



REDE  
**SUL GLOBAL**  
2030

UFPR - UNICENTRO - UVA - UFF - IBICT - IFSP

# GLOBAL SOUTH 2030 NETOWRK FOR SCIENTIFIC COOPERATION AND SUSTAINABLE DEVELOPMENT

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## THEME 1 – INCLUSION AND HUMAN DEVELOPMENT: INTEGRATED SOLUTIONS FOR HEALTH, EDUCATION, AND SOCIAL JUSTICE

**Coordenation:** Prof. Dr. Marcelo Moraes e Silva

**Theme description:** It integrates social, human, environmental, educational, linguistic, cultural, and health dimensions, linking teaching, research, innovation, and outreach to improve quality of life, promote rights, and reduce inequalities, thereby contributing to the holistic development of citizenship. It encompasses the formulation and implementation of public policies, the development of innovative solutions—including in the face of digital transformation—as well as the production of knowledge applied to social and environmental challenges, with strong cooperation among universities, companies, governments, and social organizations. Diversity, inclusion, education, cultural development, and affirmative action are foundational principles.

### Related projects:

- 1.1 - The dynamics of biological systems in prevention, determinants, diagnosis, and health therapies
- 1.2 - Public Policies, Spaces, and Social Dynamics
- 1.3 - Production, circulation, and translation of knowledge and social challenges
- 1.4 - Inclusion, human rights, and democracy
- 1.5 - GAIA-URIHI: Memory, identities, and digital citizenship

### Related Graduate Programs:

HEI	Graduate Program
UFPR	FOOD AND NUTRITION
UFPR	ANTHROPOLOGY AND ARCHAEOLOGY
UFPR	BIOPROCESS AND BIOTECHNOLOGY ENGINEERING
UFPR	CELL AND MOLECULAR BIOLOGY
UFPR	CHEMISTRY
UFPR	CHILD AND ADOLESCENT HEALTH
UFPR	CIVIL ENGINEERING
UFPR	COLLECTIVE HEALTH
UFPR	ECONOMIC DEVELOPMENT
UFPR	ECONOMY
UFPR	EDUCATION
UFPR	EDUCATION: TEACHING THEORY AND PRACTICE
UFPR	FAMILY HEALTH
UFPR	GENETICS

UFPR	GEOGRAPHY
UFPR	HEALTH CARE PRACTICE
UFPR	HISTORY
UFPR	INFORMATICS
UFPR	INFORMATION MANAGEMENT
UFPR	INTERNAL MEDICINE AND HEALTH SCIENCES
UFPR	LANGUAGES AND LITERATURE
UFPR	LAW
UFPR	MICROBIOLOGY, PARASITOLOGY AND PATHOLOGY
UFPR	MUSIC
UFPR	NATIONAL NETWORK FOR TEACHING ENVIRONMENTAL SCIENCES
UFPR	NURSING
UFPR	ODONTOLOGY
UFPR	PHARMACEUTICAL SCIENCES
UFPR	PHARMACOLOGY
UFPR	PHILOSOPHY
UFPR	PHILOSOPHY - PROFESSIONAL
UFPR	PHYSICS
UFPR	POLITICAL SCIENCE
UFPR	PUBLIC POLICY
UFPR	SCIENCE (BIOCHEMISTRY)
UFPR	SCIENCE AND MATHEMATICS EDUCATION
UFPR	SCIENCE EDUCATION, MATHEMATICS EDUCATION, AND EDUCATIONAL TECHNOLOGIES
UFPR	SOCIOLOGY IN THE NATIONAL NETWORK
UFPR	SOCIOLOGY
UFPR	SUSTAINABLE TERRITORIAL DEVELOPMENT
UFPR	URBAN PLANNING
UVA	FAMILY HEALTH - PROFESSIONAL
UVA	SOCIOLOGY IN THE NATIONAL NETWORK
UVA	FAMILY HEALTH
UVA	PHILOSOPHY
UNICENTRO	PHARMACEUTICAL SCIENCES
UNICENTRO	NURSING IN PRIMARY HEALTH CARE
UNICENTRO	PROFNIT - INTELLECTUAL PROPERTY AND TECH. TRANSFER FOR INNOVATION
IBICT	INFORMATION SCIENCE
IFSP	SCIENCE AND MATHEMATICS EDUCATION
UFF	BIOMEDICAL SCIENCES (PHYSIOLOGY AND PHARMACOLOGY)
UFF	PATHOLOGY
UFF	PHILOSOPHY

## PROJECT 1.1: THE DYNAMICS OF BIOLOGICAL SYSTEMS IN PREVENTION, DETERMINANTS, DIAGNOSIS, AND HEALTH THERAPIES

**Coordenation:** Profa. Dra. Francinete Ramos Campos

**Project description:** The project aims to deepen the understanding of the processes related to chronic, infectious, parasitic, and vector-borne diseases and their determinants, with a focus on neglected and deficiency diseases throughout the human life cycle. It integrates different areas of knowledge, using an interdisciplinary and collaborative approach to analyze the factors that influence human health. In addition to the production of knowledge, the development of scientific and technological innovations aimed at improving the well-being and quality of life of populations and reducing health inequalities is urgent. The first axis of the project investigates translational mechanisms, ranging from molecules to individuals, whether healthy or sick, linking them to the social determinants that modulate these processes. The aim is to comprehensively understand how biological, behavioral, and psychosocial factors, material living conditions, socioeconomic and political context, as well as environmental factors related to etiological agents, can impact health equity and the well-being of the Brazilian population. This integrated analysis will allow us to identify complex interactions between contexts of vulnerability, environmental conditions, access to services, and population dynamics, providing input for the formulation of more effective prevention, diagnosis, and care strategies. The second axis focuses on complex and predictive systems modeling, such as the development and validation of innovative diagnostic methodologies, highlighting biomarkers, point-of-care technologies, and advanced computational tools. It will conduct studies on the dynamics of complex systems, such as neural signals and epidemiological processes, aiming to understand and identify behavioral patterns and disease dynamics, and thereby anticipate scenarios that will guide public health policies and practices. The last axis focuses on developing and evaluating innovative therapies in biological systems applied to health, with a particular emphasis on new drugs and bioactives. It addresses advances in new therapies aimed at the prevention, diagnosis, and treatment of priority health conditions, based on nanotechnology, regenerative therapies, and drug repositioning strategies, and also includes assessments of health technologies based on cost-effectiveness and social impact. These initiatives articulate strategies for personalized medicine, person-centered care, disease prevention, and health promotion, aimed at guiding clinical guidelines and public policies. Thus, the project aligns with commitments to ongoing human resources training and consolidating international cooperation networks, which articulate academic mobility, global health training, and outreach practices.

### Related Graduate Programs:

HEI	Graduate Program
UFPR	BIOPROCESS AND BIOTECHNOLOGY ENGINEERING
UFPR	CELL AND MOLECULAR BIOLOGY

UFPR	CHEMISTRY
UFPR	CHILD AND ADOLESCENT HEALTH
UFPR	COLLECTIVE HEALTH
UFPR	ECONOMY
UFPR	FOOD AND NUTRITION
UFPR	GENETICS
UFPR	HEALTH CARE PRACTICE
UFPR	INFORMATION MANAGEMENT
UFPR	INTERNAL MEDICINE AND HEALTH SCIENCES
UFPR	MICROBIOLOGY, PARASITOLOGY AND PATHOLOGY
UFPR	NURSING
UFPR	ODONTOLOGY
UFPR	PHARMACEUTICAL SCIENCES
UFPR	PHARMACOLOGY
UFPR	PHYSICS
UFPR	SCIENCE (BIOCHEMISTRY)
UFPR	SOCIOLOGY IN THE NATIONAL NETWORK
UVA	FAMILY HEALTH - PROFESSIONAL
UVA	SOCIOLOGY IN THE NATIONAL NETWORK
UVA	FAMILY HEALTH
UNICENTRO	PHARMACEUTICAL SCIENCES
UNICENTRO	NURSING IN PRIMARY HEALTH CARE
UNICENTRO	PROFNIT - INTELLECTUAL PROPERTY AND TECHNOLOGY TRANSFER FOR INNOVATION
UFF	BIOMEDICAL SCIENCES (PHYSIOLOGY AND PHARMACOLOGY)
UFF	PATHOLOGY

