



Federal University of Rio Grande-FURG

- a university focused on coastal and oceanic ecosystems -

CALL AND INSTITUTION INFORMATION

Program – Capes/PrInt

Call 41/2017 – Capes/PrInt

Institution – UNIVERSIDADE FEDERAL DO RIO GRANDE-FURG

Institution acronym - FURG

PERSONAL INFORMATION

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Father's name – Ary João Secchi

Date of birth: 18th March 1970

Nationality: Brazilian / New Zealander

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INSTITUTIONAL COMMITTEE

BRAZILIAN MEMBERS

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Brazilian member 2

Name: CARLOS PRENTICE-HERNÁNDEZ

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Postgraduate Program: FOOD ENGINEERING AND SCIENCE

Field of research: Food Engineering

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Brazilian member 3

Name: MARA REGINA SANTOS DA SILVA

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Field of research: Resilience and Promotion of Family Health

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Brazilian member 4

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Postgraduate Program: AQUACULTURE

Field of research: Finfish Aquaculture

Admission date: 13 June 1994

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Brazilian member 5

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Postgraduate Program: PHYSICAL, CHEMICAL AND GEOLOGICAL OCEANOGRAPHY

Field of research: Physical Oceanography

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Brazilian member 6

Name: GILBERTO FILLMANN

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Field of research: Shellfish Aquaculture

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Foreign member 1

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DIAGNOSTICS

Strengths

Title - Upgrowth and Qualification of Graduate Programs

Justification - FURG was founded in 1969 and its first Graduate Program - Biological Oceanography - was created in 1979. The second one - Environmental Education - in 1994. Though the substantial upgrowth of FURG's graduate programs is a recent phenomenon, reflecting the alignment with the National Plan for Graduate Studies - and with the National Plan of Education, as well as the incitement to the qualification of Graduate Programs, the institution has shown continuous progress. In the Triennial Evaluation of 2013, 21 Programs were evaluated, including 21 Master's and 11 Doctoral courses. In the Quadrennial Evaluation (2013-2016), 29 programs were evaluated, of which 6 increased their grades. Health Sciences was upgraded to grade 5, Aquaculture and Physical, Chemical and Geological Oceanography moved to 6, and Biological Oceanography to 7, manifesting a performance equivalent to international standards of excellence.

Title - Cooperation with Foreign Institutions and Advisory Mechanisms

Justification - Through the Quadrennial Evaluation, especially with the programs graded 5, 6 and 7, the high-impact publications of both researchers (supervisors) and students evidenced by the number of citations per article, the nucleation of other graduate programs, active participation in national and international cooperation programs and projects, attraction of foreign students, post-doctorate abroad, joint doctorate and incitement to doctorate in co-participation and dual diploma. Approximately 50% of international cooperation is carried out with institutions located in countries registered by CAPES with the highest level of scientific cooperation with Brazil: Canada, Spain, the United States, Argentina, France, Italy, Mexico, United Kingdom, Germany, Australia and Russia. We register the participation of FURG's graduate programs in the following internationalization initiatives linked to CAPES: Humboldt, PGC, AULP, Post-Doctoral Internship, CAPES/UDELAR, COFECUB, PVE, DAAD, CAPES/DGPU, CAPES/FCT, CIÊNCIAS DO MAR (Marine Sciences). There are currently 72 cooperation agreements with foreign institutions located in 23 countries on five continents. In the year 2013, the International Relations Office - REINTER, a sector linked to the Office of the Main Dean, jointly with the Dean Office for Research and Graduate Studies, the Coordination of Program Administration and the Coordination of Follow-up to Graduate Studies were created. The structure for the reception and monitoring foreign students, carried out through the Intercultural Tutor Program is among the stand-out actions of the Coordination. FURG has a Foreign Language Teaching Center (CELE) and the offered courses follow the levels of competence proposed by the Common European Framework of Reference for Languages (CEFR). FURG also participates in the Languages Without Borders Program.

Title - Mission, Vocation and Institutional Programs

Justification - FURG's vocation - *a university focused on coastal and oceanic ecosystems* - expresses its socio-environmental commitment and its alignment with local, regional, national and global development, involving all areas of knowledge, especially the most consolidated graduate programs linked to the internationalization project: Biological Oceanography, Physical, Chemical and Geological Oceanography, Aquaculture, Food Science and Engineering, Health Sciences and Nursing. The definition of the University's philosophy has the virtue of understanding it as immediately committed to the community, prosecuting, therefore, its relevant social function developed in the most diverse promoted by the Institution activities, either with its undergraduate courses, *lato* and *stricto sensu* graduate studies, or research and outreach activities. In line with its vocation and philosophy, the Academic Production Publication Support Program and the Internationalization Support Program are Transversal Institutional Programs that express the set of initiatives of a continuous nature that aim to guarantee the achievement of the objectives and strategies defined in the Institutional Development Plan 2015/2018. The first one aims to stimulate and qualify the publication of the academic production of graduate students and teachers, especially in the English language. The second is linked to the Transversal Institutional Program of Academic Mobility and Internationalization of the University and aims to stimulate and follow the academic mobility and the dual diplomacy; as well as to create conditions for international scientific and technological exchanges in the academic post-graduate activities.

Title - Faculty

Justification - Through the training plans, FURG has been gradually increasing its number of PhDs. In 2013, there were 487 and in 2017, 645 PhDs, representing 77% of the institution's professors. Of these, about 60% work in the graduate programs and most of the PhDs linked to programs graded 5, 6 and 7 in the Capes Evaluation Process develop some international cooperation activity. Among the teachers of the programs with grades 5, 6 and 7, 61% had formal experience (full doctorate, sandwich or postdoctoral) abroad. Among the programs graded 6 and 7, this percentage rises to around 90%, demonstrating the great international insertion of programs that are involved in the FURG proposal for the Capes PrInt call. The inclusion of new PhDs in graduate programs is also stimulated through processes of collaborative insertion of co-supervision as well as accreditation and reaccreditation policies. FURG also carries out permanent hiring actions of visiting professors. In 2017, FURG has made available 32 places for hiring visiting professors to be linked to its graduate programs. The University defined the candidate's profile focused on the abroad experience, that is, the hiring of foreign or Brazilian professors with experience abroad with the objective of strengthening the institutional internationalization processes.

Title - Infrastructure

Justification - FURG's infrastructure is distributed in the Carreiros campus, located in the city of Rio Grande, and in the branch campuses in towns of Santo Antônio da Patrulha, São Lourenço do Sul and Santa Vitória do Palmar. The Carreiros campus concentrates the largest portion of the built physical area, with 115,017.46m² of the total of 206,304.06m². The infrastructure involves multiuser research centers, classrooms, administrative rooms, rooms for teachers and students, laboratories, libraries, museums, auditoriums, etc. The auditoriums are equipped with Information and Communication Technologies, with web and videoconference equipment for the implementation of classes, seminars and thesis evaluation processes. It also has a Transit Hotel for temporary lodging of students and foreign researchers. Worthy of particular note is the University's fleet with large, medium and small vessels, especially the Research Vessel "*Atlântico Sul*", designed to attend oceanographic and fishery researches. Recently (in 2017) FURG received, with resources from the Ministry of Education, the Teaching Vessel "*Ciências do Mar I*", a Floating Teaching Laboratory (LEF) that attends all the universities in southern Brazil that work on Marine Sciences. In addition, FURG has two Multiuser Centers, the Integrated Analysis Center (CIA-FURG) and the Southern Center for Electron Microscopy (CEME-SUL), both included in the Multi-User Equipment Sharing Program (ProCEM). FURG also has an Integrated Center for the development of the Extreme South Coastal Ecosystem - CIDECSUL, with a complex of auditoriums; a Marine Aquaculture Station (EMA); a Center for the Gathering of the Youth of the Sea, a social outreach program that attends young people in situations of socio-economic vulnerability; an Antarctic Supply Station - ESANTAR, which provides logistical support to Brazilian expeditions to the Antarctic Continent; and the University Hospital (HU-FURG), a model in the treatment of AIDS, tuberculosis and asthma. It has 252 beds and, being located next to the only maritime port of the State, the hospital has become a singular and reference place for basic and clinical research, all of which are of interest to national and international centers that develop diagnostic platforms and new drugs.

Weaknesses

Title - Asymmetry in the Actions of Internationalization among Graduate Programs

Justification - The number of FURG graduate programs has doubled since 2010, expanding opportunities for formation in areas yet to be developed. These programs are under their processes of qualification and consolidation; therefore, the internationalization actions are recent and more linked to the attraction of foreign students through the PAEC/OEA and ProAfri Programs. In this sense, an asymmetry is expressed in the culture of internationalization among the university's graduate programs. This asymmetry is reflected in the heterogeneity of the qualified scientific production among the graduate programs and in the level of interaction of the

research groups with foreign groups. Another aspect that demands growth in the institution is the generation of patents with foreign groups and the transfer of technology to society.

Title - Heterogeneity in the Potential for Raising Research Funds

Justification - The ability to raise funds to foster the development of research, due to the already consolidated experience of some groups, is strongly linked to programs that already offer doctoral courses. About half of the institution's graduate programs are recent and only offer master's degree courses. These programs have been strengthened by the hiring of new professors and/or by institutional capacity building actions. However, they also demand consolidation of professional actions and skills in research activities. As a consequence, there is heterogeneity in the capacity for successful application of research funding opportunities among graduate programs and research groups, hence, requiring institutional actions of support, qualification and induction to research actions.

Title - Predominance of Individual Actions of Internationalization

Justification - Historically, the culture of research funding and conceding of scholarships by Brazilian funding agencies was being carried out individually. Recently, the University' structuring and planning has contemplated actions of interdisciplinary, inter-institutional and internationalization nature. In this sense, the internationalization culture of FURG has been structured and institutionalized with the collaboration of programs, academic units and more experienced professors who have developed competences that are linked to internationalization and that influence other researchers and research groups. Therefore, internationalization is still largely concentrated in some academic units or has a more individual nature, demanding its organization and induction through institutionalized collective actions, mainstreaming the internationalization culture among graduate programs through their teaching, research, innovation, outreach and administrative activities.

Does the Institution have a defined vocation?

Yes.

Describe the vocation of your Institution

The vocation of FURG - a University focused on Coastal and Oceanic Ecosystems - was recognized in the University Council Resolution no. 14/1987, which determines the institutional philosophy and policy. This vocation defines the strategic field of action that aims to produce, organize and disseminate knowledge on the processes, complexity, dynamism and sustainability of these environments, with a view to improving the quality of life and reducing social inequalities.

Describe other relevant information about the level of internationalization of your Institution

In the CAPES Quadrennial Evaluation (2013-2016), 22% of the 27 graduate programs at FURG (excluding those in networks) were in the upper strata (5, 6 and 7). If we consider only Graduate Programs older than 10 years, the percentage rises to 43%. The performance of the Graduate Programs is equivalent to international standards of excellence, in different areas of evaluation: Biological Oceanography (Level 7 - Biodiversity), Physical Oceanography, Chemistry and Geology (Level 6 - Geosciences) and Aquaculture (Level 6 – Zootechny/Fisheries Resources), converging with the vocation of FURG as a University focused on the coastal and oceanic ecosystems. The high-impact publications of professors and students, active participation in programs and projects in national and international cooperation, attraction of foreign students and professors, doctoral exchange program (split-phd), and cotutelle and dual diploma programs are particularly noteworthy in these Graduate Programs. Approximately 90% of the permanent professors in the level 6 and 7 programs had formal experience (full doctorate, Doctoral Exchange Program (split-phd) or post-doctorate) abroad. FURG carries out permanent actions of hiring visiting professors (foreigner or Brazilian with training abroad) to work, mainly, in the graduate programs. The graduate programs at FURG participate in internationalization actions, including those linked to CAPES. There are 72 cooperation agreements with institutions in 25 countries on 5 continents. The FURG infrastructure, for internationalization actions, includes auditoriums with Information and Communication Technologies; Transit Hotel; a fleet, with emphasis on the "South Atlantic" Research Ship, equipped to attend national and international oceanographic research; and Multiuser Equipment Centers (Integrated Center of Analyses and Electronic Microscopy Center of the South), that attend research groups and Graduate Programs of FURG and external demand. FURG has an International Relations Office - REINTER, which counts on an Internationalization Committee, with a deliberative character, and the Internationalization Forum, of an advisory nature. It also has a Foreign Language Teaching Center and participates in the Languages Without Borders Program. The consolidation of internationalization at FURG is supported by several legal instruments, such as the Internationalization Policy and Internationalization Plan, the Language Policy, and the Transversal Institutional Programs for Academic Mobility and Internationalization.

