Federal University of Uberlândia (UFU)

UFU Institutional Internationalization Program (UFU-CAPES.PrInt)

About the Federal University of Uberlandia (UFU)

- **Minas Gerais** is a state at the southeast region of Brazil
- Federal University of Uberlândia (UFU) is Higher Education Institution (HEI) funded by the Federal government of Brazil
- UFU has 2.000 professors and 25.000 students
- Seven Campi (four at Uberlândia, Ituiutaba, Patos de Minas and Monte Carmelo)
- UFU offers 72 different undergraduate courses, 30 Masters of Science Courses, 20 Ph.D. Courses, distributed in different areas of knowledge

UFU Institutional Internationalization Program - Rationale

- The Starting point of UFU's Pint (Internationalization Program)
- Create an environment for internationalization
- Stablish an intense two-way flow of researchers and students between UFU and abroad
- Manage internationalization using an innovative approach
- Enhance interdisciplinary research with a collective and institutional focus
- Create and enhance institutional competencies in the research areas covered by the program toward leadership in Brazil in these areas using a converged technology approach

UFU Institutional Internationalization Program - Goals

- An Innovative Research Management
  - To innovatively, transparently and organically manage UFU's institutional project for internationalization with a view to leveraging its impacts
- Collaboration Networks
  - To promote and strengthen international research networks
- Joint Research
  - To carry out joint research work and look for innovative technological solutions to relevant, internationally representative problems of the society
- Knowledge Dissemination and Impact
  - To disseminate the findings of international collaboration projects and transfer the results to the society as a means to magnify their impact

Themes

- Converging Technologies and Environmental Resources
  - Use of different knowledge domains and human and technological skills that enable the society to answer questions and solve problems in an integrated fashion
  - This research theme stands out in the background of the fourth industrial revolution.
  - By drawing on a fusion of the physical, digital and biological worlds, it will serve to train highly skilled human resources who will have a deep impact on the society

- Social Dynamics, Quality of Life, and Health
  - This research theme is connected to three important aspects that require innovative research whether we are to effectively understand issues related to health, quality of life, and social dynamics, or we are to look for specific solutions to problems posed by the research teams.
  - Therefore, several research projects have been proposed to involve several knowledge domains.

UFU Converging Technologies and Environmental Resources - Countries

- Belgium; Canada; Chile; Colombia; Cuba; France;
- Germany; Ireland; Italy; Japan; Portugal; Spain;
- Sweden; Switzerland; United Kingdom; United States;

Converging Technologies and Environmental Resources – Graduate Programs

- Biomedical Engineering (PPGEB)
- Chemical Engineering (PPGEQ)
- Chemistry (PPQUI)
- Computer Science (PPGCO)
- Ecology and Conservation of Natural Resources (PPECO)
- Electrical Engineering (COPEL)
- Genetics and Biochemistry (PPGGB)
- Mechanical Engineering (PPGEM)
- Physics (PPGF)

Converging Technologies and Environmental Resources – Projects

- New technologies for efficient, sustainable energy production, conversion and storage (P6)
  - PPGCO, PPGEQ, PPQUI
- New materials and technologies for the industry and for a connected society (P7)
  - COPEM, PPGCO, PPGFIS, PPQUI
- Technological solutions for agriculture and environmental conservation (P8)
  - PPGCO, PPGECRN, PPGEQ
- Converging technologies applied to health and well-being (P9)
  - COPEL, COPEM, PPGCO, PPGEB, PPGGB, PPQUI

Converging Technologies and Environmental Resources - Grants

- Scholarships

Grant Type	P6	P7	P8	P9	Technology
Capacitação (3 meses)	3	4	4	5	16
Doutorado Sanduíche (6 meses)	11	21	14	38	84
Pós-Doutorado (6 meses)	3	3	3	3	12
Professor Visitante (0 meses)	12	27	16	30	85

- Working missions

YEAR	TECHNOLOGY
2018	10
2019	30
2020	27
2021	16
2022	7
TOTAL	90

Social Dynamics, Quality of Life, and Health - Countries

- Argentina; Canada; Chile; Colombia; Cuba; Finland;
- France; Germany; Italy; Mexico; Paraguay; Portugal;
- Russia; Spain; Sweden; Switzerland; United Kingdom;
- United States; Uruguay; Venezuela;

Social Dynamics, Quality of Life, and Health – Graduate Programs

- Applied Immunology and Parasitology (PPIPA)
- Business Administration (CPGAD)
- Dentistry (PPGO)
- Economics (PPGE)
- Education (PPGED)
- Geography (PPGEO)
- Linguistic Studies (PPGEL)

Social Dynamics, Quality of Life, and Health-Projects

- Construction of health cities: health, population, and social dynamics (P1)
  - PPGEO
- The national education systems in the Euro-American space: compared education and establishment of language policies (P2)
  - PPGED, PPGEL
- Infectious, inflammatory and chronic diseases in a constantly changing environment that affects human and animal health (P3)
  - PPIPA, PPGGB, PPQUI
- Biomechanical rehabilitation and repair processes in dentistry: Impact on people's health and quality of life (P4)
  - PPGO, PPIPA
- Socioenvironmental innovations and challenges in the Brazilian Cerrado's modernity and its links to a sustainable economy (P5)
  - CPGAD, PPGE

Social Dynamics, Quality of Life, and Health - Grants

- Scholarships

Grant Type	P1	P2	P3	P4	P5	Society
Capacitação (1 meses)	0	0	0	8	4	12
Capacitação (3 meses)	2	0	0	0	0	2
Doutorado Sanduíche (12 meses)	0	4	3	0	0	7
Doutorado Sanduíche (6 meses)	3	7	2	8	4	24
Doutorado Sanduíche (7 meses)	0	0	0	0	1	1
Jovens Talentos - A (6 meses)	0	0	0	1	0	1
Pós-Doutorado (12 meses)	0	0	3	0	0	3
Pós-Doutorado (6 meses)	0	4	3	0	0	7
Professor Visitante (1 meses)	0	2	0	4	0	6
Professor Visitante (3 meses)	0	0	7	0	0	7
Professor Visitante no Exterior Júnior (12 meses)	0	0	1	0	0	1
Professor Visitante no Exterior Júnior (3 meses)	0	0	0	5	2	7
Professor Visitante no Exterior Sênior (12 meses)	0	0	2	0	0	2
Professor Visitante no Exterior Sênior (3 meses)	2	5	0	2	2	11
Professor Visitante no Exterior Sênior (8 meses)	0	0	2	0	0	2