## PROJECT 1.2: PUBLIC POLICIES, SPACES, AND SOCIAL DYNAMICS

**Coordenation:** Profa. Dra. Elisângela Alves da Silva Scaff

**Project description:** The project aims to strengthen academic cooperation at UFPR with national and international higher education institutions to consolidate research networks on public policies in relation to diverse contexts and territories. It prioritizes experience sharing and the development of innovative and interdisciplinary research methodologies that favor the collaborative construction of knowledge with respect to local and regional particularities, combining scientific rigor and a commitment to human development and social sustainability. Integrating different areas of knowledge, the project covers legal, spatial, economic, health, environmental, food, informational, cultural, sociological, philosophical, anthropological, linguistic, identity, and

educational dimensions to address contemporary challenges. The project aligns with the 2030 Agenda in addressing the following themes: a) Poverty eradication: research on its multidimensionality, reduction of social vulnerability, integration between economic development, social, environmental, labor, and indigenous rights, and digital inclusion; b) Quality education: investigations into educational policies and practices in diverse territories, proposing innovations to improve the quality and equity of formal and non-formal education; c) Gender equality: research on gender, sexual orientation, prevention of gender violence, and socio-spatial, educational, and urban inclusion and access to positions of power; d) Promotion of decent work: studies on workplace transformations, digital platform work, labor and employment policies, protection of labor rights, and occupational health and safety; e) Reduction of inequalities: analysis of economic and social equality policies, indicators of race, gender, ethnicity, origin, disability, economic status, access to land, water, the city, education, health, nationality, among others; f) Sustainable cities and communities: research on socio-spatial dynamics, territorial policies, and community organizations in urban, environmental, social, technical, methodological, legal, economic, and cultural dimensions; g) Peace,

justice, and effective institutions: investigations into contemporary armed conflicts and the strengthening of social justice; h) Health and Well-being: research on historical, social, and environmental determinants of health-disease-care processes, health policies, and programs, based on principles of comprehensiveness and intersectorality and including studies aimed at improving treatment in critical areas, integrating science, innovation, and public health with the reduction of inequalities; i) Indigenous Peoples and Traditional Communities: research on territorial rights, combating structural racism, systematization and dissemination of knowledge to ensure access to land and territory.

### **Related Graduate Programs:**

<b>HEI</b>	<b>Graduate Program</b>
UFPR	ANTHROPOLOGY AND ARCHAEOLOGY
UFPR	CELL AND MOLECULAR BIOLOGY
UFPR	COLLECTIVE HEALTH
UFPR	ECONOMIC DEVELOPMENT
UFPR	EDUCATION
UFPR	EDUCATION: TEACHING THEORY AND PRACTICE
UFPR	FAMILY HEALTH
UFPR	FOOD AND NUTRITION
UFPR	GEOGRAPHY
UFPR	HEALTH CARE PRACTICE
UFPR	INFORMATICS
UFPR	INFORMATION MANAGEMENT

UFPR	INTERNAL MEDICINE AND HEALTH SCIENCES
UFPR	LANGUAGES AND LITERATURE
UFPR	LAW
UFPR	NURSING
UFPR	ODONTOLOGY
UFPR	PHILOSOPHY
UFPR	PUBLIC POLICY
UFPR	SCIENCE AND MATHEMATICS EDUCATION
UFPR	SCIENCE EDUCATION, MATHEMATICS EDUCATION, AND EDUCATIONAL TECHNOLOGIES
UFPR	SOCIOLOGY IN THE NATIONAL NETWORK
UFPR	SOCIOLOGY
UFPR	SUSTAINABLE TERRITORIAL DEVELOPMENT
UFPR	URBAN PLANNING
UVA	FAMILY HEALTH - PROFESSIONAL
UVA	SOCIOLOGY IN THE NATIONAL NETWORK
UVA	FAMILY HEALTH
UVA	PHILOSOPHY
UNICENTRO	NURSING IN PRIMARY HEALTH CARE
IBICT	INFORMATION SCIENCE
IFSP	SCIENCE AND MATHEMATICS EDUCATION
UFF	PHILOSOPHY

### PROJECT 1.3: PRODUCTION, CIRCULATION, AND TRANSLATION OF KNOWLEDGE AND SOCIAL CHALLENGES

**Coordenation:** Prof. Dr. José Felipe Araujo de Almeida

**Project description:** Nowadays, educational, political, and economic systems are facing continuous challenges. At the same time, a significant part of everyday life has migrated to virtual environments, international mobility is restricted, and cultural plurality is becoming increasingly prominent in the social sphere. These transformations shape a scenario of polycrisis and multiple challenges characteristic of today's world. In this context, critical reflection on the concepts of interdisciplinarity, multidisciplinary, and transdisciplinary is essential, as is the continuous construction of academic knowledge from these perspectives, without overlooking their limitations and methodological implications, which are under modernization in light of contemporary digital resources and tools. Therefore, this project proposes to investigate the production, circulation, and historical appropriation of multiple forms of knowledge, considering the diversity of multicultural experiences. The aim is to stimulate an in-depth debate on the shifts, interactions, and transformations of aesthetic, political, educational, and epistemological models in contexts where

different traditions, institutions, practices, and rationalities intersect. The project analyzes the processes of circulation and appropriation of knowledge, conceived as fundamental factors in the constitution of cultural traditions, forms of social organization, systems of thought, and educational practices. These processes are crucial tools for addressing both the polycrisis scenario and the multiple challenges that characterize the contemporary world. The objective is to analyze the formation of different intellectual schools, representational systems, and understandings of reality, attributing equal relevance to the role played by writing, translation, transmission, and appropriation of knowledge. The project seeks to consolidate the cross-cutting and international nature of ongoing research; promote the qualification of academic production by teachers and students through the development of joint work between participating teams; and offer cross-cutting courses, including in foreign languages, to intensify interaction between the programs involved, expand academic collaboration, and optimize the use of financial resources.

### Related Graduate Programs:

HEI	Graduate Program
UFPR	ANTHROPOLOGY AND ARCHAEOLOGY
UFPR	CELL AND MOLECULAR BIOLOGY
UFPR	CIVIL ENGINEERING
UFPR	COLLECTIVE HEALTH
UFPR	ECONOMIC DEVELOPMENT
UFPR	EDUCATION
UFPR	EDUCATION: TEACHING THEORY AND PRACTICE
UFPR	GENETICS
UFPR	GEOGRAPHY
UFPR	HEALTH CARE PRACTICE
UFPR	HISTORY
UFPR	INFORMATION MANAGEMENT
UFPR	LANGUAGES AND LITERATURE
UFPR	LAW
UFPR	MUSIC
UFPR	NURSING
UFPR	PHILOSOPHY
UFPR	PHILOSOPHY - PROFESSIONAL
UFPR	SCIENCE EDUCATION, MATHEMATICS EDUCATION, AND EDUCATIONAL TECHNOLOGIES
UFPR	SOCIOLOGY IN THE NATIONAL NETWORK
UFPR	SOCIOLOGY
UVA	SOCIOLOGY IN THE NATIONAL NETWORK
UVA	PHILOSOPHY
UNICENTRO	NURSING IN PRIMARY HEALTH CARE
IBICT	INFORMATION SCIENCE