INSTITUTIONAL PROJECT

Goals of the Institutional Project - The overall objective of the Proposal for Internationalization of the Federal University of Rio Grande-FURG is to create a cluster of excellence in Marine Sciences to advance knowledge, aiming at the long-term sustainability of the man-sea relationship, through 4 interconnected projects: 1) *Marine Bio/Geodiversity and Bio/Geoprospection*; 2) *Food Security and Quality of the Marine Living Resources*; 3) *Climate Change and Impacts on Coastal and Oceanic Ecosystems*; and 4) *Human Health in Coastal Ecosystems*. These projects are integrated through a multi and interdisciplinary approach to

advance problem-solving knowledge. The Project *Marine Bio/Geodiversity and Bio/Geoprospection* integrates research that addresses the identification and mapping (prospecting), monitoring the richness of biological and geological diversity of the oceans, with a special but not exclusive focus in the South Atlantic. Prospecting of geological diversity seeks the identification and mapping of minerals of economic interest including oil, gas and metallic nodules. These mineral resources are sources of energy and matter to supply part of the world economic matrix. Marine species, on the other hand, provide food and present high biotechnological potential. Thus, one way of extracting economic value from marine biodiversity is bioprospecting, which can be defined as the systematic search for organisms, genes, enzymes, compounds, processes and / or parts from marine life that may lead to product development. Bioprospecting is relevant to a wide range of sectors and activities, including biotechnology, agriculture, nutrition, the pharmaceutical and cosmetics industry, bioremediation, health, among others. In this area, the world pharmaceutical sector depends to a large extent on bioprospecting; more than half of the existing drugs have been developed from biological molecules, many of them from marine organisms. The Project *Food Security and Quality of the Marine Living Resources* investigates the potential of marine living resources from fisheries and aquaculture as a sustainable source of high quality food for the growing human population. Food security is related to ensuring everyone's right to access quality food in sufficient quantity on a permanent basis, based on healthy and sustainable practices. In this sense, national sovereignty is essential to guarantee food security from marine resources of high quality, starting from obtaining the raw material to the excellence of the final product, always respecting the cultural characteristics of each region. The Project also addresses the sustainable use of these resources by assessing their state of exploration and research on alternatives measures for fish stock management and the development of responsible aquaculture. In addition, the project investigates the potential for aggregating nutritional value to marine products (food science and technology) with low risk to human health (through the analysis of chemical and biological contaminants). The Project *Climate Change and Impacts on Coastal and Oceanic Ecosystems* aims to assess the effects of climate change on ocean dynamics and its consequences on these ecosystems, including variation or loss of biodiversity, changes in population dynamics and spatial distribution of fish stocks. It also aims at investigating potential damage to coastal structures as well as changes in the biogeochemistry and contributions of leachate contaminants from the continents, atmosphere or even remobilized from the melting of permafrost areas. An increase in the frequency of occurrence of extreme *El Niño* events has been projected for the coming decades due to factors such as global warming. This phenomenon is likely to have an impact on the biological productivity of the oceans, for example, by reducing the krill biomass around the Antarctic, affecting all the food web of the Southern Ocean that depends on this key species. Higher rainfall combined with the melting of the polar cryosphere will increase flooding, the runoff of freshwater and sediment, and raise sea level. These processes directly interfere with the rates of leaching, remobilization and inputs of natural compounds, nutrients and chemical contaminants, causing damage to agriculture, public

health and safety in coastal regions. The increasing concentration of carbon dioxide in the atmosphere, when absorbed by the oceans, causes its acidification, compromising the viability of species that depend on carbonates for the formation of their rigid structures. As a consequence, there will be changes or losses of biodiversity, which affect the resilience, functioning and potential of marine ecosystem services, including those that provide food security, such as fisheries. In addition to these environmental impacts, the increase in the average surface temperature of the planet could trigger the emergence or expansion of tropical diseases to subtropical regions, as well as raise the levels of chemical contaminants in the atmosphere, due to a greater volatilization, with impacts on the socio-environmental health. The Project *Human Health in Coastal Ecosystems* seeks to prospect and evaluate the biotechnological potential of marine resources in the production of pharmaceutical inputs and new drugs of interest and to investigate the trends and forms of control of epidemics and endemics typical of port areas or related to regions of social vulnerability, such as AIDS and other sexually transmitted diseases, hepatitis and tuberculosis. Studies on the genetic diversity of infectious agents make it possible to identify the entry into the country of exogenous strains belonging to port regions, as well as to monitor the eventual clonal dispersion of more virulent and antibiotic resistant strains. In addition, this Project aims to minimize human vulnerability related to global climate changes and the sustainability of socio-environmental health through the development of nursing, health, education, ethics and work studies and technologies, articulated to populations living in different coastal ecosystems co-responsible for the changes on their health profile. The project also aims at the diagnosis, prevention and control of diseases and threats that affect human health and quality of life in coastal ecosystems. The immense diversity of marine living resources has great potential, not only for the bioprospecting of new drugs, but also to provide food of high nutritional quality to assist in the combat against diseases and to improve the general health condition of the needy population. In this context, the formation of qualified human resources, observing the synergistic relationship among the Graduate Programs involved in this proposal, is based on a transversal approach, aiming to consolidate a cluster of excellence that is aligned with FURG's institutional vocation, contributing to the socioeconomic development and the improvement of the quality of life in the region and beyond.

THEMES AND SPECIFIC OBJECTIVES OF THE PROJECT

Theme 1 - SUSTAINABILITY IN COASTAL AND OCEANIC ECOSYSTEMS: A CLUSTER OF EXCELLENCE IN THE EXTREME SOUTH OF BRAZIL

Partner countries - Germany, USA, Australia, United Kingdom, Canada, Japan, France, Netherlands, Belgium, Italy, Spain, Argentina, Mexico.

Justification - The oceans cover more than 70% of the earth's surface and are fundamental to life on the planet. Besides its influence and regulation of the climate, its vast coastal and oceanic ecosystems harbor an immense biodiversity, largely unknown, and geodiversity not fully mapped and quantified. Biological diversity represents quality food security through fisheries and aquaculture as well as biotechnology potential. Mineral resources, in turn, are sources of energy and matter to supply part of the world economic matrix. The dynamics of the oceans and their dimensions have the potential to provide, among other services, clean energy, by means of currents, waves and tides, to add to the energy grid and enhance the country's economy. Despite this relevance, coastal and, especially, oceanic ecosystems are the least studied on the planet. Coastal regions are the most densely populated areas, with over 40% of the global population, and with the greatest projections of population growth. Large human concentrations are closely related to the increase in diseases, such as sexually transmitted infections, requiring local solutions for their prevention and control. This growth, coupled with the rapid industrial development of the last decades, accumulates pressures on these ecosystems, such as overfishing, chemical pollution (from nano to macro) and noise, among other forms of environmental degradation. Added to direct anthropogenic pressures are the impact of climate change, which includes, for example, trends in increasing the surface temperature of the planet and the concentration of carbon dioxide in the atmosphere. The synergistic effects of direct anthropogenic degradation and impacts resulting from climate change threaten the health of the oceans, jeopardizing the resilience of their ecosystems and the safety of human and non-human populations. Concern over the sustainable use of the oceans has grown at a global level. The United Nations has defined the oceans as an explicit target in the Sustainable Development Goal (SDG 14) on its 2030 Sustainable Development Agenda, and recently proclaimed 2020-2030 as the decade of the Ocean Studies. The proposal of the Federal University of Rio Grande-FURG (*Universidade Federal do Rio Grande-FURG*) is therefore aligned with these global initiatives.

Goal 1 - *Train human resources and develop research to identify, map, quantify and monitor the bio and geodiversity of the oceans and their coastal zones, with a special focus on the South Atlantic.*

Description – This Project promotes the training and specialization of students and researchers in the development of studies and actions that address the identification, mapping, prospecting, and monitoring of the biological and geological richness and diversity of the oceans and their coastal zones with a special focus on the South Atlantic. This Project will promote the following topics with missions and academic exchanges with centers of excellence abroad: 1) Bio/Geodiversity in different Brazilian sedimentary basins. These studies will make it possible to analyze geological and biological aspects in the generation of seafloor landscapes, oceanographic parameters, mineral deposits, and their influence on biodiversity, among others. The methodological approaches to studies of this magnitude, such as the use of advanced

acoustic equipment, telemetry and methods of genetic/molecular biology and stable isotopes, are constantly improving and evolving; 2) Marine pollution and its threats to biodiversity and ecosystems. In this subject, it is of fundamental importance to understand the fluxes and cycling of organic and inorganic contaminants as well as toxic blooms in coastal and oceanic environments. Among the polluting agents, plastics (from nano to macro) make up the vast majority of anthropogenic solid wastes present in marine environments and represent one of the greatest environmental problems of our time. The missions will be focused on the learning of advanced analytical techniques, interpreting results, assessing impacts and new in situ sampling methodologies; 3) Marine biodiversity and endangered species: a broad understanding of biodiversity and its relation to the ecosystem is fundamental to the development of effective conservation strategies; 4) Bioprospecting in coastal and oceanic ecosystems: in addition to providing food, marine species have enormous potential as a source of organisms, genes, enzymes and composts that can lead to the development of new products that are relevant to a wide range of economy fields, such as agriculture, pharmaceutical and cosmetics industry, biotechnology, nutrition, bioremediation, health, among others. In this sense, unlike the practices of extraction of organisms from their environment, aquaculture allows the planned production of aquatic organisms with relatively constant composition/quality throughout the year.

Goal 2 – Train human resources and investigate the potential of marine living resources from fisheries and aquaculture as a sustainable source of high quality food for the growing human population.

Description - This project addresses food security as being directly related to ensuring access to high quality food in sufficient quantity and permanently. Food security is a matter of national sovereignty. Oceans and their coastal zones have enormous relevance and will always play a key role to safeguard marine living resources for future generations. This project therefore proposes the sustainable use of these marine resources by assessing fish stocks and their state of exploration, investigating better practices of fisheries management, in addition to the development of responsible aquaculture. Besides issues related to fish (both finfish and shellfish) production *per se*, this proposal will also consider the potential of enhancing nutritional value to marine products and of developing new products through food science and technology. The proposal will also identify food resources with lower risk to human health through the analysis of chemical and biological contaminants in marine. Examples of the studies proposed here include the development of chemical (stable isotopes) and electronic (telemetry) tagging for better understanding the spatial ecology of skipjack tuna, the most important fish caught in Brazil for the production of canned tuna, for promoting sustainable fisheries with lower carbon emission; the development of integrated shrimp, fish, mollusks and macroalgae raising systems as a means of increasing simultaneously the productivity, resilience and sustainability of

aquaculture systems; and the aggregation of nutritional value to sea food usually considered as fishery residues, for popular consumption. In addition to studies such as those listed above, the project includes the qualification of students and professors in international centers of excellence in areas related to aquaculture, fisheries, and food science and technology.

Goal 3 - *Train human resources and perform research to assess the effects of global climate change on oceans and their consequences to ecosystems and society*

Description – The oceans cover $\frac{3}{4}$ of the planet's surface being one of the greatest protagonists and regulators of global climate variability. As the climate changes, fundamental properties of the oceans such as water temperature, ocean current patterns and sea level also change, with a number of consequences to their ecosystems and to society. Therefore, the project will promote the exchange of academic personnel and missions to centers of excellence focusing on the following areas: 1) Paleoceanography/Paleoclimatology: from the international perspective, paleoceanography has increasingly become a leading science for climate studies and, at the same time, it is still very incipient in Brazil. We propose missions and exchanges of students/researchers with reputed centers in paleoceanographic studies that master modern techniques for dating coastal and marine fossils, which are of essential importance for these analyzes; 2) Ocean acidification and alterations in the sea water properties: these are among the major expected consequences of climate changes and yet are poorly developed themes in Brazil. At the same time, the techniques, protocols and analyzes of these properties are in constant evolution, such as the determination of the difference of the partial pressure of CO₂ between the sea and the atmosphere; the accurate determination of the sea water salinity through the new TEOS-10 state equation and the consequences of its application, which determines the quality and scope of the analyzes in determining the role of the oceans in the climate; 3) Cryosphere, polar and high latitudes oceanography: these are among the most sensitive environments to global climate change. Academic missions and exchanges are proposed to encourage themes that are in need of development at national level, such as the autonomous monitoring of the polar oceans; cryosphere-ocean interaction through the use of remote sensors and *in situ* techniques of ablation measurements and temporal evolution of glaciers; development and training of a research group on sea ice, given its relevance for the global climate; 4) Sea level rise and coastal erosion: in Brazil, networks for monitoring and evaluating the impacts of coastal erosion due to sea level rise are in need of modeling tools and remote sensing of processes in coastal regions. The proposal includes the qualification of personnel in centers of international excellence in themes that are related to sea level rise, variation in precipitation and impacts on coastal drainage basins and extreme events.

GOAL 4 - *Train human resources, diagnose and prospect strategies for prevention and control of diseases and threats that affect human health and quality of life in coastal ecosystems.*

Description - Health can be defined as the state of complete physical, mental and social well-being. The diversity of health-related scenarios in Brazil demands the establishment of differentiated and adapted strategies for each region and each case. This project intends to carry out studies that range from neglected diseases, such as tuberculosis and intestinal parasitosis to the development of new therapeutic alternatives to infectious or not infectious diseases and to the assessment of the impact of pollutants on human health. Strategies for controlling epidemics and endemics that are typical of port regions and/or related to social vulnerability, such as AIDS and other sexually transmitted diseases will also be considered. Other issues of local relevance such as mental health, drug addiction and health in prison systems will also be taken into consideration. In addition, studies on genetic diversity of infectious agents will allow the identification of eventual in-the-country entries of exogenous strains, an inherent risk in port regions, as well as monitoring possible clonal dispersion of more virulent and antibiotic-resistant strains. Integrated with the other goals, the project will also seek prospecting, from the immense marine biodiversity, the potential for synthesis of new drugs. This project also aims to minimize human vulnerability to climate change and the sustainability of socio-environmental health, especially the potential effects on life conditions and on the spreading of tropical diseases to subtropical regions. Therefore, this project will promote the formation of highly qualified human resources, through the exchange of academic personnel and the accomplishment of missions to centers of excellence that focus on the subjects listed above. The missions will mainly converge to the learning of new methodologies and advanced analytical techniques and on the interpretation of unprecedented results. This initiative is crucial to increase efficiency in the diagnosis, prevention and control of diseases and harms that affect both human health and quality of life in coastal ecosystems.

POSTGRADUATE PROGRAMS LINKED TO THIS PROPOSAL

Theme 1 - SUSTAINABILITY IN COASTAL AND OCEANIC ECOSYSTEMS: A CLUSTER OF EXCELLENCE IN THE EXTREME SOUTH OF BRAZIL

Postgraduate Program 1 – BIOLOGICAL OCEANOGRAPHY

Capes evaluation (2017 evaluation grade) - 7

Justification – The Graduate Program in Biological Oceanography forms qualified human resources to act on the diverse coastal and oceanic ecosystems in order to generate knowledge about their biodiversity, conservation strategies, ecosystem functioning, ecological modeling and biotechnology. Several projects coordinated by the program's researchers investigate

changes induced by natural and anthropogenic factors that contribute to the comprehension of the vulnerability, adaptability and resilience of these ecosystems. These include the Long-Term Ecological Research Program (LTER) on the Patos Lagoon estuary and the adjacent marine coast in southern Brazil; SACC - An International Consortium for the Study of Oceanic Related Global and Climate Changes in South America; Climate Network – working on Coastal Areas, Blue Carbon Initiative, among others. Most of the projects are developed in partnership with international groups of different universities and research institutes in marine sciences in several continents, among which: NOAA Fisheries - Mississippi, University of Miami, Columbia University, Old Dominion University, University of South Carolina (United States), Dalhousie University (Canada), Veracruzana University (Mexico), Vrije Universiteit Brussel (Belgium), University of Georg-August (Germany), University of Groningen and Ocean Clean Up Organization (Netherlands), Institut de Recherche pour le développement and Université de Nantes (France), Institute of Marine Sciences and Polytechnic University of Valencia (Spain), University of Salford, University of Oxford and British Antarctic Survey (UK), University of Copenhagen and University of Aarhus (Denmark), University of Linköping (Sweden), University of Coimbra (Portugal) Flinders University, Southern Cross University and University of Tasmania (Australia), Pontificia Universidad Católica and Universidad de Concepción (Chile), Instituto Nacional de Desarrollo Pesquero and Centro Nacional Patagónico (Argentina), Instituto del Mar de Perú – IMARPE (Peru) and the Dirección Nacional de Recursos Acuáticos (Uruguay). This interaction with international institutions allows the analysis of problems within a global framework. Finally, the program conducts the training of doctoral candidates in the *cotutelle* system with dual degrees with Flinders University (Australia) and Vrije Universiteit Brussel (Belgium).

