actions, promoting deforestation and the consequent fragmentation and loss of habitats, poaching, roadkill's, pollution and climate changes. It is well-known that ecosystems around the world have a wide variety of functions and promote a wide range of services provided by their biodiversity, which are of crucial importance to the human well-being, health, quality of life. Although the ecosystem restructuring and management have provided some benefits such as increased food production to human consumption, these changes have generated large environmental costs, impairing the ecosystem functions and services. On the other hand, because they occur unequally among the ecosystems, such changes can worsen inequalities in access to environmental services, further contributing to poverty. The Brazilian case is of particular concern due to the disorderly economic growth carried out since the post-war period. The theme "Biodiversity, Ecosystem Services and Sustainability" has a strategic dimension that intends, in an integrated and multidisciplinary way, the integral development of scientific and technological knowledge, able to base the priority actions of conservation of biodiversity, sustainable use of natural resources, health environmental and human well-being, mitigation and adaptation to climate change. Five sub-themes will focus on Biodiversity, Ecosystem Services, Strategic Natural Resources, Environmental Health and Human Well-being, Climate Change, and will have the participation of ten Graduate Program (PPGERN, PPGGEv, PIPGCF, PPGCAm, PPGBMA, PPGPUR, PPGBiotec, PPGQ, PPGEQ, PPGCC), owned by three Academic Centers (CCBS, CCET, CCTS) and two UFSCar campuses (São Carlos e Sorocaba).

Goals - Consolidate, expand research networks and increase international visibility in this thematic through the mobility of students and faculty and attracting researchers from abroad.

Description

To achieve this objective, we wish to promote international research networks on biodiversity, ecosystem services and sustainability, by strengthening and expanding existing collaborations, as well as by nucleating new research networks with institutions of excellence from abroad. In order to do so, the international recognition of UFSCar in this area will be explored. In this sense, we will expand the mobility and attraction of foreign researchers of recognized expertise, increasing the visibility of PPGs and projecting internationally our research in Biodiversity, Ecosystem Services and Sustainability. The sub-theme Biodiversity will consolidate studies at the three levels of biodiversity, genes, species and ecosystems, promoting studies on conservation, monitoring, mapping, modeling, management and valuation of ecosystem goods and services. In the sub-theme Ecosystem Services, we will improve our knowledge on the ecosystem services of our different biomes, as well as the promotion of PD&I in new agricultural, agroindustry and agroforestry technologies based on the sustainable use of Brazilian socio-biodiversity and proper inputs to sustainable agriculture, agroecological basis and organic production. In the sub-theme Strategic Natural Resources, we seek to contribute to national water security, technological development and innovation in areas such as management and recovery of water reservoirs and watersheds, and reduction of environmental impacts on natural ecosystems. In the sub-theme "Environmental Health and Human well-being", we will study the consequences of environmental impacts on the environmental health and the consequent human well-being; the strengthening of research at the frontier of knowledge such as biotechnology, pharmaceuticals and biopharmaceuticals, bioinformatics, nanotechnology, modeling and simulation. Finally, under the Climate Change sub-theme, we intend to identify the environmental impacts that may lead to local, regional and / or global climate change, as well as to propose and elaborate urban climate models which can evaluate changes in the biophysical environment arising from the urbanization process and population density

Theme 1 - <u>STRATEGIC MATERIALS</u>

Partner countries- Australia; Austria; Belgium; Canada; China; Cuba; Denmark; Finland; France; Germany; Italy; India; Japan; Netherlands; Norway; Portugal; Russia; Spain; Sweden; United Kingdom (U.K); United States (USA).

Justification

The sustainable development of the planet implies a growing demand for new strategic materials. In Brazil, there are abundant resources in minerals, biomass, petroleum and other input of strategic importance, making even more pressing the prospection for modern technologies for the development of materials and processes of higher added value, designed to obtain the maximum performance in applications of interest. The proposal of this theme is based on UFSCar role in studies involving materials and its multidisciplinary character. In this context, the theme “Strategic Materials” has been chosen as a priority area for the joint action of nine Graduate Programs part of Exact and Technological Sciences Centre, having 3 of them score 7 by CAPES (PPGQ, PPGCEM, PPGEQ). These features consolidate UFSCar as a Center of Excellence in Materials, with the training of hundreds of masters and doctors, registration of dozens of patents and publication of hundreds of international articles in the last four years. It should be mentioned the ability of researchers working on this theme to raise funds and obtain human resources for the development of their researches either from funding agencies as from the private sector, in Brazil and abroad, being some of them CEPID’s (3), thematic FAPESP (3), INCT-CNPq, Petrobras (3), double major (Brazil-USA) and joint supervision (Spain, Cuba, etc.). UFSCar international recognition will be used in this internationalization proposal to attract young talents from Brazil and abroad as well as to consolidate current partnership with foreign institutions and acknowledge researchers. The internationalization actions will be directed in an integrated way to promote information stream and knowledge exchange, in the following sub-areas: Materials for Energy; Nanoscience and Nanotechnology; Biomaterials and Renewable Materials; Innovative Processes and Computational Modeling and Simulation.

Goals - Consolidating, expanding research network and increase international visibility in this thematic area Strategic Materials through student and faculty mobility and attracting foreign visiting researchers.

Description

To achieve this goal, we look for promoting international research network in Strategic Materials through strengthening and expansion of current collaboration as well as nucleation of new research network with leading research institutions abroad. For this, UFSCar international reputation will be considered for this theme. This way, it will be sought expanding mobility and attracting foreign visiting researchers in order to increase the Graduate Programs visibility and promote UFSCar internationally as a center of excellence in Materials. For Energy subtopic, the

development of new materials is sought as well as the improvement of known materials properties for generation and storage of energy prioritizing sustainability, availability, recycling and low-cost. Thus, material development for using in renewable energy systems such as fuel cells and photovoltaic is one of the significant aspects of this subtopic. For Nanotechnology, it is highlighted nanostructured material synthesis, characterization and application in several compositions, morphologies and microstructure to improve performance in the areas of health, food, energy and environment. The Biomaterials and Renewable Materials subtopic highlights the development of bioactive materials, functional materials, functional packaging, natural polymers, besides biphotonic. For Innovative Processes the objective is the manufacturing of hybrid metal-polymer structures, development of new cleaner processing routes, real time management of polymer transformation process, new materials for catalysis, integrated technologies to the gas and liquid effluent treatment process, laser based micro manufacturing, bioreactors, post metal, polymer, ceramic, polymer and cement composite compression processes for concrete and geotextile infrastructure. For Computational Modeling and Simulation, the objective is process automation, thermo mechanical modeling of materials, embedded systems, high performance computing, statistical pattern recognition, parallel and reconfigurable processing and prior knowledge of nanomaterial to be synthetized and according to its micro structure prediction of these material possible application.

Theme 2 - <u>REVOLUTION IN INDUSTRIES AND CITIES - INDUSTRY 4.0 AND THE SMART CITIES</u>

Partner countries- Australia; Austria; Belgium; Canada; China; Denmark; Finland; France; Germany; India; Italy; Japan; Netherlands; Norway; Portugal; Russia; Spain; Sweden; United Kingdom (U.K); United States (USA).

Justification

Ongoing technology innovations challenge the status quo and may in a few years completely change how the current society interacts in their work environments and social conviviality. Technological innovations such as Artificial Intelligence, 3D printing, autonomous vehicles, the internet of things, machine-assisted processes, biotechnological processes, new technologies for work organization, and the new instruments of environmental sustainability are among the priorities of scientific development. Unlike previous revolutions, there is a change occurring at great speed, breadth, and depth in technological and social terms. Such changes have been the subject of discussion and massive investments in countries such as Germany, United States, China, France, among others. Each of these, with their research and development centers, has defined differently as conceptualize and direct their efforts, according to their needs and specificities. Brazil will have to be integrated into and modernized so that the research and development of strategic order that will impact all the productive sectors, in special the industries and cities, occur in an endogenous and contextualized form with our reality. It is from this conjuncture that the “Revolution in the Industries and Cities – Industry 4.0 and Smart Cities” was

chosen as a priority by UFSCar within the context of PRINT. Within these themes, six sub-themes were listed: (1) Technological development and management for Industry 4.0; (2) Operations management and innovation for Industry 4.0; (3) Dynamics of work and society related to Industry 4.0 and smart cities; (4) Sustainability, institutions and social conflicts related to Industry 4.0 and smart cities; (5) Cities and ruralities in the contemporary world; (6) Management, Planning and Technology in Urban Systems. The diversity of graduate programs and the high capacity demonstrated by its researchers consolidate and accredit this proposal whose main focus is multi-disciplinarity. Thus, such PGP must articulate and interact with institutions from other countries to analyze and plan the fusion of technologies and convergence between physical, digital, biological and management domains, including the impacts of sociological order entailed.

Goals - Consolidate and expand the research nets and increase the visibility of the PGPs from UFSCar in the area "Industry 4.0 and Smart Cities" through mobility and international researchers attraction.

Description

The main objective is to promote international scientific research networks from UFSCar's PGPs in "Industry 4.0 and Smart Cities", through the strengthening and expansion of existing collaborations as well as the nucleation of new research networks with international excellence institutions. To that end, this proposal will seek to tap into international recognition for UFSCar in this theme, which will be used to expand the mobility and attraction of foreign researchers of recognized ability. With this, the intention is to increase the PGPs visibility and to project UFSCar internationally as a Center of Excellence in the area. Moreover, the following specific objectives were listed: - to study the effect of Industry 4.0 technologies in the management of operations and in the supply and alimentary chains; - to study the effect of technologies 4.0 in the management of inclusion/incorporation of alimentary industries residues by means of smart sustainability; - to create and evaluate advanced technologies for treating industrial effluents (liquid and gaseous) and to reduce the greenhouse effect, contributing to improve the air quality and preserving the environment; - to develop and implement innovative processes for the generation of energy from waste (biomass and plastics), contributing to mitigate the environmental impact of the disposal of these materials; - to empower researchers at the frontiers of knowledge to lead the Industry 4.0 deployment in Brazil; - to sustainably use residues from 4.0 food industries to head management and minimize unused residues, improving the smart use of waste; - to study the effect of Industry 4.0 on the work dynamics and organization; - to study Industry 4.0 relation and effect on the circular economy; - to study Industry 4.0 relation and effect on sustainable production; - to study the effect of Industry 4.0 on the sustainable use of alimentary residues.

Theme 4 - INTEGRATED TECHNOLOGIES FOR HEALTH: FROM PREVENTION TO REHABILITATION

Partner countries - Argentina; Australia; Belgium; Canada; Colombia; Cuba; Denmark; France; Germany; Italy; Netherlands; Norway; Spain; Sweden; United Kingdom (U.K); United States (USA).

Justification

The objective of this theme is to consolidate and broaden the research networks and to increase UFSCar's Graduate Programs visibility regarding the theme "Integrated technologies for health: from prevention to rehabilitation" through mobility and attraction of international researchers, focusing on three sub-themes: Technological solutions for health; prevention, treatment and rehabilitation of chronic diseases and Human development and life trajectory. The choice of the theme and its subtopics was motivated by the mission of UFSCar in the development and consolidation of new technologies in the priority areas of research of the Ministry of Health and World Health Organization and in the relevance of UFSCar's scientific production in the area of rehabilitation. In this way, the choice of the theme aims to strengthen international collaborations in areas of research already consolidated in UFSCar in order to improve new technologies for health, aiming at the promotion and rehabilitation of various health conditions. The proposal encompasses 11 Graduate Programs at UFSCar, characterizing the interdisciplinary nature of the subject. Three of these programs are evaluated with concept 7 in CAPES (Physical Therapy, Chemistry and Chemical Engineering). The professors linked to this proposal are mostly CNPq's (CNPq: Brazilian National Council for Scientific and Technological Development) fellows; develop research related to the proposed theme in partnership with international researchers, have published hundreds of scientific papers per year, have developed softwares and patents. Most researchers have research projects in national and international development agencies, and two thematic projects are currently under development. In recent years the Graduate Programs that participate in this proposal have received the visit of renowned researchers at UFSCar, demonstrating the capacity of these programs to establish international collaborations.

Goals- To consolidate and expand research networks and increase UFSCar's Graduate programs visibility focusing on rehabilitation through mobility and international attraction of researchers.

Description - The main objective is to promote UFSCar's international scientific research networks in the theme **"Integrated technologies for health: from prevention to rehabilitation"**, by strengthening and expanding current collaborations, as well as by nucleating new research networks with international institutions of excellence. For this, the present proposal will explore the international recognition of UFSCar in this theme, which will be used to expand the mobility and attraction of foreign researchers of recognized competence. With this, it is intended to increase the visibility of Graduate Programs and to launch UFSCar internationally as

a Center of Excellence in the area. In addition, the following specific objectives were identified: - to develop new health technologies, using basic and exact sciences resources (mathematics, physics, chemistry, computation and engineering) for diagnosis, treatment and rehabilitation - to study the use of different technologies for detection, promotion, treatment and rehabilitation in different life cycles; - to create and evaluate advanced technologies to treat numerous chronic diseases, with emphasis on cardiovascular, respiratory, neurological and musculoskeletal diseases; - to apply different health technologies, allowing greater accessibility and contributing to improve population's quality of life; – to develop and apply innovative therapies for promotion, prevention and rehabilitation; - to train researchers at the frontiers of knowledge to lead research groups with a focus on rehabilitation.

POSTGRADUATE PROGRAMS LINKED TO THIS PROPOSAL

Theme 3:
EDUCATION AND HUMAN PROCESSES FOR SOCIAL CHANGES

Graduate Program
SPECIAL EDUCATION (33001014002P6).
Capes evaluation (2017 evaluation grade) - 6
Justification –

The Education Graduate Program, created in 1977, has been the only Program in Special Education area, being faithful to its objectives of training agents (researchers, faculty and professionals) in Special Education Area to act in distinct parts of Brazil, in diverse levels of education and for research development and dissemination in this area. Through its four research lines. i.e., "Learning and cognition of individuals with special educational needs", "Implementation and evaluation of alternative special education programs" "Educational and Prevention Practices: processes and problems", "Scientific production and training of human resources in Special Education", this Program has pioneered on developing high quality scientific knowledge and meeting social and education policies demands. From the beginning, the Education Program has invested in collaborations with national and international universities which has resulted in high quality teaching and researching. Currently, besides a lot of informal collaborations (in 2015 to 2016, five PhD graduate students were abroad for internship and nine articles of foreign joint authorship were published), the program has formal current collaboration agreements with University of North Carolina – Wilmington (USA), University of Barcelona (Spain), University of La Laguna (Spain), University of Granada (Spain), National Arts and Crafts Conservatory (France); Polytechnic Institute of Porto (Portugal). Regarding challenges in Education, mainly in Special Education, the Program believes it is important to develop as well as prepare human

resources to keep on social committed investigations to support scientific-based actions in different contexts including public educational policies proposals. This area demands a strong collaboration among several scientific disciplines beyond geographic boundaries in order to enhance diverse competence contributions in the area.

Graduate Program –
SOCIAL ANTHROPOLOGY (33001014023P3).
Capes evaluation (2017 evaluation grade) - 5
Justification –

The Graduate Program in Social Anthropology has three research lines. The line “Urban Anthropology” studies the urban phenomenon problematizing the empirical approach of “cities” through the researches in this line. The city is considered not only a place of social changes but also a symbolic map and possibility of phenomenon. The “Amerindians Studies” line is linked to indigenous ethnology and studies relations, transit and translations among knowledges regimes as well as indigenous policies in their relation to public, cultural and development policies that affect them. The line “Political Anthropology” gathers researches which go through phenomena that anthropologically are understood as “political”. Overall, it is related to regimentation and mobilization of dispersed and heterogeneous elements – power, discourse practices, subjects, symbols, concepts, technologies, documents, living beings, etc. – that lead to several formations considered political: representative democracy, State, international collaboration.

Graduate Program –
COMPUTATIONAL SCIENCE (33001014008P4).
Capes evaluation (2017 evaluation grade) - 4
Justification –

The Graduate Program in Computational Science understands that Computational Science and Computational Engineering has a key role for a more equitable society contributing to people’s formation and society changes. The development of modern technologies for education, scientific dissemination, knowledge transference, digital and social inclusion is important for scientific and technological improvement of society and Computing role is essential for these goals achievement. The program has strongly operated in researches related to the themes above, mainly those related to teaching methodology. Among them, there is the development of educational games which contribute to scientists’ training, young adults and adults’ literacy, learning processes and creation of learning environment. Among the main challenges, one is the development of new algorithms to make learning spaces more realist and motivating. For this, it is need researches involving artificial Intelligence methods and Machine learning.

Graduate Program –

PSYCHOLOGY (33001014031P6).

Capes evaluation (2017 evaluation grade) – 6

Justification –

The Psychology Graduate Program aims at producing knowledge about the basic behavioral processes (for example, cognitive and social processes), the development of technology for the analysis and assessment of these processes, and finally, research on the application of knowledge that contributes to solving social problems. Among other Brazilian Psychology Graduate Programs, PPGPsi/USFCar specifically contributes to the study of Behavior and Cognition. The basic knowledge that results from this theme is important to support interventions in any situation regarding human behavior and its determinants. The program seeks to train its students to meet local, regional and national demands in a wide range of possibilities (e.g. violence, learning difficulties, lack of relevant repertory such as social skills, social cognition, literacy, anxiety disorder, depression, elderly care, etc.). These issues result in a growing demand for research and intervention in Brazil. After the most recent CAPES evaluation, PPGPsi was scored 6, thus, being part of Brazilian Graduate Programs of excellence. The PPGPsi admission in Proex System shows that the program has reached international impact through faculty and students' scientific production. In the last two years (2016-2017) six PhD students did their doctorate internship abroad and the Program received two foreign students for Master's Degree, two for Doctorate's Degree (Metropolitan Oslo University) and a post doctorate researcher, two long-term visiting scholars and ten short-term visiting scholars. More than 50% of faculty members has published in joint authorship with international collaborators. Considering the topics and collaboration agreements the Program has, including the ones established by INCT-ECCE, coordinated by a professor from the Program), the participation of Psychology Graduate Program at UFSCar the institutional proposal is justified by its potential contribution to theme 3 (objectives 2 and 4) and because its intellectual and technical production is aligned with the objectives projected for Social and Educational Sciences and Technologies as well as Teaching Methodology.

Graduate Program –

PHILOSOPHY (33001014010P9).

Capes evaluation (2017 evaluation grade) – 5

Justification –

The Philosophy Graduate Program has been historically based around the reflection, of an interdisciplinary character and in several dimensions of the History of Philosophy, about the structure and genesis of the concept of subjectivity, in the concentration area "Structure and Genesis of the Concept of Subjectivity. " The area of Philosophy has been undergoing a strong internationalization process, of which it has participated in a significant way. This can been seen not only by what is done under international agreements, but also by publications of books and

articles abroad, and especially by research work in cooperation with foreign researchers / institutions for a long time (more than ten years) , and conferences and publications as a result of these collaborative activities, supported by non-perennial institutional support (e.g. Agreement 754-12 signed with USP and Paris University 1 Panthéon Sorbonne from 2012 to 2015, resulting in several scientific events and joint-authorship publications, co-tutorship doctorate, etc. or the Thematic Group FAPESP “Wittgenstein in transition”, in the same span, which supported a research involving researchers from several Brazilian universities and abroad such as Canada, the United States, France, Norway among others, with events and regular co-authorship publications).

Graduate Program –
POLITICAL SCIENCE (33001014026P2).
Capes evaluation (2017 evaluation grade) - 5
Justification –

The Graduate Program in Political Science (PPGPol / UFSCar), created in 2007, increased its score to 5 in 2017, which comes to reward a process of consolidation and maturity. The Program has the characteristic of joining professors in the beginning of their careers to experienced faculty members. Currently, the Program has 12 permanent teachers and 3 collaborators, which are distributed in two research lines: “Institutions, Organizations and Political Behavior” and “Public Policy and Democracy”. Because of an adjustment in the research lines, it was possible to better systematize the bibliographic production and orientation activities, and to give more coherence to the professors' work plans.

Graduate Program –
EDUCATION (33001014049P2).
Capes evaluation (2017 evaluation grade) - 4
Justification –

The Education Graduate Program (PPGPE) is aligned with the Institutional Proposal for the expansion and valorization of training opportunities for teachers, articulating initial and continuing training. The developed researches have an interdisciplinary perspective because of faculty members come from diverse areas (Biology, Philosophy, Physics, Physical Education, Literature, Mathematics and Chemistry).

Graduate Program –

LITERARY STUDIES (33001014041P1).

Capes evaluation (2017 evaluation grade) -

Justification –

The Graduate Program in Literary Studies (PPGLit) provides its students with high-level specialized training, while contributing to the reflections on the literary object and to the advancement of a new state of art of research in the Literature Area, in greater affinity with the new profiles proposed by CAPES, national and international development agencies and encouraged by the Area of Literature and Linguistics.

Graduate Program –

LINGUISTICS (33001014021P0).