## PROJECT 1.4: INCLUSION, HUMAN RIGHTS, AND DEMOCRACY

### Coordenation:

**Project description:** Income concentration, the climate crisis, the infodemic, and the erosion of democracies widen social inequalities, intensify forced displacement, and lead to human rights violations, disproportionately affecting vulnerable populations. The situation intensifies by wars and geopolitical realignments, which weaken multilateral cooperation and heighten tensions between states. Added to this is the rise of physical, structural, and symbolic violence linked to identity, race, gender, sexual orientation, and ethnic-religious affiliations, compromising citizenship, social cohesion, and the protection of fundamental rights. The project aims to discuss the limits and meanings of contemporary democracy, prioritizing social inclusion, the right to truth, digital democracy, access to information, socioenvironmental justice, gender justice, and interspecies justice, articulating collective struggles and institutional strategies for the realization of human rights. It includes the protection of indigenous peoples and traditional communities, the defense of animal rights, and the fight against digital misinformation and technological asymmetries. Health is a universal right and democratic value, whose realization requires solid public policies, access to quality care, and the promotion of equity. Research in public health serves as a guide for evidence-based prevention, care, and well-being strategies informed by community dialogue. The scope of the project involves: conceptual and critical studies on the formation and crisis of the democratic rule of law in contexts of neoliberal globalization, climate change, and migratory dynamics; analyses of socioeconomic, cultural, identity, and informational inequalities, with special attention to digital misinformation and asymmetries of race, gender, sexual diversity, and ethnic-religious affiliation; empirical research on public policies and practices of inclusion in health, education, work, housing, migration, the environment, and urban production, as well as formative processes and situations of violence that affect vulnerable populations; and investigations into institutions, culture, and democratic legitimacy, combined with initiatives for democratization and access to information on the rule of law and human rights. The project connects researchers from UFPR and national and international institutions in a transdisciplinary network focused on global academic and scientific cooperation. The initiative strengthens dialogue between different areas of knowledge,

expands the international circulation of Brazilian production, and fosters strategic partnerships for innovation, social impact, and scientific diplomacy.

### Related Graduate Programs:

HEI	Graduate Program
UFPR	ANTHROPOLOGY AND ARCHAEOLOGY
UFPR	CELL AND MOLECULAR BIOLOGY
UFPR	CIVIL ENGINEERING
UFPR	COLLECTIVE HEALTH
UFPR	FAMILY HEALTH
UFPR	GEOGRAPHY
UFPR	HEALTH CARE PRACTICE
UFPR	HISTORY
UFPR	INFORMATION MANAGEMENT
UFPR	LANGUAGES AND LITERATURE
UFPR	NURSING
UFPR	PHILOSOPHY
UFPR	PHILOSOPHY - PROFESSIONAL
UFPR	POLITICAL SCIENCE
UFPR	SOCIOLOGY IN THE NATIONAL NETWORK
UFPR	SOCIOLOGY
UFPR	SUSTAINABLE TERRITORIAL DEVELOPMENT
UFPR	URBAN PLANNING
UVA	SOCIOLOGY IN THE NATIONAL NETWORK
UVA	PHILOSOPHY
UNICENTRO	NURSING IN PRIMARY HEALTH CARE
IBICT	INFORMATION SCIENCE
IFSP	SCIENCE AND MATHEMATICS EDUCATION
UFF	PHILOSOPHY

## PROJECT 1.5: GAIA-URIHI: MEMORY, IDENTITIES, AND DIGITAL CITIZENSHIP

**Coordenation:** Prof. Dr. Paulo Astor Soethe

**Project description:** The digitization and digital access to millions of textual documents, oral and visual records, and objects in Brazilian collections is a massive undertaking that requires training and participation from professionals and the general public, backed by significant technological advances. This process impacts the future of social relations in Brazil, where society is rethinking its history, seeking to balance power relations, renew and equalize its diverse identity, and raise its profile abroad. With exemplary actions, the GAIA-URIHI Project (Greek for "mother earth" and

Yanomami for "forest earth") offers theoretical and practical suggestions for the digital (trans)formation of Brazilian multilingual cultural memory, its dissemination, and incorporation into scientific, educational, and health practices. In partnership with a vast network of document management and storage institutions, the project aims to subsidize and support, in a high-standard, open, and free digital environment, based on a solid legal foundation, the availability of historical and cultural documents in various languages; visual and audio objects and records, for individual or optimized collaborative use, with social, educational, cultural, and health benefits, through technological innovation, preservation of cultural and social memory, consolidation of democracy, and renewal of national identity that promotes equity, health, and justice. The guiding hypothesis behind this project is that the practical and democratic management of such processes fosters equitable social relations, self-esteem among the population, the highlighting of silenced voices, subjectivity, and national cohesion, in support of the democratic rule of law. Under linguistic, historical, archival, and document management guidelines and methods for the organization and open dissemination of material; in dialogue with the academic field of digital humanities; with a focus on theoretical and practical dimensions aimed at the recording, preservation, organization, dissemination, and mediation of information, and attention to risk management and digital preservation models; seeking to ensure the neutral circulation of digitized material, in accordance with current legal precepts; through the comprehensive use of storage operating systems, large-scale distributed systems, and artificial intelligence subsidiary to autonomous interaction with data, the project aims to reflect on the emergence of a new digital environment for the past in various areas of social life and on the educational dissemination and development of scientific and civic instrumentation for dealing with content relevant to the discursive dynamics of the present. The international appeal and attractiveness of Brazilian society, stemming from its rich history and diverse, multilingual, intercultural, and multiethnic character, as well as the global nature of digital transformation, render international cooperation an essential aspect of the planned actions. Finally, the project aims to contribute to technological innovation in Brazil and internationally, including in the private sector, in related areas.

#### **Related Graduate Programs:**

<b>HEI</b>	<b>Graduate Program</b>
UFPR	ANTHROPOLOGY AND ARCHAEOLOGY
UFPR	EDUCATION
UFPR	HISTORY
UFPR	INFORMATICS
UFPR	INFORMATION MANAGEMENT
UFPR	LANGUAGES AND LITERATURE
UFPR	LAW

UFPR	MUSIC
UFPR	PHILOSOPHY
UVA	SOCIOLOGY IN THE NATIONAL NETWORK
IBICT	INFORMATION SCIENCE
IFSP	SCIENCE AND MATHEMATICS EDUCATION

## THEME 2 – CONSERVATION AND SUSTAINABLE PRODUCTION: SOCIO-ENVIRONMENTAL GOVERNANCE OF LAND, WATER, AND BIODIVERSITY

**Coordenation:** Prof. Dr. Marcelo Pedrosa Gomes

**Theme description:** It promotes the integration of biodiversity, agriculture, and production systems in collaboration with established international networks and by strengthening national and Global South networks, to mitigate the effects of climate change, manage natural resources, and foster innovation in agribusiness. It values the understanding and conservation of biodiversity in the Anthropocene, seeking food security and the integration of traditional knowledge and practices with science and technology. The focus is on the balance between basic and applied sciences, integrating innovation, socioeconomic viability, and respect for cultural and environmental diversity, with explicit strategies for internationalization, reduction of regional disparities, and participatory governance.