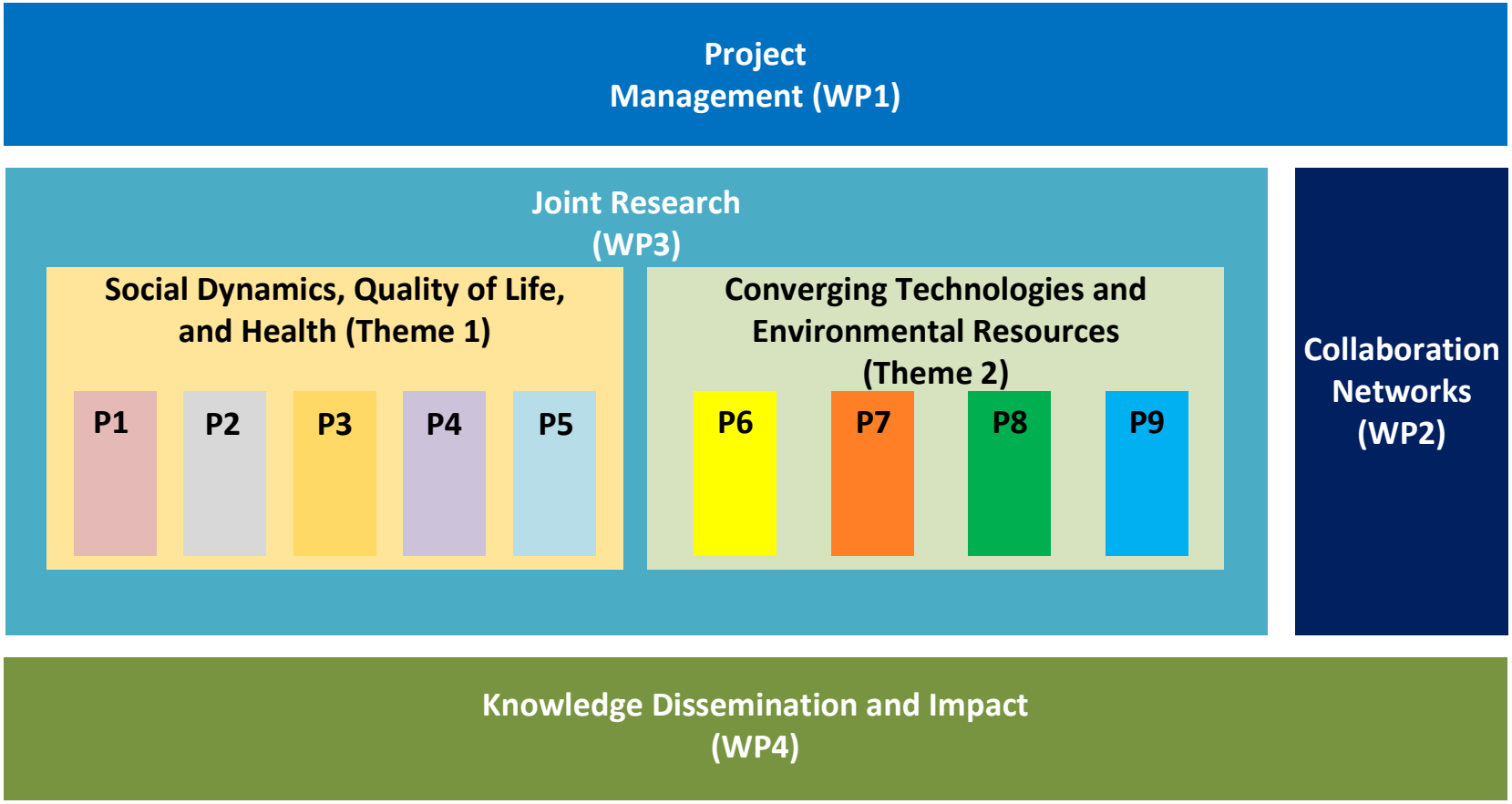
Social Dynamics, Quality of Life, and Health - Grants

- Working Missions

YEAR	SOCIETY
2018	0
2019	10
2020	13
2021	13
2022	2
TOTAL	38

UFU.CAPES-PrInt Work packages

- Projects, Themes and Work packages



Institutional Committee

- Prof. Adriano de Oliveira Andrade – Biomedical Engineering (PPGEB)
- Prof. Carla Eponina Hori – Chemical Engineering (PPGEQ)
- Prof. Carlos Henrique de Carvalho – Education (PROPP / PPGED)
- Prof. Flávio de Oliveira Silva – PPGCO
- Prof. Gilmar Guimarães – Mechanical Engineering (COPEM)
- Prof. José Roberto Mineo – Applied Immunology and Parasitology (PPIPA)
- Prof. Luiz Ricardo Goulart Filho – Genetics and Biochemistry (PPGGB)
- Prof. Paulo Eugênio Alves Macedo de Oliveira – Ecology and Conservation of Natural Resources (PPGEBV)
- Prof. Silvio Carlos Rodrigues – Geography (PPGEO-PPGAT)
- Prof. Valder Steffen Junior – Mechanical Engineering (COPEM)
- Prof. Waldenor Barros Moraes Filho – Linguistic Studies (PPGEL)
- Prof. Peter Krus (Aerospace Engineering) - Linköpings University, Sweden

WP1 – Project Management

- WP1 Goal
  - To innovatively, transparently and organically manage UFU's institutional project for internationalization with a view to leveraging its impacts
- Activity
  - Meetings will be held on a regular basis through web conferencing tools. Such meetings will be used to improve and follow up the unfolding of each international cooperation project.
  - Each project will also have a set of milestones defined by its research team and used to monitor and adjust the activities over the course of Capes-PrInt framework. This approach will allow for more effective project execution and establish strong connections between national and international participants.
  - The Management Group technical staff support, which will serve as a Project Management Office (PMO) and, therefore, ensure compliance of all international cooperation projects to a common management methodology.
  - This PMO will also provide the Management Group with the necessary support to ensure that UFU's institutional project for internationalization follows the strategy defined by the university. Work and study missions will provide opportunity for on-site meetings.
  - Technical seminars will take place on such occasions, with presentation of results to monitor and control the activities as well as to adjust planning wherever applicable.

WP2 – Collaboration Networks

- WP2 Goal
  - To create, expand and strengthen research networks in articulation with UFU's internationalization strategy
- Activity
  - The international networks strengthened through this activity will allow for sharing research infrastructure and rationalizing the use of existing resources.
  - The international collaboration networks will allow for professional and academic ties that go beyond the projects and impact on future research and opportunities

WP4 – Knowledge Dissemination and Impact

- WP4 Goal
  - To publicize the findings and explore their applications.
  - To disseminate and exploit the findings of UFU's institutional project for internationalization
- Activities
  - This activity encompasses a set of integrated activities related to the dissemination and exploitation of findings. This includes publishing articles or papers in top-quality specialized magazines, journals and scientific congresses, and publishing in open software platforms and datasets
  - Other channels include websites, social media and press releases for communication with the society in general. Such wide publicization is aimed to have an impact on the society and create opportunities to translate the obtained knowledge into new technologies, good practices, products, and innovations.
  - Such social impacts are expected to subsidize policies for conservation and sustainable use of resources and energy in such a way that they can also become qualitative indicators of successful knowledge dissemination.

WP3 – Joint Research

- WP3 Goal
  - To carry out joint research work and look for innovative technological solutions to relevant, internationally representative problems of the society.
- Next slides will present the projects associated both themes
  - Social Dynamics, Quality of Life, and Health Projects P1 to P5
  - Converging Technologies and Environmental Resources
    - Projects P6 do P9

Construction of health cities: health, population, and social dynamics (P1)

Overview

Project P1 - Vision

- Unfair, albeit evitable, inequalities are the result of unequal distribution of social determinants, which in turn aggravates avoidable disease and death conditions. Life expectancy at birth can strongly vary across the populations and be dependent on an individual's neighbourhood. It is certainly shorter and equated with lower quality of life in underprivileged neighbourhoods, which feature poorer urban infrastructure, precarious houses, health-threatening environmental conditions, and poor public transportation, education and health services, as well as reduced green area for physical and social activities.
- To identify health problems in the population drawing on the historical process that underlay people's economic, social and political development, studies should address not only health and body per se, but also the social relations that have an impact on health-disease processes.
- It is apparent that most municipality-provided health services are not prepared to this demand. The creation of health cities is who's orientation to promote health among people and communities in the territories where they live and work.
- A healthy city is defined by a process, rather than a result. It is not a city that achieved a given health status, but rather a city that is committed to its citizens' health and quality of life, a city which strives for reaching this status building on a clear intention and project.
- The aim of this project is to develop urban planning strategies to build health cities following a framework of intersectoral public policies and considering the social determinants of health.