Capes evaluation (2017 evaluation grade) - 4

Justification –

The Graduate Program in Linguistics was created in 2004. Faculty members develop their work in three research lines. The line "Language and Discourse" highlights the way discourses are constituted and how much they are enveloped in ideology. It is also worth mentioning the relevance of this theme in the training of a critical performance by professionals who deal with languages and discourses, mainly those related to teaching. The line "Language Teaching and Learning" has an active presence in actions that have teaching as their first concern. This action is noted not only in undergraduate teaching, but also in elementary and middle schools. These activities have as target not only the training in-service teachers, but mainly the production of research. The aim of the research line "Description, analysis and processing of natural languages" is to explore linguistic knowledge as a fundamental basis for the description and analysis of natural languages at different levels (phonological, morphological, syntactic, semantic and pragmatic-discursive), as well as for the construction of linguistic-computational resources for automated processing. Currently, PPGL maintains agreements with research institutions in France (EHESS, Paris IV, Versailles, Toulouse), Belgium (University of Ghent, Catholic University of Leuven, Catholic University of Louvain la Neuve), Argentina (University of Buenos Aires), Canada (University of Manitoba), Spain (University of Valladolid), and the United States (University of Michigan), among others.

Graduate Program:

SOCIOLOGY (33001014025P6).

Capes evaluation (2017 evaluation grade) - 6

Justification

The Graduate Program in Sociology was created in 2007. Being evaluated with score 6 by CAPES, it works in different areas. In the research line "Culture, Differences and Inequalities" it incorporates reflections on national, religious, ethnic-racial, gender and sexuality identities. The

research line "Social structure, Power and Mobility" analyzes the social changes in contemporaneity and its historical dimension, regarding its implications in social structure, power relations and the constitution of sociability. The line "Urbanities, Ruralities, Development and Environmental Sustainability" focuses on socio-spatial configuration studies of human activities, which involve analyzing not only social patterns of use of environmental resources but also the dynamics of contemporary social movements in urban and rural environments. In 2015 and 2016, fourteen students completed doctoral degrees abroad. Among the institutions that hosted our students are the University of California (Berkeley and Santa Cruz), University of Chicago, University of Michigan and University of Connecticut in the United States; École des Hautes Études in Sciences Sociales de Paris, Université Paris 1 (Pantheon-Sorbonne) and Université Paris X (Nanterre), France; University of Granada and Universidad de Sevilla, Spain; University of Lincoln, UK; University of Coimbra, Portugal.

Graduate Program:

EDUCATION (33001014001P0).

Capes evaluation (2017 evaluation grade) - 5

Justification

The Graduate Program in Education (PPGE-UFSCar), one of the oldest in the country, began its activities in 1974. It conceives research in education as an inseparable activity of teaching, indispensable for researcher's training. It is divided into seven research lines: "Education in Science and Mathematics", "School Education: theory and Practice", "Education, Culture and Subjectivity", "State, Politics and Human Formation"; "Teachers' and Education Agents' training", "History, Philosophy and Sociology of Education" and "Social Practices and Education Processes". With a broad history and legacy of education research production, the PPGE is organically linked to the objectives of this theme by articulating research and social intervention through activities that produce data to subsidize public policies in education that meet expectations and needs of the Brazilian context in articulation with the transnational problems. In terms of collaboration there are partnerships with Georgia State University, Francisco Jose Caldas University, Paris Nanterre University, Autonomous University of Barcelona, National University of Cuyo, National University of Don Juan, Faculty of Arts and Sciences Newark of Rutgers, Pedagogical University of Mozambique.

Theme 5:

BIODIVERSITY, ECOSYSTEM FUNCTIONS AND SUSTAINABILITY

Graduate Program–

BIOTECHNOLOGY AND ENVIRONMENTAL MONITORING (33001014042P8).

Capes evaluation (2017 evaluation grade) - 4

Justification –

PPGBMA has a strong presence in the theme of Biodiversity, Ecosystem Services and Sustainability. In the field of biodiversity, the faculty works in the analysis of animal, plant and microorganism biodiversity at different levels (diversity of species, community analysis, genetic diversity, besides studying the structure, function and evolution of biochemical and molecular processes of organisms), with international cooperation projects supported by FAPESP with different countries such as the United States and Japan. In the field of environmental services, PPGBMA develops researches in the service of pollination by bees. Analysis of the biological effects of pesticides on bee health (stress, cell damage), having already completed an international cooperation project with Slovenia, with CNPq funding. PPGBMA also acts on environmental health and human welfare: ecotoxicological effects of toxic metals, therapeutic drugs and agrochemicals on animal health (amphibians, bees, fish). Environmental chemistry for analysis of water and air pollution, use of natural residues as bioremediators. Environmental effects of the presence of microplastics in soil and water. There is ongoing conversation with two researchers from Germany who will support funding applications for new collaboration. In the theme of climate change, PPGBMA acts to quantify the effects of climate change on ecosystem functions (environmental analysis), biodiversity at different scales and biological adaptation; assessment of impacts and adaptation to climate change and discussion of mitigation strategies; In these activities there are already international cooperation projects with France, Netherlands, and United States, in partnership with EMBRAPA, and support of FAPESP.

Graduate Program:

EVOLUTIONARY GENETICS AND MOLECULAR BIOLOGY (33001014012P1)

Capes evaluation (2017 evaluation grade) – 4

Justification –

PPGGEv offers master and doctoral programs since 1991, comprising two main field of studies: i) Genetics and Evolution; and, ii) Biochemistry and Molecular Biology. All laboratories linked to PPGGEv have an excellent infrastructure, meeting the needs of their respective interest of research, with equipment usually acquired by funding agencies, which have constantly financed projects coordinated by the PPGGEv researchers. The infrastructure found in the laboratories allows to perform research related to cytogenetic analysis, population genetics, manipulation of nucleic acids and proteins, genomics, transcriptomics, proteomics, analysis of protein structures,

gene expression analysis, hypervariable DNA sequence analysis, and epigenetic. In addition to international collaborations and student exchanges, through "Sandwich" internships at foreign universities, most of the faculty have official exchanges with foreign groups, mainly from the United States, Germany, England, the Czech Republic, France, Japan, the Netherlands, and of African and South American countries. Several PPGGEv researchers work in the genetic analysis of biodiversity, in the evolutionary processes of the populations and in the genetic consequences of their threats, as well as in the genetic management for their conservation.

Graduate Program:

PHYSIOLOGICAL SCIENCES (33001014037P4).

Capes evaluation (2017 evaluation grade) –4

Justification –

PIPGCF hosts research groups working in the field of Comparative Physiology and Ecotoxicology, with areas of research that aim at the understanding of mechanisms of physiological regulation; its evolution in vertebrates; the interaction between animal and environment; methods of environmental monitoring using animals as bioindicators; besides the analysis of the impact of anthropic actions on the fauna. We have substantial production in the area, with articles of great investigative scope in high-impact journals, which come from extensive international collaborations. These groups are housed in INCT in Comparative Physiology, which has built up a network of international collaborations in this field of activity, promoting several internationalization actions since 2008: as international courses in Brazil (with teachers and participants from several continents); visits of collaborating researchers for long periods, in successive years; internships abroad; in addition to the supervision of joint graduate students (Brazil and foreign collaborator) in programs in Brazil and abroad. Because of the enormous biodiversity and number of different biomes, Brazil is an exceptional place to study these topics and this fact has made possible the investigation of important issues in this field of research with excellent international partnerships. Currently, PIPGCF has projects that already have such collaborations, so our proposal is not to start a prospective plan for potential interactions, but to consolidate and make feasible the continuity of long and fruitful international work. The annual grant for visiting professors and doctorate sandwich would be very effective in enabling longer-term plans, increasing the planning for projects in a way that we can build more lasting and effective partnerships to expand the horizon of the researched area and provide international training for students.

Graduate Program:

ECOLOGY AND NATURAL RESOURCES (33001014003P2)

Capes evaluation (2017 evaluation grade) - 4

Justification –

The Graduate Program in Ecology and Natural Resources aims to train human resources with skills and competences to perform research, teaching and extension activities in the areas of Ecology, Conservation, Management and Natural Resource Recovery. Much of the research developed by PPGERN has addressed the issue of biodiversity, being included in CAPES's Biodiversity evaluation area. It has also included molecular studies to identify and distribute populations. Works that deal with environmental services have been developed for at least 20 years in PPGERN. There was, for example, the development of a model that dealt with the improvement of water quality by a reservoir cascade. On the other hand, since the creation of PPGERN natural resources (strategic) have been the subject of numerous dissertations and theses, being the PPGERN area of limnology a national and international reference). Interactions between environmental health and human well-being, as well as climate change and its effects, have also been the subject of study, analyzing the consequences of anthropogenic changes in aquatic and terrestrial environments and mitigation. The PPGERN brings together expertise and interest to work in all five sub-themes of the theme Biodiversity, Ecosystem Services and Sustainability.

Graduate Program:

CHEMISTRY (33001014005P5)

Capes evaluation (2017 evaluation grade) – 7

Justification –

The PPGQ is a program rating 7 in CAPES, having master's and doctoral degrees and professional master's degree and has 59 permanent teachers who are professors of DQ-UFSCar and researchers of Embrapa. Some of these teachers have worked with projects that are closely related to biodiversity and sustainability. Of particular note is the CERSUSChem project, which is a Center of Excellence for Research in Sustainable Chemistry, in partnership with GSK, and follows the model of the Program to Support Research in Partnership for Technological Innovation (PITE) and Research Centers, Innovation and Dissemination (CEPIDs) supported by FAPESP. CERSusChem is dedicated to the research of sustainable chemical products and processes that can be used in the discovery and development of new drugs and aims to promote the development and effective use of sustainable chemistry and related technologies. The Center develops academic, industrial pharmaceutical and biotechnology research to overcome the current challenges in organic synthesis, based on the principles of sustainable chemistry. The

Laboratory of Micromolecular Biochemistry of Microorganisms, develops research aimed at the study, helping the plant to full development, to parasitism causing diseases and leading the host to death. LaBioMMi studies the relationship of microorganisms from a micromolecular biochemical point of view. Studies on biosynthesis and biotransformation aim to understand the establishment of these relationships and as a consequence, many bioactive molecules can be discovered. The geoprocessing laboratory aims at the global biogeochemical characterization of aquatic environments and the overall assessment of ecosystem quality including specific studies on the partitioning, bioavailability and toxicity of contaminants and high nutrient loads to aquatic ecosystems, and remediation and management of contaminated sediment. All PPGQ researchers related to this subject have international recognition and will associated to the thematic on biodiversity.

Graduate Program:

BIOTECHNOLOGY (33001014020P4)

Capes evaluation (2017 evaluation grade) – 4

Justification –

PPGBiotec has a strong participation of students and teachers in the theme of biodiversity, ecosystem services and sustainability. PPGBiotec develops research involving bioprospecting, environmental services, strategic natural resources and environmental health and human welfare. These experiences are built with scientific missions abroad (program coordination was in 2016 at the the Institute of Biotechnology, University of California, Santa Barbara UCSB, and other missions should involve fieldwork among laboratories). PPGBiotec, together with UFPB, develops an International Cooperation Project with the Université de Montréal, Québec, Canada, studying the antimicrobial effects of phenols on unused fruit products, and is interested in establishing new partnerships with other strategic countries.

Graduate Program:

PLANNING AND USE OF RENEWABLE RESOURCES (33001014050P0)

Capes evaluation (2017 evaluation grade) – 4

Justification –

PPGPUR works in the field of biodiversity, developing projects to describe the biodiversity of microorganisms, animal and plant diversity, involving the taxonomy of recent groups, diversity of species and communities, and study of their functions in agricultural and forestry landscapes. PPGPUR faculty members maintain international cooperation with the UK (including post-doc in the Kew Gardens) and Germany. In the area of environmental services, PPGPUR develops research on products and services derived from natural products, biofuels, and income generation

from seeds, maintaining international cooperation with Japan. In the field of climate change, PPGPUR also acts in the quantification of effects climate change in the ecosystem functions (environmental analysis), biodiversity at different scales and in the biological adaptation, as well as in the assessment of impacts and adaptation to climate change and mitigation strategies.

Graduate Program:

CHEMICAL ENGINEERING (33001014006P1)

Capes evaluation (2017 evaluation grade) – 7

Justification – The insertion of the PPGEQ in this theme is based on the application of technologies for the treatment of effluents and the reuse of greenhouse gases. Three proposals for international cooperation already listed by PPGEQ in themes 1 and 2 also present connections with this theme 5 and potential synergy with other PPGs of UFSCar: development of technology for the treatment of liquid effluents and as well as for the desalination of water and the conversion of CO2 into methanol by chemical and electrochemical processes. Involving three researchers from PPGEQ, working in three different research areas (Environmental Control, Particulate Systems and Heterogeneous Chemical Reactors and Catalysis), these proposals contribute to the pollution control and the environmental preservation as well as the decrease of the greenhouse effect. With the infrastructure available in the Laboratory of Environmental Technologies (LaTeA), Laboratory of Catalysis and Laboratory of Debugging of Gases and Liquids and with partnerships already established with institutions of the United Kingdom, Canada, Spain and Switzerland, the participation of PPGEQ in this theme will allow the consolidation of partnerships with the establishment of co-tutelary agreements, impacting on the number of publications and the creation of a more internationalized environment in the research groups by attracting young researchers from abroad who will undertake postdoctoral studies in Brazil and the intensification of opportunities for sandwich doctorate at the partner institutions.

Graduate Program:

ENVIRONMENTAL SCIENCES (33001014047P0)

Capes evaluation (2017 evaluation grade) – 4

Justification – PPGCAm develops research and contributes to the formation of human resources focused on the challenges of the interdisciplinarity of the environmental issues, and from a new epistemological view that integrates the knowledge of the different research areas in the context of environmental studies. The integration of the PPGCAm with the theme Biodiversity occurs in the three field of research: Environment and Society, Ecological Systems and Geosciences, and Landscape Management, in which issues related to the biodiversity conservation are developed taking into consideration the ecological systems and the direct influence of the human activities,

and how different strategies of environmental conservation influence the social and biophysical systems. The research developed within the scope of the PPGCAm seeks to systematize information on ecosystem services, aligning the preservation of ecosystem functions with the economic development, maximizing protection, environmental conservation and proposing public policies aimed at biodiversity conservation, in order to guarantee the ecosystem services and the environmental sustainability, with emphasis on the agricultural, forest and urban sectors. The preservation and protection of finite natural resources such as water and minerals have been strategically studied for an economic development with social commitment and environmental responsibility. The PPGCAm also develops research on process of nutrient cycling, pollination, solid waste management, intelligent cities, urban mobility, temporal dynamics of the landscape, epidemic control, public policies and diagnosis of environmental health that can ensure the common use of the environment, safeguarding human well-being. Among the areas of action of the PPGCAm, we highlight the area of Ecological Systems and Geosciences which has as premise the identification of environmental impacts that culminate in climate change at local, regional and global scale.

Graduate Program: COMPUTER SCIENCE (33001014008P4)

Capes evaluation (2017 evaluation grade) – 4

Justification – Biodiversity and sustainability are vital to the healthy development of a society. Technological development must be accompanied by strategies that allow this development to be accompanied by the preservation of native species and respect for their natural habitats. In this context, Computer Science and Engineering has much to contribute to the development of algorithms and methods that can support the development of new technologies, such as for energy generation, climate monitoring, geoprocessing, pollutant control and public health. Within the PPGCC, there are researches mainly related to health, with the development of computational methods to aid in medical diagnostics, and computational methods for the analysis of biological data. These investigations involve tasks such as early diagnosis of Alzheimer's and Parkinson's diseases, and characterization of genomic data, such as non-coding RNAs and proteins. The researches involve the development of computational methods using Computer Vision and Machine Learning. PPGCC can also contribute to the development of computational models for tracking and monitoring animal routes. Understanding their behavior is critical to their preservation. Currently, the Computer Department already has partnerships with Embrapa, developing research that contributes to the genetic improvement of crops, and precision agriculture. Challenge in these researches is the immense amount of data produced from several heterogeneous sources. The integration and processing of these data will require new methods involving artificial Intelligence and machine learning along with high performance computing.

Theme 1:

STRATEGIC MATERIALS

Graduate Program –

MATERIAL SCIENCE AND ENGINEERING (33001014004P9).

Capes evaluation (2017 evaluation grade) - 7

Justification – The Graduate Program in Materials Science and Engineering (PPGCEM) at UFSCar is one of the pioneers and most traditional in Brazil, with a level of excellence (CAPES Score 7). It has an inter- and multidisciplinary team that carry out research of international standard involving polymer, metallic and ceramic materials, in all areas related to the theme "Strategic Materials". Researches in Nanoscience and Nanotechnology aim at the structuring of materials, including the study of their processes of obtaining and transforming into products, for applications in the areas of interest of this theme. In the area of Biomaterials, we highlight researches in bioactive vitreous and vitro-ceramic materials for tissue engineering, with applications in bone grafting and wound healing in the medical and dental areas, research in renewable source polymer materials for application as functional packages, biodegradable plastics, edible films and regeneration of animal tissues, and in the use of Brazilian vegetal species with antioxidant, antitumor, anti-inflammatory and antimicrobial action as functional polymer loads. Research in the field of energy includes the development of amorphous and nano-structured metal alloys for hydrogen storage, amorphous metals for fuel cells, nanostructured glass ceramics for solid electrolytes and cathodes, nanostructured polymeric materials for electronic devices (capacitors, transistors), sensors, biosensors, nose and electronic language. In innovative processes, researches are focused on the automation of conventional polymer transformation processes and the development of cleaner new routes, new hybrid metal-polymer junction processes for lightweight structures for the transportation sector, new routes of processing for obtaining of amorphous metal alloys, metastable and nanostructured metallic structures and optimization of isostatic pressing processes of polymeric, ceramic and metallic powders. In Computational Modeling and Simulation, the researchers are directed to the structuring of materials, development of new manufacturing processes and optimization of conventional processes. All these researches are carried out through international collaborations with: the USA, England, Germany, Austria, France, Canada, Norway, China, Spain, Italy, Russia, India and Portugal.

Graduate Program –

STRUCTURES AND CIVIL CONSTRUCTION (33001014018P0).

Capes evaluation (2017 evaluation grade) - 4

Justification –

PPGECiv is a relatively new Graduate Program, having its doctorate started in 2012. It is part of the Civil Construction Industry, which is responsible for a large part of the consumption of environmental resources and represents a large part of Brazilian economy, besides being one of the sectors that most employ labor force in Brazil. Despite being a new Program, it received CAPES evaluation concepts of Good and Very Good in all items of Quadrennial Evaluation, except by "Distribution of qualified publications in relation to the permanent teaching staff of the Program" item. The current score is 4, being its goal to raise this to 5 in the next evaluation. The major challenge to raise this score, and consequently to produce greater benefits for national academic research, is to increase the number of relevant international articles distributed by the various professors of the Program. As PPGECiv has a number of new young faculty members (about one-third of the them have been enrolled in less than five years), part of this challenge can be addressed through the improvement of international experiences and partnerships, which positively influence technical production and potentiate the quotes of works. Notwithstanding the young teaching staff and recent approval for doctoral offering, relevant research projects and initiatives have been nationally and internationally prominent. Within the proposed theme, Strategic Materials, three research lines of PPGECiv can be listed: fiber reinforced polymer materials for reinforcement of concrete infrastructure, cementitious composites with low cement consumption, geotextiles applied to the geotechnical infrastructure for improvement of soils, restraints and pavements. Among the existing partnerships are the University of Calgary (Canada), University of Minho (Portugal), University of Texas (USA), Brigham Young University (USA). Other themes and partnerships, within the area of constructive systems, may be inserted in the theme. The economic, social and environmental importance of the construction sector; the improvement potential and the goal of obtaining a higher score in the Program quarterly evaluation; the relatively young teaching staff and researchers; the research and partnerships already existing in the Program justify the participation of this Graduate Program in Structures and Civil Construction in the Theme, within the CAPES-Print proposal of UFSCar.

Graduate Program –

COMPUTATIONAL SCIENCE (33001014008P4).

Capes evaluation (2017 evaluation grade) - 4

Justification-

Within this theme, the Graduate Program in Computational Science (PPG-CC) considers of high importance the modeling of systems and processes, as well as computational simulation of various mathematical or biological models, that contribute to the development of new materials. PPG-CC understands that research in Computer Science and Engineering is essential for the

development of science and technology in society because besides promoting its own state of art it is a useful tool to support the development of other areas, including area of development of strategic materials. Throughout its history, PPG-CC has developed different researches related to modeling and computational simulation and process automation. Within the modeling and computational simulation, we highlight researches related to the development of models to simulate observable behaviors in nature, such as evolutionary algorithms for process optimization, and artificial neural networks for descriptive and predictive tasks involving data from researches with sensors and other sources of data. The Computing Department has partnerships with national and foreign companies and universities, developing projects in optimization of manufacturing processes and industrial automation. Among the challenges for development within the strategic materials theme are the development of new algorithms to model and simulate computationally the processes observable during the construction of these materials, such as mathematical models to simulate their stability and resistance. Within these models, multi-objective analyzes should be considered, and algorithms capable of providing multiple answers should also be developed. Within the above, PPG-CC can contribute state-of-the-art knowledge in Artificial Intelligence and Machine Learning, Parallel and Distributed Processing, Bio-inspired Computing, Production Programming and Industrial Automation.