### Related Projects:

- 2.1 - Biodiversity and the environment: threats and conservation of biodiversity
- 2.2 - Evolution of Biodiversity: multidisciplinary approaches
- 2.3 - Climate change, monitoring, modeling, and environmental impacts
- 2.4 - Sustainability, sustainable technologies and production systems in food security
- 2.5 - Agroecology and socio-environmental justice: fair transition of agri-food production in the context of climate emergency
- 2.6 - Omic Sciences for Agriculture, Sustainability, and Biodiversity

### Related Graduate Programs:

HEI	Graduate Program
UFPR	AGRONOMY (PLANT PRODUCTION)
UFPR	ANIMAL SCIENCE
UFPR	ANTHROPOLOGY AND ARCHAEOLOGY
UFPR	AQUACULTURE AND SUSTAINABLE DEVELOPMENT
UFPR	BIOINFORMATICS
UFPR	BIOLOGICAL SCIENCES (ENTOMOLOGY)

UFPR	BIOPROCESS AND BIOTECHNOLOGY ENGINEERING
UFPR	BIOTECHNOLOGY
UFPR	BOTANICS
UFPR	CELL AND MOLECULAR BIOLOGY
UFPR	CHEMICAL ENGINEERING
UFPR	CHEMISTRY
UFPR	CIVIL ENGINEERING
UFPR	COASTAL AND OCEANIC SYSTEMS
UFPR	ECOLOGY AND CONSERVATION
UFPR	ECONOMIC DEVELOPMENT
UFPR	EDUCATION
UFPR	ENVIRONMENT AND DEVELOPMENT
UFPR	ENVIRONMENTAL ENGINEERING
UFPR	FOOD AND NUTRITION
UFPR	FOOD ENGINEERING
UFPR	FORESTRY ENGINEERING
UFPR	GENETICS
UFPR	GEODETTIC SCIENCES
UFPR	GEOGRAPHY
UFPR	INFORMATICS
UFPR	INFORMATION MANAGEMENT
UFPR	LAW
UFPR	MATERIALS SCIENCE AND ENGINEERING
UFPR	MICROBIOLOGY, PARASITOLOGY AND PATHOLOGY
UFPR	PHARMACEUTICAL SCIENCES
UFPR	PHARMACOLOGY
UFPR	PHYSICS
UFPR	PRODUCTION ENGINEERING
UFPR	SCIENCE (BIOCHEMISTRY)
UFPR	SOCIOLOGY
UFPR	SOIL SCIENCES
UFPR	SUSTAINABLE TERRITORIAL DEVELOPMENT
UFPR	TOURISM
UFPR	URBAN AND INDUSTRIAL ENVIRONMENT
UFPR	URBAN PLANNING
UFPR	WATER RESOURCES AND ENVIRONMENTAL ENGINEERING
UFPR	ZOOLOGY
UVA	SOCIOLOGY IN THE NATIONAL NETWORK
UVA	GEOGRAPHY
UVA	ZOOTECNY

UNICENTRO EVOLUTIVE BIOLOGY  
UNICENTRO FORESTRY SCIENCES  
UNICENTRO SANITARY AND ENVIRONMENTAL ENGINEERING - UEPG / UNICENTRO  
IBICT INFORMATION SCIENCE

## PROJECT 2.1: BIODIVERSITY AND THE ENVIRONMENT: THREATS AND CONSERVATION OF BIODIVERSITY

**Coordenation:** Profa. Dra. Chirlei Glienke

**Project Description:** Global biodiversity is under increasing threat due to ecosystem degradation, climate change, and human activities. These transnational challenges require integrated, interdisciplinary solutions coordinated through international research and training networks. In addition to their intrinsic value, ecosystems provide essential services such as climate regulation, water purification, pollination, soil fertility, food security, and human well-being. Their conservation is strategic for life, the achievement of the Sustainable Development Goals (SDGs), and the formulation of lasting public policies. This project aims to consolidate an international network of excellence focused on biodiversity conservation and socio-environmental sustainability. Planning for the conservation of biodiversity and its ecosystem interfaces, as well as food security, and the convergence of traditional knowledge, science, and technology is strategic for deepening the understanding of Brazilian biodiversity, the causes of global change, and the generation of scientific subsidies for national and international public policies. Two complementary lines of action will ensue: (1) natural dynamics and biodiversity conservation; (2) socio-environmental dynamics and natural resource sustainability. The project incorporates social inclusion by recognizing the role of indigenous peoples, quilombolas, riverine communities, and traditional communities in biodiversity management and conservation. These groups will be partners in building intercultural knowledge and developing sustainable practices. Actions will advance to increase the participation of women researchers, extension workers, and farmers, thereby strengthening gender equality in science and socio-environmental management. Internationalization will flourish through agreements, research missions, joint supervision, postdoctoral programs, bilingual workshops, courses, and publications with international co-authorship. The graduate programs will work in synergy to promote academic inclusion and reduce regional inequalities. These actions aim to strengthen emerging scientific production in global knowledge networks. Governance will be led by a Steering Committee comprising representatives from UFPR and partner institutions, which will be responsible for setting goals, indicators, and evaluating results. Data such as mobility, publications, joint defenses, bilingual courses and subjects, and reports will be monitored to support public policies. The proposal aligns with national policies on biodiversity, health, endangered species, and

traditional peoples, as well as international commitments such as the CBD/UN and IPBES.

### Related Graduate Programs:

HEI	Graduate Program
UFPR	AGRONOMY (PLANT PRODUCTION)
UFPR	ANIMAL SCIENCE
UFPR	ANTHROPOLOGY AND ARCHAEOLOGY
UFPR	AQUACULTURE AND SUSTAINABLE DEVELOPMENT
UFPR	BIOLOGICAL SCIENCES (ENTOMOLOGY)
UFPR	BOTANICS
UFPR	CELL AND MOLECULAR BIOLOGY
UFPR	CHEMISTRY
UFPR	COASTAL AND OCEANIC SYSTEMS
UFPR	ECOLOGY AND CONSERVATION
UFPR	ENVIRONMENTAL ENGINEERING
UFPR	FORESTRY ENGINEERING
UFPR	GENETICS
UFPR	GEOGRAPHY
UFPR	INFORMATION MANAGEMENT
UFPR	LAW
UFPR	MICROBIOLOGY, PARASITOLOGY AND PATHOLOGY
UFPR	PHARMACEUTICAL SCIENCES
UFPR	PHYSICS
UFPR	SOIL SCIENCES
UFPR	SUSTAINABLE TERRITORIAL DEVELOPMENT
UFPR	ZOOLOGY
UNICENTRO	EVOLUTIVE BIOLOGY
UNICENTRO	FORESTRY SCIENCES
UNICENTRO	SANITARY AND ENVIRONMENTAL ENGINEERING - UEPG / UNICENTRO

## PROJECT 2.2: EVOLUTION OF BIODIVERSITY: MULTIDISCIPLINARY APPROACHES

**Coordenation:** Prof. Dr. Marcos Soares Barbeitos

**Project description:** The project aims to consolidate an international research network on biodiversity evolution, from the molecular to the ecosystem level, through a transdisciplinary conceptual and methodological spectrum. The Network will promote the bidirectional transfer of knowledge among participants, the qualified training of human resources, and the strengthening of the internationalization of emerging Graduate Programs (notes 3 and 4) in Brazil. Based on Brazil's unique position as a

megadiverse country, the project aims to respond to the scientific and socio-environmental challenges of the 21st century, overcoming traditional disciplinary limitations by integrating systematics, ecology, and genetics with omics and bioinformatics technologies. Scientifically, the Network is organized around four strategic axes: (a) generation of primary biodiversity data, (b) molecular and comparative genomics evolution, (c) evolutionary biology of populations and communities, and (d) macroevolutionary synthesis. In addition to complying with the national strategy and the Action Plan for Biodiversity (EPANB), the Convention on Biological Diversity (CBD), the guidelines for access to genetic heritage -SisGen, and the Sustainable Development Goals (SDGs), its social relevance is manifested by the academic inclusion of emerging graduate programs and by actions aimed at popularizing science and gender equality (in STEM areas), valuing citizen science. Internationalization will be driven by solid partnerships with leading centers in the US, Finland, Ireland, Norway, the Netherlands, and Argentina, promoting exchanges of students, technicians, and teachers, strengthening the tradition of training Latin American students through affiliated graduate programs, and extending these training opportunities to BRICS countries and the global south. As institutional counterparts, the Network will promote support and reception actions for researchers residing abroad and the incorporation of international themes into postgraduate activities. The Network's Action Plan will include specific initiatives to overcome regional asymmetries among participating HEIs. The expected impact is to position Brazil at the forefront of knowledge production and biodiversity conservation, strengthening the integration of Brazilian science into global knowledge production networks. Project monitoring will rely on performance indicators, which include: the number of international co-supervisions and exchanges carried out, the quality of intellectual production, the number of network projects, the training of emerging graduate programs, and the availability of data in open databases such as SIBBr, in accordance with FAIR principles.