Postgraduate Program 2 – PHYSICAL, CHEMICAL AND GEOLOGICAL OCEANOGRAPHY
Capes evaluation (2017 evaluation grade) - 6

Justification – The Graduate Program in Physical, Chemical and Geological Oceanography develops oceanographic and coastal studies, mainly within the context of the projects " Marine Bio / Geodiversity and Bio / Geoprospection" and "Climate Change and Impacts on Marine and Coastal Ecosystems". The actions of the Program are framed in national and international activities, and include: (a) studies on the impact of sea level changes on the coastal plain of southern Brazil; (b) research into the processes responsible for triggering the acidification of sea water in different marine systems (coastal, polar, estuarine, oceanic); (c) studies on ecosystem changes and long-term changes in physical properties and ocean circulation in the South Atlantic, the Southern Ocean and Antarctica; (d) the partnership for training students in matters related to ecotoxicology and pollution in estuarine, coastal and marine environments; (e) participation in international initiatives aiming at a better understanding of biogeochemical cycles, ocean-atmosphere interactions and the large scale distribution of trace elements and their isotopes, such as GEOTRACES, SOLAS and GOA-ON; (f) development of geotechnologies for glacial monitoring; (g) paleoceanographic and paleontological studies of the

Quaternary; (h) the study of changes in the chemistry of seawater, estuarine waters and groundwater, among others. For the development of these studies and actions, the research groups associated to this Graduate Program maintain partnerships with Calvert Marine Museum, Emory University, Skidaway Institute of Oceanography, University of Georgia, University of Florida, Massachusetts Institute of Technology - MIT and Woods Hole Oceanographic Institution (USA); Alfred Wegener Institute, University of Kiel, GEOMAR Helmholtz Center for Ocean Research - Kiel, University of the German Armed Forces, Carl von Ossietzky University of Oldenburg, Max Planck Institute for Chemistry and University Muenste (Germany); British Antarctic Survey, National Oceanography Center Southampton and University of East Anglia (UK); University of Salamanca, University of Huelva and Universitat Autònoma de Barcelona (Spain); Università degli Studi di Ferrara and Consiglio Nazionale di Ricerche (Italy); University of Magallanes and Chilean Antarctic Institute (Chile); Université Bordeaux, LEGOS - Toulouse, Université de Perpignan Via Domitia (France); University of Auckland - (New Zealand); among others.

Postgraduate Program 3 – AQUACULTURE

Capes evaluation (2017 evaluation grade) - 6

Justification – The Graduate Program in Aquaculture aims to develop technologies for the production of aquatic organisms, both native and exotic adapted to local climate, with significant production potential. In addition to stimulating the production and consumption of high nutritional quality food, the Program is concerned with the sustainable development of the activity, providing scientific subsidies to significantly reduce the environmental impacts of aquaculture effluents, rich in organic matter and nutrients. In this sense, the development of methodologies for finfish and shellfish production with minimal water renewal has been improved, as in systems employing biofloc technology and in multi-trophic systems. The latter allows the production of marine shrimps, fish, mollusks and plants in an integrated system, with water recirculation and utilization of the food available in the system by several groups of organisms of different trophic levels. The ultimate goal of these researches is to provide food security and quality as well as the socio-economic development of the territory. For such, partnerships with national and international research and higher education institutions and companies are of great importance. Among them are the Waddell Mariculture Center, Texas A & M University and Auburn University (USA), Universidad Politecnica de Valencia (Spain), and Ghent University (Belgium).

Postgraduate Program 4 – FOOD ENGINEERING AND SCIENCE

Capes evaluation (2017 evaluation grade) - 5

Justification – The Graduate Program in Food Engineering and Science, taking advantage of marine biodiversity and bioprospecting, has developed research to generate and improve knowledge regarding food quality and security. These researches are conducted from the perspective of using aquatic organisms in general, availability of their functional compounds and

occurrence of contaminants in the coastal ecosystem, for the proposition of techniques for the full use of aquatic living resources, including their residues generated in the process of food preparation. In this context, researches have been developed for the recovery of bioactive substances and byproducts of the industrialization of seafood, biopolymers and production of nanocapsules to protect unsaturated fatty acids from fish oil; research related to the cultivation of microalgae involving the production of bioproducts associated with nanobiotechnology and food enriched with *Spirulina*, development of biodegradable, bioactive and intelligent packaging, as well as the determination of contaminants in the aquatic environment. For the development of these projects, the graduate program has partnerships with the United States of America (MIT - University of California, San Diego), Germany (University of Marburg, University of Bayreuth, University of Applied Sciences of Bremerhaven, and TTZ - Bremerhaven Technology Transfer Center), Spain (University of Almería, ICTAN - Institute of Food Science and Technology and Nutrition of Madrid, and IATA - Institute of Agrochemistry and Food Technology of Valencia), France (UCBL - University Claude Bernard de Lyon), Portugal (University of Lisbon), and Uruguay (UDELAR - University of the Uruguayan Republic).

Postgraduate Program 5 – HEALTH SCIENCES

Capes evaluation (2017 evaluation grade) - 5

Justification – The Graduate Program in Health Sciences develops projects integrated to the themes of Biodiversity / Bioprospection (development of new drugs and pharmaceutical inputs from marine and coastal sources - microalgae, halophytes, fish oil) and Health in Coastal Ecosystems (genetic diversity of infectious agents particularly for neglected or pandemic diseases such as tuberculosis, HIV / AIDS, hepatitis and sexually transmitted diseases, studies of chronic-degenerative diseases (Parkinson's disease) and studies of genetic polymorphism related to metabolic dysfunctions (obesity), assessment of the impact of chemical pollutants to human health. These projects have an important academic and social impact, addressing issues that are essential for regional and national public health. It is expected with this project a better understanding of those issues, allowing the formation of highly qualified human resources to confront the serious and emerging health problems, and hence offering to local, regional and national managers and decision makers the scientific evidence needed to support appropriate public policies. These projects are developed in collaboration with national and international partners, involving professor and student mobility, joint publications and projects. Among the international partners are the researchers from Yale University, University of Central Florida (USA), Ghent University (Belgium), Max Delbrück Center for Molecular Medicine, Martin Luther University Halle-Wittenberg (Germany), Università Degli Studi Di Parma (Italy), University of Nantes, Université d'Angers (France), Universidade Nova de Lisboa (Portugal), Universidad Santander, Universidad de Zaragoza (Spain).

Postgraduate Program 6 – NURSING

Capes evaluation (2017 evaluation grade) - 5

Justification – The Graduate Program in Nursing develops studies and technologies aimed at nursing, health, education, ethics and work, dedicated to populations residing in different coastal ecosystems, which are conceived as co-responsible for changes in their health profile. The Program's researches include aspects of human vulnerability related to climate changes and socio-environmental health, highlighting the relationships between individuals and social groups with conditions typical of this coastal and harbor city, such as environmental pollution as a consequence of the activities developed by local industries; the arrival of ships with crew from different parts of the country and the world; the handling of toxic loads, with risk of environmental disasters; urban and intra-family violence; the indiscriminate use of illicit substances and the spread of sexually transmitted infections, among others. In recent years, the Program has been studying the phenomenon of immigration of populations from different regions of the country, during the period of peak and decline of the naval industry, and its repercussions on human health. In this context, the Program proposes actions aimed at the diagnosis, prevention and control of diseases and harms that affect human health and quality of life. Such actions use health promotion strategies and disease prevention; investigate trends and forms to control epidemics of port regions and/or related to social vulnerability including, among others, tuberculosis, viral hepatitis, and sexually transmitted infections. The studies seek, therefore, to minimize human vulnerability related to climate changes and the sustainability of socio-environmental health. In summary, the environmental, social, cultural and institutional characteristics are references that attribute to the Program a peculiar characteristic in the process of human resources training and production of knowledge regarding human health in the coastal ecosystems. At the same time, they determine the direction of their actions in order to qualify for the confrontation of problems and respond to health demands in coastal ecosystems, which manifest locally but are of national and global scope. Internationally, the Program maintains cooperation with the Université du Québec à Trois-Rivières (UQTR) in Canada; the University of Murcia and the Universitat Rovira i Virgili in Spain and the University of Cape Verde -UniCV.

Activities Linked to the Themes

Theme 1 – SUSTAINABILITY IN COASTAL AND OCEANIC ECOSYSTEMS: A CLUSTER OF EXCELLENCE IN THE EXTREME SOUTH OF BRAZIL

Goal 1 - *Train human resources and develop research to identify, map, quantify and monitor the bio and geodiversity of the oceans and their coastal zones, with a special focus on the South Atlantic.*

Activity 1 - Performing work missions abroad to institutions of excellence for carrying out projects related to the area of marine biodiversity and geodiversity.

Start date – 01/2019

End date – 12/2021

Description – Seventy-two cooperation agreements with institutions located in 25 countries on 5 continents are in force. Work missions to institutions of excellence in the area of marine bio and geodiversity are aimed to extend and expand the terms of existing agreements or to sign new agreements to develop research and teaching projects (co-supervising, double degree, bi-national graduate studies) in international collaboration. These work missions will be conducted predominantly by coordinators of Graduate Programs, members of the Institutional Committee and outstanding professors or researchers, targeting countries that concentrate the largest number of institutions of excellence in the area of interest. The targeted institutions are located mostly in USA, Canada, Australia, and several European countries (Germany, UK, France, Italy, Spain, Belgium, the Netherlands, Sweden and Denmark). Some of these missions may be linked to major international conferences and events in the area of marine biodiversity and geodiversity.

Activity 1 - Indicator 1

Type – Quantitative

Indicator - Number of performed work missions to foreign institutions

Current situation – 4

Goal for the 2nd year – 15

Final goal - 18

Activity 1 - Indicator 2

Type – Quantitative

Indicator - Number of new agreements signed

Current situation – 21

Goal for the 2nd year – 28

Final goal – 31

Activity 2 - Attracting foreign visiting professors to develop teaching and research activities in the area of biodiversity and marine geodiversity.

Start date – 01/2020

End date – 12/2020

Description - The Federal University of Rio Grande (FURG) is internationally recognized for its excellence in the area of Marine Sciences. This performance attracts the interest of foreign researchers to develop collaborative research and teaching projects. Benefiting from this situation, it is intended to attract foreign visiting professors to work with teaching and research activities in the area of marine biodiversity and geodiversity, aiming at qualifying teaching and research at FURG as well as expanding research and teaching projects of international collaboration. Therefore, these foreign professors, when visiting FURG, are expected to qualify

teaching and research and promote cooperation agreements with their home institutions. It is also expected to attract researchers from institutions of excellence with which FURG maintains collaboration, including the National Oceanic and Atmospheric Administration (NOAA), University of Miami, Columbia University, University of South Carolina, Scripps Institution of Oceanography, Woods Hole Oceanographic Institute and Ocean Ecology Branch - Goddard Space Flight Center (USA), Dalhousie University (Canada), Vrije Universiteit Brussel (Belgium), University of Georg-August (Germany), University of Groningen and Ocean Clean Up Organization (Netherlands), Institut de Recherche pour le Développement and Université de Nantes (France), Instituto de Ciencias del Mar and Universidad Politecnica de Valencia (Spain), University of Salford, University of Oxford and British Antarctic Survey (UK), University of Copenhagen and University of Aarhus (Denmark), University of Linköping (Sweden), University of Coimbra (Portugal), Flinders University, Southern Cross University and University of Tasmania (Australia), Instituto Nacional de Investigación y Desarrollo Pesquero and Centro Nacional Patagónico (Argentina).

Activity 2 - Indicator 1

Type – Quantitative

Indicator - Number of courses taught by the visiting foreign professors

Current situation – 4

Goal for the 2nd year – 6

Final goal - 8

Activity 2 - Indicator 2

Type – Quantitative

Indicator - Number of visiting foreign professors/researchers at FURG

Current situation – 4

Goal for the 2nd year – 8

Final goal - 12

Activity 2 - Indicator 3

Type – Quantitative

Indicator - Number of new agreements signed

Current situation – 21

Goal for the 2nd year – 25

Final goal – 27

Activity 2 - Indicator 4

Type – Quantitative

Indicator - Number of articles published with foreign co-authorship per year

Current situation – 25

Goal for the 2nd year – 27

Final goal - 29

Activity 2 - Indicator 5

Type – Quantitative

Indicator - Creation of courses in new themes at FURG

Current situation – 0

Goal for the 2nd year – 1

Final goal – 2

Activity 3 - Attracting young talented researchers with experience abroad to develop teaching and research activities in the area of biodiversity and marine geodiversity.

Start date – 07/2019

End date – 07/2022

Description – The Federal University of Rio Grande (FURG) is internationally recognized for its excellence in the area of Marine Sciences. This performance attracts the interest of foreign researchers to develop collaborative research and teaching projects. Benefiting from this situation, it is intended to attract young talents with overseas experience abroad to carry out teaching and research activities in the area of marine biodiversity and geodiversity, aiming to qualify the teaching and research in the institution as well as to expand the projects in international cooperation. It is expected therefore that these young talents, on a temporary visit to FURG, qualify teaching and research and promote the signing of cooperation agreements with their institutions. These young researchers will be prospected from institutions of excellence with which FURG maintains cooperation, including the National Oceanic and Atmospheric Administration (NOAA), University of Miami, Columbia University, University of South Carolina, Scripps Institution of Oceanography, Woods Hole Oceanographic Institute and Ocean Ecology Branch - Goddard Space Flight Center (USA), Dalhousie University (Canada), Vrije Universiteit Brussel (Belgium), University of Georg-August (Germany), University of Groningen and Ocean Clean Up Organization (Netherlands), Institut de Recherche pour le Développement and Université de Nantes (France), Instituto de Ciencias del Mar and Universidad Politecnica de Valencia (Spain), University of Salford, University of Oxford and British Antarctic Survey (UK), University of Copenhagen and University of Aarhus (Denmark), University of Linköping (Sweden), University of Coimbra (Portugal), Flinders University, Southern Cross University and University of Tasmania (Australia).

Activity 3 - Indicator 1

Type – Quantitative

Indicator - Number of articles published with foreign co-authorship per year

Current situation – 25

Goal for the 2nd year – 28

Final goal - 31

Activity 3 - Indicator 2

Type – Quantitative

Indicator - Number of new agreements signed

Current situation – 21

Goal for the 2nd year – 22

Final goal – 22

Activity 3 - Indicator 3

Type – Quantitative

Indicator - Creation of courses in new themes at FURG

Current situation – 0

Goal for the 2nd year – 1

Final goal - 1

Activity 3 - Indicator 4

Type – Quantitative

Indicator - Number of young talented foreign or Brazilian researchers with experience abroad at FURG

Current situation – 5

Goal for the 2nd year – 6

Final goal – 6

Activity 4 - Developing projects and training for graduate students abroad in the field of marine bio and geodiversity.