Graduate Program –
CHEMISTRY (33001014005P5).
Capes evaluation (2017 evaluation grade) - 7
Justification-

The Graduate Program in Chemistry (PPGQ) has score 7 by CAPES, offering Master's and Doctoral Degrees and a Professional Master's Degree and it has 59 permanent faculty members who are professors at the Chemistry Department (DQ-UFSCar) and researchers over Embrapa. Most of these professors (about 80%) work in the area of materials involving Materials for Energy, Nanoscience and Nanotechnology, Renewable Materials, Innovative Processes and Computational Modeling and Simulation. The PPGQ recognition in this national and international theme and the capacity of innovation by the professors can be proven by the numerous large projects approved in this subject and coordinated by professors of the PPGQ involving several partners institutions in Brazil and abroad. These include the Center for the Development of Functional Materials (CDMF / FAPESP 4 million / year - 10 years), Center for Sustainable Chemistry (CerSusCHem - FAPESP / GSK - 10 years 1.5 million / year), National Institute of Science and Technology of Biorrational Control of Insects Pest and Phytopathogens (INCT- 5 years), 02 Petrobras projects (1 million). It is also worth noting the considerable number of human resources formed, with a total of 1450 graduate students among masters and doctorates. The program now has 275 students and has an average of one defense every 5 days and more than 40 postdoctoral researchers develop their projects under the supervision of the PPGQ professors. The recognition and international dissemination of these researches carried out by our professors

in this subject can be proven by the substantial number of articles published and citations in international journals in the Qualis A stratum, with about 100 publications a year and by the position that these professors occupy as editors of periodicals, directors of association directors and members of councils for development agencies such as CAPES, FAPESP and CNPq. The actions for the internationalization of PPGQ within this theme have been fruitful and effective with the arrival of about 10 visiting scholars a year to offer workshops at the Program as well as to establish collaboration projects. There are also students in co-tutorship with Cuba and Spain and projects in collaboration with visiting professors from the USA, the UK, Japan, China, Scotland, Netherlands, Germany, etc. Each year 20 to 25 students go to doctorate abroad and about 12 foreign students doing their graduate course in PPGQ. Three young talents from abroad came to the Program as post doctorate researchers.

Graduate Program –
MATHEMATICS (33001014007P8).
Capes evaluation (2017 evaluation grade) - 4
Justification-

The Graduate Program in Mathematics (PPGM) considers very important modeling, simulation and analysis of data to contribute to the development of new materials. PPGM is linked to the subtopics "Nanoscience and Nanotechnology", "Modeling and Computational Simulation". PPGM's research history can be seen through publications in international journals and research projects. Some ongoing projects to be mentioned are: Thematic Project- Algebraic, Geometric and Differential Topology that involves the subject Topological Data Analysis (TDA) and Mathematical Physics Thematic Project that involves the subject nanotubes. The modeling and study of problems on the materials known as nanotubes go through very important mathematical processes, because these materials, although they are similar to lines, are three-dimensional objects. Thus, this situation must be considered mathematically so that the best results are obtained in modeling and solving problems involving such materials. The challenges in data analysis arise when the type of problem is presented in a large volume of complex data. In this case, math can provide important insights and perspectives, including new computational models and data visualization and analysis tools. Topological Data Analysis (TDA) has emerged as a promising approach to many of the problems that fall into the above-mentioned conditions. Persistent homology was introduced heuristically by computer scientists about fifteen years ago, but in the last decade TDA has had vigorous development both in theory and in applications, primarily through multidisciplinarity involving mathematicians, statisticians, computer scientists and experts in each domain.

Graduate Program –

CHEMICAL ENGINEERING (33001014006P1)

Capes evaluation (2017 evaluation grade) - 7

Justification-

Contributing for 36 years to the training of professionals at Master's and Doctoral levels and acting at the frontier of knowledge, the Graduate Program in Chemical Engineering (PPGEQ-UFSCar) has maintained the score 7 in the last evaluations by CAPES. With a physical infrastructure composed of the Laboratory of Agroenergy (EMBRAPA Instrumentation - Sao Carlos) and 20 laboratories located in the Department of Chemical Engineering at UFSCar, including a recently completed research facility (FINEP CT-INFRA resources), the PPGEQ houses 24 research groups registered in CNPq directory, led by program professors, who develop projects in 6 research areas (Environmental Control, Biochemical Engineering, Heterogeneous Chemical Reactors and Catalysis, Simulation and Control of Chemical Processes, Particulate Systems and Thermodynamics and Separation Processes) (FAPESP 2016 / 10.636-8), and by companies such as Petrobrás, Braskem and Arcelor Mittal. The insertion in the theme "Strategic Materials" takes place through 10 proposals of international cooperation with 9 strategic countries. The use of nanotechnology for the synthesis of chemical and enzymatic catalysts and nanofibers with bactericidal action for air filtration (subtopic "Nanoscience and Nanotechnology"); the development of innovative processes for the control of pollutants, the generation of energy from biomass and plastics, the production of methanol from CO2 and the desalination of water (subtopic "Materials for Energy" and "Innovative Processes"); the production of 3G fuels, esters, surfactants and nano-cellulose from renewable resources (subtopic "Biomaterials and Renewables") supported by simulations via Virtual Biorefinery (subtopic "Modeling and Computational Simulation") are some of the challenges proposed. With the renewal of 50% of the faculty at the Dpt. of Chemical Engineering in the last 5 years, the PPG-EQ UFSCar considers investments in Post-Doctoral studies in international institutions crucial for its expansion, incorporating young professors with quality preservation. Likewise, participation in the PRINT notice is considered essential to enable actions aimed at attracting young talents from abroad and establishing co-tutorship and joint degree agreements with partner institutions, ensuring the projection of PPG-EQ in the international scenario.

Graduate Program–

BIOTECHNOLOGY (33001014020P4)

Capes evaluation (2017 evaluation grade) - 4

Justification-

The Biotechnology Graduate Program plays a significant role in the national strategic area. The multidisciplinarity of PPGBiotec combines exact sciences, biological and health approaches, generating a skilled and capable professional in the national and international multidisciplinary market. Since 2004, PPGBiotec has enabled the training of professionals at the Master's and

Doctoral levels. PPGBiotec works at key points uniting knowledge areas and expanding and integrating them. The Program has excellent physical infrastructure composed by the Laboratory of Nanotechnology (EMBRAPA Instrumentation - Sao Carlos) and by more than 15 laboratories located in the Departments (Morphology and Pathology, Chemistry, Chemical Engineering, Genetics), and other HEIs such as USP, UNESP, UNIFESP. Another relevant point is the participation of HEIs abroad: Canada, Sweden, Germany, Russia, Portugal, Spain, among others. The PPGBiotec houses 15 research groups registered in CNPq directory led by program professors who develop projects in 5 research areas (Biotechnology Development for industrial processes and environmental protection; Development of biotechnological products; Biotechnology in silicon; Nanobiotechnology and Biotechnological Applications in Medicine). These lines culminate in research projects funded by development agencies (CNPq, FAPESP and CAPES), including a recent Petrobrás project. The insertion in the theme "Strategic Materials" takes place through 06 proposals of international cooperation with 5 strategic countries. The use of nanotechnology for the synthesis of nanofibers with bactericidal action for the air filtration (subtopic "Nanoscience and Nanotechnology"), in collaboration with PPGEQ; the development of innovative processes for the control of pollutants, the generation of energy from biomass (subtopic "Materials for Energy") are some of the challenges proposed. We emphasize that in 2016, PPGBiotec was the holder of the CAPES Thesis Award in Biotechnology. This demonstrates the quality of our students, being trained by our professors, with national and international recognition. Thus, the participation of PPGBiotec in the PRINT notice is vital to make possible institutional actions aimed at attracting young talents from abroad and the establishment of co-tutorship and joint degree agreements with the partner institutions, guaranteeing the projection of PPGBiotec in both national and international scenario.

Theme 2: INDUSTRY AND URBAN REVOLUTION - INDUSTRY 4.0 AND THE SMART CITIES

G**raduate Program –**

MATHEMATICS (33001014007P8)

Capes evaluation (2017 evaluation grade) - 4

Justification –

In the view of the Mathematics Graduate Program in Mathematics (PPGM) the subject in question is of great interest for several areas and the area of Mathematics is directly linked to the technological development, contributing with specific modeling or interpretation of mathematical methods related to the theme. Mathematics is particularly important in Industry and Engineering for theoretically supporting the physical models and computational experiments in these areas. More specifically, many physical laws are expressed mathematically in differential equations and, therefore, in the project of creating a car, for example, shape alterations result in changes in the aerodynamic behavior, from whose analysis one gets an indicator of the profits and/or losses in performance. The onboard computer of cars and other machines is, in itself, a result of diverse numerical assays developed from mathematical techniques. The ideal location for an airplane wing in relation to the hoof can be obtained through a mathematical simulation of the aerodynamics equations. This way, the time-saving in the initial conception of a product, or in a decision-making is clear, significantly diminishing the number of archetypes or models in reduced size to be constructed and assayed. Having said that, as in practice the theme is still incipient, mathematical modeling is one of the main approaches to work with Industry 4.0. PPGM has already been developing research within the context of sub-themes 1 and 2 - “Technological management and development for Industry 4.0” and “Operations management and innovation in Industry 4.0". Examples of such initiatives are studies of specific differential equations and of data analyses that shape some of the above-mentioned situations. PPGM considers that the main challenges for industrial development as well as the development of smart cities are multidisciplinary research involving mathematicians, statisticians, computer scientists, engineers and experts in each field. For example, the data analysis challenges arise when the problem is presented in a large volume of complex data. Topological data analysis, a recent theory developed by mathematicians and computer scientists, offers important prospects for visualization, interpretation, and analysis of complex data.

Graduate Program –

PRODUCTION ENGINEERING (33001014013P8)

Capes evaluation (2017 evaluation grade) - 5

Justification –

The Graduate Program in Production Engineering (PPGEP) understands that all operations management, including human, organizational, managerial and technological aspects, is and will

continue to be strongly impacted by the so-called "Industry 4.0". Many of the current forms of managing operations will stop existing or will change radically to adjust to the necessities of this new trend. Therefore, it is essential that researchers follow this revolution, registering it in their studies. Within the production engineering GP, the theme Revolution in industries and Cities – Industry 4.0 and Smart Cities has been already worked in collaboration with other national and international programs. More specifically, PPGEP has a series of research within sub-themes 1, 2, 3, and 4. Within sub-themes 1 and 2 "Technological management and development for Industry 4.0" and "Operations management and innovation in Industry 4.0", the research groups develop research focusing, for example, on the reduction of lead time, the strategies and Lean manufacturing tools, and the flow time reduction in Industry 4.0. Aspects of supply chain integration in the Industry 4.0 have also been studied in partnership with an international network (Supply Chain 4.0-https://supplychain4.org/), in partnership with universities in the United States, Canada, Italy, Portugal, and Sweden. Theme 3 "Work and society dynamics related to Industry 4.0 and Smart cities" is also studied in the context of PPGEP in partnership with Danish universities. Finally, aspects on sustainability and circular economy and their relations with Industry 4.0 (within sub-theme 4, “Sustainability, institutions and social conflicts related to Industry 4.0 and smart cities”) have also been investigated in cooperation with colleagues from French universities, with some positive results in important international publications. The PPGEP sees the integration of areas of knowledge in Industry 4.0 as the main challenge. The many aspects - human, technological, mathematical, computational, behavioral, environmental - must be studied jointly. This is exactly what is intended to be done within the scope of the present UFSCar research project, also developing a better internal interaction among the participating programs.

Graduate Program –

CHEMICAL ENGINEERING (33001014006P1)

Capes evaluation (2017 evaluation grade) - 7

Justification –

The insertion of the Graduate Program in Chemical Engineering (PPGEQ) in this subject is based on the concepts of Sustainability and Environmental Preservation as pillars of the fourth Industrial Revolution and the transformation of urban centers into Smart Cities. The PPGEQ hosts research groups with a long tradition and recognized competence in the development of technology for treatment and control of pollutants, as well as the application of knowledge in catalysis, electrochemistry and particulate systems for the environmental and energy areas. A multidisciplinary consortium among researchers belonging to three research areas (Environmental Control, Heterogeneous Chemical Reactors and Catalysis, and Particulate Systems) aims to contribute to the theme "Revolution in the industries and Cities – Industry 4.0 and Smart cities "(more specifically for sub-themes 1 and 6) with the challenge to develop technology for the use of waste for energy and fuel generation integrated to Environmental Control. Through the intensification of already established partnerships with centres of excellence

in priority countries (Spain, Canada, United Kingdom, USA, Switzerland, and France), the researchers consortium aims to develop technologies for: i) control of pollutants; II) thermal power generation from waste utilization; III) methanol production from CO2 by chemical and electrochemical processes, and iv) desalination of water by electrochemical processes. The results of these studies will contribute to the creation of future industrial and urban environments more sustainable and less polluted. Featuring laboratories as the Drying Center, the Laboratory of Catalysis (LabCat ®), the Environmental Technology Laboratory (LaTEA) and Environmental Control Laboratory, all equipped with excellent infrastructure and potential to attract young talents, the PPGEQ participation will allow the consolidation of international partnerships, reflecting on the establishment of co-supervision agreements and in a growing number of publications. In addition, the interest of young researchers from abroad in post-doctoral studies in Brazil and the participation of Brazilian students in sandwich doctorate programs at the partner institutions will contribute to the creation of a more internationalized environment in the research groups and to a greater insertion of the PPGEQ in the international arena.

Graduate Program –

STRUCTURES AND CIVIL CONSTRUCTION (33001014018P0)

Capes evaluation (2017 evaluation grade) - 4

Justification –

Civil construction is one of the industrial sectors that face the biggest challenges in adapting to Industry 4.0. While there are large contractors, users of digital technologies and machinery, there are also small and medium-sized enterprises that employ a significant portion of the workforce in the industry. The training characteristics of the workers and the form of contracting through subcontractors contribute to the need for permanent study of the work organization in this sector. In addition, the environmental and sustainability issues of the Smart Cities defined in the Sustainable Development Agenda 2030, which highlights water and sanitation, accessible and clean energy, and sustainable cities and communities, represent challenges that can be solved within the field of Civil Engineering. Currently, developers have been searching for sustainable products and processes in civil construction, strengthening the adoption of environmental certification seals, such as LEED (Leadership in Energy and Environmental Design). There are studies developed in the PPGECiv on these subjects: use of alternative sources of energy and use of rainwater in the buildings as ways of guaranteeing the habitability and urbanity in the cities. In the management line, the term “Construction 4.0” is adopted and includes the use of digital technologies for monitoring of works by means of RFID (Radio Frequency Identification), use of BIM (Building Information Modelling) for development of virtual projects, use of virtual/augmented reality, computer-aided design tools and others. Studies are also carried out on the workers' contracting modality in Brazil and in the world and the impact of outsourcing in the work organization. The construction industry complexity is recognized by researchers and professionals in the project development field. One of the challenges is the qualification for the

use of virtual reality to create virtual three-dimensional prototypes. An integration project with the University of Huddersfield, England is being developed through researchers at the Innovative Design Lab (http://www.hud.ac.uk/research/researchcentres/idl/), with PPGECiv and PPGCC, with the help of the Visualization, Immersion, Interactive and Collaborative Laboratory (LaVIIC).

Graduate Program –

COMPUTER SCIENCE (33001014008P4

Capes evaluation (2017 evaluation grade) - 4

Justification – Within this theme, the Graduate Program in Computer Science (PPGCC) considers the development of research in Computer Science and Engineering indispensable. Not only is the state-of-the-art development in Computing and support to other areas important, but also the training of qualified human resources to deal with the demand that will arise in the development of smart cities, and also for industrial development. Computer Science and Engineering is increasingly present in the daily routine of society and people's lives, being directly responsible for the development of the proposed theme. The PPGCC has always developed research directly related to the subject in question. Among the research developed are proposals for new computational models for automation and industrial control, manufacturing optimization, simulation of industrial processes. Directly related to the smart cities topic, some PPGCC research has direct application in the subject, for instance, research on Artificial Intelligence and Machine Learning applied to tasks such as independent navigation of Terrestrial Vehicles and Aircrafts (VANTS), Internet of Things, Biotechnology, Computer Vision, Illnesses Diagnosis, Natural Language Processing, Text Processing, Distributed Systems and Data Continuous Flow Treatment. Within these lines of research, there are partnerships with important national and foreign companies and universities. Among the partnering countries are Canada, England, U.S.A., Belgium, Portugal, Australia and Germany. The PPGCC considers that the main challenges for the development of smart cities as well as industrial development are to be found in research related to high-performance computing and Artificial Intelligence. Mathematical, computational and specific applications knowledge will necessarily be combined so that significant advances in the area of Data Science are obtained, aiming to improve the performance of institutions and people, together with sustainability, also dealing with social conflicts intrinsic to the process of urban and industrial development. This challenge is also tied to the immense amount of data that is generated continuously, which demands the development of new computational methods for discovering useful patterns in the data in performing predictive and descriptive tasks along with high-performance computing strategies.

Graduate Program –

URBAN ENGINEERING (33001014015P0)

Capes evaluation (2017 evaluation grade) - 4

Justification –

Current literature reports that 54% of the world's population lives in urban areas, a proportion that is expected to increase to 66% by 2050, according to a United Nations report. In addition to seeking to meet the demand for a labor market increasingly challenging and open to professionals with integrated knowledge, the PPGEU rescues the social role of professionals committed to the quality of life in cities. In this way, the PPGEU works in the development of solutions that integrate the urban subsystems. By the characteristics of the PPGEU, two lines of research have been established: Processes and Phenomena Applied to Urban Engineering, focused on the identification, analysis, monitoring, and modeling of the different processes and phenomena associated with the urban environment; and Management, Planning, and Technologies Applied to Urban Engineering, which seek to develop and evaluate the management tools of the city through the study of urban policies, programs and projects. In this sense, the PPGEU believes that its participation in relation to compliance with sub-item 6 is highly relevant: “Management, Planning and Technology in Urban Systems”. It is worth mentioning that some professors linked to the PPGEU have technical exchanges in the chosen subject area with research institutions from countries such as Ireland, Spain and Portugal, and since 2014 have received Graduate students from Latin American countries. In addition, PPGEU has joined the Education Alliance Program (EAP), with partners such as the Organization of American States (OAS) and the Coimbra Group of Brazilian Universities (CGBU). As a challenge, the PPGEU intends to strengthen the partnership with international reference institutions to attract researchers and promote a mobility of professors and students of the program. In this way, the project is expected to train human resources first, and subsequently to improve the existing infrastructure for research development, and as a consequence, to increase the number of publications in renowned international journals.

Graduate Program –

SOCIOLOGY (33001014025P6)

Capes evaluation (2017 evaluation grade) - 6

Justification – Originated from the experience accumulated during nearly two decades in the Graduate program in Social Sciences (PPGCS) at UFSCar, the post-graduate program in Sociology (PPGS) was created in 2007 and, since 2010, has been evaluated by CAPES with concept 6. In this proposal, the PPGS will act in the sub-themes "dynamics of work and society related to industry 4.0 and smart cities", and "sustainability, institutions and social conflicts related to the industry." This co-operation is justified by the important research history of the PPGS in the areas of dynamics and work transformation, digital sociology, and social-environmental conflicts and institutions. These themes are at the core of two of the three PPGS research lines: Social

Structure, Power and Mobility; and Urbanization, Ruralities, Development and Environmental Sustainability. In these lines, the research groups: Work and Mobility, NaMargem - Urban Research Nucleus, NEDJUS - Nucleus of Studies in Law, Justice and Society, GEVAC - Group of Studies on Violence and Conflict Management, and RURAS - Research Group on Ruralities, Environment and Society, have a prominent position in the sociology scenario, with consolidated international partnerships involving institutions from the United States, United Kingdom, France, Germany and Argentina. For the development of these sub-themes, the aforementioned groups will contribute with their accumulated experiences in qualitative and quantitative methodologies in social research for studies on sustainability and social-environmental governance, Digital Territories, public safety, management of urban spaces, new configurations of the working world, and citizen access to Justice institutions.

Graduate Program –
BIOTECHNOLOGY (33001014020P4)
Capes evaluation (2017 evaluation grade) - 4
Justification –

The Graduate program in Biotechnology (PPGBiotec), the first interdisciplinary program in UFSCar, aims to train human resources to induce and participate in the development of Biotechnology in the country in parallel with the implementation and consolidation of interdisciplinary scientific and technological research in Biotechnology. The PPGBiotec works in research directly related to the theme of this study. Among the research developed are those that propose new biological models (synthetic biology), physical (biophotonic applied to health), chemical (molecular docking) and computational models for industrial automation and control, manufacturing optimization, industrial processes simulation. Directly related to the theme Smart Cities, PPGBiotec research on Artificial Intelligence and Machine Learning, has generated patents, publications, and applications to tasks such as autonomous navigation of Terrestrial and Aerial Vehicles (VANTS), development of sensors and biosensors, Internet of Things, Biotechnology, Computational Vision, and Diagnosis of Diseases. Within these research lines, PGPBiotech partners with important national and foreign companies and universities. Among the partnering countries are Canada, England, U.S.A., Belgium, Portugal, Australia and Germany.

Graduate Program –
MATERIAL SCIENCE AND ENGINEERING (33001014004P9
Capes evaluation (2017 evaluation grade) - 7
Justification –

The Graduate Program in Material Science and Engineering (PPGCEM) at UFSCar is one of the pioneering and more traditional programs in Brazil, with an excellence level (CAPES grade 7) in all assessments. In the subject “Revolution in the Industries and Cities: Industry 4.0 and Smart

Cities", the PPGCEM has a research group in Additive Manufacturing. Studies carried out by the group are related to the manufacturing of complex geometric parts through laser selective melting of metallic alloys, by applying basic solidification concepts, physical metallurgy and phases transformation, mainly aiming at the elimination of critical defects generally obtained when conventional metallic alloys are used. These studies are conducted in collaboration with the Leibniz Institute for Solid State and Materials Research Dresden (IFW-Dresden) in Germany. The synergy between the PPGCEM/UFSCar's experience in processing and characterization of atomized powders and IFW's experience in additive manufacturing by selective laser melting will bring a qualitative leap in the development of new manufacturing processes.