P1 Facts

- Start: 01/2019 and End: 10/2022
- Total Budget: **R$ 533,882.80**
  - Grants: R$ 252,100.80
  - Working Missions: R$ 251,782.00
- Working Mission, Support and Grants

YEAR	GRANT DESCRIPTION	QUANTITY
2019	Doutorado Sanduíche (6 meses)	1
2019	Capacitação (3 meses)	1
2019	Professor Visitante no Exterior Sênior (3 meses)	1
2020	Doutorado Sanduíche (6 meses)	1
2020	Professor Visitante no Exterior Sênior (3 meses)	1
2020	Capacitação (3 meses)	1
2021	Doutorado Sanduíche (6 meses)	1

YEAR	QUANTITY
2019	8
2020	5
2021	4
2022	0

YEAR	AMOUNT
2019	10,000.00
2020	10,000.00
2021	10,000.00
2022	10,000.00

P1 KPIs

- KPIs associated with the project

TYPE	INDICATOR	CURRENT STATUS	GOAL 2ND YEAR	FINAL GOAL
Quantitative	Work presentation in scientific events abroad	0	4	6
Quantitative	Participation in international research networks	0	1	2
Qualitative	Publication in Capes Qualis-certified journals	15% of total international publications certified	20% of total international publications certified	30% of total international publications certified
Quantitative	Hosting visiting scholars in Brazil	0	4	8
Qualitative	Coordination of funded projects	Assessed as “Good” by Capes	Assessed as “Good” by Capes	Assessed as “Very Good” by Capes
Qualitative	Courses in foreign languages	Assessed as “Regular” by Capes	Assessed as “Good” by Capes	Assessed as “Very Good” by Capes
Quantitative	Sending visiting scholars abroad	0	1	2
Quantitative	Work presentation in scientific events abroad	0	10	20
Qualitative	Publications in journals by faculty	Assessed as “Good” by Capes	Assessed as “Good” by Capes	Assessed as “Very Good” by Capes

The national education systems in the Euro-American space: compared education and establishment of language policies (P2)

Overview

Project P2 - Vision

- This study of the national education systems intends to intersect multiple perspectives in the past and present context(s). The aim is to investigate modernization, its time, its forms and its material and immaterial traces inscribed in the plural scales and environments that form these two worlds: the European and the American worlds.
- The projects in this area have given rise to new information, interpretation or rethinking of historical phenomena, particularly those related to forms of education and their interrelations/implications with the State, the society, and other education instances.
- Such investigation is related to incentives in the graduate programs and from funding agencies, aiming to increase the number of researchers devoted to the education history.
- It is also influenced by an understanding among researchers, governmental authorities (in change of education policies) and the population in general that education is a mechanism of upward mobility, which therefore requires an understanding of this process over time.

P2 Facts

- Start: 01/2019 and End: 10/2022
- Total Budget: **R$ 1,098,384.74**
  - Grants: R$ 977,119.74
  - Working Missions: R$ 121,265.00
- Working Missions and Scholar Grants

YEAR	GRANT DESCRIPTION	QUANTITY
2019	Professor Visitante no Exterior Sênior (3 meses)	2
2019	Doutorado Sanduíche (6 meses)	2
2019	Pós-Doutorado (6 meses)	2
2019	Doutorado Sanduíche (12 meses)	1
2019	Professor Visitante (1 meses)	1
2020	Doutorado Sanduíche (6 meses)	3
2020	Doutorado Sanduíche (12 meses)	2
2020	Pós-Doutorado (6 meses)	2
2020	Professor Visitante no Exterior Sênior (3 meses)	1
2020	Professor Visitante (1 meses)	1
2021	Professor Visitante no Exterior Sênior (3 meses)	2
2021	Doutorado Sanduíche (12 meses)	1
2021	Doutorado Sanduíche (6 meses)	2

YEAR	QUANTITY
2019	3
2020	2
2021	1
2022	1

P2 KPIs

- KPIs associated with the project

TYPE	INDICATOR	CURRENT STATUS	GOAL 2ND YEAR	FINAL GOAL
Qualitative	Expansion of student share in academic	10% share	20% share	30% share
Qualitative	Expansion of faculty share in post-doctoral studies	5% share	10% share	15% share
Qualitative	Hosting visiting scholars in Brazil	0	4	6
Quantitative	Participation in international research networks	0	1	2
Qualitative	Publications in journals by faculty	Assessed as “Good” by Capes	Assessed as “Good” by Capes	Assessed as “Very Good” by Capes
Qualitative	Coordination of funded projects	Assessed as “Good” by Capes	Assessed as “Good” by Capes	Assessed as “Very Good” by Capes
Qualitative	Courses in foreign languages	Assessed as “Regular” by Capes	Assessed as “Good” by Capes	Assessed as “Very Good” by Capes
Qualitative	Publication in Capes Qualis-certified journals	15% of total international publications certified	20% of total international publications certified	30% of total international publications certified
Qualitative	Participation of faculty in projects abroad	13 individuals	Increase to 30% of participating programs	Increase to 40% of participating programs
Quantitative	Sending visiting scholars abroad	0	1	2

Infectious, inflammatory and chronic diseases in a constantly changing environment that affects human and animal health (P3)

Overview

Project P3 - Vision

- This project aims to develop contemporary approaches to studying diseases by relating them to changes in the ecosystem of humans and animals. The actions will be fundamentally multidisciplinary developed by the Graduate Program in Applied Immunology and Parasitology in collaboration with the Graduate Program in Genetics and Biochemistry and the Graduate Program in Chemistry.
- Climate changes and human-caused environmental degradation produce unbalances in the relationships between pathogens and hosts, thereby spreading to the ever-increasing cities infectious agents and vectors which formerly were contained in the forests. Additionally, globalization has leveraged the scattering of pathogens and eventually created increasingly favorable conditions to new world epidemics.
- On the top of that, urbanization, population growth and increased life expectancy have come with a number of inflammatory and chronic-degenerative disorders that reduce quality of life. This project aims to leverage UFU's interaction with renowned international institutions in the relevant knowledge domain to further develop its relevant graduate programs' scientific activities and findings in the area.
- This will be accomplished through student and faculty mobility for professional improvement and training, which will provide students and faculty with access to cutting-edge methodologies in the area.
- In return, the studies developed in the Graduate Program in Applied Immunology and Parasitology will be increasingly accessed and recognized by the international scientific community as the presence of international researchers increases in the program and contributes to training human resources and on-site experience exchanges.