#### **Related Graduate Programs:**

<b>HEI</b>	<b>Graduate Program</b>
UFPR	ANTHROPOLOGY AND ARCHAEOLOGY
UFPR	BOTANICS
UFPR	SOIL SCIENCES
UFPR	SCIENCE (BIOCHEMISTRY)
UFPR	BIOLOGICAL SCIENCES (ENTOMOLOGY)
UFPR	ECOLOGY AND CONSERVATION
UFPR	PHYSICS
UFPR	GENETICS
UFPR	MICROBIOLOGY, PARASITOLOGY AND PATHOLOGY
UFPR	CHEMISTRY
UFPR	COASTAL AND OCEANIC SYSTEMS
UFPR	ZOOLOGY
UNICENTRO	EVOLUTIVE BIOLOGY

## PROJECT 2.3: CLIMATE CHANGE, MONITORING, MODELING, AND ENVIRONMENTAL IMPACTS

**Coordenation:** Prof. Dr. Victor Pereira Zwiener

**Project description:** Climate change is one of the main contemporary challenges, with direct effects on biodiversity, water resources, public health, and the resilience of urban and rural communities. In South America, the region's climatic and socioenvironmental heterogeneity necessitates integrated scientific approaches that combine climate modeling, environmental monitoring, and vulnerability analysis to support public policies and adaptation strategies at multiple scales. Global climate models, although fundamental for future projections, present significant discrepancies for the South American continent. The choice of climate models capable of representing observed climatology and key regional processes is essential for generating reliable data and serving as a basis for regional projections that will support impact studies in strategic sectors such as agriculture, biodiversity, energy, water resources, health, and infrastructure. This project proposes consolidating an international network of excellence in modeling, monitoring, and assessing the impacts of climate change, involving graduate programs in the Network in cooperation with research institutions from various countries in the Americas, Europe, Africa, and Oceania. The approach is multidisciplinary and based on geospatial data, digital technologies, artificial intelligence, and integrated analysis of physical-chemical, biological, climatic, and sociocultural variables, aiming to expand predictive capacity and the scientific basis for climate governance. The proposal includes strategies for social and territorial inclusion, with a focus on the vulnerability of riverside, coastal, and peripheral communities. Outreach activities will ensue in climate education, participatory risk management, and community strengthening, encouraging the participation of women and local leaders in mitigation and adaptation actions. Internationalization will be intensified through academic exchanges, joint doctoral programs, postdoctoral studies abroad, bilingual workshops, and co-authored publications. Governance will be conducted by an interinstitutional Steering Committee, responsible for monitoring indicators such as academic mobility, scientific production, regional climate databases, and technical reports for public policies. The initiative aligns with the Sustainable Development Goals (SDGs 6, 11, 13, and 17), the National Plan on Climate Change, the Nationally Determined Contributions (NDCs), the National Water Resources Policy, and the National Civil Defense Policy. The project integrates science, innovation, international cooperation, and socio-environmental justice, strengthening South America's scientific and institutional response to climate challenges.

**Related Graduate Programs:**

<b>HEI</b>	<b>Graduate Program</b>
UFPR	ANTHROPOLOGY AND ARCHAEOLOGY
UFPR	BIOLOGICAL SCIENCES (ENTOMOLOGY)
UFPR	BOTANICS
UFPR	CELL AND MOLECULAR BIOLOGY
UFPR	CHEMISTRY
UFPR	CIVIL ENGINEERING
UFPR	COASTAL AND OCEANIC SYSTEMS
UFPR	ECOLOGY AND CONSERVATION
UFPR	ECONOMIC DEVELOPMENT
UFPR	ENVIRONMENTAL ENGINEERING
UFPR	FOOD AND NUTRITION
UFPR	FORESTRY ENGINEERING
UFPR	GENETICS
UFPR	GEODETTIC SCIENCES
UFPR	GEOGRAPHY
UFPR	INFORMATICS
UFPR	INFORMATION MANAGEMENT
UFPR	LAW
UFPR	MICROBIOLOGY, PARASITOLOGY AND PATHOLOGY
UFPR	PHARMACEUTICAL SCIENCES
UFPR	PHARMACOLOGY
UFPR	PHYSICS
UFPR	SOCIOLOGY
UFPR	SOIL SCIENCES
UFPR	SUSTAINABLE TERRITORIAL DEVELOPMENT
UFPR	URBAN AND INDUSTRIAL ENVIRONMENT
UFPR	URBAN PLANNING
UFPR	WATER RESOURCES AND ENVIRONMENTAL ENGINEERING
UFPR	ZOOLOGY
UVA	GEOGRAPHY
UVA	SOCIOLOGY IN THE NATIONAL NETWORK
UNICENTRO	EVOLUTIVE BIOLOGY
UNICENTRO	FORESTRY SCIENCES
UNICENTRO	SANITARY AND ENVIRONMENTAL ENGINEERING - UEPG / UNICENTRO

## PROJECT 2.4: SUSTAINABILITY, SUSTAINABLE TECHNOLOGIES AND PRODUCTION SYSTEMS IN FOOD SECURITY

**Coordenation:** Prof. Dra. Maria Lucia Masson

**Project description:** In this project, we propose coordination between UFPR graduate programs and institutions associated with international partners, forming a network for the development of integrated strategies focused on sustainability, the transformation of agricultural, forestry, and agro-industrial production systems, as well as their processes for the production of environmentally friendly food, strengthening food security in local and global contexts, and developing and applying sustainable electronics solutions. The Network formed is comprehensive, with consistent and significant scientific output, active in human resources training, university extension, and the popularization of science. The initiative seeks to promote the internationalization of research through partnerships with foreign institutions, fostering the exchange of knowledge, information, and sustainable technologies. The research strategies address the characteristics of sustainability and suitability of regionally distinct production systems, among large, medium, and small producers, family farming, assessing the impacts of economic activities that pose potential risks to environmental sustainability and food security, consolidating scientific cooperation networks that contribute to ecological, socio-environmental, and agroecological transition, the promotion of agroecological practices, traditional knowledge, and the development of inclusive public policies aligned with the Sustainable Development Goals (SDGs). The initiative also includes the use of sustainable information, innovation, and technology to monitor production processes, generate greater efficiency in the use of resources, and reduce environmental impacts; the construction and application of social and ecological indicators that indicate the degree of alignment of production chains with the SDGs; sustainable electronics; the development of industrial processes with green solvents; efficient management of natural resources and reduction of energy consumption, animal health, aquaculture, food and nutritional security, in line with SDG 9 by fostering the development of clean and innovative technologies, with SDG 12 by promoting the use of recyclable or biodegradable materials, and with SDG 13 by supporting systems that monitor and mitigate environmental impacts. The expected results are the qualified training of masters and doctors; scientific articles and patents co-authored with foreign researchers, increased interaction with the productive sector, formation and consolidation of national and international networks; a change in the level of internationalization of the graduate programs involved, the offering of courses in foreign languages, the contribution of foreign researchers to graduate programs, and sandwich doctoral internships, improving the attractiveness of national institutions in global networks.