Theme 4:
INTEGRATED TECHNOLOGIES FOR HEALTH: FROM PREVENTION TO REHABILITATION

Graduate Program –
BIOTECHNOLOGY (33001014020P4)
Capes evaluation (2017 evaluation grade) - 4

Justification –
This Program (PPGBiotec) is inserted in the sub theme of technological solutions for health. In PPGBiotec, for example, health-applied biosensors are developed to detect pathogens, to determine blood glucose levels, among others. In PPGBiotec there is intense use of Physics, Biological Engineering, Mathematics and Computing to develop biophotodynamic therapies. These therapies are already included in treatments used by the Brazilian Unified Health System (SUS". The PPGBiotec has partnerships with Universities in Canada (Toronto, Université de Montréal) to detect and use health-related bioactive molecules. Another relevant work is the development of dynamic, molecular docking and drug design as potent computer-aided inhibitors for native and mutant kinases. This insertion of PPBiotec in health can be observed in the developed works, such as new methods for development of recombinant vaccines, protein expression, development of systems for magnetic resonance imaging in medical treatments, therapeutic laser effects and other photodynamic therapies with *in vitro* and *in vivo* effects evaluation, protocols for bioterrorism and hospital biosafety, development of software that supports basic science or biological processes monitoring, establishment of methodologies for DNA analysis, *in vitro*, *in vivo* and *in silico* studies of compounds related to anti-inflammatory processes and diseases such as malaria, studies for the development and agriculture support, especially sugarcane, development of a pipeline for genomic and transcriptomic analysis based on web services, biocompatibility studies, magnetism, nanoparticles, controlled release of drugs, among several others. This variety of themes is made possible by the training of researchers and their laboratories in the application of 21st century issues, in a totally interdisciplinary way.

Graduate Program –

PHYSICAL THERAPY (33001014016P7)

Capes evaluation (2017 evaluation grade) - 7

Justification –

This Program (PPGFt) has started its activities in 1997, with the Masters course, created in 1996 and the Doctorate in 2001. Both courses were the first created in the area of physical therapy in the country. It is currently the only PPG in the area of Physical Therapy in the country with concept 7 in CAPES. The PPGFt was responsible for 280 masters and 180 doctorate defenses. Currently the program has 90 doctoral and 45 masters' students. The PPGFt has five lines of research: Motor Function and Biomechanical Analysis of the Human Movement; Basic processes, development and functional recovery of the nervous system; Cardiovascular and Respiratory Physiotherapy, Exercise Physiology and Functional Performance; Physiotherapeutic resources in pain, tissue repair and functional performance and health of the elderly. Of the professors accredited in the PPGFt, 55% has CNPq productivity grant. Another strong point of the PPGFT is its internationalization, the program's accredited professors develop scientific research in cooperation with several international researchers (University of Illinois at Chicago, University Degli Studi Di Milan, Italy, Marquette University, University of Quebec, University of Santander, University of Lund, University of Gävle, Virginia Tech University, McGill University, Aalborg University, Queens University, Monash University). These collaborations have resulted in various products such as scientific articles, student exchanges and participation in scientific events. Faculties' technical visits at foreign universities should also be highlighted for future partnerships. In the last two years, the PPGFt has received eleven international researchers who conduct research in partnership and ministered classes to enrolled students. Most PPGFt faculty has resources from development agencies, which reflects the impact of the scientific productions produced by the group. Currently, PPGFt has 17 research laboratories and several diagnostic and therapeutic equipment to support the lines of research related to the evaluation and intervention processes in the different life trajectories. PPGFt counts on national and international prominent researchers, with the support of CNPq and FAPESP funding, through regular grants and two Thematic projects. In view of the research already done, the excellent infrastructure of the program and of the international partnerships already consolidated, it is hoped to be able to increase the internationalization of the program.

Graduate Program –
CHEMISTRY (33001014005P5)
Capes evaluation (2017 evaluation grade) - 7
Justification –

The PPGQ has concept 7 in CAPES, having master's and doctoral degrees and a professional master's degree and 59 permanent professors who are professors of the Department of Chemistry - UFSCar and researchers of the “Empresa Brasileira de Pesquisa Agropecuária – EMBRAPA”. The research on health solutions is undoubtedly one of the lines consolidated in several groups of the PPGQ. In this perspective, one of the objectives of our professors is the search of new materials for use in diagnoses of diseases and new drugs for therapies. Of particular note are the projects of Prof. Alzir Batista in partnership with the University of Havana in Cuba and the research of Prof. Ronaldo Farai on devices for diagnosis of Alzheimer's disease. In this area, the CERSusChem projects are also a Center of Excellence for Research in Sustainable Chemistry in partnership with GSK (GlaxoSmithKline) and follow the model of the Program to Support Research in Partnership for Technological Innovation (PITE) and Research Centers, (CEPIDs) supported by FAPESP, to carry out long-term research, which enables the shared generation of knowledge in areas of common interest, with great potential for application of results. CERSusChem is dedicated to the research of sustainable chemical products and processes that can be used in the discovery and development of new medicines and aims to promote the development and effective use of sustainable chemistry and related technologies.

Graduate Program –
COMPUTER SCIENCE (33001014008P4)
Capes evaluation (2017 evaluation grade) - 4
Justification –

The development of technologies for the health care of the population is of paramount importance for the scientific, technological and human development of a society. Thus, PPGCComp evaluates that research in Computer Science and Engineering should be considered as the most important in the subject, supporting the areas of Medicine, Physiotherapy, Psychology, Gerontology, and Biological Sciences. As the age of the world population is currently increasing, new technologies must be developed for accident prevention, disease treatment, early diagnosis, and mobility. PPGCCom has several research closely related to the above topic. Among them, it can be highlighted researches related to the treatment of medical images, such as magnetic resonance imaging (MRI), for early diagnosis of Alzheimer's disease, and diagnosis and treatment of other diseases such as Parkinson's, Barrett's esophagus and diabetic retinopathy. In addition, computational models have been investigated for the study and understanding of biological characteristics that may lead to certain diseases or syndromes. Among these studies, there are

those related to Single Nucleotide Polymorphisms (SNPs), transposition elements (TEs), assembly of genomes, functional study of proteins, and the study of non-coding RNAs. New computational models involving artificial Intelligence, machine learning and computational vision are widely studied and proposed in the research developed in the department. Several challenges can be highlighted within this theme. Among them, it is possible to highlight the high amount of unstructured data that are produced within the health area, generating the need to extract patterns that may explain behaviors or diseases, in order to allow preventive measures to be taken. With the aging of the population, studies related to the perception of time in healthy or demented elderly, for example, will demand increasingly accurate computational models. Moreover, dementias such as Alzheimer's disease will become increasingly common along with population aging, and techniques involving computer vision and artificial intelligence will be of vital importance for early diagnosis and treatment.

Graduate Program –
PHYSIOLOGICAL SCIENCES (33001014037P4)
Capes evaluation (2017 evaluation grade) – 4

Justification –

PIPGCF has held international partnerships with different researchers from abroad (McGill University – (Canada), University of Alberta (Canada), National University of Córdoba (Argentina), University of Hull, University of Nottingham Purdue University, University of Barcelona (Spain), University of Valencia (Spain), University of Manchester (England), University of Quebec (Canada), Cancer Research Institute (Australia), Virginia Commonwealth University (USA), University of Study of Milna (Italy), specifically under the sub-theme "Chronic non-communicable diseases". PIPGCF has made efforts to develop strategies related to the theme of this proposal, for example: design and study of new antitumor and antimetastatic molecules for different types of cancer, including breast , prostate, cervix, among others; to the study of molecules involved in nitric oxide-dependent vasodilation mechanisms, atherosclerosis pathophysiology and cardiac hypertrophy, related to diseases such as endothelial dysfunction, atherosclerosis, cardiac hypertrophy, oxidative stress and hypertension; to carry out studies of the bone tissue, investigating its biomechanics, to better understand the mechanisms of some chronic diseases such as osteoporosis.

Graduate Program –
EVOLUTIVE GENETICS AND MOLECULAR BIOLOGY (33001014012P1)
Capes evaluation (2017 evaluation grade) –4

Justification – The PPGGEv is part of the proposed theme, with the area of concentration Biochemistry, Molecular and Structural Biology, in which research is carried out on isolation, characterization and functional studies of genes and proteins of medical-pharmaceutical and biotechnology interest. The line also includes biochemical and molecular studies of the adaptive responses of organisms to biotic and abiotic factors. The PPGGEv has an excellent research infrastructure and some faculty members develop research on human aging, with consolidated partnerships with the University of Oxford and University of Cambridge.

Graduate Program –
MATHEMATICS (33001014007P8)
Capes evaluation (2017 evaluation grade) – 4

Justification –

The prevention, diagnosis and early treatment of diseases are of fundamental importance in a society's health system. Mathematics is directly related to integrated health technologies. The PPGM search history can be seen through publications in international journals and in research projects. The projects currently in development in the PPGM are: Thematic Project - Algebraic, Geometric and Differential Topology that involves the subject Topological Data Analysis (TDA) and regular grant FAPESP research project - Existence, stability and asymptotic behavior of solutions for a family of non-linear evolution equations, which involves image analysis. Mathematics supports the construction of state-of-the-art equipment used for the prediction of various diseases, machines that process images of computed tomography (CT) scans by photon emissions.

Graduate Program –
CHEMISTRY ENGINEERING (33001014006P1)
Capes evaluation (2017 evaluation grade) – 7

Justification –

The insertion of the PPGEQ in this theme is based on the application of innovative technologies for air purification and the concepts of Systems Biology to obtain new drugs. Both proposals include connections particularly with the sub-theme "Technological solutions for health" and potential of synergy with other Graduate Programs of the Center of Biological Sciences and Health of UFSCar: development of technology for the purification of air using nanofibers with bactericidal properties and the production of biomolecules for pharmaceutical use by applying the

concept of "microbial factories". The proposed application of nanofibers with bactericidal properties explores the application of Systems Biology for the development of drug production platforms based on microbial cells. Involving 3 researchers from PPGEQ belonging to the research areas in environmental control and biochemical engineering and counting on the infrastructure of well-equipped laboratories (Laboratory of Environmental Control and Laboratory of Cellular Factories - LaFaC), these proposals intend to contribute to the improvement of the quality of life and health of the population. With partnerships already established with institutions in France and the United States, including the prestigious Institut Européen des Membranes and Rensselaer Polytechnic Institute, the participation in this proposal will allow us the consolidation of partnerships with the establishment of co-tutelary agreements, impacting the number of publications and in the creation of a more internationalized environment in the research groups by attracting young researchers from abroad who will perform postdoctoral studies in Brazil and the intensification of sandwich doctorate opportunities in partner institutions.

ACTIONS

Theme 3:
EDUCATION AND HUMAN PROCESSES FOR SOCIAL CHANGES

Goal: To develop and evaluate social, instructional and teaching methodological technologies

Action – Development and promotion of symbolic behavior on at-risk population
Start date - 2018 End date - 2022

Description –

This proposal intends: (1) to conduct advanced scientific analyses of basic processes involved in the relational learning and the emergency of symbolic behavior, and (2) to establish the basis for scaling solutions that contribute on the current challenges faced by teaching and rehabbing programs, developing innovative approaches that can be implemented in Brazilian schools. More specifically, it is intended: to develop or perfect teaching programs of reading and writing (with visual alphabet and braille), second language, math, music and social competences; to improve the efficiency, efficacy, attractiveness and motivational value of the teaching programs; to disseminate teaching program in experimental classrooms, regular schools, particularly in areas/institutions with low-rate performances in national exams. To accomplish such objectives, it will be necessary to recruit and qualify, on undergraduate, graduate and postdoctoral levels, young and promising researchers under full dedication to the initiatives of thematic research of the project, as well as perfecting current team-members competences. The step-by-step interactions (course offering, missions, internships abroad, foreign researchers' visits to UFSCar and adding of young researchers with international experiences) will allow to establish, expand and/or perfect team competences at scientific research projects, at experimental development and evaluation of efficacy of teaching programs and modules for different purposes and targets, and for interlocution on international levels. Causing no harm to the inclusion of other possible local participants, this proposal will rely on, for its implementing, the infrastructure of INCT-ECCE, hosted at UFSCar, that integrates faculties of this institution and eight other Brazilian universities (USP, UNESP, UFAL, UFMG. UFMT, UFA, Unb and UCDB) and foreign universities (UMMAS and UNC-Wilmington, USA; Uminho, Portugal; Graz University, Austria; and UNC, Argentina). These various laboratories master different processes and technologies; their collaborative action will be able to substantially expand the range of teaching-aimed developments, while transferring knowledge to each other, enhancing also national and international team competences.

Action Indicators

Type	Indicator	Current situation	2nd-year Goal	Final goal
Quantitative	Publishing papers in journals (total)	0	4	8
Quantitative	Associated master's thesis	0	3	6
Quantitative	Publishing papers in journals, with foreign researchers as co-authors	0	2	4
Quantitative	Developed and evaluated teaching programs	0	1	2
Quantitative	Associated projects of scientific initiation	0	2	4
Quantitative	Associated doctorate thesis	1	1	1
Quantitative	Oral presentations in international scientific conferences	2	6	12

Action – To develop a data bases for great amount of information related to remote application

Start date - 2018 **End date - 2022**

Description –

The application of large scale teaching programs needs analysis of great amount of information, which is possible due to computational advance resources. That justifies funding for the development of team competences to accomplish the compilation and the specification of requirements (for the use of computational professionals), to design the most appropriate types of analysis for this level of action and for the competent use of databases, when available. The interactions with colleagues from the area of computation, linguistics, and with specialists in program evaluation (in Brazil and abroad) is critical for the purpose of this action. In this sense, this action aims at planning and developing structured databases to promote efficient recovery of data and facilitate its mining. Developing mechanisms of search capable of recovering data and generating adequate reports to diverse research purposes and to operationalization of the application of teaching programs. Developing the application of data mining algorithms, aiming at generating knowledge that might contribute to the scientific exploration and to the improvement of the teaching programs. The data recovery in several points of view is essential to evaluate the efficiency of teaching programs applied in different versions and to different subjects. A well-planned database facilitates its mining and allows the knowledge generation. Besides the funding

in computational infrastructure, it is important the development of team competences to do the survey and the specification of requisites to design the most appropriate types of analysis for this level of action and for the competent use of databases and the knowledge produced by the mining action.

Action indicators

Type	Indicator	Current situation	2nd-year Goal	Final goal
Qualitative	Identify actions to improve the institutional conditions of the graduate programs according to the level of internationalization	average	good	high
Quantitative	Publishing papers in journals, with foreign researchers as co-authors	0	2	4
Quantitative	Oral presentations in international scientific conferences	2	6	12
Quantitative	Developed and evaluated teaching programs	0	1	2
Qualitative	Improvement and expansion of programs for teacher and family education	median	good	high
Qualitative	To develop measures of monitoring and production of indicators	median	good	high
Qualitative	To promote forums of discussion for analysis and insertion of research themes	median	good	high
Qualitative	To outline goals for innovation and research in internationalized themes	median	good	high
Qualitative	Level of consolidation of the international relations in the programs involved	median	good	high
Qualitative	Detailed studies of the production of the areas	median	good	high
Qualitative	To increase position of UFSCar in evaluation rankings concerning the elements of internationalization	median	good	high

Action – Teachers' and family members' qualification, aiming at promotion of oral language

Start date - 2018 End date - 2022

Description –

The efficient learning as instrument of citizens and scientists education requires a radical change on the traditional teaching manners that have shown themselves inadequate to the social demands. Education through science, uses of the technology and production of information depend on education of multiple generations, from primary school to higher education and professionalization. In order to achieve this objective, it is fundamental to ensure well-qualified initial and continued education of teachers, adding the experience to hybrid learning environments. To qualify faculties and students for the use and production of teaching and learning technologies and methods aimed at teachers and family members education, pursuing the promotion of oral language, based on the theoretical assumptions and scientific evidence produced by faculties from UFSCar Psychology Graduate Program (PPGPSi) and Special Education Graduate Program (PPGEEs) and the Educational Psychology Sector of the Barcelona University (UB), through formal agreements between both universities, have been dedicating on the study of the necessary conditions for oral language promotion (or gestural, as the sign languages case). To accomplish it, there has been an endeavoring on developing qualification activities, directed both for parents and active teachers at basic, primary and special education and kindergarten. Qualification activities also involve applications development with support system to decision-making, aimed towards the use of continued education of teachers, in loco. The realization of short-term courses and internships, as well as missions and foreign researchers' visits and short-term courses will be able to favor this qualification action of the academic and external community, with further intentions of expanding the use and production of technologies that may contribute with the improvement of oral language teaching since primary school and throughout all the stages of education. The importance of the competence in oral language lies on, also, its relationship with written language, especially regarding to text comprehension, on which all academic learning relies.

Action indicators

Type	Indicator	Current situation	2nd-year Goal	Final goal
Quantitative	Oral presentations in international scientific conferences	2	6	12
Quantitative	Associated master's thesis	0	3	6
Quantitative	Publishing papers in journals, with foreign researchers as co-authors	0	2	4
Quantitative	Associated doctorate thesis	1	1	1
Quantitative	Developed and evaluated teaching programs	0	1	2
Quantitative	Publishing papers in journals (total)	0	4	8
Quantitative	Associated projects of scientific initiation	0	2	4

Goal: Expand the equity in the access to education and knowledge

Action-

To perform studies to subsidy policies for overcoming of inequality, ethnic-racial relations, gender, sexuality, social classes, accessibility and people with special needs issues

Start date - 2018 End date - 2022

Description –

The new national setups have resized the thinking on the field of international studies regarding nation setups. Elements that once fundament the national identities are now being reshaped and, in the field of social and applied research, inserted in new themes that seek to comprehend countries internal social dynamics and articulate them with the understandings about internalization and globalization. Such dimensions require the revision of assumptions that base public policies within the countries that face issues regarding new familiar compositions, migration, public safety, access to justice, etc., that require the creation of integrated solutions for the promotion of competitivity and innovation with assurance of maintenance of basic assumptions of equity, citizenship diversity, i.e human rights. In developing societies such matters impose the challenge of developing universalist and redistributive-wise policies that represent the culture diversity of peoples. On the regards of globalization, it is fundamental the exchange of well-succeeded experiences that may form bridges between different cultures that promote and

cherish diversity. On that note, the field of education is productive for its provision of debates that subsidize curricular changes minding different contexts with promotion of affirmative actions to subordinated segments. To exemplify, in 2016, UFSCar engaged in agreements attached to the Abdias do Nascimento Academic Development Program, which objective is providing and encouraging education and qualification for students who have self-declared themselves as black, brown, indigenous and students with disabilities, or global disorders to the development and highly-skilled, for higher qualification in research and teaching institutions in Brazil and abroad. Measures like that represent an important shift on the regards of allowing the questioning of scientific-academic knowledge, enabling a dense production of new epistemologies allied to plural experiences.

Action indicators

Type	Indicator	Current situation	2nd-year Goal	Final goal
Quantitative	Oral presentations in international scientific conferences	2	6	12
Quantitative	Associated master's thesis	2	3	6
Quantitative	Publishing papers in journals, with foreign researchers as co-authors	0	2	4
Quantitative	Associated doctorate thesis	1	1	1
Quantitative	Developed and evaluated teaching programs	0	1	2
Quantitative	Publishing papers in journals (total)	0	4	8
Quantitative	Associated projects of scientific initiation	0	2	4

Action-

Production of Qualitative and Quantitative instruments of analysis of social inequalities in the access to knowledge.

Start date - 2018 End date - 2022

Description –

The classic sociological theme of social differentiation and economic inequalities has been refined through the last decades incorporating reflections upon national, religious, ethnic-racial, gender

and sexual identities. Besides the investigations based on field research and statistics, the cultural production has also revealed as important means of analysis to the understanding of social mechanisms of creation and reproduction of exploitation, marginalization and subordination of specific social groups. The studies from this field focus on the social inequalities through socioeconomic bias, as well as the ones that reflect other forms of subordination of groups and cultures: the reproduction of inequalities by means of current ethnic-racial relations, gender relations and social reproduction, besides the social processes of subordination and control of stigmatized social identities, such as politically minority groups and people with special needs. This action aims at consolidating the participation of researchers (faculties and graduate students) in the international debate about the contemporaneous markers of social inequality that affect the access to institutional formal knowledge – notably, the ethnic-racial, gender, sexual, social class, accessibility, age, generation and intergeneration markers. In this range, the justification to this action lies on the permanent need of dialogue among researchers from international centers that debate those varied faces of social inequalities, that also restrain the access to formal education and to institutional knowledge. The intention is to potentialize the interlocution with foreign institutions dedicated to this theme by means of establishing visits and short-term courses at UFSCar.