P3 Facts

- Start: 01/2019 and End: 10/2022
- Total Budget: **R$ 1,754,453.84**
  - Grants: R$ 1,525,863.84
  - Working Missions: R$ 188,590.00
- Working Missions, Support and Scholar Grants

YEAR	GRANT DESCRIPTION	QUANTITY
2019	Professor Visitante no Exterior Júnior (12 meses)	1
2019	Professor Visitante no Exterior Sênior (12 meses)	1
2019	Pós-Doutorado (12 meses)	1
2019	Doutorado Sanduíche (12 meses)	1
2019	Doutorado Sanduíche (6 meses)	1
2019	Professor Visitante (3 meses)	2
2020	Pós-Doutorado (6 meses)	3
2020	Doutorado Sanduíche (12 meses)	0
2020	Professor Visitante no Exterior Sênior (8 meses)	2
2020	Doutorado Sanduíche (12 meses)	2
2020	Professor Visitante (3 meses)	2
2020	Doutorado Sanduíche (6 meses)	1
2021	Pós-Doutorado (12 meses)	2
2021	Professor Visitante (3 meses)	3
2021	Professor Visitante no Exterior Sênior (12 meses)	1
2022	Professor Visitante (3 meses)	0

YEAR	QUANTITY
2019	3
2021	3
2020	3
2022	0

YEAR	AMOUNT
2019	10,000.00
2021	10,000.00
2022	10,000.00
2018	10,000.00

P3 KPIs

- KPIs associated with the project

TYPE	INDICATOR	CURRENT STATUS	GOAL 2ND YEAR	FINAL GOAL
Quantitative	Joint publications of scientific papers with researchers from partner institutions, thesis and dissertation defenses, oral communications in international events	2	4	8
Quantitative	Joint publication of scientific articles with researchers from international partner institutions, dissertation defenses, and oral communication in events of relevance to the area	3	6	9
Quantitative	Identification of the profile of molecules involved in innate immunity in response to congenital infections	The role of molecules taking part in this type of infection has been widely unknown	Role of cytokines in these processes measured by using immunoassays and molecular techniques	Role of selected products validated in in-vivo and in-vitro trials
Quantitative	Publication of scientific papers in international journals, dissertation defenses, oral communications in international scientific events	2	4	8
Qualitative	Treatment and immunodiagnostic tools that contribute to the quality of life of hypersensitive people	Biotechnological products are still scarce for this purpose	Biotechnological products for application to allergic processes	Product validation in experimental models

Biomechanical rehabilitation and repair processes in dentistry: Impact on people's health and quality of life (P4)

Overview

Project P4 - Vision

- Mesenchymal stem cells from the bone marrow that can produce different cell types will be used to study the effect of nanotopography on cell population and differentiation in in-vivo osteoporosis. The “classic” culture of the BM-MSCs as plastic adherent cell populations produces colonies with variable osteogenic potential. Nanoscale titanium topography plays an important role in the osseointegration process, inducing the differentiation of mesenchymal stem cells into osteoblasts.
- The number of older adults looking for dental implants have increased in the past years and is related to the increased number of people suffering from one or more chronic metabolic diseases, such as osteoporosis, which may affect bone healing and cause implant failure.
- This project builds on finite element methods and clinical trials to analyze the biomechanical effects of polymerization shrinkage and substrate degradation without total cavity removal on the interface of dental composites, intact tooth structures, and defective tooth interface of young people’s molars.
- The ultimate goal is to produce a computational simulation of fragile interface and adhesive fracture, as well as to understand the interference of such factors on the fracture propagation in posterior teeth.
- This will reinforce the use of individual-specific finite element models in research and industrial development of dental materials. It is primarily concerned with producing knowledge to minimize early loss of first molars among young people, which has a relevant impact on their immediate and future quality of life

P4 Facts

- Start: 01/2019 and End: 10/2022
- Total Budget: **R$ 1,410,555.65**
  - Grants: R$ 977,119.74
  - Working Missions: R$ 863,935.65
- Working Missions, Support and Scholar Grants

YEAR	GRANT DESCRIPTION	QUANTITY
2019	Professor Visitante no Exterior Sênior (3 meses)	1
2019	Capacitação (1 meses)	2
2019	Doutorado Sanduíche (6 meses)	3
2019	Professor Visitante (1 meses)	1
2019	Professor Visitante no Exterior Júnior (3 meses)	1
2020	Professor Visitante (1 meses)	1
2020	Jovens Talentos - A (6 meses)	1
2020	Capacitação (1 meses)	2
2020	Professor Visitante no Exterior Sênior (3 meses)	1
2020	Doutorado Sanduíche (6 meses)	2
2020	Professor Visitante no Exterior Júnior (3 meses)	3
2021	Professor Visitante (1 meses)	2
2021	Professor Visitante no Exterior Júnior (3 meses)	1
2021	Capacitação (1 meses)	4
2021	Doutorado Sanduíche (6 meses)	3

YEAR	QUANTITY
2019	8
2020	8
2021	8
2022	8

YEAR	AMOUNT
2019	10,000.00
2020	10,000.00
2021	10,000.00
2022	10,000.00

P4 KPIs

- KPIs associated with the project

TYPE	INDICATOR	CURRENT STATUS	GOAL 2ND YEAR	FINAL GOAL
Quantitative	Joint publications of scientific papers with researchers from partner institutions, thesis and dissertation defenses, oral communications in international events	4	8	16
Quantitative	Joint publication of scientific articles with researchers from partner institutions, dissertation examinations, and oral communications in international scientific events	3	6	9

Socioenvironmental innovations and challenges in the Brazilian Cerrado's modernity and its links to a sustainable economy (P5)

Overview

Project P5 - Vision

- This project joins together several subprojects that address economic modernization, its social and environmental impacts, with a focus on understanding how the Brazilian ecosystem Cerrado is integrated to the modern capitalist economy.
- The objectives are concerned with recent changes in the use of natural resources, construction of the rural space, and exploitation of mineral resources.
- The project will also involve studies of the environmental, social and cultural impacts of this new configuration.
- Such studies are innovative in that they can compare the Brazilian reality to that of countries in the BRICS or in the European Union, and therefore allow for gaining a broader understanding of such impacts and for producing models to influence public planning and policies.

P5 Facts

- Start: 01/2019 and End: 10/2022
- Total Budget: **R$ 668,709.60**
  - Grants: R$ 428,709.60
  - Working Missions: R$ 210,000.00
- Working Mission, Support and Grants

YEAR	GRANT DESCRIPTION	QUANTITY
2019	Doutorado Sanduíche (7 meses)	1
2019	Professor Visitante no Exterior Júnior (3 meses)	1
2019	Doutorado Sanduíche (6 meses)	2
2019	Capacitação (1 meses)	2
2019	Professor Visitante no Exterior Sênior (3 meses)	1
2020	Professor Visitante no Exterior Júnior (3 meses)	1
2020	Doutorado Sanduíche (6 meses)	1
2020	Professor Visitante no Exterior Sênior (3 meses)	1
2020	Capacitação (1 meses)	1
2021	Doutorado Sanduíche (6 meses)	1
2021	Capacitação (1 meses)	1

YEAR	QUANTITY
2019	4
2020	4
2022	1
2021	1

YEAR	AMOUNT
2019	10,000.00
2020	10,000.00
2021	10,000.00
2022	-

P5 KPIs

- Indicators Associated with the Project

TYPE	INDICATOR	CURRENT STATUS	GOAL 2ND YEAR	FINAL GOAL
Quantitative	Presentation of papers in scientific events abroad	0	4	6
Quantitative	Participation in International Research Networks	0	1	2
Qualitative	Publication in journals ranked in Qualis CAPES	Percentage of qualified international publications around 15% of the total	Percentage of qualified international publications around 20% of the total	Percentage of qualified international publications around 30% of the total
Quantitative	Reception of Visiting Professors in Brazil	0	4	8
Qualitative	Coordination of projects with financing	Ratted Good by CAPES	Ratted Good by CAPES	Rated Very Good by CAPES
Qualitative	Offer of courses in other languages	Rated Regular by CAPES	Ratted Good by CAPES	Rated Very Good by CAPES
Qualitative	Sending of Visiting Professor outside Brazil	0	1	2
Qualitative	Presentation of papers in scientific events abroad	0	10	20
Qualitative	Published of Production in journals	Ratted Good by CAPES	Ratted Good by CAPES	Rated Very Good by CAPES