Start date - 01/2021

End date – 07/2022

Description – For the Federal University of Rio Grande (FURG) to continue being a protagonist in the area of Marine Sciences, it is fundamental to qualify students from four of its Graduate Programs (Biological Oceanography, Physical, Chemical and Geological Oceanography, Aquaculture, and Food Engineering and Sciences), at international institutions of excellence that work with identification, mapping, prospection and monitoring the richness and biological and geological diversity of the oceans and their coastal zones. Therefore, FURG's doctoral students are expected to enhance their qualification by taking part of their research, preferably in the modality of co-supervising (*cotutelle*) with double degree, in the best research institutions that work in these areas of knowledge. These institutions include the National Oceanic and Atmospheric Administration (NOAA), University of Miami, Columbia University, University of South Carolina, Scripps Institution of Oceanography, Woods Hole Oceanographic Institute and Ocean Ecology Branch - Goddard Space Flight Center (USA) , Dalhousie University (Canada), Vrije Universiteit Brussel (Belgium), University of Georg-August (Germany), University of Groningen and Ocean Clean Up Organization (Netherlands), Institut de Recherche pour le Développement and Université de Nantes (France), Instituto de Ciencias del Mar and Universidad Politecnica de Valencia (Spain), University of Salford, University of Oxford and British Antarctic Survey (UK), University of Copenhagen and University of Aarhus (Denmark), University of Linköping (Sweden), University of Coimbra (Portugal), Flinders University, Southern Cross University and University of Tasmania (Australia).

Activity 4 - Indicator 1

Type – Quantitative

Indicator – Number of students in joint doctoral studies abroad

Current situation – 4

Goal for the 2nd year – 12

Final goal - 18

Activity 4 - Indicator 2

Type – Quantitative

Indicator - Number of students in joint doctoral studies abroad in *cotutelle* and/or dual degree

Current situation – 2

Goal for the 2nd year – 3

Final goal – 4

Activity 5 - Training professors and expanding cooperation with research groups in foreign institutions of excellence in the area of marine biodiversity and geodiversity.

Start date - 01/2020

End date – 12/2021

Description – Similarly to the previous activity, For FURG to continue being a protagonist in the area of Marine Sciences, it is fundamental to qualify professors (Junior Visiting Professor), associated to five Graduate Programs (Biological Oceanography, Physical, Chemical and Geological Oceanography, Aquaculture, Food Engineering and Sciences, and Health Sciences) of the University (Junior and Senior Visiting Professor) through collaboration with research groups of international institutions of excellence that work with identification, mapping, prospecting and monitoring the biological and geological diversity and wealth of the oceans and their coastal zones. Although some of the Graduate Programs already have a high percentage of professors with overseas experience, others still need to expand their activities at international level. Therefore, FURG's faculty are expected to expand their research potential and their level of interactions, thus signing cooperation agreements in research and teaching with outstanding research groups or researchers from foreign institutions of excellence. These institutions include the National Oceanic and Atmospheric Administration (NOAA), University of Miami, Columbia University, University of South Carolina, Scripps Institution of Oceanography, Woods Hole Oceanographic Institute and Ocean Ecology Branch - Goddard Space Flight Center (USA), Dalhousie University (Canada), Vrije Universiteit Brussel (Belgium), University of Georg-August (Germany), University of Groningen and Ocean Clean Up Organization (Netherlands), Institut de Recherche pour le Développement and Université de Nantes (France), Instituto de Ciencias del Mar e Universidad Politécnica de Valencia (Spain), University of Salford, University of Oxford and British Antarctic Survey (UK), University of Copenhagen and University of Aarhus (Denmark), University of Linköping (Sweden), University of Coimbra (Portugal), Flinders University, Southern Cross University and University of Tasmania (Australia).

Activity 5 - Indicator 1

Type – Quantitative

Indicator - Number of new agreements signed

Current situation – 21

Goal for the 2nd year – 25

Final goal - 27

Activity 5 - Indicator 2

Type – Quantitative

Indicator - Number of articles published with foreign co-authorship per year

Current situation – 25

Goal for the 2nd year – 33

Final goal - 37

Activity 5 - Indicator 3

Type – Quantitative

Indicator – Number of teachers trained abroad

Current situation – 25

Goal for the 2nd year – 29

Final goal - 31

Theme 1 – SUSTAINABILITY IN COASTAL AND OCEANIC ECOSYSTEMS: A CLUSTER OF EXCELLENCE IN THE EXTREME SOUTH OF BRAZIL

Goal 2 - *Train human resources and investigate the potential of marine living resources from fisheries and aquaculture as a sustainable source of high quality food for the growing human population.*

Activity 1 - Training professors and expanding cooperation with research groups in foreign institutions of excellence in the area of food security and quality.

Start date – 08/2018

End date - 07/2022

Description – The oceans harbor the greatest biodiversity on planet. This great diversity of marine species, in addition to providing food, has high biotechnological potential. The qualification of professors (Junior Visiting Professor), associated to three of FURG's Graduate Programs (Biological Oceanography, Aquaculture, Food Engineering and Sciences), and the increased cooperation (Junior and Senior Visiting Professors) with research groups of international institutions of excellence that have been investigating the potential of marine living resources from fisheries and aquaculture as a sustainable source of high quality food for the growing human population are actions in line with the University's social commitment. Although some of the Graduate Programs already have a high percentage of professors with overseas experience, others still need to expand their activities at international level. Therefore, these FURG's faculty are expected to broaden their research potential and level of interactions by signing cooperation agreements regarding research and teaching, with outstanding research groups or researchers representing foreign institutions of excellence. These institutions include Auburn University, Texas A&M University, Waddell Mariculture Center, University of California – San Diego, Massachusetts Institute of Technology - MIT (USA), Ghent University (Belgium), University of Marburg, University of Bayreuth, University of Applied Sciences and the Centre of Technological Transference-Bremenhaven (Germany), Universidad Politecnica de Valencia, Universidad de Almería, Instituto de Ciencia y Tecnologia de Alimentos y Nutricion – Madri, Instituto de Agroquímica y Tecnologia de Alimentos de Valencia (Spain), Université Claude Bernard (France), Universidade de Lisboa (Portugal).

Activity 1 - Indicator 1

Type – Quantitative

Indicator – Number of teachers trained abroad

Current situation – 6

Goal for the 2nd year – 6

Final goal - 8

Activity 1 - Indicator 2

Type – Quantitative

Indicator - Number of articles published with foreign co-authorship per year

Current situation – 9

Goal for the 2nd year – 11

Final goal - 18

Activity 1 - Indicator 3

Type – Quantitative

Indicator - Number of new agreements signed

Current situation – 13

Goal for the 2nd year – 18

Final goal - 20

Activity 2 - Attracting foreign visiting professors to develop teaching and research activities in the area of food security and quality.

Start date – 08/2018

End date – 07/2022

Description – The oceans harbor the greatest biodiversity on the planet. This great diversity of marine species, in addition to providing food, has broad biotechnological potential. The Federal University of Rio Grande (FURG) is internationally recognized for its excellence in the area of Marine Sciences. This performance attracts the interest of foreign researchers to develop collaborative research and teaching projects. Benefiting from this situation, it is intended to attract foreign visiting professors to work in teaching and research activities concerned with the potential of marine living resources from fisheries and aquaculture as a sustainable source of high quality food for the growing human population. These actions are in line with FURG's social commitment. It is expected therefore to attract researchers from institutions of excellence with which FURG maintains cooperation, including Auburn University, Texas A&M University, Waddell Mariculture Center, University of California-San Diego, Massachusetts Institute of

Technology - MIT (USA), Ghent University (Belgium), University of Marburg, University of Bayreuth, University of Applied Sciences and the Centre of Technological Transference-Bremenhaven (Germany), Universidad Politecnica de Valencia, Universidad de Almería, Instituto de Ciencia y Tecnologia de Alimentos y Nutricion - Madri, Instituto de Agroquimica y Tecnologia de Alimentos de Valencia (Spain), Université Claude Bernard (France), Universidade de Lisboa (Portugal).

Activity 2 - Indicator 1

Type – Quantitative

Indicator - Number of courses taught by the visiting foreign professors at FURG

Current situation – 2

Goal for the 2nd year – 3

Final goal - 4

Activity 2 - Indicator 2

Type – Quantitative

Indicator - Number of articles published with foreign co-authorship per year

Current situation – 9

Goal for the 2nd year – 12

Final goal - 15

Activity 2 - Indicator 3

Type – Quantitative

Indicator - Number of new agreements signed

Current situation – 13

Goal for the 2nd year – 18

Final goal – 20

Activity 2 - Indicator 4

Type – Quantitative

Indicator - Number of visiting foreign professors/researchers at FURG

Current situation – 2

Goal for the 2nd year – 3

Final goal - 4

Activity 2 - Indicator 5

Type – Quantitative

Indicator - Creation of courses in new themes at FURG

Current situation – 0

Goal for the 2nd year – 1

Final goal – 2

Activity 3 - Performing work missions abroad to institutions of excellence for carrying out projects related to the area of food security and quality.

Start date - 08/2018 **End date** – 12/2021

Description – Seventy-two cooperation agreements with institutions located in 25 countries on 5 continents are in force. It is intended to carry out work missions to institutions of excellence engaged in teaching and research on the potential of marine living resources from fisheries and aquaculture as a sustainable source of high quality food. Areas of interest include the development of automatic water quality monitoring systems applied to aquaculture and multi-trophic culture aimed at integrating fish species, mollusks, crustaceans and algae to reduce the environmental impacts of cultivation activity. Therefore, the work missions are expected to extend and expand the terms of existing agreements or to sign new agreements to develop research and teaching projects (co-supervising, double degree, bi-national graduate studies) in international cooperation. These work missions will be conducted predominantly by coordinators of Graduate Programs, members of the Institutional Committee and outstanding professors or researchers, aimed at countries that concentrate the largest number of institutions of excellence in the area of interest. The targeted institutions are mostly located in the United States and several European countries (Germany, France, Spain, Belgium and Portugal). Some of these missions may be linked to major international conferences and events related to food security and quality.

Activity 3 - Indicator 1

Type – Quantitative

Indicator - Number of new agreements signed

Current situation – 13

Goal for the 2nd year – 18

Final goal – 20

Activity 3 - Indicator 2

Type – Quantitative

Indicator - Number of performed work missions to foreign institutions

Current situation – 3

Goal for the 2nd year – 8

Final goal - 10

Activity 4 - Developing projects and training for graduate students abroad in the field of food security and quality.

Start date - 08/2018

End date – 07/2022

Description – It is part of FURG's social commitment to qualify students from three of its Graduate Programs (Biological Oceanography, Aquaculture, and Food Engineering and Sciences) at international institutions of excellence that investigate the potential of living resources from fisheries and aquaculture as a sustainable source of high quality food for the growing human population. The extreme south of Brazil continues being protagonist in this broad and relevant subject. The oceans harbor the greatest biodiversity on planet. This great diversity of marine species, in addition to providing food, has high biotechnological potential. Therefore, doctoral students at FURG are expected to enhance their qualification by performing part of their doctoral research, preferably in the modality of co-supervision with double degree, in the research institutions of excellence in these areas of knowledge. These institutions include Auburn University, Texas A&M University, Waddell Mariculture Center, University of California – San Diego, Massachusetts Institute of Technology - MIT (USA), Ghent University (Belgium), University of Marburg, University of Bayreuth, University of Applied Sciences and the Centre of Technological Transference-Bremenhaven (Germany), Universidad Politecnica de Valencia, Universidad de Almería, Instituto de Ciencia y Tecnologia de Alimentos y Nutricion – Madri, Instituto de Agroquímica y Tecnologia de Alimentos de Valencia (Spain), Université Claude Bernard (France), Universidade de Lisboa (Portugal).

Activity 4 - Indicator 1

Type – Quantitative

Indicator - Number of students in joint doctoral studies abroad in *cotutelle* and/or dual degree

Current situation – 2

Goal for the 2nd year – 2

Final goal - 3

Activity 4 - Indicator 2

Type – Quantitative

Indicator – Number of students in joint doctoral studies abroad

Current situation – 4

Goal for the 2nd year – 5

Final goal - 9

Theme 1 – SUSTAINABILITY IN COASTAL AND OCEANIC ECOSYSTEMS: A CLUSTER OF EXCELLENCE IN THE EXTREME SOUTH OF BRAZIL

Goal 3 - *Train human resources and perform research to assess the effects of global climate change on oceans and its consequences to ecosystems and society.*

Activity 1 - Attracting young talented researchers with overseas experience abroad to develop teaching and research activities related to climate change and impacts on ecosystems.

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

Description – The Federal University of Rio Grande-FURG is internationally recognized for its qualified academic and scientific contribution in the area of Marine Sciences, including topics related to climate change and its impacts on ecosystems. This performance attracts the interest of foreign researchers to develop collaborative research and teaching projects. Benefiting from this situation, it is intended to attract young talents with overseas experience to carry out teaching and research activities related to climate change and its impacts on coastal and oceanic ecosystems, in order to qualify teaching and research at FURG as well as expand international collaboration. Therefore, it is expected that these young talents, on a temporary visit at FURG, qualify teaching and research and promote the establishment of cooperation agreements with their home institutions. These young researchers have been prospected from institutions of excellence with which FURG maintains cooperation, including Skidaway Institute of Oceanography, University of Georgia, University of Florida, Massachusetts Institute of Technology - MIT, and Woods Hole Oceanographic Institution (USA); Alfred Wegener Institute, University of Kiel, GEOMAR Helmholtz Centre for Ocean Research – Kiel, University of the German Armed Forces, Carl von Ossietzky University of Oldenburg, Max Planck Institute for Chemistry and University Muenste (Germany); British Antarctic Survey, National Oceanography Centre Southampton and University of East Anglia (UK); Universidad de Salamanca, Universidad de Huelva and Universitat Autònoma de Barcelona (Spain); Università degli Studi di Ferrara and Consiglio Nazionale delle Ricerche (Italy); Universidad de Magallanes and Instituto Antártico Chileno (Chile); Université Bordeaux, LEGOS – Toulouse, Université de Perpignan Via Domitia (France); University of Auckland – (New Zealand).

Activity 1 - Indicator 1

Type – Quantitative

Indicator - Number of courses taught by the young talented researchers

Current situation – 1

Goal for the 2nd year – 1

Final goal - 4

Activity 1 - Indicator 2

Type – Quantitative

Indicator - Number of new agreements signed

Current situation – 19

Goal for the 2nd year – 19

Final goal – 22

Activity 1 - Indicator 3

Type – Quantitative

Indicator - Number of visiting foreign professors/researchers at FURG

Current situation – 2

Goal for the 2nd year – 2

Final goal - 5

Activity 1 - Indicator 4

Type – Quantitative

Indicator - Creation of courses in new themes at FURG

Current situation – 0

Goal for the 2nd year – 0

Final goal – 3

Activity 1 - Indicator 5

Type – Quantitative

Indicator - Number of articles published with foreign co-authorship per year

Current situation – 26

Goal for the 2nd year – 26

Final goal - 29

Activity 2 - Training professors and expanding cooperation with research groups in foreign institutions of excellence in the area of climate change and its impacts to the ecosystems.