Action indicators

Type	**Indicator**	**Current situation**	**2nd-year Goal**	**Final goal**
Quantitative	Associated projects of scientific initiation	0	2	4
Quantitative	Publishing papers in journals, with foreign researchers as co-authors	0	2	4
Quantitative	Associated master's thesis	2	3	6
Quantitative	Associated doctorate thesis	1	1	1
Quantitative	Oral presentations in international scientific conferences	1	6	12
Quantitative	Developed and evaluated teaching programs	0	1	2
Quantitative	Publishing papers in journals (total)	1	4	8

Action - Training of faculties and students for developing of attention-wise teaching programs to target individuals from Special Education field

Start date - 2018 End date - 2022

Description –

These actions aim at training faculties and students to identify, develop and conduct services to highly-skilled students and students with disabilities, or global disorders on development, aiming at encouraging and potentializing their know-how and creating conditions for teaching skills, based on theoretical assumptions and scientific productions on the regards of different theoretical streamlines. The studies of higher abilities, for instance, show an urgency on developing actions to overcome barriers that obstruct or disturb the acknowledgement of higher abilities in the context of educational conceptualization, identification, and attention in different countries. There is, therefore, an operational difficulty that is translated, in parts, into the difficulty of acknowledging higher abilities while enhancing them. This area requires the elaboration of thematic inquiries which objective is to formulate strategies that may enable independence of the target audience of special education and their social insertion. The main objective of these proposals is the planning and the evaluation of curricula that seek to attended individuals' necessities. The partnerships with researchers from different countries contribute to the expansion of the analyses of different realities and variables and favor the development of strategies that contribute to the qualification of human resources and to collaborative research projects amongst national and international teams.

Action indicators

Type	Indicator	Current situation	2nd-year Goal	Final goal
Quantitative	Publishing papers in journals, with foreign researchers as co-authors	0	2	4
Quantitative	Publishing papers in journals (total)	0	4	8
Quantitative	Oral presentations in international scientific conferences	2	6	12
Quantitative	Associated master's thesis	0	3	6
Quantitative	Developed and evaluated teaching programs	0	1	2
Quantitative	Associated doctorate thesis	1	1	1
Quantitative	Associated projects of scientific initiation	0	2	4

Goal: Formulate policies to the educational organization and social inclusion.

Action: Strengthen the international exchange in the investigations about childhood, basic and higher education, considering the educational politics with historical, sociological and philosophical focus.

Start date - 2018 **End date - 2022**

Description – It is fundamental to create conditions to the production of dialogues and elaboration of proposals that expand the possibilities of internationalization that insert educational policies in international themes, that promote the public diversity assisted by mobility policies, of the production of debate from internationally informed research, aiming at generating global citizens. Thus, it is crucial to offer support to count on professionals with specialized experience, whose goal is the formation to act in a global, interdependent, multicultural and plurilingual world. The extent of an effective educational policy is measured by its articulation with the values that support it. This action proposed the development of research related to childhood, basic education and higher education which focus on the realities of the countries. Therefore, it is fundamental to know the philosophical, sociological and historical bases that rule the educational policies in different national contexts and once put into dialogue they prioritize the regional diversity.

Action indicators

Type	Indicator	Current situation	2nd-year Goal	Final goal
Quantitative	Publishing papers in journals (total)	0	4	8
Quantitative	Oral presentations in international scientific conferences	2	6	12
Quantitative	Associated master's thesis	2	3	6
Quantitative	Associated doctorate thesis	1	1	1
Quantitative	Developed and evaluated teaching programs	0	1	2
Quantitative	Publishing papers in journals, with foreign researchers as co-authors	0	4	8
Quantitative	Associated projects of scientific initiation	0	2	4

Action- Developing models of analysis in compared education for the promotion of international curricula

Start date - 2018 **End date - 2022**

Description –

There is a progressive interest in the articulation of curricula and their internationalization in the field of theory and practice. Such attraction has been incorporated to the demands of institutional agendas that orbit around the indications of international agencies. It is known that some themes are on the agenda because they come from a debate in the international agencies once they search for answers to challenges in the nations. There is also a more consistent understanding that the internationalization is a result from the difference of visualization of nation and national identity conceptions from which the frontiers become fluid among the social-economic and cultural exchanges. Such issues are proposed in the field of compared education that currently acquire new outlines with the questions related to the shifting of the global to local gravity centers. The issues related to other epistemologies, of the Global South, post-colonial, decolonial, cultural, subordinate studies have been relevant to new contexts. There is a need of holistic and multifaceted analysis, in the field of research in compared contexts and we must observe the bases of formulations of public policies and the indications of internationalized agencies. The debate about the migrations is inserted in this context once there is a claim that migration is a human right. The fundamental and historical bases under the conception of humanity and rights to everyone have been called inside the life conditions and the child, young and adult development. In this way, further studies that would allow the construction of an internationalized curriculum are fundamental to expand the proposals. This action, therefore, sustains activities in order to know different curricula from the educational institutions creating conditions that allow experiences, learning abilities and results in local and global scope.

Action indicators

Type	Indicator	Current situation	2nd-year Goal	Final goal
Quantitative	Associated master's thesis	2	4	8
Quantitative	Associated projects of scientific initiation	0	2	4
Quantitative	Oral presentations in international scientific conferences	2	6	12
Quantitative	Associated doctorate thesis	1	1	1
Quantitative	Publishing papers in journals, with foreign researchers as co-authors	0	4	6
Quantitative	Publishing papers in journals (total)	0	4	8
Quantitative	Developed and evaluated teaching programs	0	1	2

Action: Knowledge production in the social politics field

Start date - 2018 **End date - 2022**

Description – The understanding that the sphere of the universalization of rights is a dominant way of citizenship constitutes the motto of the discussion of this action. The groups formed by figures emerging from activity and work, concerning the social politics or articulated with them, from the repression to the social assistance and inclusive education, are part of the discussions with other configurations of moral formalization (religious, politics, social), where multiple forms are articulated. The production of knowledge and its dissemination by means of diffusion of results in the studied universes, particularly in the field of social politics, aims at contributing with the public debates and promoting the decision-making, to expand the contexts and audiences to be reached. Thus, the public policies which are oriented to the administration of the social issue and the decrease of poverty are sometimes separated from the implementation of the work policies. To overcome this impasse, Brazil and France have developed social and political processes that question the work regulation, realized as a barrier for the productivity. We understand that the logics of globalization lead to social-historical processes hierarchically differentiated and the results are predominantly heterogeneous. In this scenario, the proposal aims at comparing the interrelations among social protection, education, employment and citizenship. The perspective in comparison allows to emphasize the similarities and differences between contexts with

“educational cultures”, "wage cultures" and distinct forms of collective organization, as well as their effects in the production of hybrid processes targeting a new configuration of work-capital relations. The partnership among researchers from UFSCar and the National Conservatory of Arts and Crafts and the Interdisciplinary Laboratory of Economic Sociology presents as a work proposal to understand the changes in the articulations between educational policies and social policies.

Action indicators

Type	Indicator	Current situation	2nd-year Goal	Final goal
Quantitative	Presentations in international scientific conferences	2	6	12
Quantitative	Publishing papers in journals (total)	0	4	8
Quantitative	Associated doctorate thesis	1	1	1
Quantitative	Associated master’s thesis	2	4	8
Quantitative	Associated projects of scientific initiation	0	2	4
Quantitative	Developed and evaluated teaching programs	0	1	2
Quantitative	Publishing papers in journals, with foreign researchers as co-authors	0	4	6

Goal: Promote diversified actions of scientific dissemination

Action: To improve the process of faculty’s and student’s formation in interdisciplinary themes related to Science, technology and society

Start date - 2018 End date - 2022

Description –

Reflections upon the promises and prospections that Science and Technology would generate well-being, freedom, equity, autonomy and dominance of time and space surrender to a growing concern with the social and environmental risks, originated from scientific and technological processes of the 21st century. In this way, it is important the advancement of the area of Science and Technology through the axes of economic and technological development, as well as through the social and environmental risks and benefits that must be widely disseminated. To understand the impacts of science and technology through economic, professional, educational, social and

institutional spheres of the contemporary society, it is necessary to deepen the knowledge about the relations of science, technology and society as an interdisciplinary research area shared by several courses. The social, educational and cultural asymmetries also lead to a low comprehension by the society about science and technology, their impacts and utilization in their lives. Because of that, it is relevant for the society and for the organizations the formation of researchers, faculties and professionals with a better comprehension of the inter-relations between science, technology and society, to contribute to the solution of economic, social and environmental contemporary challenges. Thus, it is imperative to create opportunities to deepen partnerships and intensify the interdisciplinary scientific production, in little explored areas of the relation among science, technology and society.

Action indicators

Type	Indicator	Current situation	2nd-year Goal	Final goal
Quantitative	Publishing papers in journals (total)	0	4	8
Quantitative	Associated master's thesis	1	3	6
Quantitative	Publishing papers in journals, with foreign researchers as co-authors	0	2	4
Quantitative	Associated doctorate thesis	1	1	1
Quantitative	Associated projects of scientific initiation	0	2	4
Qualitative	Systematic analysis of internationalization activities	median	good	high
Qualitative	To outline goals for innovation and research in internationalized themes	median	good	high
Quantitative	Oral presentations in international scientific conferences	2	6	12
Qualitative	Improvement and expansion of programs for teacher and family education	median	good	high
Qualitative	To promote forums of discussion for analysis and insertion of research themes	median	good	high
Quantitative	Developed and evaluated teaching programs	0	1	2
Qualitative	Associated projects of scientific initiation	median	good	high
Qualitative	Detailed studies of the production per area	median	good	high
Qualitative	To develop measures of monitoring and production of indicators	median	good	high
Qualitative	To increase position of UFSCar in evaluation rankings concerning the elements of internationalization	median	good	high
Qualitative	To identify actions to improve the institutional conditions of the graduate programs according to the level of internationalization	median	good	high

Action: To create opportunities to reinforce partnerships and intensify the interdisciplinary scientific production in little explored areas related to Science, technology and Society.
Start date - 2018 End date - 2022

Description –

The world tendency points to a more intensive use of communication and information technologies. These technologies impact the process of formation, independently from its focus on teaching, in research and professional development. Recent studies point out that 85% of the professions in 2030 have not been invented yet according to Dell Technologies studies, in partnership with the Institute for the Future (IFTF, The Next Era of Human-Machine Partnerships, 2017). A significant part of these professions will come from the intense changes in the technology, which will require a plural formation, where professionals not only accumulate knowledge, but also know how to potentiate it as well as acquire it in different situations. The use of the Internet of Things, Big Data aiming Algorithm governing will be fundamental. Although understanding we live in a hyperconnected Society, in Brazil only 57,8% of the houses have access to Internet. This number is different from the considered developed countries, that achieve 83,8%, according to the ICT Facts and Figures 2016 research, carried on by the agency of the Organization of United Nations (ONU) for information technologies, the ITU. Although the use of Internet has grown up, this is due to portable equipment, whose use is predominant in women, young people from 15 to 24 and people with higher income. These data are capitalized by the increase of school process, once the more years of study, the greater access to Internet. The moment demands a direct effort in the investment in knowledge to digital natives, giving opportunities to the formation in digital technologies, innovation ecosystems, collaborative use of intellectual property, cyber safety to attract talents as well as endeavor substantial changes in the innovation of teaching methods that consider abilities as communication, creativity, collaboration, adaptability and resilience, among others. This formation must have critical thought, whose base could be built in the diversity with equity, with the development of social abilities, committed with ethics.

Action indicators

Type	Indicator	Current situation	2nd-year Goal	Final goal
Quantitative	Publishing papers in journals (total)	0	4	8
Quantitative	Developed and evaluated teaching programs	0	1	2
Quantitative	Associated doctorate thesis	1	1	1
Quantitative	Publishing papers in journals, with foreign researchers as co-authors	0	2	4
Quantitative	Associated master's thesis	1	3	6
Quantitative	Associated projects of scientific initiation	0	2	4
Quantitative	Oral presentations in international scientific conferences	2	6	12

Goal: To create conditions to the elaboration of new epistemologies in Human Sciences for the formation of new scientists

Action: To consolidate research with different epistemologies for teachers' formation
Start date - 2018 End date - 2022

Description – The contemporary debate in the field of education points to the limits of the Western epistemological suppositions. Such debates mention the need of expanding the structures of thought which are geographically and historically guided. In this way, the contemporary premises defend the expansion fo the educational epistemologies, pedagogical theories, educational practices, evaluation and elaboration of didactic material and educational processes in the teacher's formation for children, young adults and adults, as well as education for environmental sustainability. The research area in teacher formation is already internationalized. Research projects in human sciences at UFSCar have international partnership and knowledge production well established. This action aims at developing comparative studies among different epistemological conceptions and practices for the teacher's formation. Knowing the policies applied in different countries for the educational professional formation would allow the theoretical bases to sustain new educational practices and policies internationally.

Action indicators

Type	Indicator	Current situation	2nd-year Goal	Final goal
Quantitative	Publishing papers in journals (total)	0	4	8
Quantitative	Presentations in international scientific conferences	1	6	12
Quantitative	Associated master's thesis	2	3	6
Quantitative	Publishing papers in journals, with foreign researchers as co-authors	0	4	6
Quantitative	Associated doctorate thesis	0	0	2
Quantitative	Developed and evaluated teaching programs	0	1	2
Quantitative	Associated projects of scientific initiation	1	2	4

Action: Formation of researchers for the dialogue of knowledge in social-environmental education

Start date - 2018 **End date - 2022**

Description –

This action aims at preparing faculties and students to alterations in the disciplinary paradigm that marked the dominance of Western societies upon the nature in the 20th century to inter, multi and transdisciplinary perspectives. Notedly, one of the most important contributions to the environmental issue nowadays concerns its calling to the dialogue (or ecology) of knowledge. This dialogue emerges when crossing the identities in environmental complexity. It is referred to the importance of the cultural diversity in the construction of a different policy, mobilizing the social agents through the differentiated and sometimes opposite senses of sustainability. In this scenario, this action is justified by the contribution that human sciences could bring to the them of diversity in social-environmental education, emphasizing the plurality and the complexity of phenomena and processes that mark the social appropriation of nature. We intend to provide international mobility to faculties and students, and the execution of missions and visits from foreign researchers, in order to expand the contributions of these studies in social-environmental field for the formation of new scientists, attentive to modern environmental challenges.

Action indicators

Type	Indicator	Current situation	2nd-year Goal	Final goal
Quantitative	Publishing papers in journals, with foreign researchers as co-authors	0	2	4
Quantitative	Publishing papers in journals (total)	1	4	8
Quantitative	Oral presentations in international scientific conferences	2	6	12
Quantitative	Associated doctorate thesis	1	1	2
Quantitative	Developed and evaluated teaching programs	0	4	6
Quantitative	Associated master's thesis	0	3	6
Quantitative	Associated projects of scientific initiation	0	2	4

Action: To consolidate and expand the internationalized debate of philosophical, linguistic and educational premises

Start date - 2018 **End date - 2022**

Description –

In the last years, there has been a significant increase of international circulation of Brazilian philosophical, linguistic and educational production, frequently being constituted as reference to the foreign research. This level of international insertion is, however, unequal depending on the research subarea. In Philosophy, for example, because of several reasons, the process of internationalization for researchers from the area of logic was precocious. Generally, in the other areas of Philosophy research, this process is slower. In the Linguistics area, though, the discussions about the implications of the non-exhaustive knowledge of peculiarities of the phenomena of Brazilian Portuguese have been potentialized. Being the 7th most spoken language in the world, the actions aiming at the internationalization of its study are imperative. The task, therefore, consists of reinforcing the partnerships already consolidated (and strengthening those in construction) by spreading, in a foreign language, the Brazilian contributions to the philosophical, linguistic, political and educational themes in oral presentations, courses and publications. The joint organization of research activities in foreign language, abroad or in Brazil, and their dissemination through articles, compilations and books would have as an effect, not only increasing the visibility of national production, but also intensifying the cooperation

among Brazilian and foreign researchers, expanding the groups of foreigners who could contribute to the current investigations.

Action indicators

Type	Indicator	Current situation	2nd-year Goal	Final goal
Quantitative	Scientific initiation projects related	1	2	4
Quantitative	Associated doctorate thesis	0	0	2
Quantitative	Presentations in international scientific conferences	1	6	12
Quantitative	Publishing papers in journals (total)	0	4	8
Quantitative	Associated master's thesis	2	3	6
Quantitative	Developed and evaluated teaching programs	0	1	2
Quantitative	Publishing papers in journals, with foreign researchers as co-authors	0	4	6
Quantitative	Associated master's thesis	2	3	6
Qualitative	Improvement and expansion of programs for teacher training and relatives	median	good	high
Quantitative	In-depth production studies by area	median	good	high
Quantitative	Degree of relationship consolidation the programs involved	median	good	high

Action: To create conditions for the preparation of new epistemologies in the sciences human rights for the formation of new scientists

Action: Consolidate surveys with different epistemologies for teacher education

Description –

To train faculties and students to the contemporary debates about post-normal science and the frontier references that unveil the epistemic geopolitics in the knowledge production. Different research groups in the human and social applied sciences areas of UFSCar have been approaching from the analytical advancements carried out by new epistemologies, among them

the so-called post-colonial perspective. One of the fundamental suppositions of this perspective is that the construction of scientific modern knowledge is linked to a process that must be identified, in space and time, as occidental. This process places the industrial liberal Society as the most advanced expression of the historical process, establishing a universal norm, a reference that classifies all societies as subordinate and obsolete. Because of its universal construction from the European historical experience, the categories of comprehension of this society converge in the only valid, objective and universal forms of knowledge. Historical categories such as economy, State, civil society, market and class are taken from their political roots and changed into universal analytical axes for any social reality. Thus, the analytical confrontation of these contemporary issues is important to the constitution of programs of excellence. We intend to provide international mobility to faculties and graduate students, by means of courses and internships abroad, and the execution of missions and visits from foreign researchers and short-term courses at UFSCar, in order to consolidate this debate at the frontier in the programs.

Action indicators

Type	Indicator	Current situation	2nd-year Goal	Final goal
Quantitative	Developed and evaluated teaching programs	0	1	2
Quantitative	Publishing papers in journals (total)	1	4	8
Quantitative	Associated projects of scientific initiation	2	2	4
Quantitative	Associated master's thesis	1	3	6
Quantitative	Associated doctorate thesis	1	1	1
Quantitative	Presentations in international scientific conferences	2	6	12
Quantitative	Publishing papers in journals, with foreign researchers as co-authors	0	2	4

Action: Disseminate models of knowledge allowing the access and popularization of diverse epistemologies formulated inside the university: the traditional peoples' contributions of knowledge

Start date - 2018 End date - 2022

Description –

From decades, research in humanities has been developing and improving contacts among the traditional and academic knowledge. This very distinction between academic and traditional knowledge have been discussed in several spaces. The fomalization and reflection upon the epistemologies and knowledge from indigenous peoples, for instance, reflect that debate. The institutional recognition of a particular indigenous school process, with differentiated structures and operations is indicative of the advancement accomplished in those debates. Such experiences have expanded and modified the production of knowledge, especially from the adoption of affirmation action policies which enable to spread knowledge produced in the universities. In this way, this action aims at improving the reception of students from diverse Brazilian social-cultural environment and allow their international mobility with faculty training, incorporation their knowledge actions, as well as their professional activities in the academic environment, for the formation of high-level professional groups to actions in their places of origin. The collaborative research projects among nations in which distinct traditional peoples live favor the exchange of knowledge of the local and global realities.

Action indicators

Type	Indicator	Current situation	2nd-year Goal	Final goal
Quantitative	Associated doctorate thesis	0	0	1
Quantitative	Associated master's thesis	0	2	3
Quantitative	Publishing papers in journals (total)	0	4	8
Quantitative	Developed and evaluated teaching programs	0	1	2
Quantitative	Publishing papers in journals, with foreign researchers as co-authors	0	2	4
Quantitative	Associated projects of scientific initiation	0	2	4
Quantitative	Oral presentations in international scientific conferences	0	6	12

Theme 5:

BIODIVERSITY, ECOSYSTEM FUNCTIONS AND SUSTAINABILITY

Goal: Consolidate, expand research networks and increase international visibility in this thematic through the mobility of students and faculty and attracting researchers from abroad.

Action- International insertion and dissemination of knowledge on "Biodiversity, ecosystem functions and sustainability"

Start date - 2018 **End date -2022**

Description-

Efforts to increase the international insertion and visibility abroad of the research carried out under the theme "Biodiversity, ecosystem functions and sustainability" are fundamental for the actions of attraction of young talents and senior researchers (see "Action 1"). Thus, PRINT / UFSCar resources will be used to enable a set of actions specifically to increase the visibility of PPGs. The holding of lectures in Institutions abroad by professors participating in work missions or long-term capacity building activities to publicize the available infrastructure in the laboratories and the opportunities for young doctors is one of the proposed actions. Likewise, the participation of researchers from PPGs on the theme "Biodiversity, ecosystem functions and sustainability" in overseas congresses will give preference to oral presentations and "keynotes" also with the intention of taking advantage of these opportunities for dissemination and diffusion of knowledge. Publication of the results of the research carried out in books and / or chapters of books and articles in indexed journals is another action proposed to promote the international insertion and the diffusion of knowledge.

Action indicators

Type	Indicator	Current situation	Goal 2nd year	Final Goal
Quantitative	Number of lectures or oral presentations abroad	25	38	45
Quantitative	Number of articles published in partnership with collaborators abroad	15	20	30
Qualitative	increase the interaction between academia and society	regular	good	high
Quantitative	Number of books / chapters published in partnership with collaborators abroad	18	24	32
Qualitative	increase the community's perception about the research carried out at UFSCar	good	excellent	high

Action- Development of technology at the frontier of knowledge

Start date - 2018 **End date -2022**

Description –

With the internationalization, by strengthening and expanding existing collaborations as well as by nucleating new research networks with institutions of excellence from abroad, the research of all PPG involved in the theme "Biodiversity, ecosystem functions and sustainability" will be raised, with a significant impact on the development of technologies and processes in the thematic, a strategic dimension that seeks, in an integrated and multidisciplinary way, the integral development of scientific and technological knowledge, capable of supporting priority actions for biodiversity conservation, sustainable use of natural resources, environmental health and human well-being, mitigation and adaptation to climate change.