Working Missions

- This project encompasses research actions of two postgraduate programs: Business Administration (Note 4 in CAPES) and Economics (Note 4 in CAPES).
- Actions in collaboration with groups in England, Finland, Argentina, USA and Portugal, among others.
- Related Searches
  - Rural Territorial Policies: development strategy for overcoming poverty
  - Sustainable Development, Green Economy and Ecological Economics: theoretical reflections and empirical evaluation for BRICS countries and Eco-innovations in BRICS
  - Innovation in the supply chain and new markets: impacts on brand management with a regional, national and international focus
  - Death in corporate crimes: an analysis of the manifestations of loss and mourning in community posts in defense of territories against mining
    - Motivations Related to Spectators' Attendance at Sports Events in Minas Gerais and Portugal

New technologies for Efficient, Sustainable Energy Production, Conversion and Storage(P6)

Overview

Project P6 - Vision

- New technologies will be produced by developing new materials, including conductors, semiconductors, composites, catalysts, and films, to generate and convert energy while using renewable sources, such as agricultural waste and microorganisms.
- New sustainable technologies will make use of cellulose-rich agricultural waste, such as bagasse, sugar cane solid waste, soy, maize and cotton crop residues, as well as of microorganisms, such as fungi and algae. Such technologies will perfectly marry Brazil's agricultural tradition and, therefore, contribute to reducing environmental impacts. As this is a worldwide issue, such technologies have the potential to exploit waste and residues in the entire planet.
- Other potential technology developments target solar energy production, conversion and storage, which is one of the cleanest sources of energy. The search for more efficient conversion materials is fundamental for applications in batteries, supercapacitors, sensors, and photocatalysts.
- In a context of new devices and sources of energy generation and production, new protocols and technologies will be developed to intelligently manager and control an energy grid comprising different sources and a massive number of consuming devices distributed over this grid. The development of such technologies will contribute to energetic independence and leadership in a vital area for the human kind.

P6 Facts

- Start: 01/2019 and End: 10/2022
- Total Budget: **R$ 1,124,790.95**
  - Grants: R$ 822,790.95
  - Working Missions: R$ 252,000.00
- Working Missions, Support and Scholar Grants

YEAR	GRANT DESCRIPTION	QUANTITY
2019	Pós-Doutorado (6 meses)	1
2019	Capacitação (3 meses)	1
2019	Doutorado Sanduíche (6 meses)	3
2019	Professor Visitante (0 meses)	5
2020	Doutorado Sanduíche (6 meses)	3
2020	Professor Visitante (0 meses)	3
2020	Capacitação (3 meses)	1
2020	Pós-Doutorado (6 meses)	1
2021	Capacitação (3 meses)	1
2021	Doutorado Sanduíche (6 meses)	3
2021	Pós-Doutorado (6 meses)	1
2021	Professor Visitante (0 meses)	3
2022	Professor Visitante (0 meses)	1
2022	Doutorado Sanduíche (6 meses)	2

YEAR	QUANTITY
2019	6
2020	3
2021	3
2022	2

YEAR	AMOUNT
2019	10,000.00
2020	10,000.00
2021	10,000.00
2022	10,000.00

P6 – Joint Research

PPG	PESQUISA ASSOCIADA
PPQUI	Óxidos metálicos semicondutores e compostos de coordenação para conversão de energia solar
PPQUI	Filmes finos de óxidos metálicos semicondutores associados a compostos de coordenação para aplicações fotoeletroquímicas
PPQUI	Nanocompósitos Multifuncionais: Aplicação De Estruturas Carbonáceas E Azul Da Prússia Na Preparação De Baterias, Supercapacitores E Sensores
PPQUI	Filmes nanocompósitos entre nanoestruturas de carbono e hexacianoferratos visando à aplicação em sensores e dispositivos para armazenamento de energia.
PPGCO	SEMEAR - Smart Energy for a Mobile Enabled Smart Grid
PPGEQ	Projeto: Influência da utilização de radiação de micro-ondas e pré-tratamentos químicos na produção de etanol lignocelulósico.
PPGEQ	Produção, purificação e aplicação de ficobiliproteína de cianobactéria
PPGEQ	Avaliação do Potencial Tecnológico da Produção de Etanol por Algas Verdes
PPGEQ	Transferência de Massa e Energia na Secagem de Cascalho na Perfuração por Micro-ondas
PPGEQ	Estudo da Fermentação Alcoólica Empregando Altas Concentrações de Açúcar (VHG) e Baixas Temperaturas
PPGEQ	Produção de hidrogênio a partir da reforma de hidrocarbonetos

P6 KPIs

- KPIs associated with the project

TYPE	INDICATOR	CURRENT STATUS	GOAL 2ND YEAR	FINAL GOAL
Qualitative	Use of new materials for energy production and conversion	Potential strategies defined, but not tested or validated	Development of test trials and validation of new strategies	Validation and valuation of strategies for national and international use
Qualitative	Reduction in agricultural waste and environmental impacts	Partial use of agricultural waste, with pollution and production inefficiency	Reduction of agricultural and industrial waste via optimized conversion and use in the production chain	Collaborative validation and valuation of good practices together with the international community
Qualitative	Use of agricultural waste for energy and material production	Partial use of bagasse, cellulose, and other agricultural waste	Optimized use of such resources through catalysis and new methods to obtain production and quality gains	Validation, valuation and protection of technological knowledge building on international cooperation to develop expertise in the optimization process

Working Missions

- This project encompasses integrated research activities of three graduate programs: Chemical Engineering (Grade 6), Chemistry (Grade 5), and Computer Science (Grade 4 according to Capes' quadrennium evaluation). Common core competences were identified in the area of NEW ENERGY PRODUCTION TECHNOLOGIES.
- These research activities have the collaboration from institutions from the following countries: United Kingdom, Germany, Spain, USA, Portugal, among others. Building on ongoing studies at UFU that were considered priority for this PrInt Framework proposal, the project targets cleaner, more efficient fuels and includes:
  - 1) study of very high grading (VHG) and low-temperature ethanolic brewing and fermentation; 2) evaluation of the technological potential of producing ethanol from green algae; 3) influence of using microwave radiation and chemical pre-treatment to produce lignocellulosic ethanol; and 4) hydrogen production from reforming hydrocarbons and renewable fuels.
  - It also involves optimization of solar energy converters through: 5) semiconductor metallic oxides and coordination complexes for solar energy conversion; 6) thin films of semiconductor metal oxides associated with coordination complexes for photoelectrochemical applications; 7) semiconductor metallic oxides and coordination complexes for solar energy conversion; and 8) thin films of semiconductor metal oxides associated with coordination complexes for photoelectrochemical applications.
  - Such studies involving semiconductors aims at innovative energy storage and production of sensors using: 9) multifunctional nanocomposites through application of Prussian blue and carbonaceous structures in batteries, supercapacitors and sensors; 10) nanocomposite films between carbon nanostructures and hexacyanoferrates for application in sensors and energy storing devices; and 11) development of smart energy for a mobile enabled smart grid (SEMEAR). Finally, the project will address waste treatment and remediation through 12) mass and energy transfer in grid drying during microwave drilling.

New materials and technologies for the industry and for a connected society (P7)

Overview

Project P7 - Vision

- To search for and implement enabling technological solutions for application in the industry and in a society of interconnected people, machines and systems.
- New technologies will be developed to produce new materials, intelligent materials, and nanomaterials for application in various areas in the industry.
- Use of computation and computational models to assess the properties and mechanical behavior of materials applied to the aeronautical and the oil industry.
- To use computational technologies from several fields, including machine learning and bioinspired computation, to support the new networks and future applications, such as those based on the Internet of Things.