Start date – 08/2018

End date - 07/2022

Description – The qualification of professors (Junior Visiting Professor), associated to three of FURG's Graduate Programs (Biological Oceanography, Physical, Chemistry and Geology

Oceanography, and Aquaculture) and the expansion of cooperation (Junior and Senior Visiting Professor) with research groups of international institutions of excellence in issues related to climate change and its impacts on coastal and ocean ecosystems are strategic actions for the University to continue being a protagonist in marine sciences. It is of paramount relevance to the country considering current and future global warming scenarios and all their projected effects on the environment and the quality of life, which will require qualified responses to society. While some of the Graduate Programs have a high percentage of overseas-trained professors, others still need to expand experience, at international level, on issues of global concern. Therefore, such faculty are expected to broaden their research potential and their level of interactions, by signing cooperation agreements in research and teaching with outstanding research groups or researchers from foreign institutions of excellence. These institutions include Calvert Marine Museum, Emory University, Skidaway Institute of Oceanography, University of Georgia, University of Florida, Massachusetts Institute of Technology - MIT, and Woods Hole Oceanographic Institution (USA); Alfred Wegener Institute, University of Kiel, GEOMAR Helmholtz Centre for Ocean Research – Kiel, University of the German Armed Forces, Carl von Ossietzky University of Oldenburg, Max Planck Institute for Chemistry and University Muenste (Germany); British Antarctic Survey, National Oceanography Centre Southampton and University of East Anglia (UK); Universidad de Salamanca, Universidad de Huelva and Universitat Autònoma de Barcelona (Spain); Università degli Studi di Ferrara and Consiglio Nazionale delle Ricerche (Italy); Universidad de Magallanes and Instituto Antártico Chileno (Chile); Université Bordeaux, LEGOS – Toulouse, Université de Perpignan Via Domitia (France); University of Auckland – (New Zealand).

Activity 2 - Indicator 1

Type – Quantitative

Indicator - Number of new agreements signed

Current situation – 19

Goal for the 2nd year – 28

Final goal - 33

Activity 2 - Indicator 2

Type – Quantitative

Indicator – Number of teachers trained abroad

Current situation – 22

Goal for the 2nd year – 26

Final goal - 26

Activity 2 - Indicator 3

Type – Quantitative

Indicator - Number of articles published with foreign co-authorship per year

Current situation – 26

Goal for the 2nd year – 41

Final goal – 45

Activity 3 - Developing projects and training for graduate students abroad in the field of climate change and its impacts to the ecosystems.

Start date - 08/2018

End date – 07/2022

Description – For the Federal University of Rio Grande (FURG) to continue being a protagonist in the field of Marine Sciences, improving the qualification of students, from three of its Graduate Programs (Biological Oceanography, Physical, Chemistry and Geology Oceanography, and Aquaculture) at international institutions of excellence in the area of climate change and its impacts on coastal and oceanic ecosystems is fundamental. Therefore, FURG's doctoral students are expected to enhance their qualification by performing part of their doctoral research, preferably in the modality of co-supervision (*cotutelle*) with dual diploma, in research and higher education institutions of excellence. These institutions include Calvert Marine Museum, Emory University, Skidaway Institute of Oceanography, University of Georgia, University of Florida, Massachusetts Institute of Technology - MIT, and Woods Hole Oceanographic Institution (USA); Alfred Wegener Institute, University of Kiel, GEOMAR Helmholtz Centre for Ocean Research – Kiel, University of the German Armed Forces, Carl von Ossietzky University of Oldenburg, Max Planck Institute for Chemistry and University Muenster (Germany); British Antarctic Survey, National Oceanography Centre Southampton and University of East Anglia (UK); Universidad de Salamanca, Universidad de Huelva and Universitat Autònoma de Barcelona (Spain); Università degli Studi di Ferrara and Consiglio Nazionale delle Ricerche (Italy); Universidad de Magallanes and Instituto Antártico Chileno (Chile); Université Bordeaux, LEGOS – Toulouse, Université de Perpignan Via Domitia (France); University of Auckland – (New Zealand).

Activity 3 - Indicator 1

Type – Quantitative

Indicator - Number of students in joint doctoral studies abroad in *cotutelle* and/or dual degree

Current situation – 2

Goal for the 2nd year – 5

Final goal - 5

Activity 3 - Indicator 2

Type – Quantitative

Indicator – Number of students in joint doctoral studies abroad

Current situation – 4

Goal for the 2nd year – 12

Final goal - 13

Activity 4 - Attracting foreign visiting professors to develop teaching and research activities in the area of climate change and its impacts to the ecosystems.

Start date – 08/2018

End date – 07/2022

Description – The Federal University of Rio Grande-FURG is internationally recognized for its excellence in Marine Sciences. This qualification attracts the interest of foreign researchers to develop collaborative research and teaching projects. Benefiting from this situation, it is intended to attract foreign visiting professors (PVE) to work in teaching and research activities related to climate change and its impacts on ecosystems. This inbound mobility is expected to qualify teaching and research at FURG and to expand research and teaching projects in international cooperation. It is hoped to attract researchers from institutions of excellence with which FURG maintains collaboration, including Calvert Marine Museum, Emory University, Skidaway Institute of Oceanography, University of Georgia, University of Florida, Massachusetts Institute of Technology - MIT, and Woods Hole Oceanographic Institution (USA); Alfred Wegener Institute, University of Kiel, GEOMAR Helmholtz Centre for Ocean Research – Kiel, University of the German Armed Forces, Carl von Ossietzky University of Oldenburg, Max Planck Institute for Chemistry and University Muenste (Germany); British Antarctic Survey, National Oceanography Centre Southampton and University of East Anglia (UK); Universidad de Salamanca, Universidad de Huelva and Universitat Autònoma de Barcelona (Spain); Università degli Studi di Ferrara and Consiglio Nazionale delle Ricerche (Italy); Universidad de Magallanes and Instituto Antártico Chileno (Chile); Université Bordeaux, LEGOS – Toulouse, Université de Perpignan Via Domitia (France); University of Auckland – (New Zealand).

Activity 4 - Indicator 1

Type – Quantitative

Indicator - Number of courses taught by the visiting foreign professors at FURG

Current situation – 2

Goal for the 2nd year – 5

Final goal - 5

Activity 4 - Indicator 2

Type – Quantitative

Indicator - Number of new agreements signed

Current situation – 19

Goal for the 2nd year – 27

Final goal – 32

Activity 4 - Indicator 3

Type – Quantitative

Indicator - Number of articles published with foreign co-authorship per year

Current situation – 26

Goal for the 2nd year – 40

Final goal - 44

Activity 4 - Indicator 4

Type – Quantitative

Indicator - Number of visiting foreign professors/researchers at FURG

Current situation – 2

Goal for the 2nd year – 5

Final goal - 5

Activity 4 - Indicator 5

Type – Quantitative

Indicator - Creation of courses in new themes at FURG

Current situation – 0

Goal for the 2nd year – 1

Final goal – 2

Activity 5 - Performing work missions abroad to institutions of excellence for carrying out projects related to the area of climate change and its impacts to the ecosystems.

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

Description – The Federal University of Rio Grande-FURG is internationally recognized for its leading role in the area of Marine Sciences, including in topics related to climate change and its impacts on ecosystems. This leading role arouses the interest of foreign researchers to develop collaborative research and teaching projects. There are 72 cooperation agreements with

institutions located in 25 countries of five continents. The work missions to institutions of excellence on issues related to climate change and its impacts on ecosystems aim to broaden existing or establishing new agreements for the development of research and teaching projects (*cotutelle*, dual degree, bi-national graduate programs) in international cooperation. These work missions will be conducted predominantly by coordinators of Graduate Programs, members of the Institutional Committee and outstanding professors or researchers, targeting countries that concentrate the largest number of institutions of excellence in the area of interest, including the United States, Germany, the United Kingdom, France, Spain, Italy, Japan, Australia and New Zealand. Some of these missions may be linked to major international conferences and events on climate change.

Activity 5 - Indicator 1

Type – Quantitative

Indicator - Number of performed work missions to foreign institutions

Current situation – 2

Goal for the 2nd year – 4

Final goal - 9

Activity 5 - Indicator 2

Type – Quantitative

Indicator - Number of new agreements signed

Current situation – 19

Goal for the 2nd year – 23

Final goal - 28

Theme 1 – SUSTAINABILITY IN COASTAL AND OCEANIC ECOSYSTEMS: A CLUSTER OF EXCELLENCE IN THE EXTREME SOUTH OF BRAZIL

Goal 4 - *Train human resources, diagnose and prospect strategies for prevention and control of diseases and threats that affect human health and quality of life in coastal ecosystems.*

Activity 1 - Attracting foreign visiting professors to develop teaching and research activities in the area of human health and quality of life in coastal ecosystems.

Start date – 08/2018

End date – 07/2022

Description – The Federal University of Rio Grande (FURG) has strong performance in the area of human health and quality of life in coastal ecosystems. The two Graduate Programs involved in this area, however, need to further their level of internationalization. Thus, it is intended to attract foreign visiting professors to work in teaching and research activities in this

area, aiming at qualifying teaching and research at FURG and expanding collaboration projects with international research and higher education institutions of excellence in the areas of human health in coastal ecosystems. It is expected that these visiting professors, when visiting FURG, will qualify teaching and research and promote cooperation agreements with their home institutions. Visiting researchers are prospected from institutions of excellence with which FURG maintains cooperation. These institutions include Yale University, University of Central Florida (USA), Ghent University (Belgium), Max Delbrück Center for Molecular Medicine, Martin Luther Universität Halle-Wittenberg (Germany), Université du Québec à Trois-Rivières (Canada), Università degli Studi di Parma (Italy), Université de Nantes, Université d'Angers (France), Universidade Nova de Lisboa (Portugal), Universidad Santander, Universidad de Zaragoza, Universidade de Murcia and Universitat Rovira i Virgili (Spain).

Activity 1 - Indicator 1

Type – Quantitative

Indicator - Number of articles published with foreign co-authorship per year

Current situation – 16

Goal for the 2nd year – 16

Final goal - 19

Activity 1 - Indicator 2

Type – Quantitative

Indicator - Number of new agreements signed

Current situation – 18

Goal for the 2nd year – 18

Final goal – 19

Activity 1 - Indicator 3

Type – Quantitative

Indicator - Creation of courses in new themes at FURG

Current situation – 0

Goal for the 2nd year – 1

Final goal – 1

Activity 1 - Indicator 4

Type – Quantitative

Indicator - Number of visiting foreign professors/researchers at FURG

Current situation – 1

Goal for the 2nd year – 1

Final goal – 2

Activity 1 - Indicator 5

Type – Quantitative

Indicator - Number of courses taught by the visiting foreign professors at FURG

Current situation – 4

Goal for the 2nd year – 5

Final goal - 5

Activity 2 - Performing work missions abroad to institutions of excellence for carrying out projects related to the area of human health and quality of life in coastal ecosystems.

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

Description – The Federal University of Rio Grande (FURG) has strong performance in the area of Human Health and quality of life in coastal ecosystems. Although there are 72 cooperation agreements with institutions located in 25 countries on 5 continents, international agreements in the area of health are still limited to a few countries. The work missions in institutions of excellence in areas related to human health and quality of life in coastal ecosystems are aimed to expand existing or fostering new agreements to develop research and teaching projects (co-supervising, dual degree, bi-national graduate programs) in international collaboration. These work missions will be conducted predominantly by coordinators of Graduate Programs, members of the Institutional Committee and outstanding professors or researchers, and will target countries that concentrate a large number of institutions of excellence in the area of interest, including the United States, the United Kingdom, Belgium, Germany, Canada, Italy, France and Spain. Some of these missions may be linked to major international conferences and events in the area of human health and quality of life.

Activity 2 - Indicator 1

Type – Quantitative

Indicator - Number of performed work missions to foreign institutions

Current situation – 4

Goal for the 2nd year – 8

Final goal – 9

Activity 2 - Indicator 2

Type – Quantitative

Indicator - Number of new agreements signed

Current situation – 18

Goal for the 2nd year – 22

Final goal – 23

Activity 3 - Attracting researchers with experience abroad to post-doctoral activities in the area of human health and quality of life in coastal ecosystems.

Start date – 08/2018

End date – 07/2022

Description – The Federal University of Rio Grande (FURG) is internationally recognized for its excellence in the field of Marine Sciences. This qualification may attract the interest of foreign researchers to develop collaborative research and teaching projects in less internationalized areas such as human health and quality of life in coastal ecosystems. Therefore, these young talents are expected, on a temporary visit at FURG, to enhance quality in teaching and research activities and to foster collaboration agreements with their home institutions. These young researchers will be prospected from institutions of excellence with which FURG maintains cooperation, including Yale University, University of Central Florida (USA), Ghent University (Belgium), Max Delbrück Center for Molecular Medicine, Martin Luther Universität Halle-Wittenberg (Germany), Université du Québec à Trois-Rivières (Canada), Università degli Studi di Parma (Italy), Université de Nantes, Université d'Angers (France), Universidade Nova de Lisboa (Portugal), Universidad Santander, Universidad de Zaragoza, Universidad de Murcia and Universitat Rovira i Virgili (Spain).

Activity 3 - Indicator 1

Type – Quantitative

Indicator - Number of courses taught by the researcher with experience abroad

Current situation – 2

Goal for the 2nd year – 3

Final goal - 4

Activity 3 - Indicator 2

Type – Quantitative

Indicator - Number of articles published with foreign co-authorship per year

Current situation – 4

Goal for the 2nd year – 7

Final goal – 10

Activity 3 - Indicator 3

Type – Quantitative

Indicator - Number of post-doctoral fellows with experience abroad at FURG

Current situation – 4

Goal for the 2nd year – 5

Final goal – 6

Activity 4 - Training professors and expanding cooperation with research groups in foreign institutions of excellence in the area of human health and quality of life in coastal ecosystems.