Action indicators

Type	Indicator	Current situation	Goal 2nd year	Final Goal
Quantitative	Number of PDs coming from abroad	3	5	8
Quantitative	Number of articles published in partnership with collaborators abroad	25	35	45
Qualitative	increase the contribution of academia to solving national problems	regular	good	high
Quantitative	Number of doctoral students with sandwiches abroad	12	18	24
Quantitative	Number of lectures or oral presentations abroad	12	18	24
Qualitative	increase the potential for the generation of innovative technologies and strategies	regular	good	high
Qualitative	increase the interaction between academia and society	good	excellent	high
Quantitative	Number of visiting researchers from abroad	5	8	10
Quantitative	Number of teachers with PD abroad	6	10	15

Action - Team training and intensification of the internationalization of the research and of the graduate programs in Biodiversity, Ecosystem Functions and Sustainability.

Start date - 2018 End date -2022

Description –

Training of the global team, including teachers, students and technicians, who participates in the process of knowledge formation in "Biodiversity, ecosystem functions and sustainability" is fundamental for the expected progress to be made. In this sense, the following actions are proposed to foment the qualification: accomplishment of Post-Doctorates, Doctorate sandwiches and specialization in Institutions from abroad; participation of teachers in work assignments or exchange activities as visiting researchers in Institutions abroad. The construction of an internationalized environment in the research laboratories and the graduate programs is another requirement to intensify the insertion of the researchers (teachers and students) in the international academic scenario. In this way, the PRINT / UFSCar resources will be used to enable the following actions: attraction of young talents from abroad to perform post-doctoral studies in Brazil; short and long-term visits of senior researchers of recognized competence in different specialties, for the exchange of knowledge and establishment of partnerships for graduate student's supervision; offering lectures and courses by young talents and visiting researchers in English. The opportunities for international exchange, involving both the participation of Brazilian teachers in activities abroad and the presence of senior researchers in Brazil, will be used to establish joint supervision and double graduation program agreements, helping to consolidate the internationalization process.

Action indicators

#	Type	Indicator	Current situation	Goal 2nd year	Final Goal
1	Quantitative	Number of doctoral students with sandwiches abroad	10	15	20
2	Quantitative	Number of agreements of double graduation program and joint supervision	10	15	20
3	Qualitative	internationalized environment construction	median	good	high
4	Qualitative	increase the potential for the generation of innovative technologies and strategies	median	good	high
5	Quantitative	Number of visiting researchers from abroad	3	6	10
6	Quantitative	Number of lectures given by visiting professor	5	8	12
7	Quantitative	Number of courses offered in English	1	5	12
8	Quantitative	Number of courses offered by teachers from abroad	4	5	8
9	Qualitative	increase the interaction between academia and society	good	excellent	high
10	Qualitative	increase the contribution of academia to solving national problems	regular	good	high
11	Quantitative	Number of cooperation agreements	10	15	20
12	Quantitative	Number of doctoral students with sandwiches abroad	10	15	20
13	Quantitative	Number of PDs coming from abroad	3	5	7
14	Qualitative	improve team capacity in the development of innovative technologies	median	good	high

Theme 1:

STRATEGIC MATERIALS

Goal: To consolidate and expand research networks and to increase the international visibility in the area of Strategic Materials through mobility and international attraction of researchers

Action - Development of technologies at the frontier of knowledge

Start date -2018 **End date – 2022**

Description –

Along with the internationalization, by strengthening and expanding existing collaborations, as well as by nucleating new research networks with institutions of excellence overseas, the lines of scientific research of the UFSCar Graduate Programs on the theme "Strategic Materials" will be fostered, with a significant impact on the development of technologies, processes in the theme "Strategic Materials" and in the following subareas: i) Materials for energy: sensors, biosensors, electronic devices, solid electrolytes, electrodes, cathodes, fuel cells, semiconductors, water splitting, photovoltaic cells, use of waste to generate thermal energy; (ii) Nanoscience and Nanotechnology: polymer nanocomposites, nanostructured metal alloys, two-dimensional (2D) materials, nanowires, chemical catalysts, enzymatic and nanofilters, nanoparticles with synergism in antimicrobial bioactivity; iii) Biomaterials and Renewable Materials: bioactive materials, functional materials, functional packaging; natural polymers; biophotonics; v) Innovative processes: manufacturing of hybrid metal-polymer structures, newer and cleaner processing routes, real-time monitoring of polymer processing, new in-process catalysis materials, integrated process technologies for the treatment of liquid and gaseous effluents, laser micro-fabrication, bioreactors, metallic, polymer and ceramic powder compacting processes, manufacture of polymer composites for concrete reinforcement, cementitious composites with low consumption of cement and geotextiles; vi) Computational Modeling and Simulation: process automation, thermo-mechanical behavior modeling of materials, embedded systems, high-performance computing, statistical techniques of pattern recognition, parallel and reconfigurable processing.

Action indicators

Type	Indicator	Current situation	2nd-year Goal	Final goal
Quantitative	Number of patents	50	10	20
Quantitative	Number of products	10	15	20
Quantitative	Number of processes	10	15	20
Qualitative	To increase the potential of generation of technologies and innovative strategies	good	good	high

Action - International insertion and dissemination of knowledge in "Strategic Materials".

Start date -2018 End date – 2022

Description – Efforts to increase the international insertion and visibility of research carried out under the theme "Strategic Materials" are to attract young talents and senior researchers (see "Action 1"). Thus, PRINT/UFSCar resources will be used to enable a set of actions geared specifically to increase the visibility of UFSCar Graduate Programs in the international scenario. The holding of lectures in Institutions abroad by faculties participating in work missions or long-term capacity activities to unveil the available infrastructure in the laboratories and the opportunities for young PhDs is one of the proposed actions. Likewise, the participation of researchers from the theme “Strategic Materials” in conferences abroad will be made preferentially through oral presentations and keynotes, also with the intention of taking advantage of these opportunities for knowledge dissemination and diffusion. Publication of the research results conducted in books and/or book chapters and in the form of articles in indexed journals is another action proposed to promote international insertion and knowledge dissemination.

Action indicators

Type	Indicator	Current situation	2nd-year Goal	Final goal
Quantitative	Number of conferences or oral presentations abroad (current situation: 2017)	20	50	100
Quantitative	Number of books/chapters published in partnership with foreign collaborators (current situation: 2017)	3	5	10
Qualitative	To increase the academic interaction with society	good	high	high
Qualitative	To increase the community perception about the research projects at UFSCar	mediana	good	good
Quantitative	Number of published articles in partnership with foreign collaborators (current situation: 2017)	100	300	600

Action – Team training and intensification of the research internationalization and graduate studies in the theme "Strategic Materials".

Start date -2018 End date – 2022

Description –

The training of the team, including researchers, students and staff members, who participate in the process of knowledge formation in " Strategic Materials" is fundamental for the expected progress to be achieved. In this sense, the following actions are proposed to foster training: post-doctoral studies, sandwich programs for doctorate students, specialization in foreign institutions and faculties' participation in work missions or exchange activities as visiting researchers in institutions abroad. The construction of an internationalized environment in the research laboratories and the Graduate programs is another requirement to intensify the insertion of the researchers (faculties and students) and of the Graduate Programs themselves in the international academic scenario. In this way, PRINT/UFSCar resources will be used to enable the following actions: attraction of young talents from abroad to perform post-doctoral studies in Brazil; short and long-term visits of senior researchers of recognized competence in different specialties, aiming the exchange of knowledge and the establishment of partnerships in the orientation of graduate students; offering lectures and courses, including those ministered by young talents and visiting researchers, in English language. The opportunities for international exchange, involving both the participation of Brazilian faculties in activities abroad and the

presence of senior researchers in Brazil, will be used to establish joint supervision and double degree agreements, helping to consolidate the internationalization process.

Action indicators

Type	Indicator	Current situation	2nd-year Goal	Final goal
Quantitative	Number of foreign post-doctoral scholars and young talents	0	16	32
Quantitative	Number of EMI courses	15	20	30
Qualitative	Formation of internationalized environment	mediana	good	high
Quantitative	Number of cooperation agreements	5	7	10
Quantitative	Number of visiting foreign researchers	5	30	60
Qualitative	To increase the potential of generation of technologies and innovative strategies	mediana	good	high
Qualitative	To increase the contribution for the resolution of national issues	mediana	good	high
Quantitative	Number of joint supervision and double degree agreements	6	3	6
Quantitative	Number of faculties with post-doctoral studies abroad	150	30	60
Quantitative	Number of doctorate students with sandwich mobility abroad	15	22	44

Theme 2:

REVOLUTION IN INDUSTRIES AND CITIES - INDUSTRY 4.0 AND SMART CITIES

Goal To consolidate and expand research networks and increase the visibility of UFSCar's PPGs in the theme "Industry 4.0 and Smart Cities" through mobility and interest of international researchers.

Action – International inclusion and knowledge dissemination of "Industry 4.0 and Smart Cities"

Start date - 2018 End date - 2022

Description – Efforts to develop international inclusion and visibility of research carried through abroad in the scope of "Intelligent Industry 4.0 and Smarty Cities" are basic so that the actions of attracting young talents and senior researchers (see "Action 1") are implemented. Thus, the capabilities of PRINT/UFSCar will be used to implement a set of actions geared especially to increase the visibility of the PGPs. The lectures at institutions abroad by professors participating in working missions or long-term training activities to promote the infrastructure available in the laboratories and the opportunities for young doctors are some of the actions proposed. All the same, the participation of researchers from the PGPs on the subject "Industry 4.0 and Smart Cities" in congresses abroad should give preference to verbal presentations and "keynotes" also intending to use these opportunities for knowledge dissemination. Publication of the results of research conducted through books and/or book chapters and in the form of articles in indexed journals is another action proposed to promote international insertion and dissemination of knowledge.

Action indicators

Type	Indicator	Current situation	2nd-year Goal	Final goal
Quantitative	Number of books/chapters published in partnership with collaborators abroad	10	15	20
Qualitative	To increase the community's perception of the research carried through at UFSCar	median	good	high
Qualitative	To increase the academy's interaction with society	median	good	high
Quantitative	Number of articles published in partnership with collaborators abroad	35	50	75
Quantitative	Number of lectures or verbal presentations abroad	35	50	65

Action – Development of technologies at the frontier of knowledge

Start date - 2018 **End date – 2022**

Description – With internationalization, through the strengthening and expansion of existing collaborations as well as the nucleation of new research networks with institutions of excellence abroad, the lines of scientific research of the PGPs/UFSCar on the theme " Industry 4.0 and Smart Cities "will be fostered with significant impact on the development of technologies, processes and new forms of management related to the theme and in the following subareas: Management and technological development for industry 4.0; Operations management and innovation in industry 4.0; Work and society dynamics related to Industry 4.0 and smart cities; Sustainability, institutions and social conflicts related to Industry 4.0 and smart cities; Cities and ruralities in the contemporary world; Management, Planning, and Technology in Urban Systems.

Action indicators

Type	Indicator	Current situation	2nd-year Goal	Final goal
Quantitative	Number of doctorate students doing sandwich abroad	22	30	35
Quantitative	Number of Ph.Ds. from abroad	12	15	18
Quantitative	Number of lectures or verbal presentations abroad	35	50	65
Qualitative	To increase the academy's contribution to the resolution of national problems	median	good	high
Qualitative	Number of articles published in partnership with collaborators abroad	20	30	40
Quantitative	Number of visiting researchers from abroad	5	8	10
Qualitative	To increase the potential for generation of innovative technologies and strategies	median	good	high
Quantitative	Number of visiting researchers from abroad	5	8	10
Qualitative	To increase the academy's interaction with society	median	good	high
Quantitative	Number of professors with Ph.D. achieved abroad	50	65	75

Action– Team qualification and deepening of the internationalization of research and graduate studies in Industry 4.0 and Smart Cities.

Start date - 2018 End date - 2022

Description –

The qualification of the team, including professors, students, and technicians, who participate in the process of knowledge formation in "Industria 4.0 e Smart Cities" are fundamental for achieving the expected progress. With this in mind, the following actions have been proposed to foment qualification: post-doctoral programs, sandwich doctorates, specialization in foreign Institutions, and the professors' participation in working missions or interchange activities such as acting as visiting researchers in foreign Institutions. The building of an internationalized environment in the research laboratories and graduate studies is another requirement to intensify the integration of researchers (professors and students) and of the Graduate Program in the international academic scene. In this way, the capabilities of PRINT/UFSCar will be used to implement the following actions: attract overseas young talents to carry out Postdoctoral studies in Brazil; short and long-

term visits of senior researchers of recognized competence in different specialities, knowledge exchange and partnerships in the guidance of graduate students; provide lectures/courses/subjects for young talents and visiting researchers in English. The opportunities for an international exchange involving both the participation of Brazilian professors in activities abroad and the presence of senior researchers in Brazil will be used to establish co-operation and double qualification, helping to consolidate the internationalization process.

Action indicators

#	Type	Indicator	Current situation	2nd-year Goal	Final goal
1	Quantitative	Number of agreements for double qualification and co-operation	12	15	17
2	Quantitative	Number of visiting researchers from abroad	4	6	8
3	Quantitative	Number of lectures done per visiting professor	35	50	60
4	Quantitative	Number of Ph.Ds. from abroad	5	8	12
5	Quantitative	Number of cooperation agreements	16	20	24
6	Quantitative	Number of professors with Ph.D. achieved abroad	150	165	175
7	Qualitative	Internationalized environment formation	median	good	high
8	Qualitative	To increase the potential for generation of innovative technologies and strategies	median	good	high
9	Qualitative	To increase the academy's interaction with society	median	good	high
10	Qualitative	To increase the academy's contribution to the resolution of national problems	median	good	high
11	Quantitative	Number of doctorate students doing sandwich abroad	22	30	36
12	Quantitative	Number of subjects offered by foreign professors	35	50	60
13	Qualitative	To improve the team's qualification in the development of innovative technologies	median	good	high
14	Quantitative	Number of subjects offered in English	35	50	60

Theme 4:

INTEGRATED TECHNOLOGIES FOR HEALTH: FROM PREVENTION TO REHABILITATION

Goal: To consolidate and expand research networks and to increase the visibility of UFSCar's Graduate Programs with a focus on rehabilitation through mobility and international attraction of researchers.

Action-

Development of technologies at the frontier of knowledge

Start date - 2018 **End date - 2022**

Description- Along with the internationalization, by strengthening and expanding existing collaborations, as well as by nucleating new research networks with institutions of excellence overseas, the lines of scientific research of the UFSCar's Post-Graduate Programs on the theme "Integrated technologies for health: rehabilitation" will be fostered, with a significant impact on the development of technologies, processes and new forms of management related to the theme proposed and in the following subareas: 1. Technological solutions for health; 2. Human development and life trajectory; 3. Chronic non-communicable diseases.

Action indicators

Type	Indicator	Current situation	Goal 2nd year	Final Goal
Quantitative	Number of faculties with postdoctoral studies abroad	50	60	70
Quantitative	Number of postdoctoral students coming from abroad	4	6	8
Qualitative	increase the potential for the generation of innovative technologies and strategies	good	great	excelent
Quantitative	Number of oral presentations and/or pôster presentations abroad	50	75	100
Quantitative	Number of papers published in partnership with collaborators abroad	40	60	80
Qualitative	increase the interaction between academia and society	good	great	excelent
Qualitative	increase the contribution of academia to solving national problems	good	great	excelent
Quantitative	Number of doctoral students of sandwiches abroad	20	30	40
Quantitative	Number of visiting researchers from abroad	10	15	20

Action - Team training and intensification of the research internationalization and graduate studies in the theme “Integrated technologies for health: from prevention to rehabilitation”.

Start date - 2018 End date - 2022

Description – The training of the team, including researchers, students and technicians, who participate in the process of knowledge formation in "Integrated technologies for health: from prevention to rehabilitation" is fundamental for the expected progress to be achieved. In this sense, the following actions are proposed to foster training: postdoctoral studies, sandwich programs for doctorate students, specialization in foreign institutions and participation of professors in work missions or exchange activities as visiting researchers in overseas institutions. The construction of an internationalized environment in the research laboratories is another

requirement to intensify the insertion of the researchers (professors and students) and of the Graduate Programs themselves in the international academic scenario. In this way, PRINT/UFSCar resources will be used to enable the following actions: attraction of young talents from abroad to perform post-doctoral studies in Brazil; short and long-term visits of senior researchers of recognized competence in different specialties, aiming the exchange of knowledge and the establishment of partnerships in the orientation of graduate students; offering lectures and courses, including those ministered by young talents and visiting researchers, in English language. The opportunities for international exchange, involving both the participation of Brazilian professors in activities abroad and the presence of senior researchers in Brazil, will be used to establish co-supervision and double degree agreements, helping to consolidate the internationalization process.

Action indicators

Type	Indicator	Current situation	Goal 2nd year	Final Goal
Quantitative	number of international cooperation agreements	30	40	50
Quantitative	Number of agreements of double degree and co-supervision	2	3	5
Quantitative	Number of courses offered by international faculties from abroad	20	30	40
Quantitative	Number of lectures given by visiting professor	20	30	40
Qualitative	increase the potential for the generation of innovative technologies and strategies	good	great	excelent
Quantitative	Number of courses offered in English	25	35	50
Qualitative	Increase the interaction between academia and society	good	great	excelent
Qualitative	internationalized environment training	regular	great	excelent
Quantitative	Number of faculties with Post doctorade abroad	50	60	70
Quantitative	Number of visiting researchers from abroad	10	15	20
Quantitative	Number of doctoral sandwich students abroad	20	30	40
Quantitative	Number of Post-doctorade coming from abroad	4	6	8
Qualitative	improve the team's development of innovative technologies	good	great	excelent
Qualitative	increase the contribution of academia to the resolution of national problems	good	great	excelent

Action-

International insertion and dissemination of knowledge in "Integrated technologies for health: from prevention to rehabilitation".

Start date - 2018 **End date - 2022**

Description-

Efforts to increase the international insertion and visibility of research carried out under the theme "Integrated technologies for health: from prevention to rehabilitation" are to attract young talents and senior researchers (see "Action 1"). Thus, PRINT/UFSCar resources will be used to enable a set of actions geared specifically to increase the visibility of UFSCar's Post-Graduate Programs in the international scenario. The holding of lectures in Institutions overseas by professors participating in work missions or long-term capacity activities to unveil the available infrastructure in the laboratories and the opportunities for young doctors is one of the proposed actions. Likewise, the participation of researchers from the Post-Graduate Programs in overseas conferences will be made preferentially through oral presentations and keynotes, also with the intention of taking advantage of these opportunities for knowledge dissemination and diffusion. Publication of the research results conducted in books and/or book chapters and in the form of articles in indexed journals is another action proposed to promote international insertion and knowledge dissemination.

Action indicators

Type	Indicator	Current situation	Goal 2nd year	Final Goal
Quantitative	Number of books / chapters published in partnership with collaborators abroad	30	45	60
Quantitative	Number of oral presentations or presentations abroad	50	75	100
Qualitative	increase the interaction between academia and society	good	great	excelent
Quantitative	Number of papers published in partnership with collaborators abroad	40	60	80
Qualitative	increase the community's perception about the research in this theme carried out at UFSCar	good	great	excelent

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.

UFSCar wants to institutionalize actions for the improvement, expansion and consolidation of already-existing partnerships, and create new priority-themes focused partnerships. To accomplish so, through joint actions among PRINT Administration and International Relations Office (SRinter), we have taken as a mission to guide and support the development of an international relations policy, via promotion of academic and scientific cooperation and diffusion among foreign partner institutions. Amongst the proposed strategies, the focus lies on the respective actions: a) To induce and consolidate UFSCar internationalization, having as goal the institutional growth and the quality of its academic activities and visibility of its researches, through strengthening partnership and revising external agreements; b) To institutionalize already-existing international academic partnerships, intermediating and proposing cooperation agreements compatible with the activities to be cooperatively developed (general/specific faculty/student co-supervision, mobility agreements, etc.); d) To establish new partnerships through academic cooperation agreements, whether demanding faculty/researchers to attend to Funding Agencies public notices, or by partnership-prospection actions in fields of knowledge that pervade more than one Graduate Program; d) To advise and give operational aid to multiple UFSCar academic unities on implementing and executing actions and agreement-related aspects; e) To impart, support and host missions, delegations and foreign visits at UFSCar, with strategic data presentation about the fields of research/publishing among UFSCar and the visiting country/university; f) To guide faculties on protocols regarding acceptance letters and declarations for consular visas or UFSCar interests formalization for research project proposal submissions to national and international funding agencies; g) To aid on international academic cooperation projects submission process to funding agencies, on the regards of institutional articulation (hosting partner institutions and discussing the proposals) as well as in providing UFSCar institutional data (undergraduate majors, research, graduate programs, human resources, innovation, etc.)