P7 Facts

- Start: 01/2019 and End: 10/2022
- Total Budget: **R$ 2,103,370.70**
  - Grants: R$ 1,495,370.70
  - Working Missions: R$ 558,000.00
- Working Missions, Support and Scholar Grants

YEAR	GRANT DESCRIPTION	QUANTITY
2019	Pós-Doutorado (6 meses)	1
2019	Capacitação (3 meses)	1
2019	Doutorado Sanduíche (6 meses)	1
2019	Doutorado Sanduíche (6 meses)	6
2019	Professor Visitante (0 meses)	9
2020	Capacitação (3 meses)	1
2020	Pós-Doutorado (6 meses)	1
2020	Doutorado Sanduíche (6 meses)	6
2021	Pós-Doutorado (6 meses)	1
2021	Doutorado Sanduíche (6 meses)	6
2021	Capacitação (3 meses)	1
2022	Capacitação (3 meses)	1
2022	Doutorado Sanduíche (6 meses)	2
2022	Professor Visitante (0 meses)	2

YEAR	QUANTITY
2019	18
2020	9
2021	6
2022	3

YEAR	AMOUNT
2019	10,000.00
2020	10,000.00
2021	10,000.00
2022	10,000.00

P7 – Joint Research

PPG	Título Pesquisa
PPQUI	Sensores Eletroquímicos de Alto Desempenho: Novos Materiais e Estratégias de Produção. Prof. Rodrigo A. A. Munoz
PPQUI	Desenvolvimento e Aplicação de Sensores Eletroquímicos para a Detecção de Analitos de Interesse Biológico e Farmacêutico. Prof. Rodrigo A. A. Munoz e Prof. Eduardo M. Richter (participante)
PPGCO	Análise de alertas de intrusão para apoiar a segurança de redes
PPGCO	Desenvolvimento e avaliação de um sistema terrestre de mapeamento móvel de baixo custo para aplicações em transportes
PPGCO	Análise e Visualização de Redes Complexas Temporais
PPGCO	NIID-Machine Learning: Estudo sobre processos não-estacionários e não-i.i.d. aplicado a técnicas de aprendizado por transferência em situações de concept drifting
PPGCO	ROBO-BIO: Abordagens bio-inspiradas em Robótica Autônoma
PPGCO	Estratégias Inteligentes Híbridas na Exploração de Sequências de Otimização de Compiladores
PPGCO	SMILE! - YAO : SMILE! - YOU ARE OBSERVED.
PPGCO	NECOS - Novel Enablers for Cloud Slicing
PPGCO	Infraestrutura de Acordo como Serviço baseado Consenso Generalizado
PPGCO	MUDRO – Multi Domain Distributed Resource Orchestrator
PPGCO	Learning Analytics e Big Data em cursos online
COPEM	Modelagem matemática e computacional de escoamentos turbulentos multifásicos.
COPEM	Avaliação de Propriedades Mecânicas e Integridade Estrutural sob Hidrogenação em Amostras Miniaturas e Estudos Tribológicos para Previsão de Desgaste do Revestimento na Perfuração
COPEM	Modelagem computacional e ensaios experimentais de avaliação não-destrutiva de materiais avançados usados em aeronáutica e Modelagem Robusta para o Diagnóstico de Defeitos em Unidades Geradoras
COPEM	Detecção e identificação de trincas transversais em eixos flexíveis de máquinas rotativas e Rotores Inteligentes: Suspensão com Ligas de Memória de Forma (SMA)
COPEM	Desenvolvimento de processos de microusinagem e usinagem de alta precisão
PPGFIS	Sistemas fortemente correlacionados e estados topológicos da matéria
PPGFIS	Ordem e Caos em sistemas quânticos
PPGFIS	Nanomateriais e nanotecnologia

P7 KPIs

- KPIs associated with the project

TYPE	INDICATOR	CURRENT STATUS	GOAL 2ND YEAR	FINAL GOAL
Qualitative	New algorithms and techniques created through international collaboration	Little representativeness in numbers	Increased production of algorithms and techniques through international collaboration	Increased production compared to previous period
Qualitative	Development of intelligent materials and new materials through international collaboration	Low number	Increased number of products created through international collaboration	Increased production compared to previous period
Qualitative	Number of thesis and dissertation defenses in international collaboration	Low number compared to UFU's total	Increased number of thesis and dissertation defenses	Increased number compared to previous period
Qualitative	To develop computational models to assess properties and behaviors of materials in international collaboration projects	Few models developed through isolated activities	Increased number of models developed in international collaboration	Increased development compared to previous period
Qualitative	To develop new architectures, techniques and software components to use in intelligent systems in the scope of international collaboration agreements	Few products developed through isolated activities	Increased number of products created through international collaboration	Increased production compared to previous period

Working Missions

- This project involves the following graduate programs: Mechanical Engineering (Grade 7 in Capes' quadrennium evaluation), Chemistry (Grade 5), Physics (Grade 4), and Computer Science (Grade 4). Such programs have shared core competence in DEVELOPMENT OF NEW MATERIALS AND TECHNOLOGIES FOR THE INDUSTRY AND FOR A CONNECTED SOCIETY.
- The research activities involve research teams from England, Canada, France, Germany, the USA, Portugal, Australia, Belgium, Scotland, Spain, Ireland, among other countries. It includes industrial processes such as:
  - 1) mathematical and computational modelling of multiphase turbulent flows; 2) evaluation of mechanical properties and structural integrity using hydrogenation in miniature samples and tribological studies to predict coating abrasion in drilling; 3) computational modelling and non-destructive experimental tests of advanced materials for aeronautics; 4) diagnosis of defects in generating units; 5) detection and identification of transverse cracks in flexible shafts of rotating machines and intelligent rotors; 6) development of micro-machining processes and high precision machining; 7) development of high performance electrochemical sensors: new materials and production strategies; and 8) detection of analytes of biological and pharmaceutical interest.
  - It also includes computational processes and data management, such as: 9) analysis of intrusion alerts for network security; 10) development and evaluation of low cost mobile terrestrial mapping system for transport applications; 11) analysis and visualization of complex temporal networks; 12) NIID-machine learning: non-stationary and non-i.i.d. processes applied to transfer-based learning techniques in situations of concept drifting; 13) bioinspired approaches to autonomous robotics; 14) intelligent hybrid strategies to explore compiler optimization sequences; 15) machine learning techniques to optimize service provision; 16) new techniques for cloud data management (Novel Enablers for Cloud Slicing); 17) service infrastructure based on generalized consensus; and (18) multi-domain distributed resource orchestrator.
  - In addition, theoretical and practical aspects of materials physics will be addressed in the areas of: 19) strongly correlated systems and topological states of matter; 20) order and chaos in quantum systems; and 21) nanomaterials and nanotechnology.

Technological solutions for agriculture and environmental conservation (P8)

Overview

Project P8 - Vision

- While the demand of energy has continually increased, environmental sustainability increasingly requires clean sources of low economic and environmental costs. Food production is directly linked to energetic and technological issues. Therefore, the binomial food-energy needs to be addressed sustainably. Rational use of land and water, responsible resource management and sustainable food production are some of the greatest challenges of this century.
- Water resources, agricultural pest control and successful pollination-dependent crops are influenced by flora and fauna conservation. However, anthropization and biological diversity impoverishment have relevant socioeconomic consequences to a region and the entire country.
- Environmental quality, productivity and sustainable agricultural activities depend upon the research institutions' ability to train professionals to find technologies and good practices that support conservation policies for a region and the country in general.
- UFU is located in a biome named Cerrado, which has the largest agricultural potentials in the country and the world's richest savannas in terms of biodiversity. The tropical savannas are the origin of humankind, house 20% of the world's population, and feature large biological and cultural diversity. They are responsible for 30% of the planet's net primary production and are an important carbon repository.
- Expertise and technological aid are necessary to define and develop conservation and sustainable use policies for the savanna ecosystems, with important impacts beyond their region and the country. International cooperation for producing technologies and validating and disseminating good practices resulting thereof will be vital to both UFU in particular and Brazil in general.