Start date – 08/2018

End date - 07/2022

Description – For FURG to expand its capacity to meet the demands of society, it is essential to qualify professors (Junior Visiting Professor), linked to two of its Graduate Programs (Health Sciences and Nursing) and to expand cooperation (Junior and Senior Visiting Professor) with research groups of international institutions of excellence in the area of human health in coastal ecosystems. The faculty of both Health Sciences and Nursing Programs need to broaden their experience at international level. Therefore, these professors are expected to expand their interaction with outstanding research groups or researchers from foreign institutions of excellence, hence increasing their international collaboration and research potential in matters of broad interest. The aimed institutions include Yale University, University of Central Florida (USA), Ghent University (Belgium), Max Delbrück Center for Molecular Medicine, Martin Luther Universitat Halle-Wittenberg (Germany), Université du Québec à Trois-Rivières (Canada), Università degli Studi di Parma (Italy), Université de Nantes, Université d'Angers (France), Universidade Nova de Lisboa (Portugal), Universidad Santander, Universidad de Zaragoza, Universidade de Murcia and Universitat Rovira i Virgili (Spain).

Activity 4 - Indicator 1

Type – Quantitative

Indicator – Number of teachers trained abroad

Current situation – 10

Goal for the 2nd year – 15

Final goal - 19

Activity 4 - Indicator 2

Type – Quantitative

Indicator - Number of new agreements signed

Current situation – 18

Goal for the 2nd year – 23

Final goal - 27

Activity 4 - Indicator 3

Type – Quantitative

Indicator - Number of articles published with foreign co-authorship per year

Current situation – 16

Goal for the 2nd year – 21

Final goal – 25

Activity 5 - Developing projects and training for graduate students abroad in the field of human health and quality of life in coastal ecosystems.

Start date - 08/2018

End date – 07/2022

Description – Qualification of students, from two Graduate Programs (Health Sciences and Nursing) of the Federal University of Rio Grande (FURG), at international institutions of excellence that work in the area of human health and quality of life in ecosystems, is essential for FURG to expand its capacity to meet the demands of society. Therefore, FURG doctoral students are expected to improve their qualification by performing part of their doctoral research, preferably in the modality of co-supervising (*cotutelle*) with dual degree, in research and higher education institutions of excellence in the areas of human health in coastal ecosystems. These institutions include Yale University, University of Central Florida (USA), Ghent University (Belgium), Max Delbrück Center for Molecular Medicine, Martin Luther Universität Halle-Wittenberg (Germany), Université du Québec à Trois-Rivières (Canada), Università degli Studi di Parma (Italy), Université de Nantes, Université d'Angers (France), Universidade Nova de Lisboa (Portugal), Universidad Santander, Universidad de Zaragoza, Universidade de Murcia and Universitat Rovira i Virgili (Spain).

Activity 5 - Indicator 1

Type – Quantitative

Indicator – Number of students in joint doctoral studies abroad

Current situation – 4

Goal for the 2nd year – 6

Final goal - 8

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.

The strategies for building and consolidating international partnerships are linked to the Institutional Development Plan -2015/2018, which consists of: expanding the activities of the International Office (REINTER); expanding exchanges with universities and research institutes; expanding exchanges with institutions funding culture, science and technology; disseminating the institutional mission and its actions; and strengthening the institutional image. These strategies are supported by the Internationalization Policy and by specific actions linked to the strategic axes of the FURG Internationalization Plan (IP-FURG). We highlight Axes II: strengthen insertion and international visibility; III: increase the participation of students and staff in undergraduate, graduate and other academic and administrative actions in foreign institutions; IV: enhance the performance of foreign students, researchers and professors in undergraduate, graduate and administrative activities at FURG; V: encourage training opportunities under a *cotutelle* scheme with dual degrees abroad; VII: increase institutional participation in international research publications and consortia; and VIII: structure a coordination and support center for internationalization.

Many of these strategies are facilitated by the membership of FURG in international institutional cooperation organizations, such as the Coimbra Group of Brazilian Universities (GCUB), Association of the Montevideo Group of Universities, Association of Portuguese Language Universities and the Tordesillas Group. FURG participates in academic mobility programs under the GCUB group, Student Agreement Program (PEC-G and PEC-PG) of the MRE (Ministry of External Relations) and CAPES International Baccalaureate Program. FURG's Graduate Programs also participate in CAPES-related internationalization programs, including Marine Sciences (Ciencias do Mar call), Humboldt, DAAD and CAPES/DGPU. There are 72 cooperation agreements with institutions in 25 countries on 5 continents. There are also many informal "researcher-researcher" partnerships with international research groups.

In general, the consolidation of the partnerships takes place through the actions of mobility, institutionalization and publicity of the agreements with foreign institutions, training abroad [postdoctoral, Doctoral Exchange Program (joint doctoral), co-supervision (*cotutelle*) and dual degree, strategic work missions] and establishment of international projects network.

2. Strategy to attract foreign students to Brazil.

Specific actions of the Strategic Axes of IP-FURG are essential for attracting foreign students. Axes II: strengthen insertion and international visibility; III: increase the participation of students and staff in undergraduate, graduate and other academic and administrative actions in foreign

institutions; IV: enhance the performance of foreign students, researchers and professors in undergraduate, graduate and administrative activities at FURG; V: encourage training opportunities under a *cotutelle* scheme with dual degrees abroad; altogether have a set of actions that, combined, enhance the effectiveness of strategies to attract foreign students.

The International Office (REINTER) and the academic and administrative units continuously disseminate the FURG's potential in Brazil and abroad for the training of human resources and the development of high-impact research on topics of national and international interest. Websites of Graduate programs, Graduate Programs and Research Groups Catalogs are available in bi/trilingual formats. REINTER and the FURG researchers actively prospect international partnerships for the development of teaching and research in the various fields of knowledge. In addition to existing international cooperation agreements, there are informal agreements between researchers that include active and passive academic mobility. The application of candidate selection tests to the Graduate Programs carried out abroad is also part of the strategies for attracting foreign students. In accordance with its Language Policy, Internationalization Policy and Institutional Plan, FURG offers, through the Center for the Teaching of Foreign Languages (CELE), Portuguese language classes for foreigners. In the most consolidated graduate programs, the didactic material is available in Portuguese and English and the subjects, if necessary, are offered in a foreign language.

The insertion of FURG in the Coimbra Group of Brazilian Universities, the Association of Montevideo Universities Group and Association of Portuguese Language Universities, as well as the Tordesillas Group, and its participation in several academic mobility programs (e.g. PAEC/OEA, PEC-PG, Erasmus +, and BE-a-DOC) allow for the development of strategies to attract foreign students. The PAEC/OEA program, for example, supports graduate students in higher education in the Americas by granting scholarships for master's and doctoral degrees; in 2018, 47 students were benefited at FURG.

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

The strategies of attracting professors and researchers with international experience are linked to specific actions of the Strategic Axes of the IP-FURG. Axes II, III, IV; and V involve multiple actions related to visibility, with the disclosure, in foreign institutions, of activities and infrastructure (research potential) of FURG; consolidation and expansion of international mobility programs for which FURG is a participant; and expansion of international agreements that facilitate the process of exchange in teaching and research. In addition, the attraction of professors and researchers from abroad for a temporary stay at FURG is due to the widespread dissemination of postdoctoral fellowships and hiring of Foreign Visiting Professors (FVP) or Brazilians with formal experience abroad. In 2017, 32 positions were made available for hiring FVPs via a Simplified Selection Process. The FVP is hired for a period of 2 years, renewable for a further 2, and can thus interact with research groups and become involved in undergraduate and graduate studies. This institutional action is also in line with the Institutional Pedagogical Project (IPP) and the Institutional Development Plan (IDP) and aims to attract researchers of

recognized scientific and academic production, to participate at least 75% of the time in the graduate programs and thus contribute to the development, strengthening or creation of *stricto sensu* Graduate Programs. In addition to the agreements signed with foreign institutions, numerous informal “researcher-researcher” partnerships with international research groups facilitate the dissemination of FURG's scientific potential and the attraction of foreign and Brazilian professors and researchers with international experience.

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.

The professor/student preparation strategies are guided by the principles and objectives of the Internationalization Policy and Axis III of the Internationalization Plan: To increase the participation of FURG students and staff in undergraduate and graduate courses, as well as in different actions in academic and administrative institutions in foreign institutions. The following actions are taken from this axis: a) to offer exchange opportunities with universities with cooperation agreements with FURG through the FREE MOBILITY CALL; b) hold a seminar for the preparation of exchange students, meeting the growing concept of Internationalization at Home; c) conduct an Evaluation Seminar for exchange students; d) establish Internship Abroad Program; e) organize a permanent mobility calendar (CALLS); f) to stimulate the provision of foreign language courses for the student and faculty, as well as administrative staff. This last action aims to contribute to the pursuit of the excellence in internationalization, observing the guidelines of the Language Policy of FURG.

The actions involving administrative instrumentation, such as cooperation agreements, the execution of calls for exchange opportunities and visa arrangements, are developed by REINTER. The training and follow-up actions of the academic processes are developed by the coordination of the Programs and by the Dean of Research and Graduate Studies. The appropriation of the formative experience, upon the return of the developed activities, is carried out through extensive seminars to the teachers and students of the institution.

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

FURG conducts a robust and wide dissemination and communication plan, in order to qualify and expand its image abroad. Through an initiative of its Social Communication Office (SECOM), work is ongoing on the restructuring and proposition of new platforms to support the visibility of the institution. This includes the restructuring of its WEB page, the generation of printed material for dissemination and the production of institutional videos. More recently, joint efforts between SECOM and the International Office (REINTER) have produced bi or trilingual institutional publicity materials geared specifically to the visibility of the university abroad.

FURG, in the search for a greater effectiveness of the internationalization actions that involve the academic mobility, advances in the curricular flexibilization. This flexibility, one of the principles of the Internationalization Policy, is included in PI-FURG Axis III and is considered as a necessity to qualify the academic mobility, by allowing the recognition of the credits of courses taken abroad. In addition, IP-FURG's Axis V - Intensify FURG's interactions with society and public authorities, with the objective of increasing the promotion of internationalization actions - provides, among its actions, internationalization events open to the community at large ("Countries Day"). These events allow the community to become familiar with the characteristic elements of the countries of origin of international students, as well as to provide an opportunity to interact with the participating community. These elements would contribute to greater cultural integration between our foreign students and the local community.

FURG's proposal aims at establishing an integration between the Graduate Programs that are involved in Marine Sciences, Food Security and Health in Coastal Ecosystems. This proposal follows a rationale of transversal action, to consolidate a cluster of excellence that fits the institutional vocation, aiming, in the long term, for socioeconomic development and improvement of the quality of life in the region and beyond. This cluster seeks the interaction between the graduate programs, aiming at the transfer of know-how in internationalization actions from the most consolidated programs (CAPES grades 6 and 7) to the less consolidated ones (grade 5) in priority areas. This strategy intends to consolidate internationalization among the programs inserted in the proposal with the vision of extending it to the other programs.

POLICIES

1. 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).

The policy of choosing foreign partners is based on the research expertise and excellence of foreign researchers, groups and institutions, as well as on the interactions and inductions provided through the specific calls for funding agencies and university associations, such as the actions arising from the Coimbra Group of Brazilian Universities (GCUB). Currently, about 50% of the cooperation agreements in force at FURG have been carried out with the institutions of the countries with which CAPES has partnerships. Among the most relevant results, we highlight the accomplishment of research in cooperation, funding, publications in co-authorship with foreign researchers, co-supervision (*cotutelle*), dual degrees and the participation of foreign researchers in graduate program theses/dissertations defenses and FURG professors in theses/dissertations evaluations in foreign institutions. On a smaller scale, cooperation, solidarity and nucleation actions are also included, as in the case of projects in cooperation with African institutions (CAPES/AULP).

The recent inclusion of FURG in the Association of Montevideo Universities Group (AUGM) has extended its possibilities for the improvement of policies or practices of choosing international partners. More specifically, by taking part in the AUGM ESCALA Program, the opportunity is open to negotiate, on a case-by-case basis and among the members of the association, in all mobility actions, that include students, faculty and administrative staff. In forums like this or in others similar, FURG can choose to collaborate internationally, based on its Internationalization Policy or its Official Philosophy of a university focused on coastal and oceanic ecosystems. This institutional uniqueness facilitates the definition of counterparts in a previously adopted context.

2. 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.

The policy of internal selection of specific actions and beneficiaries of the specific funding actions of the Capes-PrInt Program are based on the monitoring and diagnosis of the expertise, potentials and institutional demands. That is to say, they are linked to the objectives and strategies of the Institutional Development Plan (IDP), the Internationalization Policy and Plan, as well as the history of the actions and experiences developed by the different Graduate Programs. In this sense, the beneficiaries will be chosen through a public call, to be organized and coordinated by the Institutional Committee, directed to the faculty and students of the Graduate Programs that integrate the proposal. The following criteria will be considered: linking the research proposal with the scope and the objectives of the internationalization project; convergence and feasibility of the goals with the institutional project of internationalization; indicators of ongoing cooperation actions with the foreign institution; experiences in teaching, supervision, publications and coordination of research and proficiency according to CAPES regulations. The internal selection of actions and beneficiaries will follow the principle of transparency in the dissemination of financing opportunities, which will be made by public calls. The calls will contain details of the criteria of merit and, in the case of scholarships, ineligibility criteria, according to normative instruments, and foreign language proficiency requirements.

Priority will be given to actions that aim to fill gaps or deficiencies in key knowledge areas to increase the probability of success of the Institutional Project of Internationalization. These must have quality and value the choice of the partner institution based on academic excellence in the area of the proposal, especially those with which there is an established and effective partnership (e.g. qualified scientific/technological production) and, preferably, involving institutions with a matching financial support (e.g. with exemption or reduction of academic and administrative fees).

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

The policy of hiring professors with recognized international scientific performance is linked to the Internationalization Policy and the Axes of the Internationalization Plan: 1) Establish guidelines for the elaboration of Strategic Internationalization Plans. Proposed action: Elaborate a Plan of Attraction and Fixation of Professors and Researchers from Abroad. The attraction and fixation of professors from abroad at FURG, temporarily or permanently is an action that aims to contribute to the qualification of undergraduate courses, and especially graduate programs, training processes and the production of knowledge in research groups, and for the internationalization of the University. It also enhances existing actions such as the hiring of Foreign Visiting Professor or Brazilian with formal experience abroad.

The hiring of professors with recognized scientific performance at an international level can be carried out through the regular processes of selection of professors, Post-Doctoral Interns and Visiting Professors. In 2017, there were 32 vacancies for Visiting Professor in a Simplified Selection Process. The hiring has the aim of bringing a visiting professor, foreign or Brazilian with formal experience abroad, of recognized scientific and academic production, to support the execution of teaching, research and outreach activities; as well as contribute to the development, strengthening or creation of *stricto sensu* graduate programs, in accordance with the Institutional Pedagogical Project (IPP) and the Institutional Development Plan (IDP).