#### **Related Graduate Programs:**

<b>HEI</b>	<b>Graduate Program</b>
UFPR	AGRONOMY (PLANT PRODUCTION)
UFPR	ANIMAL SCIENCE
UFPR	AQUACULTURE AND SUSTAINABLE DEVELOPMENT
UFPR	CELL AND MOLECULAR BIOLOGY

UFPR	CHEMICAL ENGINEERING
UFPR	CHEMISTRY
UFPR	ECONOMIC DEVELOPMENT
UFPR	FOOD AND NUTRITION
UFPR	FOOD ENGINEERING
UFPR	FORESTRY ENGINEERING
UFPR	GEOGRAPHY
UFPR	MATERIALS SCIENCE AND ENGINEERING
UFPR	PHARMACEUTICAL SCIENCES
UFPR	PHYSICS
UFPR	PRODUCTION ENGINEERING
UFPR	SCIENCE (BIOCHEMISTRY)
UFPR	SOIL SCIENCES
UFPR	SUSTAINABLE TERRITORIAL DEVELOPMENT
UFPR	URBAN AND INDUSTRIAL ENVIRONMENT
UVA	GEOGRAPHY
UVA	ZOOTECNY
UNICENTRO	EVOLUTIVE BIOLOGY
UNICENTRO	FORESTRY SCIENCES
UNICENTRO	SANITARY AND ENVIRONMENTAL ENGINEERING - UEPG / UNICENTRO
IBICT	INFORMATION SCIENCE

## PROJECT 2.5: AGROECOLOGY AND SOCIO-ENVIRONMENTAL JUSTICE: FAIR TRANSITION OF AGRI-FOOD PRODUCTION IN THE CONTEXT OF CLIMATE EMERGENCY

### Coordenation:

**Project description:** Contemporary agri-food systems face challenges related to environmental degradation, food insecurity, social inequalities, and the concentration of land and markets. The transition requires structural changes that promote socio-environmental justice, value traditional knowledge, and ensure gender, racial, and generational equity. Agroecology, as a science, practice, and social movement, is a path toward building resilient production systems based on cultural and biological diversity, social participation, and sovereignty. The project aims to consolidate an international network in agroecology and socio-environmental justice, integrating graduate programs at UFPR and associated institutions in cooperation with universities and research centers in Latin America, Africa, Europe, and Asia. The proposal combines science, extension, and critical training to promote the just transition of agri-food production at

different scales, contributing to the reduction of inequalities and to socioenvironmental and climate justice in the territories. The Network will revolve around three areas of action: 1) agroecology and fair transition of production systems; 2) public policies and socio-environmental governance; and 3) valuing traditional knowledge and community practices. Indigenous peoples, quilombola communities, family farmers, riverine communities, and traditional peoples are strategic partners, recognizing their contribution to biodiversity conservation, food production, and sociocultural diversity. Affirmative actions will also encourage the participation of women farmers, researchers, and community leaders, ensuring greater gender equality and combating environmental racism. Internationalization will stem through cooperation with foreign universities, sandwich internships for doctoral students, international co-supervision, bilingual workshops, participation in events, and international co-authored publications. Technical exchange missions will be organized between rural communities in Brazil and other countries, promoting dialogue between scientific and popular knowledge. Governance will be conducted by a Steering Committee, ensuring the participatory definition of goals and indicators. These include mobility achieved, co-authored articles published, jointly supervised theses, bilingual courses, and technical reports focused on public policy and socio-environmental rights. The project is aligned with the SDGs and complies with national and international regulations, such as PNAPO, PNPCT, PNGTAQ, PNSAN, PNRA, PNMC, PNEA, and Decree No. 11,326/2006, in addition to FAO and ILO guidelines. The project contributes to a fair and sustainable agri-food transition, based on good living, food sovereignty, and socio-environmental justice.

#### **Related Graduate Programs:**

<b>HEI</b>	<b>Graduate Program</b>
UFPR	CELL AND MOLECULAR BIOLOGY
UFPR	CHEMISTRY
UFPR	ECOLOGY AND CONSERVATION
UFPR	EDUCATION
UFPR	ENVIRONMENT AND DEVELOPMENT
UFPR	FOOD AND NUTRITION
UFPR	GEOGRAPHY
UFPR	LAW
UFPR	SOCIOLOGY
UFPR	SUSTAINABLE TERRITORIAL DEVELOPMENT
UFPR	TOURISM
UVA	ZOOTECNY
UNICENTRO	EVOLUTIVE BIOLOGY
UNICENTRO	FORESTRY SCIENCES
UNICENTRO	SANITARY AND ENVIRONMENTAL ENGINEERING - UEPG / UNICENTRO

## PROJECT 2.6: OMIC SCIENCES FOR AGRICULTURE, SUSTAINABILITY, AND BIODIVERSITY

**Coordenation:** Prof. Dr. Emanuel Maltempi de Souza

**Project description:** This proposal aims to strengthen the leadership of the Federal University of Paraná (UFPR) in cutting edge fields such as genomics, proteomics, transcriptomics, and metabolomics, by establishing and consolidating strategic partnerships with global research leaders. With a network of international partners — especially among the top 100 universities worldwide — and researchers with publications in high impact journals such as Cell, Nature, and Science, the initiative positions UFPR and associated national institutions at the forefront of scientific knowledge.

The UFPR researchers involved in this proposal already have an established record of international excellence in omics sciences, including the creation of state of the art multiuser platforms such as nuclear magnetic resonance centers, analytical facilities, and sequencing and proteomics laboratories. These resources, combined with consolidated expertise, form the foundation of the project.

The research focuses on essential biological questions related to agriculture, sustainability, and biodiversity conservation, with particular attention to technological applications that drive Brazilian scientific and economic development. The initiative contributes to SDGs 2 (Zero Hunger and Sustainable Agriculture), 12 (Responsible Consumption and Production), 13 (Climate Action), and 15 (Life on Land), by addressing sustainable agriculture, technological innovation, responsible resource use, climate action, and biodiversity conservation.

The main objective is to advance the internationalization of UFPR's top graduate programs and those of associated national institutions, creating robust cooperation networks and providing high level training for students and researchers. The specific objectives include: a) Strengthening international research networks to enhance the quality of scientific output; b) Expanding the internationalization of UFPR's graduate programs and those of partner institutions; c) Promoting faculty and student exchanges to foster global academic connections; d) Implementing an international academic environment in Brazil through the offering of courses in English and the organization of high level symposia and conferences. To achieve these goals, resources will be allocated to: a) Doctoral sandwich internships abroad; b) Postdoctoral fellowships for UFPR faculty; c) Attraction of young foreign researchers; d) Researcher exchanges among national institutions; e) Participation in work missions and international conferences; f) Offering courses and organizing scientific events in English.

The implementation of the project will generate a positive cascading effect, training human resources with a global perspective and elevating the position of national institutions in international rankings.

### Related Graduate Programs:

HEI	Graduate Program
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UFPR	AGRONOMY (PLANT PRODUCTION)
UFPR	ANIMAL SCIENCE
UFPR	BIOINFORMATICS
UFPR	BIOLOGICAL SCIENCES (ENTOMOLOGY)
UFPR	BIOPROCESS AND BIOTECHNOLOGY ENGINEERING
UFPR	BIOTECHNOLOGY
UFPR	BOTANICS
UFPR	CHEMISTRY
UFPR	GENETICS
UFPR	MICROBIOLOGY, PARASITOLOGY AND PATHOLOGY
UFPR	PHARMACEUTICAL SCIENCES
UFPR	SCIENCE (BIOCHEMISTRY)
UFPR	SISTEMAS COSTEIROS E OCEÂNICOS
UFPR	SOIL SCIENCES
UVA	ZOOTECNY
UNICENTRO	EVOLUTIVE BIOLOGY
UNICENTRO	FORESTRY SCIENCES

## THEME 3 – FRONTIERS OF INNOVATION: SCIENCE AND DIGITAL TRANSFORMATION FOR A SUSTAINABLE FUTURE

**Coordenation:** Profa. Dra. Lucimara Stolz Roman

**Theme description:** The theme “Frontiers of Innovation: Science and Digital Transformation for a Sustainable Future” comprises four projects structured in alignment with the Sustainable Development Goals (SDGs) proposed by the United Nations (UN) and adopted by its 193 member states as part of the 2030 Agenda. The projects share the common goal of consolidating and expanding international collaborations among the participating institutions, fostering new partnerships by establishing a strategic network for training researchers in this field of knowledge. The Brazilian professors involved possess extensive experience in international collaborations across diverse and complementary research areas, forming a multidisciplinary team of researchers dedicated to achieving the goals of the four projects comprising this theme.