P8 Facts

- Start: 01/2019 and End: 10/2022
- Total Budget: **R$ 1,300,313.71**
  - Grants: R$ 1,034,313.71
  - Working Missions: R$ 216,000.00
- Working Missions, Support and Scholar Grants

YEAR	GRANT DESCRIPTION	QUANTITY
2019	Doutorado Sanduíche (6 meses)	1
2019	Doutorado Sanduíche (6 meses)	3
2019	Pós-Doutorado (6 meses)	1
2019	Professor Visitante (0 meses)	4
2019	Capacitação (3 meses)	1
2020	Doutorado Sanduíche (6 meses)	4
2020	Pós-Doutorado (6 meses)	1
2020	Professor Visitante (0 meses)	5
2020	Capacitação (3 meses)	1
2021	Doutorado Sanduíche (6 meses)	4
2021	Pós-Doutorado (6 meses)	1
2021	Professor Visitante (0 meses)	5
2021	Capacitação (3 meses)	1
2022	Capacitação (3 meses)	1
2022	Doutorado Sanduíche (6 meses)	2
2022	Professor Visitante (0 meses)	2

YEAR	QUANTITY
2019	5
2020	4
2021	2
2022	1

YEAR	AMOUNT
2019	10,000.00
2020	10,000.00
2021	10,000.00
2022	10,000.00

P8 – Joint Research

PPG	PESQUISA ASSOCIADA
PPGCO	Detection of Pests in Coffee Crops using UAVs and Supervised Learning
PPGCO	Análise visual de recursos hídricos para agricultura
PPGECRN	Padrões de biodiversidade e processos ecológicos em ecossistemas de Cerrado na região do Triângulo Mineiro e Sudeste de Goiás (sub-bacia do Rio Paranaíba)
PPGECRN	Diversidade biótica e serviços ambientais em áreas de Cerrado de Minas Gerais
PPGECRN	Alternativas reprodutivas, interações bióticas e diversidade funcional no Cerrado
PPGECRN	Pautas de Control químico y vacunal de las garrapatas del vacuno em América Latina
PPGECRN	Interações multitróficas em plantas com nectários extraflorais: como efeitos recíprocos emergentes das interações entre predadores e, entre predadores e herbívoros, alteram o comportamento desses animais e o valor adaptativo das plantas.
PPGEQ	Avaliação do processo de remoção de metais de baterias de íons de lítio.
PPGEQ	IARA- Instituto Nacional de Ciência e Tecnologia em Inovação no Aproveitamento de Resíduos Agro-Industriais(INCT- IARA)
PPGEQ	Produção, imobilização e aplicação de fosfatases ácidas.
PPGEQ	Aplicação de lipases no tratamento de efluentes.
PPGEQ	Estudo via simulação molecular do uso de líquidos iônicos para captura CO2
PPGEQ	Produção de membranas aniônicas e catiônicas para processo de eletrodiálise

P8 KPIs

- Indicators associated with the project

TYPE	INDICATOR	CURRENT STATUS	GOAL 2ND YEAR	FINAL GOAL
Qualitative	Bioindicators of environmental quality	Some potential indicators, including diversity of some interaction groups and systems	Expansion of indicators and validation of their use regionally	Selection of indicators upon their validation for more general use in tropical savannas
Qualitative	Validation and valuation of use strategies for environmental services	Few use strategies defined	To expand the number of strategies and to validate good practices nationally	Strategies validated, and costs estimated for use in Brazil and abroad
Qualitative	Good practices for conservation of pollination services in agroecosystems	Good practices defined and tested locally	To test good practices regionally and nationally	To validate good practices internationally through international cooperation
Qualitative	Policies for conservation of environmental services	Agroecosystem related regulation policies defined for the use of pesticides and conservation of natural areas, but in need of validation and further details	To obtain, through cooperation, international experience in establishing such policies.	To influence the implementation and specification of agroecosystem related policies for use of pesticides and conservation of natural areas by adapting the international experience to the Brazilian conditions

Working Missions

- This project encompasses integrated research activities of three graduate programs: Chemical Engineering (Grade 6 in Capes' quadrennium evaluation), Ecology and Conservation of Natural Resources (Grade 5), Computer Science (Grade 4), and Genetics and Biochemistry (Grade 4). These programs have shared competences in the area of TECHNOLOGICAL SOLUTIONS TO AGRICULTURE AND ENVIRONMENTAL CONSERVATION.
- These research activities have the collaboration of institutions from the following countries: United Kingdom, Germany, Spain, USA, Portugal, among others.
- Building on ongoing studies at UFU that were considered priority for this PrInt Framework proposal, the project involves studies aimed to:
  - 1) define biodiversity patterns and ecological processes in the Cerrado ecosystem in the region known as Triângulo Mineiro, with a view to building models for tropical savannas in general;
  - 2) analyze alternatives of reproduction, biotic and functional diversity, and environmental services in these areas of Cerrado; 3) map multitrophic interactions between plants and animals to understand how reciprocal effects from such interactions change animal behavior and plant adaptation;
  - 4) define chemical and vaccinal control of ticks and other plagues associated with Latin American agroecosystems; 5) analyze water resources for agriculture and the impact of their use on agrosystem sustainability and environmental degradation. The former aim can lead to practices that involve: 6) innovative use of agroindustrial waste; 7) production and application of acid phosphatase; 8) lipase application to effluent treatment; 9) optimized metal removal from lithium-ion batteries; 10) production of anionic and cationic membranes for electrodialysis; and 11) molecular simulation study of the use of ionic liquids to capture and fix CO2.

Converging technologies applied to health and well-being (P9)

Overview

Project P9 - Vision

- By designing and implementing technologies drawing on synergies between different knowledge domains, including genetics, computer science, biochemistry, engineering, and chemistry, the aim is: to diagnose diseases and monitor health status; to use new technologies to support treatment and rehabilitation; and to ensure health technology safety.
- Biosensors, biomedical instrumentation, biotechnological processes and telemedicine will be used to support diagnosis of allergic and respiratory diseases, tumors, tropical diseases, and neurodegenerative diseases.
- Mathematical models will be developed and validated to detect and manage such diseases as Parkinson's disease, respiratory disease, as well as thyroid, ovarian and breast cancer.
- Virtual reality will be used to formulate alternative rehabilitation treatments for amputees with neuromotor diseases. Additionally, biomarkers and bioactive compounds from plants and animals will be mapped with a view to new treatment techniques.
- Protocols and techniques will be implemented to ensure the quality and safety of health technologies.