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

This policy is linked to FURG's Language Policy and to Axis III of the Internationalization Policy: To increase the participation of FURG students and staff in undergraduate and graduate courses, as well as in different academic and administrative actions in foreign institutions. One of the actions envisaged is to stimulate the provision of foreign language courses for the student and faculty and for the administrative staff, contributing to the pursuit of the excellence of internationalization, observing the guidelines of the Language Policy of FURG. FURG also participates in the Languages Without Borders Program, applies the TOEFL ITP exams and has a Foreign Language Teaching Center (CELE) that offers face-to-face classes at different levels and languages (English, French, Spanish and possibly Italian).

The students of the programs involved in the proposed Institutional Internationalization Project will also be able to increase their proficiency by accessing courses with didactic material produced in English. In addition, with the increase in internationalization at FURG, the institution has been preparing to expand its "internationalization culture" through its Internationalization Policy and Plan. The most consolidated programs, which will be directly related to the Institutional Internationalization Project, present a large number of teachers with experience abroad and an established internationalization culture. This culture should propagate from the most consolidated to the less consolidated programs, using the proposal's cluster structure.

In relation to personnel involved in administrative activities focused on internationalization, the REINTER team is proficient in English or has English as a first language. The geographical position of FURG, near the border with Uruguay, favors the understanding of Spanish by many staff. It is also intended to encourage the increase of proficiency in English for technical administrative staff linked to the secretarial activities of the coordination of graduate programs and related deans.

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

This policy is contemplated in Axis III of the Internationalization Plan: to increase the participation of FURG students and staff in undergraduate and graduate courses, as well as in different academic and administrative actions in foreign institutions. One of the actions envisaged is to stimulate curricular flexibilization, as it is considered as a necessity to qualify the academic mobility, by allowing the complete recognition of credits referring to subjects studied abroad. This policy is also contemplated by the University's Mobility Program, which informs the procedures for the recognition of academic and scientific activities carried out abroad.

The Internationalization Plan also foresees the incentive to training opportunities under a *cotutelle* regime abroad with dual degrees. The actions in this strategic axis are thought of within an advanced scope of international academic cooperation. A *cotutelle* scheme abroad with dual degrees is configured ultimately as a mutual recognition of the desired quality or excellence in graduate programs. In addition, graduate programs participants in the *cotutelle* scheme tend to provide the conditions for international scientific cooperation between advisors or thesis tutors, raising the possibility of expanding integration through research projects. It is worth mentioning, that for a proposed *cotutelle* scheme, the eventual offer of graduate courses in foreign languages at FURG is of utmost importance.

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

One of the actions foreseen in the Internationalization Plan is to hold an Integration Seminar for foreign students, facilitating the process of adaptation of the participants, as well as the academic processes in which they will be involved during their period at FURG. The Intercultural Tutor project developed by the Office of the Dean of Research and Graduate Studies is an example. This is intended for students regularly enrolled in graduate programs, which will receive foreign students. The tutoring is carried out on a voluntary basis, with no compensation for the hours worked and no type of employment relationship with the University. Tutoring activities are developed in the first semester of each year and certified as a 60-hour outreach activity that, at the discretion of the Graduate Program, may be counted as complementary activities. Among the welcoming actions, we highlight the participation in the FURG Citizen's Welcome Program, the monthly meetings of students and tutors, and the holding of intercultural seminars, developed by foreign students for cultural socialization. In its

Internationalization Plan (Axis VI), FURG plans to carry out, as from 2018, the “Country Day”. It will be characterized as an internationalization event open to the community, allowing the society to know the characteristic elements of the countries of origin of international students, as well as giving them an opportunity to interact with the participating community. These elements would contribute to a greater cultural integration between our foreign students and the host community. As part of the welcoming policy, FURG has a Transit Hotel, a self-catered, non-en suite accommodation of up to 2 months for students, professors and foreign researchers. The Hotel is within the university campus, facilitating the mobility of the visitor. In addition, in order to ease the adaptation process, and in accordance with the Language Policy, Internationalization Policy and IP-FURG, FURG offers, through the Center for the Teaching of Foreign Languages (CELE), Portuguese language classes for foreigners.

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

The appropriation of knowledge and learning experience acquired abroad will occur at different levels. The students benefited will be encouraged to hold seminars, extended to the faculty and students of the institution as well as share the knowledge acquired to other students. Faculty, on the other hand, will be encouraged, to create lines of research and disciplines in the theme of the experience gained. The visit of the foreign researchers will be linked to specific actions of qualification of the teaching, especially of *stricto sensu* graduate programs, of the research and innovation of FURG. These foreign researchers will teach short courses or courses of theoretical or technical training, and will interact with research groups and University students. Fundamentally, the cluster structure of the proposal seeks to mainstream, among the academic units, the knowledge acquired by the beneficiaries of the actions.

8. Policy for management and operationalization of the Institutional Internationalization Project.

The management and operationalization will follow the Institutional Plan of Internationalization of FURG and will be conducted by the office of the Dean of Research and Graduate studies and by the Institutional Committee, with support from the Office of International Relations - REINTER and other University structures linked to Internationalization. The Institutional Committee will be formed by researchers linked to *stricto sensu* graduate programs, with academic leadership and international experience in the different areas defined as priority, and by a foreign member, linked to a HEI abroad, with globally recognized expertise in the theme of Institutional Design of Internationalization. The Institutional Committee will be deliberative and will be responsible for the selection of proposals for internationalization actions, based on institutional policies. The operationalization of the various internationalization actions contained in the Institutional Project will be coordinated by the Institutional Committee in conjunction with REINTER. The actions defined in the Institutional Project are organized in a format that seeks to

address the following aspects: i) the rationality of action; ii) objective (s) of the Institutional Project; iii) dynamics of temporal operation of actions; iv) conduct of actions (leadership, coordination and follow-up); v) financial cost of the action; and vi) goals and expected results. These aspects will be used as references by the Institutional Committee in the selective process of internal proposals. In the same way as the Internationalization Plan, the Institutional Project will be adaptive, so that, after evaluation, it may be adjusted, if necessary, in order to achieve greater effectiveness of the actions.

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

The Institutional Committee, along with other coordinators of the graduate programs that will participate in the institutional proposal of internationalization, will determine strategies for follow-up and criteria for internal evaluation of the goals and execution of the Institutional Project. These criteria will include the number of academic mobility actions carried out and the number of actions taken to appropriate the knowledge acquired with these actions, number of scientific articles with high impact co-authored with international partners, number of new Memoranda of Understanding or cooperation agreements signed. This evaluation will be linked to the management and operation of the Institutional Project and, therefore, its result will guide the decisions on the need to adapt the Project's actions. It should be noted that the actions present in the project comply with strategic actions in effect in the Institutional Plan of Internationalization of FURG. The same applies to the temporal dimension of the plan where, for each action, the goals refer to the expected results, from 2018, until 2029. The proposed model of evaluation and adaptation of the plan will involve the following steps: (1) intermediate evaluation of the plan on an annual basis, with measurement of all actions through the corresponding indicators; (2) possible proposition of adaptation of actions and goals, in the period following the annual evaluation; (3) overall evaluation of the plan, at the end of the four-year period, with a measurement of all actions and targets, through the corresponding indicators; (4) review of priorities, with possible adjustments of targets and indicators of actions in case of reissue of the HEI Internationalization Notice. The idea behind the proposed evaluation and adaptation activities is that FURG can count on an "organic" plan, adequate and constantly updated, always aiming to maximize the institutional return. When establishing monitoring, evaluation and adaptation through a model based on indicators and goals, some aspects of the university scope can be facilitated. Among them is the possibility of evaluation metrics, transparency, and ease of participation, timely adjustments and a search for excellence in internationalization.

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

The internationalization efforts and the qualification opportunities of the FURG graduate programs will be maximized by the conciliation of actions proposed in the Institutional Project

with those contemplated in national development programs supported by CAPES. FURG has been successful in several actions supported and co-supported by CAPES at the national level that somehow consider aspects of internationalization. For example, the institution has several initiatives related to programs such as CAPES/Marine Sciences, CAPES/IODE, the National Institutes of Science and Technology-INCTs (Integrated Center of Oceanography, Aquatic Toxicology, Climate Change, Cryosphere etc.), and the CT PETRO call, with which synergistic actions can be taken to reinforce the present internationalization proposal. Effective coordination between the institutional plan and these projects in specific internationalization actions will be sought through the allocation of Doctoral Exchange Program (joint doctoral) quotas, missions abroad and attraction of students, professors and foreign researchers for a period of stay in this HEI. Another action, that is quite relevant, is related to the organization and realization of events of international scope. The encouragement and feasibility of support for the organization of events should be intensified in order to allow the integration of several national and international actors, as well as the practice of transversality of the different themes that cover this cluster.

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

FURG, through an initiative of its Secretariat of Social Communication (SECOM), has been working on the restructuring and proposition of new platforms to support the visibility of the institution. This includes the restructuring of its WEB page, the generation of printed material for dissemination and the production of institutional videos. More recently, joint efforts between SECOM and the Office of International Relations (REINTER) have produced institutional disclosure bi or trilingual materials specifically elaborated with the aim of increasing the visibility of the university abroad. Curricular flexibility is also one of the principles of the FURG Internationalization Policy and is also contemplated in the Axis III of the Institutional Plan for Internationalization (IP-FURG). It states that curricular flexibility is necessary in mobility programs in order to enable the students going abroad obtaining maximum academic benefit after returning to FURG. In addition, IP-FURG's Axis V – foresees the Intensification of interactions with society to promote internationalization actions through open event such as the "Countries Day". These events allow society to become familiar with the characteristic elements of the countries of origin of international students and provide an opportunity to students to interact with the community. These elements would contribute to greater cultural integration between our foreign students and society. The FURG's proposal, entitled "SUSTAINABILITY IN COASTAL AND OCEANIC ECOSYSTEMS: A CLUSTER OF EXCELLENCE IN THE EXTREME SOUTH OF BRAZIL", aims at establishing the integration of graduate programs that work in a variety of subjects in Marine Sciences, Food Security and Health in Coastal Ecosystems. This proposal follows a rationale of transversal action, to consolidate a cluster of excellence that fits the institutional vocation, aspiring, in the long term, socioeconomic development and improvement of the quality of life in the region and beyond. This cluster pursues the interaction

among FURG's graduate programs, aiming at the transfer of know-how in internationalization actions from the most (graded 6 and 7 in CAPES evaluation process) to the less consolidated ones (grade 5) in priority areas. This strategy intends to consolidate internationalization among the programs included in the proposal with a view of expanding it for the remaining programs of the University.

FURTHER INFORMATION

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

Quantity of courses = 8

Number of joint supervision postgraduate programs between 2013 and 2016.

Quantity of programs = 2

Number of double degree postgraduate programs between 2013 and 2016.

Quantity of programs = 1

Number of bilateral postgraduate programs between 2013 and 2016.

Quantity of programs = 0

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

Quantity of products and contributions = 3

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

Quantity of programs = 20

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

Quantity of projects = 37

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

Description - Foreign language materials, themes and subjects integrate research routines and graduation level studies within graduate programs with a higher level of internationalization (programs graded 6 and 7 in Capes evaluation process). These materials are predominantly available in English. In other programs, given the nature of knowledge and international cooperation, materials are produced in Spanish or French. The materials used in the courses, especially those dealing with topics of global interest such as climate change, biodiversity, bio and geo-prospecting, impacts on oceanic and coastal ecosystems, food security are available in Portuguese and English and their insertion in curricula occurs in a transversal way, that is they are available online and can be accessed by the students of any program, providing the interdisciplinary training and acquaintance on those contemporary matters. Some subjects are taught with the participation of foreign professors. The graduate programs also make the contents of part of their courses available in bi or trilingual material. These actions are in accordance with the Language Policy, the Internationalization Policy and Plan of FURG.

EXPECTED BENEFITS

Theme - SUSTAINABILITY IN COASTAL AND OCEANIC ECOSYSTEMS: A CLUSTER OF EXCELLENCE IN THE EXTREME SOUTH OF BRAZIL

INTERNATIONAL COOPERATION PROJECTS

Name of the project

FOOD SECURITY AND QUALITY OF MARINE LIVING RESOURCES

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

Description - This project addresses food security as being directly related to ensuring access to high quality food in sufficient quantity and permanently. Food security is a matter of national sovereignty. Oceans and their coastal zones have enormous relevance and will always play a key role to safeguard marine living resources for future generations. This project therefore proposes the sustainable use of these marine resources by assessing fish stocks and their state of exploration, investigating better practices of fisheries management, in addition to the development of responsible aquaculture. Besides issues related to fish (both finfish and shellfish) production *per se*, this proposal will also consider the potential of enhancing nutritional value to marine products and of developing new products through food science and technology. The proposal will also identify food resources with lower risk to human health through the analysis of chemical and biological contaminants in marine. Examples of the studies proposed

here include the development of chemical (stable isotopes) and electronic (telemetry) tagging for better understanding the spatial ecology of skipjack tuna, the most important fish caught in Brazil for the production of canned tuna, for promoting sustainable fisheries with lower carbon emission; the development of integrated shrimp, fish, mollusks and macroalgae raising systems as a means of increasing simultaneously the productivity, resilience and sustainability of aquaculture systems; and the aggregation of nutritional value to sea food usually considered as fishery residues, for popular consumption. In addition to studies such as those listed above, the project includes the qualification of students and professors in international centers of excellence in areas related to aquaculture, fisheries, and food science and technology.

Work missions related to the cooperation project

Year	Quantity	Amount (BRL)
2020	1	15,422.00
2021	2	33,414.00

Resources to maintenance the projects

Year	Amount (BRL)
2019	10,000.00
2021	10,000.00
2018	5,000.00
2022	5,000.00
2020	10,000.00

Scholarships related to the cooperation project

Year	Modality	Quantity	Amount (BRL)
2021	Joint Doctorate (6 months)	2	80,956.80
2022	Joint Doctorate (6 months)	1	40,478.40
2021	Visiting Professor (1 month)	1	23,155.29
2020	Visiting Professor (1 month)	1	23,155.29
2021	Junior Visiting Professor (6 months)	1	60,638.40
2022	Senior Visiting Professor (6 months)	1	65,678.40
2020	Joint Doctorate (6 months)	1	40,478.40
2021	Joint Doctorate (12 months)	1	76,276.80

Name of the project

BIO AND GEODIVERSITY AND BIO AND GEOPROSPECTION IN COASTAL AND OCEANIC ECOSYSTEMS

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

Description - This Project promotes the training and specialization of students and researchers in the development of studies and actions that address the identification, mapping, prospecting, and monitoring of the biological and geological richness and diversity of the oceans and their coastal zones with a special focus on the South Atlantic. This Project will promote the following topics with missions and academic exchanges with centers of excellence abroad: 1) Bio/Geodiversity in different Brazilian sedimentary basins. These studies will make it possible to analyze geological and biological aspects in the generation of seafloor landscapes, oceanographic parameters, mineral deposits, and their influence on biodiversity, among others. The methodological approaches to studies of this magnitude, such as the use of advanced acoustic equipment, telemetry and methods of genetic/molecular biology and stable isotopes, are constantly improving and evolving; 2) Marine pollution and its threats to biodiversity and ecosystems. In this subject, it is of fundamental importance to understand the fluxes and cycling of organic and inorganic contaminants as well as toxic blooms in coastal and oceanic environments. Among the polluting agents, plastics (from nano to macro) make up the vast majority of anthropogenic solid wastes present in marine environments and represent one of the greatest environmental problems of our time. The missions will be focused on the learning of advanced analytical techniques, interpreting results, assessing impacts and new in situ sampling methodologies; 3) Marine biodiversity and endangered species: a broad understanding of biodiversity and its relation to the ecosystem is fundamental to the development of effective conservation strategies; 4) Bioprospecting in coastal and oceanic ecosystems: in addition to providing food, marine species have enormous potential as a source of organisms, genes, enzymes and composites that can lead to the development of new products that are relevant to a wide range of economy fields, such as agriculture, pharmaceutical and cosmetics industry, biotechnology, nutrition, bioremediation, health, among others. In this sense, unlike the practices of extraction of organisms from their environment, aquaculture allows the planned production of aquatic organisms with relatively constant composition/quality throughout the year.