2. Strategy to attract foreign students to Brazil.

The strategies that have been being implemented, and yet can be perfected, to attract foreign faculties to Brazil are countless. Amongst these actions, there will be included:
1) To improve Provost Office for Graduate Programs homepage and expanding its international visibility, as well as the translation and conversion of the Graduate Programs Homepage to

English and Spanish, in order to disseminate scholarship opportunities in different programs (masters, doctorates and postdoctoral scholarships);

2) To seek greater interaction with strategic partners/affiliated universities to disseminate new opportunities to faculties from those institutions;

3) Creation of resolutions and manuals in foreign languages to guide, facilitate, organize and standardize foreign students' activities;

4) To enlarge course offering in foreign language, by stimulating UFSCar faculty members, as well as hiring foreign visiting scholars to hold office for multidisciplinary courses for multiple programs;

5) To enlarge language courses offering (Portuguese as a foreign language and, among other languages, English, Spanish and French courses);

6) To aid on hosting actions for foreign students through Student Mobility Programs;

7) To aid foreign students with a share in institutional scholarship and CAPES scholarships, through public notices in collaboration with foreign partner institutions;

8) To implement policies to lever academic interactions through laboratory research internships to incoming and outcoming undergraduate and graduate students, regardless their attendance in regular courses.

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

UFSCar has been frequently hosting foreign visiting faculties, through CNPq, CAPES (Senior visiting faculty, International Visiting Faculty – PVE) and FAPESP public notices. UFSCar intention is to increase the number of foreign faculty members, that has already got to 3% of its faculty team. UFSCar will keep endeavouring to host faculties via PRINT Capes and other CNPq and FAPESP public notices, as it has already been done insofar. In addition, existing consolidated partnerships will allow to maintain research connection that has naturally happened throughout the years. Among the strategies that may be enhanced to increase new faculties and researchers attraction, we may list:

1. To boost the hiring of foreign and Brazilian researchers with full-doctoral degree abroad for open concurrence in the academic unities, emphasizing the evaluation of their international projection;
2. Temporary hiring of foreign visiting faculties to aid on strategies for institution internationalization;
3. To expand international partnerships through broader cooperation agreements (joint supervision and double degree) and thus strengthen research connections and interaction with researchers from those institutions;
4. To expand diffusion of opportunities on the Provost Office for Graduate Programs (ProGP) homepage and other media (FAPESP homepage) to attract new researchers through PNDP scholarships;

5. To perform prospective missions involving UFSCar remarkable researchers, as well as excellence programs, to strategic institutions for UFSCar, allowing the increase of interaction and new research connections in priority institutional areas.
6. To perform missions for UFSCar diffusion in strategic countries to expand visibility and attracting students, faculties and researchers;
7. To stimulate intensive course schools in Brazil aimed for strategic themes according to the São Paulo School of Advanced Science (ESPCA) from FAPESP, favouring incoming international renowned researchers and foreign students from different countries.

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

UFSCar has been giving aid on outgoing student and faculty preparation to facilitate experiences abroad. Every year unrestricted faculty withdrawals have been authorized, through office maintenance at the Equivalent-Faculty Database (BPEq), stimulating withdrawals with no losses on other academic activities. Courses, internships and visits occur over individual initiative (the faculty/researcher requests the scholarship and financial aid for funding agencies) or through selective processes for PDSE graduate students. The faculty withdrawal policy has always been an institutional strength, and through PRINT, it is going to be possible to enhance such strategies, promoting internal public notices at thematic areas to allow the selection of candidates with the best projects, the induction of strategic-areas projects and the improvement of evaluation and outcome-monitoring process. Regarding the preparation of such experiences, both faculties and students have the preparation opportunities with the International Relations Office (SRInter) aid for protocolary, cultural and legal matters, besides languages courses (English, Spanish, French and others). In addition, it is possible to evaluate the proficiency level through run exams by the Languages Branch, kept by the Languages without Borders (Idiomas sem Fronteiras - IsF) governmental program. IsF promotes preparatory courses for proficiency exams (TOEFL-ITP) and runs such exams periodically. After 2017, IsF started to serve, also, academic needs related to Spanish and Portuguese as foreign languages. Thus, UFSCar counts on two structures that serves the purpose of complementary linguistic skills development to aid university community: The Languages Institute (IL), responsible for the general policy, and IsF, aimed towards activities for specific academic purposes. Therefore, IL and IsF have been developing the linguistic policy for internationalization and has the capability of expanding and improving their performances. Regarding students and faculty returning, UFSCar intends to invest on promotion of courses, internships, meetings and new projects, in order to allow fresh knowledge of strategic focuses that have been aggregated abroad to be spread and appropriated by the internal academic community. Besides, UFSCar will stimulate young PhD holders' participation at selective processes for PNDP scholarships, benefiting the academic merit of these experiences.

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

In addition to the several strategies mentioned above, UFSCar has also as a goal the expansion of Graduate Programs internationalization, including the following actions:

1) To create mechanisms for the students to attend to undergraduate and graduate courses during their internship abroad and develop a policy for recognition of credits taken abroad;

2) To evaluate and re-evaluate researchers' scientific production indexes, involving the community in outcomes exams and goals establishment;

3) To articulate and provide interaction between national and international researchers within priority areas;

4) To expand administrative staff training at qualification and support for foreign students;

5) To expand selection and evaluation of international personnel, seeking to expand the foreign faculties team;

6) To benefit an international identification medium, facilitating financial resources to give more internal and external visibility, both within Campus (bilingual signs) and at the institutional website;

7) To optimize internal procedures regarding foreign resources proceeding through projects and international cooperation agreements;

8) To strengthen the institutional repository to expand UFSCar international visibility;

9) To stimulate and qualify the university researchers, students and faculties through courses and events to innovate and endeavour in international context;

10) To seek insertion of research outcomes in society, trying to maximize their impact, without disregarding global insertion of potential innovative products and internationalizing the Innovation Agency;

11) To spread patent portfolios in English and Spanish at UFSCar Innovation Agency website;

12) To diversify UFSCar knowledge diffusion through financial aid for translations, interpreting and revision of scientific texts by the Languages Institute (IL), as well as scientific writing courses in several fields of knowledge. The hiring of visiting faculties becomes necessary to allow greater support and expansion of these actions;

13) To support Strategic and Advanced Studies Institute (IEAE) to create scientific-academic cooperation networks on designing projects for harvesting of resources through major national and international public notices.

POLICIES

Policy for selection of foreign partners, 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).

UFSCar has put effort into policies for maintenance of already-existing partnerships with strategic countries, as well as to stimulate new partners to cooperate mutually, aggregating knew knowledge, seeking to strengthen even more already-existing research projects. However, in some cases, this movement has happened individually among researchers and research groups. UFSCar wants to undertake a more effective commitment from these partnerships, thus raising the extent of the institutional management to increase the levels of interaction between strategic thematic areas, therefore allowing several programs to benefit from these institutional partnerships.

It is worth to remark that UFSCar has a broad spectrum of CAPES-considered priority strategic countries as partners, such as United States of America, Spain, France, Germany, the United Kingdom, Japan, Netherlands, Canada, Australia, Portugal, Belgium, Norway, among others.

Regarding quantitative aspects, we emphasize that such countries have already been collaborating with gathering of highly qualified human resources (through faculty and students qualification) as well as with UFSCar knowledge production. UFSCar has kept scientific production in collaboration with researchers from the USA, the United Kingdom, France, Germany, Spain and Canada. Besides, UFSCar has cooperated with several Latin American countries, such as Colombia, Peru, Argentina, in addition to African countries, focusing on solidarity and research partnerships in common thematic areas between these countries and Brazil.

Initially, partnerships with institutions that hold complements of funding programs as CAPES – COFECUP (French Committee for Evaluation of University Cooperation with Brazil) or the BRAFITEC program with France may be encouraged. There are also programs relying on sponsoring institutions in their own countries that, together, promote integration projects such as CYTED – Iberic-American Program for Science and Technology Development.

Among other factors, the criteria for choosing and/or maintaining partner may consider: (a) the length of the partnership/agreement; (b) the existence of co-publishing; (c) reciprocity x benefits; (d) insertion in research thematic areas; (e) institutional relevancy/strategic research continuity; (f) possibility of other funding agencies supplementing.

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

UFSCar has history on resource demand and CAPES-sponsored scholarships, through Graduate Programs. We understand that high-class programs have presented already-expected superior internationalization demands, therefore resource allocation will consider captured resources from previous years by the programs as a starting point, counting with percentile growth of resources and scholarships capacity yearly, once that the growth and expansion of CAPES funding is expected. It is worth to consider, however, that the selection criteria should be concentrated within thematic areas proposed, in a way that specific public notices ought to be undertaken, minding CAPES already-established criteria (merit criteria scrutinizing for beneficiary selection, candidate disqualification criteria – such as the years of joining or concluding their course -, the intended proficiency levels in languages, verification of legal requirements and administrative procedures for faculty and researchers missions or travels abroad) as well as specific project criteria, such as the confection of a research project, presentation of objectives and goals to be accomplished (with well-defined quantitative and qualitative criteria), activity schedule, expected outcomes and the means of transferring the knowledge acquired at UFSCar. Foreign institutions counterpart evidences will be required. Such criteria and procedures will allow more accurate indexes to be achieved. The entire process will be developed aiming greater efficacy and transparency in diffusing potential sponsoring opportunities to candidates inside the university academic community. Candidates that feel damaged or confused throughout the process will be able to require administrative appeals to the PEI Management Committee. There will be assured to participants the compliance of the statement of Decree 7,203, June 4th of 2010, regarding nepotism stagnancy on public administration spheres. Selection of action and beneficiaries' policy will also consider the countries of the foreign institutions, aiming at ensuring destination to at least 70% of priority-considered countries. In addition, meanwhile, there will be necessary to assure maintenance and expansion of activities regarding UFSCar existing partnerships.

Policy for hiring faculty with recognized scientific performance at an international level.
As it has been highlighted before, UFSCar predicts the encouragement of absorption of young talents and foreign senior faculties, according to previously established criteria in our own public notices, prioritizing scientific-academic production and their own skills, according to the requested expertise by departmental priorities. On that note, it has become also necessary to restructure UFSCar homepage aiming towards facilitating international faculty and researchers' accessibility. In addition, temporary contracts of visiting faculties with the purpose of expanding internationalization at home strategies, offering broader-character courses (such as "Scientific

Writing", "Statistics", "Scientific Methods", "Oral and Poster Presentations".) Besides, institutional policy will stimulate faculties attached to graduate programs to teach their courses in other languages, providing an international environment to UFSCar students, and preparing them for internships abroad. Our goal is to expand the offering of EMI courses (courses using English as a Medium of Instruction) at UFSCar GPs, as specified in the next item, thus the presence of foreign faculties might contribute with this goal.

Policy to increase proficiency in foreign languages for students, postgraduate faculty and technical staff that have a direct relationship with the proposed Internationalization Project.

We will have, as institutional priority goal, the increase of proficiency in foreign languages for students and faculties composed by: Experiences abroad and English Language mastering: first steps towards internationalization. We do acknowledge that global interaction allows rich and intense experience exchange that may overcome future challenges and bring profound professional, social and cultural transformations. Universities with highest internationalization rates are those in the spotlight at international rankings and UFSCar seeks, through countless actions, to increase language fluency of its academic community. Thus, it is necessary to stimulate graduate programs to add more EMI courses, by the offering of elective courses in the programs concentration fields. To achieve so, IL and IsF have been offering courses for faculties qualification to hold offer EMI courses in foreign languages (not just English). Relying on visiting collaborators and the faculty team, we intent to engage in this effort with, at least, one annual course, offered by each program, and at least one annual course of general character to graduate students of different programs. The general goal for the next four years is to increase that number to two annual courses per program. These courses (titles, syllabus, evaluation system) will be registered at the Academic Control System for GPs (ProPGWeb) in English. Regarding administrative staff, UFSCar already offers language courses to them. Our policy will be focused on stimulation and adherence to such courses, to be taken during the regular shift and stimulation and acknowledge of such efforts through career promotion. There will be also necessary to regimentally support credits inclusion for students who have accomplished language courses within their academic curriculum as optional credits, that may be taken at UFSCar-inside unities: IL and IsF.

Policy for recognition of academic and scientific activities performed by faculty and students abroad.

It is worthy to remark that such agreements are ensured by the broad partnership with possibilities of courses to be taken by faculties and students in foreign institutions abroad. However, due to short-term internships (4 to 5 months), several students were not able to fully

attend such courses. In that context, it has become necessary CAPES funding with long-term scholarships to then allow more students to benefit from them. UFSCar will also manage alongside GPs to may have such strategies expanded and to prioritize longer periods abroad rather than short-term internships.

Thus, this action will possibly result in new internal regimental changes, in terms of encouraging students to take courses abroad and, furthermore, recognize their credits at UFSCar. With the SIP, the goal is to make these collaborative networks stronger, apart from allowing new counterparts to be perfected. Cooperation memoranda may start to include, for instance, the possibility of aggregating the new-produced knowledge (courses and knowledge regarding new methods and technologies), also of endeavouring courses to be offered by faculties with UFSCar institutional recognition, as well as allowing the inclusion of institutional agreements of joint supervision and double degrees. Nowadays, UFSCar has 15 joint supervision and 2 double degrees active agreements - being one directed to undergraduate majors and the other to graduate programs. To accomplish it, there will be necessary to sign new agreements, in order to expand these last actions, expanding cooperation agreements negotiation.

Policy for hosting and support of foreign faculty, researchers and students.

Among other extension project proposals, UFSCar supports the actions of the Languages Institute (IL), built around a managing unity, that, among several other activities, provides, through extension projects, language courses to Brazilian and foreign students. UFSCar policy, apart from expanding funding possibilities to aid on IL actions, will also expand cultural activities, interaction and experience exchange amongst Brazilian and foreign students in a multicampi form. Alongside the International Relations Office (SRInter) and the Provost Office of Graduate Programs (ProPG), IL also assists on actions for hosting incoming foreign students, faculties and researchers through several actions such as meetings, open conversations and cultural activities. As an example, we can cite the proceedings of the I Seminar for Hosting Foreign Incomers, whereby the disclosure of the Orbis Program for Hosting Foreign Incomers. SRinter hosts initially and registers incoming foreigners at UFSCar, guiding them in bureaucratic and visa matters, housing and life at campus. Among multiple activities offered by IL, several language courses are included, along with thematic workshops, as well as hosting of foreign incomers in academic mobility programs, in partnership with other unities, providing a friendly environment for experience exchange among people from different cultures and languages. To achieve its goals, IL relies on four action fronts: a) Language courses; b) Proficiency exams; c) Text translation, interpretation and revision; d) Collaborative network. Regarding Language courses, IL endeavours on sequential courses of Spanish, Brazilian Sign Language (LIBRAS) and Portuguese as a foreign language (PFL), among other foreign languages. Under specific demands, IL seeks to serve with workshops and short-term courses. There is also the promotion of activities in Portuguese (Text: Reading and Production), specially for academic purposes, for

foreign students. In the Collaborative Network, actions are aimed towards integration of Brazilian and foreign students, relying on activities that promote from linguistic to intercultural skills, minding the diversity and the necessity of the different communities represented at UFSCar.

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

UFSCar is establishing a new policy to be instituted, which is responsibility of the managing group of this proposal, for the selection through public notice to be broadly accessible to the entire academic community, as well as the diffusion of the selection criteria, according to the objectives and goals to be achieved by the end of the project, and the ways of transferring knowledge to UFSCar. It will be important that agreements and contracts can be signed by the parts, as assurance of appropriation of the produced knowledge within proposals. It will be important also for faculties and administrative staff to have a more detailed evaluation on the counterparts to be specified by each candidate to a scholarship. As for students, it will be important to predict the most appropriate way of knowledge transferring for the research groups (the tutor and other students from the laboratory; other faculties and laboratories) that will assist the programs in which they are attached to. UFSCar will be able to provide resources for the courses to be offered and UFSCar management will encourage programs to do such activities as seminars and workshops to account them as credits to be fulfilled by other students of the program. Another policy to be adopted is the standardization of PNDP public notices, seeking to ensure the selection of the best candidates, according to the outcomes of their recent academic-scientific production, their new knowledge acquired abroad and their fluency to teach courses with new methods and innovative know-how aggregated abroad. The use of powerful indexes of fellow-scholars should contribute to enhance the graduate programs. A significative step of the policy towards greater possibilities in international range and diffusion will be requiring the final product of the doctoral study – the thesis – to be presented in English.

Policy for management and operationalization of the Institutional Internationalization Project.

Operational aid will be sought from UFSCar Institutional Support Foundation to Scientific and Technological Development (FAI), which is an entity of private interests, non-profitable, created in 1992, certified by the Ministry of Education and the Ministry of Science, Technology and Innovation. FAI mission is to assist the academic community on accomplishing activities in teaching, research and extension, with the objective of promoting scientific and technological development and encouragement to innovation. Due to its faster and less bureaucratic way of managing projects, FAI performs a relevant role and acts efficiently at managing large-scale resources and investments, becoming UFSCar most-wanted way of managing PRINT resources,

if possible. FAI relies on infrastructure and highly-qualified human resources with experience in managing, among other funding agencies, FINEP-funded large-scale projects, for instance. In order to favor the financial managing, the Provost Office for Graduate Programs (ProPG) should develop an Institutional Development Project (ProDin), a recently created modality in UFSCar to favor the institutional use of extension resources. If PRINT resources were docked through the Decentered Execution Term, their administration could be delegated to FAI, favoring and allowing greater administrative aid. It is then justified that because the number of employees at UFSCar managing group, as aforementioned, is unreasonable and jeopardizes, sometimes, the execution of resources in timely manner, apart from the fact that possible strikes may considerably harm the SPI execution. Once approved, FAI management will be monitored by the Management Committee, headed by the Provost Office of Graduate Programs.

Policy for monitoring and internal evaluation of the goals of the Institutional Internationalization Project.

Alongside the Management Committee and other strategic-thematic area coordinators, the Provost Office for Graduate Programs has the objective of creating information management systems to allow the monitoring of the countless activities casted by this proposal. To accomplish it, institutional resources, or even PRINT resources - if possible, will be docked to the tracking and monitoring of those activities, through reports of candidates and supervisors (institutional tutor and foreign supervisor) to ensure that the activities are being fully executed. A thorough project with the plan of activities will be mandatory for the starting of activities abroad. Such policies will be elaborated through specific resolutions to guide activities and diffuse them beforehand. Annually, all indexes will be retrieved and disclosed, with the objective of checking whether the goals are to be achieved or not and if they are following the fixed trends of goals for the next four years. According to the Strategic Internationalization Plan (SIP), the outcome indexes will also be disclosed to the entire academic community, to raise awareness and mobilize the agents on the new trends and discuss if new policies should be implemented to reach the objectives defined in the plan.

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

It is certain that other CAPES support such as PROEX (resources of high-class GPs) as well as PROAD resources (Support Program for Graduate Programs) are also going to be enquired to assist on the activities of the institutional projects of this proposal. In addition, the aid of PNPD scholars are also allowing to induce new strategies, such as the aid of these young faculties to assist on several internationalization at home activities, as well as their assistance on specific public notices to attract recent Ph.D scholars with experience abroad to aggregate

recently-acquired knowledge for its dissemination at UFSCar. Historically, UFSCar GPs have been endeavoring a policy of encouragement and support to countless internationalization strategies, adding on the income of visiting faculties (through PROEX and PROAD resources). Complementarily, additional efforts can be favored for external resources capturing at other funding unities to expand the Graduate Programs internationalization strategies. Both individually or in groups, faculties and graduate program coordinators have been receiving assistance from funding for research projects in collaboration with international researchers and incomed foreign faculties that have been teaching summer courses and workshops at UFSCar. Some examples are: the three INCT hosted at UFSCar, the three CEPID and the tens of FAPESP-thematic projects – which activities affect on the research projects and the formation of human resources in the institution. Besides, other forms of support from FAPESP and CNPq will be able to be potentialized, such as expanding double-degree agreements through missions at high-class institutions abroad. The Provost Office for Graduate Programs will also encourage the agents within thematic areas to seek also other resources, such as the disclosed by public notices for public policies, innovation, entrepreneurship and resources capturing in national and international organizations, expanding funding sources, especially for the research and development.

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

UFSCar created, in 2016, the Institute of Advanced and Strategic Studies (IEAE/UFSCar) that has as main objective to contribute on expanding the knowledge to a natural and socially-sustainable development of human society, aiming at ensuring the promotion of equity, social justice, peace and national sovereignty. IEAE/UFSCar has as main mission to acknowledge UFSCar reality and potential to develop advanced strategic studies, of inter, multi and transdisciplinary character, aiming for the future, highlighting relevant actions and paths towards a humane and sustainable development. The reference of this relation is the sustainability, both natural and social/economic, aiming for the human development in the contemporary society scenario. To accomplish its objectives and collaborate on implementing the SIP, the IEAE will be incorporated to the workgroups within the thematic areas, focusing on the national and international projection, the development and alignment towards sustainability of the themes, as well as guidance on monitoring and capturing of external resources, both national and internationally. In such context, the Institute will have a leading role on allowing that groups from the themes built on this institutional project to converge within the actions of both organization and society, giving infrastructural and personnel aid.

Other strategies to expand internationalization possibilities are the sharing of visiting faculties among partner institutions nearby, such as USP/São Carlos and UNESP/Araraquara. Several sharing actions have already been established throughout the years, especially among GPs, through the Interinstitutional Program of Graduate Programs (PIPG), and they are

opportunities to share the knowledge of visiting foreign scholars with Federal HEIs nearby, assisting them, strengthening even more national partnerships and rationalizing bilateral resources. It is the case, for instance, of UFSCar-USP/São Carlos Statistics PIPG (PIPGEs) and UFSCar-UNESP(Araraquara/Bauru/Jaboticabal) Physiological Sciences PIPG (PIPGCF). Apart from USP/São Carlos and UNESP, another experience of significative synergy is the Biotechnology GP (PPGBiotec) that relies on research projects certified by EMBRAPA Instrumentation.