### **Related projects:**

3.1 - Advanced (nano)materials and biomaterials: preparation, characterization, modeling, study of properties and applications

3.2 - Mathematical and computational modeling, artificial intelligence, and data analysis applied to global technical-scientific and socio-cultural challenges

3.3 - Engineering and circular economy: conversion of waste into advanced biofuels and bioproducts

3.4 - Science, Technology, and Innovation Policies and the Regulation of Emerging Technologies: challenges for achieving the Sustainable Development Goals (SDGs) at the local and global levels

### Related Graduate Programs:

HEI	Graduate Program
UFPR	AGRONOMY (PLANT PRODUCTION)
UFPR	ACCOUNTING
UFPR	BIOPROCESS AND BIOTECHNOLOGY ENGINEERING
UFPR	BIOTECHNOLOGY
UFPR	CELL AND MOLECULAR BIOLOGY
UFPR	CHEMICAL ENGINEERING
UFPR	CHEMISTRY
UFPR	CIVIL ENGINEERING
UFPR	COASTAL AND OCEANIC SYSTEMS
UFPR	COMMUNICATION
UFPR	ECOLOGY AND CONSERVATION
UFPR	EDUCATION
UFPR	ELECTRICAL ENGINEERING
UFPR	ENVIRONMENT AND DEVELOPMENT
UFPR	ENVIRONMENTAL ENGINEERING
UFPR	FOOD ENGINEERING
UFPR	GENETICS
UFPR	GEODETTIC SCIENCES
UFPR	GEOGRAPHY
UFPR	HEALTH CARE PRACTICE
UFPR	INFORMATICS
UFPR	INFORMATION MANAGEMENT
UFPR	LAW
UFPR	MANUFACTURING ENGINEERING
UFPR	MATERIALS SCIENCE AND ENGINEERING
UFPR	MATHEMATICS
UFPR	MECHANICAL ENGINEERING
UFPR	MUSIC
UFPR	NURSING
UFPR	PHARMACEUTICAL SCIENCES
UFPR	PHYSICS
UFPR	POLITICAL SCIENCE
UFPR	PRODUCTION ENGINEERING

UFPR	PUBLIC POLICY
UFPR	SCIENCE (BIOCHEMISTRY)
UFPR	URBAN AND INDUSTRIAL ENVIRONMENT
UFPR	WATER RESOURCES AND ENVIRONMENTAL ENGINEERING
UFPR	ZOOLOGY
IBICT	INFORMATION SCIENCE
IFSP	MECHANICAL ENGINEERING
UFF	NURSING

### PROJECT 3.1: ADVANCED (NANO)MATERIALS AND BIOMATERIALS: PREPARATION, CHARACTERIZATION, MODELING, STUDY OF PROPERTIES AND APPLICATIONS

**Coordenation:** Prof. Dr. Daniel Eiras

**Project description:** The project aims to consolidate and expand existing or developing international collaborations in the field of Advanced Materials and Biomaterials. This multi- and interdisciplinary theme, in which UFPR has been a leading player, brings together foreign researchers from 74 universities and/or research institutes in 27 countries across five continents. It is a broad national and international network dedicated to scientific, technological, and innovation production, with significant involvement in inclusive human resources training, university extension, and the popularization and dissemination of science. The team is made up of research groups with a history of international collaboration formalized by cooperation agreements and reflected in joint publications. In the context of the challenges of the CAPES Global Program, the project will seek to expand and integrate interactions between partner institutions. The proposal covers the entire knowledge chain in Advanced Materials and Biomaterials: preparation, processing, characterization, modeling, study of properties, application, and development of devices, prototypes, products, and processes. The scope of the materials investigated includes carbon nanostructures (nanotubes, graphene, graphene oxide, nanographite, fullerenes), metallic nanoparticles, transition metal oxides, semiconductors, conventional and conductive polymers, lamellar and two-dimensional materials, polymer (nano)composites, ceramic (nano)composites, molecular magnets and metal alloys, and biomaterials of technological and scientific relevance. In line with its multidisciplinary nature, the project explores interfaces with health, biological sciences, energy, data storage and processing, food production, sustainable development, and ecology. Partnerships with the productive sector increase the relevance of the projects and their socioeconomic impacts, strengthening the connection between basic science and technological innovation. Among the expected results, the following stand out: training of masters and doctors; production of scientific articles and patents in co-authorship with foreign researchers; increased interaction with the productive sector;

the formation and consolidation of national and international networks; a change in the level of internationalization of the programs involved, with the offering of courses in foreign languages, the contribution of international researchers to graduate programs, sandwich doctoral internships, and increased access to international research funding. In summary, this initiative holds great scientific and technological potential, capable of expanding UFPR's international presence and its associated institutions, while generating direct societal benefits through innovation in Advanced Materials and Biomaterials.

### Related Graduate Programs:

HEI	Graduate Program
UFPR	AGRONOMY (PLANT PRODUCTION)
UFPR	BIOTECHNOLOGY
UFPR	CELL AND MOLECULAR BIOLOGY
UFPR	CHEMICAL ENGINEERING
UFPR	CHEMISTRY
UFPR	CIVIL ENGINEERING
UFPR	COASTAL AND OCEANIC SYSTEMS
UFPR	ECOLOGY AND CONSERVATION
UFPR	FOOD ENGINEERING
UFPR	HEALTH CARE PRACTICE
UFPR	MATERIALS SCIENCE AND ENGINEERING
UFPR	MECHANICAL ENGINEERING
UFPR	PHARMACEUTICAL SCIENCES
UFPR	PHYSICS
UFPR	SCIENCE (BIOCHEMISTRY)
UFPR	URBAN AND INDUSTRIAL ENVIRONMENT
UFPR	ZOOLOGY
IFSP	MECHANICAL ENGINEERING

## PROJECT 3.2: MATHEMATICAL AND COMPUTATIONAL MODELING, ARTIFICIAL INTELLIGENCE, AND DATA ANALYSIS APPLIED TO GLOBAL TECHNICAL-SCIENTIFIC AND SOCIO-CULTURAL CHALLENGES

**Coordenation:** Prof. Dr. Marcos Gomes Eleuterio da Luz

**Project description:** Knowledge generation is a highly cumulative activity, requiring both information production and analysis. Thus, theoretical methods such as database manipulation and processing, mathematical-numerical modeling, and Artificial Intelligence (AI) become crucial in technical-scientific activity. This project aims to create a collaborative network between Brazilian partner institutions and international

centers, focused on research in modeling and data analysis, high-performance computing, and AI, creating world-class expertise and making all institutions a reference in research and in training professionals qualified in the use of theoretical, computational, and AI methods in solving the significant challenges of modern society. From renewable energies to pandemic control strategies, from public policy decision-making to new educational approaches, from genetic therapies to environmental issues,

including current topics such as AI challenges in artistic creation, production processes, and labor relations. At UFPR, large teams that use these tools and collaborate with institutions in different countries, such as South Africa, Australia, Germany, Argentina, Austria, Belgium, Canada, China (Hong Kong and Taiwan), Colombia, Denmark, Spain, the United States, Finland, France, the Netherlands, England, Italy, Ireland, Japan, Mexico, Mozambique, Peru, Portugal, Russia, Sweden, Switzerland, and potentially Chile, Hungary, India, Iran, the Czech Republic, and Poland. Every effort will occur to ensure the integration of Brazilian partners into these collaborations. Practical actions include: a) sending PPG students, primarily from partner institutions, for sandwich doctorates and training abroad, b) bringing international researchers to collaborate with PPG-linked research groups to teach mini-courses and subjects, c) hold workshops in Brazil, focusing on student training, in addition to disseminating the scientific work developed by the Network, d) carry out work missions abroad, fostering concrete interactions and stimulating new joint projects, maintaining the Network even after the end of CAPES-Global. Each action will always include professors and researchers from partner institutions. In the long term, the aim is to: (i) Make the Network's graduate programs national hubs for multidisciplinary research in modeling, scientific computing,

and AI, serving as a reference and bridge for an international network in these major themes; (ii) Make the associated graduate programs major attractions for students who want to develop high-quality work in the different themes of the project; (iii) Create a tradition of courses (in the PPGs) and workshops in modeling, scientific computing, and AI, with international reach, offered by the Network. In particular, periodic schools are held to train young researchers in theoretical techniques of data analysis and AI.