P9 Facts

- Start: 01/2019 and End: 10/2022
- Total Budget: **R$ 2,990,732.77**
  - Grants: R$ 2,257,435.77
  - Working Missions: R$ 684,000.00
- Working Missions, Support and Scholar Grants

YEAR	GRANT DESCRIPTION	QUANTITY
2019	Doutorado Sanduíche (6 meses)	1
2019	Pós-Doutorado (6 meses)	1
2019	Doutorado Sanduíche (6 meses)	12
2019	Capacitação (3 meses)	1
2019	Professor Visitante (0 meses)	5
2019	Professor Visitante (0 meses)	9
2020	Capacitação (3 meses)	2
2020	Professor Visitante (0 meses)	9
2020	Pós-Doutorado (6 meses)	1
2021	Pós-Doutorado (6 meses)	1
2021	Doutorado Sanduíche (6 meses)	12
2021	Capacitação (3 meses)	2

YEAR	QUANTITY
2019	16
2020	11
2021	8
2022	3

YEAR	AMOUNT
2019	9,297.00
2020	10,000.00
2021	10,000.00
2022	10,000.00

P9 – Joint Research

PPG	PESQUISA ASSOCIADA
PPGEBI	Virtual reality for rehabilitation in Parkinson's disease
PPGEBI	Ergonomics of orthotic devices: A computational modelling approach
PPGEBI	Universal control interface for people with disabilities based on biomedical signals
PPGEBI	Telemedicine-based system for the evaluation of clinical signs of Parkinson's disease.
PPQUI	Uso de modelagem molecular no desenvolvimento de nanobiossensores para detecção de herbicidas, e de doenças causadas pelo mosquito Aedes Aegypti.
PPQUI	Biossensor Para Diagnóstico Point-Of-Care Do Vírus Zika
PPQUI	Desenvolvimento De Imunossensor Para Diagnóstico De Distúrbios Da Tireóide Usando Plataforma Funcionalizada Com Nanomateriais
PPQUI	Desenvolvimento De Imunossensores Para Diagnóstico Molecular De Tumores De Mama E Ovário.
PPQUI	Uso do sistema de análise por injeção em batelada no desenvolvimento de métodos portáteis para identificação de adulterações ou falsificações em medicamentos ou suplementos alimentares.
PPQUI	Desenvolvimento de métodos analíticos com características portáteis visando à identificação de falsificações em produtos farmacêuticos e drogas lícitas CAPES (Pro Forenses)
PPGGB	Análise de alergomas por meio das tecnologias de phage display e espectrometria de massas para controle de doenças alérgicas respiratórias
PPGGB	INCT-TeraNano
PPGGB	Aplicação de processos biotecnológicos para o desenvolvimento de novos ensaios imunológicos para diagnóstico, monitoramento e promoção à saúde de pacientes com alergia respiratória
PPGGB	Produção de alérgenos recombinantes modificados da proteína semelhante a peritrofilina (Der p 23) do ácaro Dermatophagoides pteronyssinus para emprego no imunodiagnóstico e aplicação potencial na imunoterapia de doenças alérgicas respiratórias
PPGGB	Potencial antitumoral e antiangiogênico de componentes bioativos isolados da peçonha da serpente bothrops pauloensis
PPGGB	Ação antiangiogênica e antimetastática de uma fosfolipase A2 de peçonha ofídica em câncer de mama: uma abordagem in vitro, ex vivo e in vivo
PPGGB	Estudo das atividades biológicas e moleculares de toxinas isoladas de peçonhas botrópicas em Leishmania: Efeito na interação parasita-hospedeiro
PPGGB	Biotecnologia em diagnóstico de microRNAs circulantes do plasma como potenciais biomarcadores do exercício e dos seus benefícios para saúde
PPGGB	Desenvolvimento e caracterização de complexos bioativos-nanoestruturados.
PPGGB	Plantas Medicinais, Frutos do Cerrado e Diabetes Mellitus: descoberta de inibidores de enzimas alvos, atividades antiglicação e antioxidante, efeito neuroprotetor em modelo experimental e caracterização por análise fitoquímica biomonitorada dos extratos.
PPGGB	Diagnóstico pela saliva: descoberta e inovação em biomarcadores para o exercício físico, estresse e saúde bucal
PPGCO	b-SPAN - Application of electroencephalographic signals at the Intensive Care Unit
PPGCO	Seleção de alvo contra doenças bacterianas
PPGCO	SMART PROGNOSTIC: precisão prognóstica em pacientes com tumores sólidos metastáticos
COPEL	3DLIMB:Fabricação de baixo custo e rápida de próteses de membros superiores impressos em 3D
COPEL	Realidade Virtual para a reabilitação da Doença de Parkinson.
COPEM	Uso de termografia na investigação de materiais compostos com aplicação na indústria aeronáutica e na biomecânica

P9 KPIs

- Indicators associated with the project

TYPE	INDICATOR	CURRENT STATUS	GOAL 2ND YEAR	FINAL GOAL
Qualitative	Biotechnology based biosensors for diagnosis of tropical diseases	Promising biosensors, but waiting for validation and assessment of potential use	Sensor testing and technique improvement	Validation and clinical trials using international expertise
Qualitative	Mathematical models for detection and management of Parkinson's disease	Models in development with potential for diagnostic use	Testing of diagnosis models, including via telemedicine	Assays for clinical use and validation of diagnostic models building on interactions with international groups
Qualitative	Bioindicators for monitoring and diagnosis	Strategies defined, but indicators still in development	Indicators defined and tested locally	Indicators validated at a broader level building on studies developed in international collaboration

Working Missions

- This project encompasses research activities of six graduate programs: Mechanical engineering (Grade 7 in Capes' quadrennium evaluation), Electrical Engineering (Grade 5), Genetics and Biochemistry (Grade 4), Chemistry (Grade 5), Biomedical Engineering (Grade 4), and Computer Science (Grade 4).
- These programs have common competences in CONVERGING TECHNOLOGIES APPLIED TO HEALTH and work in collaboration with research teams in England, Canada, France, Germany, the USA, Portugal, and other countries.
- The studies aim at enabling technologies, including:
  - 1) low cost manufacturing of 3D-printed upper limb prostheses; 2) ergonomic aspects of orthotic devices via computational models; and 3) use of biomedical signals to create control interfaces for people with disabilities.
  - They also involve monitoring of pathologies or health disorders, including: 4) monitoring in intensive care units via electroencephalographic signals; 5) smart prognostic techniques in patients with metastatic solid tumors; 6) use of biotechnological processes to select targets against bacterial diseases; and 7) immunological assays for diagnosis of respiratory allergies.
  - Additionally, they aim at: 8) biotechnology in the diagnosis of circulating plasma microRNAs as biomarkers of exercises and health benefits; and 9) diagnosis by saliva of bioindicators of physical exercise, stress and oral health. Also, 10) biosensors will be tested for Point-Of-Care diagnosis of the Zika virus; 11) immunosuppressants will be developed and tested for the diagnosis of thyroid disorders and breast and ovarian tumors; 12) molecular modeling will be used in nanobiosensors to detect herbicides and diseases caused by Aedes Aegypti.
  - Biotechnological analyses will be carried out 13) to investigate the antitumor and antiangiogenic potential of bioactive components of snake venoms, 14) to develop nanostructured bioactive complexes, and 15) to develop portable methods of drug tampering identification. New approaches will be developed, including: 16) telemedicine-based systems for clinical evaluation of signs of Parkinson's disease; and 17) virtual medicine for rehabilitation of people with Parkinson's disease. Additionally, 18) thermography techniques will be used to investigate composite materials with application in the aeronautical industry and biomechanics.

Concluding Remarks

- Research based on an converging and interdisciplinary approach
  - Put together different knowledge domains and technological skills that enable the society to answer questions and solve problems in an integrated fashion
- Creation of an intense bi-directional flow of researchers between UFU and abroad
- Promotion and strengthening of international collaboration networks
- Apply an innovative research management
- Contribute to the society in strategic areas that are consistent with UFU's institutional vocation.

Thank you!

UFU CAPES PrInt Institutional Committee

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