FURTHER INFORMATION

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

Quantity of courses: 99

Number of joint supervision postgraduate programs between 2013 and 2016.

Quantity of programs: 26

Number of double degree postgraduate programs between 2013 and 2016.

Quantity of programs: 2

Number of bilateral postgraduate programs between 2013 and 2016.

Quantity of programs: 1

Number of products derived from research projects and contributions to international databases between 2013 and 2016.

Quantity of products and contributions: 350

Number of Capes' development programs from which the institution benefited between 2013 and 2016.

Quantity of programs: 14

Number of Capes' international cooperation projects from which the institution benefited between 2013 and 2016.

Quantity of projects: 35

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

As previously mentioned at the tab of institutional policies for the expansion of the internationalization at home, the continuity of the already existent courses will be supported once

many of them have already included the institutional themes of this project. Moreover, by means of the institutional policies of internationalization and the orientation within the priority thematic areas, it will be possible to expand the offer of courses/subjects in other foreign languages, in the curricular structure of the graduate programs, aiming to promote such strategies. Besides, it will also be encouraged and expanded doctorate graduate students' attendance to courses abroad, aiming to include such courses as international credits in their academic records. To accomplish those actions, regimental adjustments and pacts with international partners will be necessary and, in this sense, such actions will certainly be important and feasible in a short-term period. Also, we predict the inclusion of compulsory EMI courses/subjects (taught in English as the medium of instruction) within the strategic thematic areas, aiming to spread those courses to the programs involved, offering new courses to different GPs and expanding the possibilities of internationalization at home for more students. It will also be possible to offer courses and subjects such as "Scientific Writing", "Oral and Poster presentations", among others, taught by hired foreign visiting scholars, with the objective of giving instrumental linguistic support to students, whose attendance will be counted as optional credits to the Graduate Programs. In order to expand such possibilities to other campuses of UFSCar, these actions could happen on-site as well as by means of the Open University of UFSCar (Universidade Aberta da UFSCar - UAB), as distance education courses. Consequently, it will be possible, by means of different approaches, to expand the Internationalization at home of UFSCar. Last, but not least, summer courses and subjects offered by foreign visiting scholars and post-doctoral researchers have already been solid actions at UFSCar and, through Print CAPES, with the increase of the number of foreign visiting scholars and researchers, such actions will be expanded and spread through all the graduate programs (including the newest GPs), in all the campuses. All those jointed actions will certainly be transformed into a great expansion of the internationalization of UFSCar and consequently into its international projection.

EXPECTED BENEFITS

Name of the project:

EDUCATION AND HUMAN PROCESSES FOR SOCIAL CHANGES

Start date: 2018 End date: 2022

Description: This proposal integrates the research areas of the graduate programs of the Humanities areas of UFSCar and the graduate programs of other areas of congregated knowledge. The general goal is to develop research projects that overcome lacks of knowledge, maximizing experiences abroad aiming at understanding and facing the challenges of local and global realities and, at the same time, building a complementarity that would reduce asymmetries and increase the level of knowledge by the mutual contribution, resulting from different competences of the partner national and international institutions. The proposal presents an innovative character in the theme as well as in the way of approaching it, searching to consolidate the highlighted areas, besides prompting the areas with international potential. This is shown in the composition of competitive subthemes that, once generalized, could be inserted in attractive fields of research of international interest. It will allow to build a network of research and knowledge production concerning graduate programs that would be linked to the competences of the institution and to the central issues of the Brazilian Society: knowledge production and scientific dissemination; new Science epistemologies in the formation of scientists; equity in the access to education and knowledge; politics, educational organization and inclusion; development and evaluation of educational, instructional technologies and educational methodologies. These topics refer to the tendencies of policies in CT&I (Science, Technology and Innovation) indicated at the MCTI document, and are in accordance to the predicted objectives to education, sciences and social technologies. The objective is to produce and disseminate innovative solutions, as well as create indicators to elaborate and justify public policies that guarantee inclusion, considering social-economic and cultural aspects and the improvement in the population’s quality of life. The proposal is coherent to the MCTI principle that: "The universities and research institutions need to be stimulated to incorporate the social dimension in their research agendas, promote the citizen formation and a greater integration of social and human sciences to CT&I policies must be sought." (National Strategy of Science, Technology and Innovation 2016/2022, p. 98s). The implementation of the proposal will contribute to UFSCar advance in the initiatives of current internationalization and/or in process of institutionalization.

Missions Related to the Research Project

See Executive Summary.

Resources to maintenance the projects

See Executive Summary.

Scholarships linked to the Research Project

See Executive Summary.

Name of the project:

BIODIVERSITY, ECOSYSTEM FUNCTIONS AND SUSTAINABILITY

Start date: 2018 End date: 2022

Description:

According to the recent publication of the Regional Diagnosis of Biodiversity and Ecosystem Services in the Americas, prepared by the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), it is estimated that about 30% of the biodiversity populations in the Americas have already declined since the beginning of European colonization and this figure should increase in the coming years. At the heart of this scenario is the man and their disordered actions, promoting deforestation and the consequent fragmentation and loss of habitats, hunting, trampling, pollution and climate change. It is a well-known fact that ecosystems around the world have a wide variety of functions and promote a wide range of services provided by their biodiversity, which are of crucial importance to the health, quality of life, well-being and survival of all, humans. Although ecosystem restructuring and management have provided human societies with some benefits such as increased food production, these changes have generated large environmental costs, directly reflecting ecosystem functions and services. On the other hand, since they occur unequally in ecosystems, such changes can exacerbate inequalities in access to environmental services, further contributing to poverty. The Brazilian case is a particular concern due to the disorderly economic growth carried out in the post-war period. The theme "Biodiversity, Ecosystem Services and Sustainability" has a strategic dimension that intends, in an integrated and multidisciplinary way, the integral development of scientific and technological knowledge, able to base the priority actions of conservation of biodiversity, sustainable use of natural resources, health environmental and human well-being, mitigation and adaptation to climate change. Conducted in five sub-themes (Biodiversity, Ecosystem Services, Strategic Natural Resources, Environmental Health and Human Well-being, Climate Change).

Missions Related to the Research Project

See Executive Summary.

Resources to maintenance the projects

See Executive Summary.

Scholarships linked to the Research Project

See Executive Summary.

Name of the project **STRATEGIC MATERIALS**

Start date 2018 **End date:2022**

Description:

This research project aims to foster the international scientific research lines of UFSCar PPGs in the theme "Strategic Materials" aiming at strengthening and expanding existing collaborations as well as the nucleation of new research networks with institutions of excellence from abroad, such as visibility and internationally design the UFSCar as a Center of Excellence in Materials. The internationalization actions will be directed in an integrated way, fomenting the flow of information and the exchange of knowledge in the following subareas: i) Materials for power generation: sensors, biosensors eletronic devices,solid electrolytes, electrodes, cathodes, fuel cells, semiconductors, water splitting, photovoltaic cells, use of waste to generate thermal energy; (ii) Nanoscience and Nanotechnology: polymer nanocomposites, nanostructured metal alloys, two-dimensional (2D) materials, nanowires, chemical catalysts, enzymatic and nanofilters, nanoparticles with synergism in antimicrobial bioactivity; iii) Biomaterials and Renewable Materials: bioactive materials, functional materials, functional packaging; natural polymers; biophotonics; v) Innovative processes: fabrication of hybrid metal-polymer structures, newer and cleaner processing routes, real-time monitoring of polymer transformation processes, new in-process catalysis materials, integrated process technologies for the treatment of liquid and gaseous effluents , laser micro-fabrication, bioreactors, metallic, polymeric and ceramic powder compacting processes, manufacture of polymer composites for concrete reinforcement, cementitious composites with low consumption of cement and geotextiles; vi) Computational Modeling and Simulation: process automation, thermo-mechanical behavior modeling of materials, embedded systems, high-performance computing, statistical techniques of pattern recognition, parallel and reconfigurable processing.

Missions Related to the Research Project

See Executive Summary.

Resources to maintenance the projects

See Executive Summary.

Scholarships linked to the Research Project

See Executive Summary.

INTERNATIONAL COOPERATION PROJECTS

Name of the project:

INDUSTRY AND URBAN REVOLUTION - INDUSTRY 4.0 AND THE SMART CITIES

Start date: 2018 End date: 2022

Description: This research Project aims at fostering the international scientific research areas of the GPs of UFSCar inside the theme “Industry and Urban Revolution - Industry 4.0 and the Smart Cities”, by means of strengthening and expansion of the current collaborations, as well as by the nucleation of new research networks with foreign institutions of excellence, as a way of increasing the visibility and projecting UFSCar internationally as a Center of Excellence in the theme. The actions of internationalization will be directed in an integrated way, fostering the flow of information and the Exchange of knowledge in the following subareas: (1) Management and technological development fot the industry 4.0; (2) Management and innovation of operations in industry 4.0; (3) Work and Society dynamics related to industry 4.0 and to the smart cities; (4) Sustainability, institutions and social conflicts related to industry 4.0 and the smart cities; (6) Cities and ruralities in contemporaneity; (6) Management, Planning and Technology in urban systems.

INTERNATIONAL COOPERATION PROJECTS

Name of the project:

INTEGRATED TECHNOLOGIES FOR HEALTH: FROM PREVENTION TO REHABILITATION

Start date: 2018 End date: 2022

Description:

The development, incorporation and use of technologies in health systems, as well as their sustainability, are embedded in social and economic contexts, which derive from the continuous production and consumption of goods and products. The health system is influenced by public policies and by the strengthening of the role of its professionals and users, who, together, exert strong pressure for the incorporation of new technologies. The continuous growth of health expenses, the growing production of new technologies, and the changes in the epidemiological profile of populations that have occurred in the last two decades have led to the need for interdisciplinary attention. In this way, the study of the different technologies, their biomedical consequences and their social cost are made socially and politically necessary to better understand the problems identified in the health services, constituting an important tool for the formulation of actions that may interfere in the system. In this way, it is considered that the greater access of public and private health managers to this knowledge is positive for the understanding of the complex articulation of the technologies with the political and technical processes, which build, in the different levels of the health systems, the standards incorporation and use of technologies. In Brazil, the Unified Health System (SUS) aims to guarantee universality and integrality to health, allowing greater access of the population to care networks. However, it is noted that existing resources are not always used in the most effective and equitable ways in order to this purpose to be achieved. Thus, to guarantee the integrality principle, the incorporation of new technologies must be carried out incorporating techniques that are effective and safe, whose damages or risks do not exceed their benefits. In this context, UFSCar has carried out research involving the use of various technologies (devices for diagnosis and prevention of diseases, use of engineering, chemistry, mathematics, physics and computing, as well as for health management) and innovative approaches related to pharmacological and non-pharmacological interventions to prevent, treat and rehabilitate individuals at different stages of life (child-adult-elderly).

Missions Related to the Research Project

See Executive Summary.

Resources to maintenance the projects

See Executive Summary.

Scholarships linked to the Research Project

See Executive Summary.

COUNTERPART

Internationalization of the curriculum - Incorporation of international themes in postgraduate classes.

UFSCar has already been carrying out numerous actions to improve and consolidate the themes specifically related to the institutional thematic projects chosen as a priority by the PRINT public notice. Among these actions, one stands out. Many Graduate Programs (GPs) from UFSCar use to receive, throughout the year, foreign researchers who use to teach short courses in English or Spanish, with the participation of undergraduate and graduate students. The current goal will be to expand these actions to all GPs which will participate in institutional projects. In this context, it will be important to horizontalize the actions in order that the strategic themes can move among the different programs, to promote even more such themes, canalizing research in a multidisciplinary context and thus leveraging and projecting them to the international scenario. For this purpose, the specific courses of the themes may be offered in a shared way to other programs. As UFSCar maintains a focus on innovation and entrepreneurship, specific courses can be created in these issues, which could also be offered in other languages, focusing on an international context, reinforcing even more UFSCar as an Institution of excellence in innovation (a chosen and transiting subject in the five themes proposed). Such courses should be offered both for undergraduate and graduate courses and will be implemented through the support from the UFSCar Innovation Agency. In addition, UFSCar already officially recognizes several extracurricular activities, such as undergraduate and graduate students' participation in courses and international fairs f, validating them as complementary activities in the student's academic records. UFSCar understands that such activities enrich the students' academic and professional formation, which allow them to live important experiences for their formation. In addition, it is emphasized that the offering of courses, workshops, and lectures by foreign visiting researchers and postdoctoral students also contribute to the internationalization of the teaching aspect of the university.

Production of international publicity material in other languages, including course websites.

UFSCar currently produces folders, posters, and journals in Portuguese, English, and Spanish, to act as promotional materials that are used to present GP activities to partner institutions and visitors to our Institution. In addition, we have an institutional video in four different languages (Portuguese, English, Spanish, and French). Most of our GPS already have their websites translated to English, and some also feature the Spanish version. The Languages Institute of UFSCar, through institutional support, translates the pages of the websites for the GPs. In addition, an online journal is being planned to present the institutional strategic themes of the SIP and disseminate the results and research products, through articles, videos and reports that will

be systematically included in the webpage of the Provost Office for Graduate Programs. The new website of the Provost Office of Graduate Programs is being updated and will have a translation in English, Spanish and French, as well as information on research opportunities within the institutional thematic areas. The four UFSCar campuses will also have their bilingual signs and information translated into English and Spanish, creating an international campus culture.

Training and qualification of staff for institutional internationalization.

UFSCar has the financial resources destined to the training of the staff members to improve the proficiency level, especially in English, through language courses offered by the Languages Institute. In addition, to increase the staff members' access to these courses it will be provided course timetables during their working hours, with the aim of encouraging more of them to improve their proficiency in languages. It is also worth mentioning that UFSCar supports and promotes, through the Languages Institute and the Languages without Borders Program (Idiomas sem Fronteiras - IsF), EMI courses for faculty members for training them into teaching their subjects in English. With these preparatory courses, the faculty members can start teaching their own courses in English. UFSCar also has public notices opened for visiting foreign scholars, to expand these actions. There are Spanish and English for specific purposes courses offered by UFSCar, helping both faculty and staff members to expand their linguistic arsenal for daily activities in language use to receive foreign researchers and students. UFSCar also estimates the hiring of bilingual staff members, with recent retirements, to expand internationalization strategies, especially from the International Relations Office (SRInter), and the hiring of foreign visiting scholars to expand Portuguese as a foreign language courses.

Counterparts offered by foreign partnership institutions, when applicable.

As already explained, UFSCar, through the Provost Office for Graduate Programs (ProPG) and the International Relations Office (SRInter), is articulating to broaden the counterparts with the partner institutions. Several signed agreements give ample possibilities for students to study subjects abroad without paying institutional fees. However, these actions have presented some difficulties of execution because they were restricted to the period of academic internship that would last six months or less, rarely coinciding with the home institution academic periods (semesters or years) to recognize credits, due to the fact that many students would have this academic internship in the last year of their graduate studies. For that matter, the administration of UFSCar will expand such actions, encouraging students to attend subjects and courses abroad, as well as expanding cooperation agreements of joint supervision and double degrees. The Graduate Program of Physics has a joint supervision cooperation agreement with Tampere University of Technology (Finland) and a graduate student has completed a one-year internship and, currently, he has made regular trips to Finland with financial support from the foreign team.

Another example is the agreement, in progress, between Graduate Program of Statistics and the University of Durham, United Kingdom. Another kind of support or counterpart of the partner universities is to enable their researchers to participate in activities at UFSCar receiving their proceedings. In addition, with the institutional project of UFSCar, the international partners included in our proposal intend to expand the reciprocity actions, allowing the agreements already signed to reach other GPs included in the institutional themes, disseminating the actions that only happen in the GPs of excellence of UFSCar.

Other counterparts, when applicable.

UFSCar maintains many initiatives to support the Internationalization that can be considered as counterparts derived from the availability of the physical space, equipment, and furniture, promotional materials, and wages of the professionals involved. A simplified presentation of the main current projects with the support of the funding agencies will be presented. Brazilian National Council for Scientific and Technological Development (CNPq) – Special Visiting Researcher (PVE):

1. Proc. 400442/2014-0. Audrey Borghi-Silva and Shane Phillips (University of Illinois at Chicago, US). R$1.000.000,00;
2. Proc. 401047/2014-8. Joaquim A. Nóbrega and Antonio Canals (Universidad de Alicante, Spain). From Feb 02, 2015 to Feb 02, 2018;
3. Proc. 401074/2014-5. Edenir R. Pereira Filho and Mario S. P. Alfonso (University of Havana, Cuba).
4. Proc. 400467/2014-3. Claudio S. Kiminami and Michael J. Kaufman (University of Illinois in Urbana-Champaign, US);
5. Proc. 401061/2014-0. Francisco T. Rantin and Edwin W. Taylor (University of Birmingham, England);
6. Proc. 401461/2014-9. Gustavo Hoepfner and Irina Mitrea (Temple University, US);
7. Proc. 401401/2014-6. Pedro M. Galetti Junior and Warren E. Johnson (Smithsonian's Conservation Biology Institute's, US). Embrapa/BNDES:
8. Structuring actions and innovation for the strengthening of Aquaculture production chains in Brazil. R$ 1.889.472,00. FINEP:
9. Conclusion of ten buildings for research: R$ 18.021.231,00. INCT-MCTI/CNPq/CAPES/FAPESP: Duration: July 1, 2017 to June 30, 2023.
10. INCT 2014: for the Biorational Control of Pest and Phytopathogen Insects. Proc. 2014/50918-7. Maria Fátima G. F. da Silva.
11. INCT 2014: Behavior, Cognition, and Teaching (ECCE): relational learning and symbolic functioning. Proc. 14/50909-8. Deisy G. de Souza.

12. INCT 2014: the Hymenoptera Parasitoids. Proc. 14/50940-2. Angélica M. P. Martins Dias. FAPESP:
13. FAPESP/GSK. Center of Excellence for Research in Sustainable Chemistry, Arlene G. Correa. R$4.095.284,65 + US$1.102.771,44. From April 01, 2016 to March 31, 2021.
14. CEPID. Center for the Development of Functional Materials Proc. 13/07296-2. Prof. Elson Longo. R$4.000.000,00/year.
15. CEPID. Center for Teaching, Research and Innovation in Glasses. Proc. 13/07793-6. Edgar D. Zanotto. From July 1, 2013 to June 30, 2018.
16. Thematic. From the cellular plant to the integrated Biodiesel-Bioethanol biorefinery: a systemic approach applied to complex problems in micro and macro scales. Proc. 16/10636-8. Roberto de C. Giordano. From Feb 01, 2017 to Jan 1, 2022.
17. Thematic. Integrated studies for the control of leafcutter ants. Proc. 12/25299-6. João B. Fernandes.
18. Thematic. Processing and characterization of amorphous, metastable and nano-structured metal alloys. Proc. 13/05987-8. Claudio S. Kiminami. From July 1, 2014 to June 30, 2019.
19. Thematic. Follow-up study of the factors limiting physical exercise and the effect of rehabilitation resources on chronic cardiorespiratory diseases - a multicentric approach. Proc. 15/26501-1. Audrey Borghi Silva. Global Values (grants and scholarships): R$1.200.000,00. From Dec 1, 2017 to Nov 30, 2022.
20. Thematic. Study of the biomechanical, sensorial, cardiorespiratory and quality of life adaptations associated to the physiotherapeutic intervention in fibromyalgia syndrome. Proc. 11/22122-5. Tania F. Salvini. From Feb 1, 2013 to Jan 31, 2018.
21. Thematic. Bioluminescence of arthropods: biological diversity in Brazilian biomes; biochemical origin; structural/functional evolution of luciferases; molecular differentiation of lanterns; biotechnological, environmental and educational applications. Proc. 10/05426-8. Vadim Viviani. From May 1, 2017 to April 30, 2022.
22. Thematic: Problems of cutting, packaging, batch sizing, production scheduling, routing, location and their integration in industrial and logistic contexts. Proc. 16/01860-1. Reinaldo Morabito Neto. From May 1, 2017 to April 30, 2022.
23. Thematic. The extracellular matrix in ageing, exercise and tumor microenvironment. Proc. 13/00798-2. Heloisa S. S. de Araújo. From Jan 1, 2014 to Dec 31, 2018.
24. Thematic: Characterization and processing of semiconductor nanostructures and applications as devices. Proc. 14/19142-2. Gilmar E. Marques. From July 1, 2015 to June 30, 2020.
25. Other: 12 grants for young researchers and several current regular grants for projects.
26. Scholarship to Internship Research Abroad (BEPE): 282 scholarships were awarded, 34 in the Biology areas, 54 in the Technology and Exact Science areas, 57 in the Humanities area, 3 in the Social Sciences and 43 in the Health Science area, 47 in Engineering, 7 in

interdisciplinary area and 27 in Linguistics, Languages, Literatures and Arts. CAPES-BRAFITEC:

27. Proc. 173/15. For innovative and sustainable engineering. Mario O. Batalha and Eric Bonjour (University of Lorraine, Nancy)
28. Proc. 196/15. Materials for Energy. Walter J. Botta Filho and Jacques Guindet (Polytech Grenoble, Grenoble)
29. Proc. 227/18. Network for the training of engineers in intelligent, autonomous and embedded systems, USP (coord), UFMG, UFSCar and Jean-François Naviner (CHIMIE ParisTech, coord).

Documents anexed

Institutional Project for Internationalization in English	21/05/2018 10:30:36
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SUMARIO EXECUTIVO	10/05/2018 10:55:21
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Presentation of the document issued by the highest	

authority (8.2.4 of the Final Tender Protocol)	09/05/2018 11:17:21
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