Work missions related to the cooperation project

Year	Quantity	Amount (BRL)
2021	3	50,672.00
2020	4	68,254.00
2019	3	52,832.00

Resources to maintenance the projects

Year	Amount (BRL)
2019	10,000.00
2020	10,000.00
2021	10,000.00
2022	5,000.00
2018	5,000.00

Scholarships related to the cooperation project

Year	Modality	Quantity	Amount (BRL)
2019	Joint Doctorate (6 months)	4	161,913.60
2020	Senior Visiting Professor (3 months)	1	39,866.40
2019	Visiting Professor (1 month)	1	23,155.29
2021	Joint Doctorate (6 months)	2	80,956.80
2020	Visiting Professor (15 days)	1	16,155.29
2019	Visiting Professor (15 days)	1	16,155.29
2022	Joint Doctorate (6 months)	4	161,913.60
2021	Visiting Professor (1 month)	1	23,155.29
2021	Senior Visiting Professor (6 months)	1	65,678.40
2020	Joint Doctorate (12 months)	1	76,276.80
2020	Joint Doctorate (6 months)	3	121,435.20
2020	Visiting Professor (1 month)	1	23,155.29
2021	Visiting Professor (15 days)	2	32,310.58
2019	Senior Visiting Professor (3 months)	1	39,866.40
2020	Junior Visiting Professor (3 months)	1	36,986.40
2020	Senior Visiting Professor (6 months)	1	65,678.40
2022	Visiting Professor (1 month)	1	23,155.29

Name of the project

PREVENTION AND CONTROL OF DISEASES AND THREATS THAT AFFECT HUMAN HEALTH AND QUALITY OF LIFE IN COASTAL ECOSYSTEMS.

Start date 01/08/2018

End date 31/07/2022

Description - Health can be defined as the state of complete physical, mental and social well-being. The diversity of health-related scenarios in Brazil demands the establishment of differentiated and adapted strategies for each region and each case. This project intends to carry out studies that range from neglected diseases, such as tuberculosis and intestinal parasitosis to the development of new therapeutic alternatives to infectious or not infectious diseases and to the assessment of the impact of pollutants on human health. Strategies for controlling epidemics and endemics that are typical of port regions and/or related to social vulnerability, such as AIDS and other sexually transmitted diseases will also be considered. Other issues of local relevance such as mental health, drug addiction and health in prison systems will also be taken into consideration. In addition, studies on genetic diversity of infectious agents will allow the identification of eventual in-the-country entries of exogenous strains, an inherent risk in port regions, as well as monitoring possible clonal dispersion of more virulent and antibiotic-resistant strains. Integrated with the other goals, the project will also seek prospecting, from the immense marine biodiversity, the potential for synthesis of new drugs. This project also aims to minimize human vulnerability to climate change and the sustainability of socio-environmental health, especially the potential effects on life conditions and on the spreading of tropical diseases to subtropical regions. Therefore, this project will promote the formation of highly qualified human resources, through the exchange of academic personnel and the accomplishment of missions to centers of excellence that focus on the subjects listed above. The missions will mainly converge to the learning of new methodologies and advanced analytical techniques and on the interpretation of unprecedented results. This initiative is crucial to increase efficiency in the diagnosis, prevention and control of diseases and harms that affect both human health and quality of life in coastal ecosystems.

Work missions related to the cooperation project

Year	Quantity	Amount (BRL)
2020	2	35,207.00
2019	2	31,211.00

Resources to maintenance the projects

Year	Amount (BRL)
2018	5,000.00
2021	10,000.00

2022	5,000.00
2019	10,000.00
2020	10,000.00

Scholarships related to the cooperation project

Year	Modality	Quantity	Amount (BRL)
2022	Post-Doctorate (6 months)	1	35,755.29
2021	Junior Visiting Professor (6 months)	2	121,276.80
2022	Joint Doctorate (6 months)	1	40,478.40
2020	Joint Doctorate (6 months)	2	80,956.80
2018	Junior Visiting Professor (6 months)	1	60,638.40
2021	Joint Doctorate (6 months)	1	40,478.40
2021	Post-Doctorate (6 months)	1	35,755.29
2021	Senior Visiting Professor (3 months)	1	39,866.40
2020	Junior Visiting Professor (6 months)	1	60,638.40
2020	Post-Doctorate (12 months)	1	69,310.58
2020	Visiting Professor (1 month)	1	23,155.29
2022	Junior Visiting Professor (6 months)	2	121,276.80
2019	Junior Visiting Professor (6 months)	2	121,276.80

Name of the project

GLOBAL CLIMATE CHANGE AND ITS CONSEQUENCES TO COASTAL AND OCEANIC ECOSYSTEMS

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

Description - The oceans cover $\frac{3}{4}$ of the planet's surface being one of the greatest protagonists and regulators of global climate variability. As the climate changes, fundamental properties of the oceans such as water temperature, ocean current patterns and sea level also change, with a number of consequences to their ecosystems and to society. Therefore, the project will promote the exchange of academic personnel and missions to centers of excellence focusing on the following areas: 1) Paleoceanography/Paleoclimatology: from the international perspective, paleoceanography has increasingly become a leading science for climate studies and, at the same time, it is still very incipient in Brazil. We propose missions and exchanges of students/researchers with reputed centers in paleoceanographic studies that master modern techniques for dating coastal and marine fossils, which are of essential importance for these analyzes; 2) Ocean acidification and alterations in the sea water properties: these are among the major expected consequences of climate changes and yet are poorly developed themes in Brazil. At the same time, the techniques, protocols and analyzes of these properties are in constant evolution, such as the determination of the difference of the partial pressure of CO₂ between the sea and the atmosphere; the accurate determination of the sea water salinity through the new TEOS-10 state equation and the consequences of its application, which determines the quality and scope of the analyzes in determining the role of the oceans in the climate; 3) Cryosphere, polar and high latitudes oceanography: these are among the most sensitive environments to global climate change. Academic missions and exchanges are proposed to encourage themes that are in need of development at national level, such as the autonomous monitoring of the polar oceans; cryosphere-ocean interaction through the use of remote sensors and *in situ* techniques of ablation measurements and temporal evolution of glaciers; development and training of a research group on sea ice, given its relevance for the global climate; 4) Sea level rise and coastal erosion: in Brazil, networks for monitoring and evaluating the impacts of coastal erosion due to sea level rise are in need of modeling tools and remote sensing of processes in coastal regions. The proposal includes the qualification of personnel in centers of international excellence in themes that are related to sea level rise, variation in precipitation and impacts on coastal drainage basins and extreme events.

Work missions related to the cooperation project

Year	Quantity	Amount (BRL)
2022	1	15,422.00
2018	1	17,625.00
2021	3	54,992.00

2019	1	17,625.00
2020	2	35,207.00

Resources to maintenance the projects

Year	Amount (BRL)
2019	10,000.00
2022	5,000.00
2018	5,000.00
2020	10,000.00
2021	10,000.00

Scholarships related to the cooperation project

Year	Modality	Quantity	Amount (BRL)
2019	Senior Visiting Professor (3 months)	1	39,866.40
2020	Joint Doctorate (12 months)	2	152,553.60
2020	Joint Doctorate (6 months)	1	40,478.40
2020	Junior Visiting Professor (3 months)	1	36,986.40
2020	Senior Visiting Professor (3 months)	1	39,866.40
2019	Joint Doctorate (12 months)	1	76,276.80
2020	Visiting Professor (1 month)	2	46,310.58
2022	Joint Doctorate (6 months)	1	40,478.40
2019	Joint Doctorate (6 months)	4	161,913.60
2021	Tallented Young Researchers (6 months)	3	177,465.87
2020	Senior Visiting Professor (6 months)	1	65,678.40
2020	Visiting Professor (6 months)	1	95,155.29

WORK MISSIONS

Year of work missions	Quantity of work missions per year	Amount of work missions
2020	6	R\$ 106,024.00
2019	8	R\$ 148,859.00

SCHOLARSHIPS

Year	Modality	Quantity	Amount
2019	Training	3	R\$ 46,375.20

OTHER PROGRAM ACTIONS

Year	Actions	Description	Amount
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COUNTERPART**1. Internationalization of the curriculum - Incorporation of international themes in undergraduate and postgraduate classes.**

Graduate Programs and Undergraduate Courses have been incorporating themes of international relevance in the classroom. These themes include, but are not restricted to, climate change, biodiversity, bio and geo-prospecting, threats to oceanic and coastal ecosystems, food security, infectious and parasitic diseases. In some Graduate Programs and undergraduate courses, especially within the more internationalized academic units, these topics of global interest have been taught for quite some time. The subjects that integrate the curricular formation of the graduate students are available online and can be accessed by the students of any program, providing the interdisciplinary training and acquaintance on subjects of global interest.

In addition, in line with its Internationalization Plan, FURG encourages the provision of foreign language courses and the teaching of subjects of global relevance in other languages for undergraduate and, especially, for graduate students. This action aims to contribute to the pursuit of the excellence of internationalization, observing the guidelines of the Language Policy of FURG. Within the curriculum structure of the graduate programs, open seminars are given by graduate students and professors returning from foreign institutions in order to stimulate the appropriation of the training abroad and the dissemination of international themes to undergraduate and graduate students.

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

This counterpart is linked to Axis II of the Internationalization Plan of FURG (IP-FURG): to strengthen insertion and international visibility. The University conducts a robust and broad dissemination and communication plan, in order to qualify and expand its image abroad. Through an initiative of its Secretariat of Social Communication (SECOM), FURG has been

working on the restructuring of new platforms to support the institutional visibility. This includes a new WEB page layout, the production of bi/trilingual printed material and institutional videos. More recently, joint efforts between SECOM and the Secretariat for International Relations (REINTER) have produced bi or trilingual institutional disclosure materials specifically designed for enhancing the visibility of FURG abroad. In addition to these initiatives, all graduate programs have their websites in three languages (Portuguese, English and Spanish), with information on faculty, research lines, curricular structure, regulations, among others aspects. FURG's Graduate Programs and Research Groups have their bi or trilingual catalogues available both in printed and online version, with information on courses and research lines, respectively.

3. Training and qualification of staff for institutional internationalization.

This counterpart is ensured by the FURG Language Policy and by Axis III of the Internationalization Policy: To increase the participation of FURG students and administrative staff in undergraduate courses and graduate programs, as well as in different academic and administrative actions in foreign institutions. One of the actions planned to attend the internationalization demands at the University is the provision of foreign language courses to the administrative staff. In relation to personnel involved in administrative activities focused on internationalization, the REINTER team is proficient in English or has English as a first language. The geographical position of FURG, near the border with Uruguay, favors the understanding of Spanish by many staff. It is also intended to encourage the increase of proficiency in English for administrative staff linked to the secretarial activities of the coordination of graduate programs and related deans.

4. Counterparts offered by foreign partnership institutions, when applicable.

The foreign institutions that are partners of the Federal University of Rio Grande-FURG in this proposal, with formal cooperation agreements already signed or informal (researcher-researcher relationship), with formal agreement in process, offer exemption or reduction of academic and administrative fees, infrastructure of excellence, including maintenance resources, for the execution of the project. Total exemption of fees is guaranteed in the foreign institutions which FURG has established *cotutelle* with dual degree agreements.

5. Other counterparts, when applicable.

The Federal University of Rio Grande-FURG offers counterparts of various natures to qualify the internationalization actions. The infrastructure involves multiuser research centers, classrooms, administrative rooms, rooms for teachers and students, laboratories, libraries, museums, auditoriums, etc. The auditoriums are equipped with Information and Communication Technologies, with web and videoconference equipment for the implementation of classes, seminars and thesis evaluation processes. It also has a Transit Hotel for temporary lodging of students and foreign researchers. Worthy of particular note is the University's fleet with large,

medium and small vessels, especially the Research Vessel "*Atlântico Sul*", designed to attend oceanographic and fishery researches. Recently (in 2017) FURG received, with resources from the Ministry of Education, the Teaching Vessel "*Ciências do Mar I*", a Floating Teaching Laboratory (LEF) that attends all the universities in southern Brazil that work on Marine Sciences. In addition, FURG has two Multiuser Centers, the Integrated Analysis Center (CIA-FURG) and the Southern Center for Electron Microscopy (CEME-SUL), both included in the Multi-User Equipment Sharing Program (ProCEM). FURG also has an Integrated Center for the development of the Extreme South Coastal Ecosystem - CIDECSUL, with a complex of auditoriums; a Marine Aquaculture Station (EMA); a Center for the Gathering of the Youth of the Sea, a social outreach program that attends young people in situations of socio-economic vulnerability; an Antarctic Supply Station - ESANTAR, which provides logistical support to Brazilian expeditions to the Antarctic Continent; and the University Hospital (HU-FURG), a model in the treatment of AIDS, tuberculosis and asthma. It has 252 beds and, being located next to the only maritime port of the State, the hospital has become a singular and reference place for basic and clinical research, all of which are of interest to national and international centers that develop diagnostic platforms and new drugs.

FURG also has a program of hiring Foreign or Brazilian Visiting Professor with formal experience abroad (FVP). In 2017, 32 positions were made available for hiring FVPs via a Simplified Selection Process. The FVP is hired for a period of 2 years, renewable for a further 2, and can thus interact with research groups and become involved in undergraduate and graduate studies. This institutional action is also in line with the Institutional Pedagogical Project (IPP) and the Institutional Development Plan (IDP) and aims to attract researchers of recognized scientific and academic production, to participate at least 75% of the time in the graduate programs and thus contribute to the development, strengthening or creation of *stricto sensu* Graduate Programs.