### Related Graduate Programs:

HEI	Graduate Program
UFPR	CELL AND MOLECULAR BIOLOGY
UFPR	CHEMICAL ENGINEERING
UFPR	CHEMISTRY
UFPR	CIVIL ENGINEERING
UFPR	ECOLOGY AND CONSERVATION
UFPR	EDUCATION
UFPR	ELECTRICAL ENGINEERING
UFPR	ENVIRONMENT AND DEVELOPMENT
UFPR	ENVIRONMENTAL ENGINEERING

UFPR	GEODETIC SCIENCES
UFPR	HEALTH CARE PRACTICE
UFPR	INFORMATICS
UFPR	INFORMATION MANAGEMENT
UFPR	MATERIALS SCIENCE AND ENGINEERING
UFPR	MATHEMATICS
UFPR	MECHANICAL ENGINEERING
UFPR	MUSIC
UFPR	NURSING
UFPR	PHARMACEUTICAL SCIENCES
UFPR	PHYSICS
UFPR	POLITICAL SCIENCE
UFPR	PRODUCTION ENGINEERING
UFPR	PUBLIC POLICY
UFPR	WATER RESOURCES AND ENVIRONMENTAL ENGINEERING
IBICT	INFORMATION SCIENCE
IFSP	MECHANICAL ENGINEERING

### PROJECT 3.3: ENGINEERING AND CIRCULAR ECONOMY: CONVERSION OF WASTE INTO ADVANCED BIOFUELS AND BIOPRODUCTS

**Coordenation:** Profa. Dra. Luciana Porto de Souza Vandenberghe

**Project description:** The complete use of green carbon, through the use of agro-industrial waste and/or by-products and industrial effluents, represents an efficient approach to mitigating fossil carbon emissions. Research on this topic needs to be intensified to limit the effects of climate change. This strategy is aligned with SDGs 7, 9, 12, and 13 and proposes the sustainable use of waste, within the concept of biorefinery and circular economy, for the production of advanced biofuels and biomolecules of industrial interest. Advances in this area resulted from projects such as CAPES PrInt, BIOADD, CNPq BRICS-BEST (completed), and CNPq BRICS BIOGEN and GREENERGY (ongoing), coordinated by team members and researchers from UFPR in a consolidated

partnership with researchers from 44 foreign institutions in 20 countries on 5 continents. Brazilian and foreign teams have been collaborating since 2015, resulting in at least 45 articles, 6 books, and 20 book chapters over the past 5 years. Within the scope of the project, he has extensive experience in the recovery of industrial waste and effluents and stands out in the development and scaling of biotechnological processes. Advanced technologies and tools, such as machine learning, multi-omics, and strain engineering, among others, will be applied to optimize processes, improve productivity, and reduce operating costs, in addition to reducing environmental impacts, in pursuit of a more sustainable circular economy, prioritizing intellectual

property and the transfer of developed technology. This proposal has the following goals: 1) technological prospecting studies and production of aviation bio-kerosene (jet fuel), biogas, biohydrogen, and green hydrogen from effluents or biomass from Brazilian agribusiness production chains; 2) development of processes and bioproducts (bioplastics, organic acids, algal biomass, enzymes, biofertilizers, starters, alternative proteins, diagnostic kits, among others) from the conversion of alternative substrates into a biorefinery concept, evaluating the generation and operational flows of waste; 3) network support and the creation and growth of emerging groups. As for the planned activities, there are plans to offer sandwich doctorates and postdoctoral programs, missions for Brazilian researchers abroad and foreign researchers in Brazil, training and capacity building missions, courses taught in foreign languages, mini-courses and/or lectures, events (workshops) in Brazil, with the participation of foreign collaborators, for interactions between researchers and the dissemination of scientific work; joint scientific and technological productions; alignment and development of new international projects.

#### **Related Graduate Programs:**

<b>HEI</b>	<b>Graduate Program</b>
UFPR	BIOPROCESS AND BIOTECHNOLOGY ENGINEERING
UFPR	CHEMICAL ENGINEERING
UFPR	CIVIL ENGINEERING
UFPR	FOOD ENGINEERING
UFPR	GENETICS
UFPR	INFORMATION MANAGEMENT
UFPR	MANUFACTURING ENGINEERING
UFPR	MECHANICAL ENGINEERING
UFPR	SCIENCE (BIOCHEMISTRY)

### PROJECT 3.4: SCIENCE, TECHNOLOGY, AND INNOVATION POLICIES AND THE REGULATION OF EMERGING TECHNOLOGIES: CHALLENGES FOR ACHIEVING THE SUSTAINABLE DEVELOPMENT GOALS (SDGS) AT THE LOCAL AND GLOBAL LEVELS

**Coordenation:** Profa. Dra. Noela Invernizzi

**Project description:** The transition to a sustainable society in economic, social, and environmental terms requires intensive use of science, technology, and innovation. Currently, the trajectory of STI in the most industrialized countries suffers from a lack of direction, as it is primarily oriented towards affluent markets and is environmentally predatory. In Brazil, as in other countries in the Global South, there is also the problem of the low applicability of the science produced, either due to a lack of demand from industry or because its orientation is subordinate to the research agendas of central countries. Therefore, new knowledge and technologies are urgently needed, as well as strategies for the preservation, recovery, and management of information, which

require agendas more aligned with local problems and global socio-environmental challenges, driving the transition to sustainable societies. This project examines the formulation, implementation, and evaluation of public policies for science, technology, and innovation (PCTI), regulatory policies for emerging technologies (artificial intelligence, digitization, biotechnologies and biomedical technologies, advanced automation, alternative energies, among others) to address socio-technical transitions, understood here as structural changes that depend on regulatory frameworks, government incentives, and networks of actors to break with established paradigms and enable the adoption of new technologies and sustainable practices. Policy formulation is examined in terms of its scientific basis, including evidence-based policies, public participation by various social actors, and evaluation and compliance mechanisms. The project is open to regional and global collaborations to address the challenges specific to Latin America and those that arise globally. An intention to change the national PCTI arose from the 5th National CTI Conference, in which the axes of techno-scientific development, sustainability (environmental and social), and social participation intertwine. The Brazilian Artificial Intelligence Plan was presented in an integrated manner with its regulatory challenges to ensure national participation and identity, as well as the security and privacy of citizens. These challenges arise at a time when science is questioned in several fragile democracies. The fight against scientific denialism and the defense of digital sovereignty are central themes in this context, whose impact on social peace, health, education, and sustainable development is evident.

#### **Related Graduate Programs:**

<b>HEI</b>	<b>Graduate Program</b>
UFPR	ACCOUNTING
UFPR	CELL AND MOLECULAR BIOLOGY
UFPR	COMMUNICATION
UFPR	GEODETTIC SCIENCES
UFPR	GEOGRAPHY
UFPR	HEALTH CARE PRACTICE
UFPR	INFORMATICS
UFPR	INFORMATION MANAGEMENT
UFPR	LAW
UFPR	NURSING
UFPR	PHYSICS
UFPR	POLITICAL SCIENCE
UFPR	PUBLIC POLICY
UFF	NURSING
IBICT	INFORMATION SCIENCE