Name	E-mail	Institution	Abstract
Ricardo José Ferrari	ricardo.jose.ferrari@gmail.com	Centro de Ciências Exatas e de Tecnologia/CCET/ UFSCAR	With the increase in people's life expectancy, dementia poses a pressing global public health issue. Among the diverse forms of cognitive decline, Alzheimer's disease (AD) is the most common, accounting for nearly 70% of cases. The World Health Organization estimates that 35.6 million people had dementia in 2010, and projections show a doubling by 2030 (to 65.7 million) and a surge to 131.5 million by 2050. Currently, in Brazil, the estimated number of people with dementia is 1.2 million. To facilitate early interventions and enhance the quality of life for patients, it is crucial to detect and diagnose AD early. Mild cognitive impairment (MCI), a condition characterized by subtle cognitive decline, serves as a prodromal stage of AD. Individuals with MCI have an increased risk of developing AD. Therefore, recognizing patients with MCI who will develop AD in subsequent years is crucial, as early identification of these patients allows for early interventions and better management of the disease. The proposed research will focus on the automatization of the most common visual rating scales used by radiologists in Alzheimer's, such as the medial temporal atrophy (MTA), global cortical atrophy (GCA) and white matter hyperintensities (WMH), with the novelty of assessing these scales in a longitudinal manner, by following a cohort of individuals with MCI over a designated period, aiming to assess the conversion rate to AD. We understand that this approach may bring an important contribution to the current FAPESP research project on Alzheimer's.

Name	E-mail	Institution	Abstract
Gustavo Henrique Goldman	ggoldman@usp.br	Faculdade de Ciências Farmacêuticas de Ribeirão Preto/FCFRP/USP	Invasive pulmonary aspergillosis (IPA), mainly caused by Aspergillus fumigatus, is a major infectious complication with mortality rates as high as 90% depending on the immunological status of the host. Azoles are fungicidal drugs for A. fumigatus and the main antifungal agents recommended for IPA. Echinocandins, such as caspofungin (CSP), represent a second line therapy and target the fungal cell wall by inhibiting 1,3-beta-D-glucan synthase, which is responsible for the assembly of beta-D-glucan, a major component of the fungal cell wall. CSP is fungistatic against A. fumigatus and treatment with CSP leads to hyphae with defects in growth and morphology. One of the objectives of our project is to investigate how the signal transduction for the fungal response to CSP is mediated via oxylipins. The fungal oxylipin 5,8-dihydroxyoctadecadienoic acid (5S,8R-diHODE) is important for cellular differentiation and lateral branching in A. fumigatus. CSP induces A. fumigatus hyperbranching and phenocopies the increased lateral branching observed when this fungus is exposed to 5S,8R-diHODE. Preliminary results from our laboratory indicate that the null mutant for ppoA gene that encodes the fatty acid oxygenase 5,8-linoleate diol synthase (5,8-LDS) responsible for the formation of 5S,8R-diHODE is resistant to CSP while the strain overexpressing ppoA is more sensitive to CSP than the corresponding wild-type strain. We also observed that the null mutant for ppoC (ppoC encodes a fatty acid dehydrogenase) has lost the caspofungin paradoxical effect (CPE). We propose to identify through a combination of RNAseq, metabolomics and molecular genetics which genes are modulated by 5S,8R-LDs, 8R-HODE, and CSP. We will identify these genes by comparing the corresponding wild-type strain with the null mutants of ppoA and ppoC, and also by using representative strains from a collection of about 70 worldwide A. fumigatus clinical isolates with different degrees of CSP sensitivity and tolerance. As a second objective, we will also evaluate A. fumigatus wild-type and null ppoA mutant growth alone or synergistically with CSP and libraries of compounds and chemical probes that could synergize and potentiate CSP. Finally, as a third objective, we will investigate a collection of 11 transcription factors previously implicated in caspofungin resistance and CPE and will determine if they are modulated by oxylipins. This can open new avenues for the identification of new metabolic pathways involved in caspofungin resistance and tolerance and can provide the development of novel CSP-based antifungal therapy.

Name	E-mail	Institution	Abstract
Leandro Wang Hantao	wang@unicamp.br	Instituto de Química/IQ/UNICAMP	Considering the current geopolitical and economic scenario, it is necessary to develop research in strategic areas, such as prospecting for energy and new products from renewable sources of biomass. This knowledge can help diversify the Brazilian energy matrix, reducing dependence on fossil fuels, in addition to opening new opportunities in the Brazilian chemical market. More specifically, the lignocellulosic residue from the sugar and ethanol industries is considered the main source of biomass available in the country. This abundant biomass can be used in thermal transformation processes for the production of bio-oils, among other complex mixtures produced in this process. Thus, bio-oil is touted as a candidate in the direction of accelerating progress towards a greener and more sustainable circular economy. In addition, little is known about the composition of the aqueous fraction resulting from the thermal conversion, which may also contain important compounds for the chemical industry, and given that there is still a lack of Brazilian research groups that dedicate their activities to the expanded study of production, improvement and chemical characterization of bio-oils, leaving the country deficient in the development of scientific and technological innovations in this area. The main objective of this project is to carry out analytical developments aimed at the production and investigation of the improvement of sugarcane bagasse bio-oils obtained with a view to industrial application in the sugar-energy sector.The multidisciplinary project has three axes of action, namely: sustainable technologies, advanced analytical technologies and artificial intelligence. Among the planned activities, we highlight the optimization of the process and obtaining bio-oils from sugarcane bagasse in a microscale reactor and semi-pilot scale reactor to carry out catalytic or non-catalytic experiments, study of methodologies based on liquid chromatography (LC-HRMS) and comprehensive two-dimensional gas chromatography coupled with high resolution mass spectrometry (GC×GC-HRMS) for the analysis of bio-oil and other residues of commercial interest, aiming at a comprehensive chemical characterization at the molecular level. Also, artificial intelligence concepts will be applied to predict multiple oil properties as proof of concept. These results will be important to improve the understanding of the best use of sugarcane bagasse for the production of bio-oils by different methods, allowing to infer the best process of thermal conversion and its feasibility of use in the sugar-energy sector of plants in the states of Pernambuco and São Paulo, therefore, the proposal has the formal support of plants in the mentioned states, which issued letters of support.

Name	E-mail	Institution	Abstract
Marcelo Bispo de Jesus	dejesusmb@gmail.com	Instituto de Biologia/IB/UNICAMP	Nanomaterials have enormous potential to solve problems in various fields, such as agriculture, livestock, and medicine. The biological role of nanomaterials is closely related to their physicochemical properties, and because these nanomaterials interact with the environment in which they are inserted, the corona effect appears as a protagonist. An important application of nanomaterials is the delivery of drugs and genes that can be used to achieve various biological goals, such as treating tumors, controlling pests, and genetically improving the cellular microenvironment. However, developing or evaluating nanomaterials without considering their toxic effects is impossible. Therefore, the unintentional exposure to pollutants in the nanometer range, such as silver nanoparticles and micro- and nanoplastics, should be emphasized here. Thus, the assessment of the toxic effects of nanomaterials is essential for nanomaterials that are designed for use in their nanometric form or that have the potential to produce these species. Therefore, this grant is divided into three different subprojects: NanoCell@Therapeutics: which aims to investigate aspects of nanoparticle-cell interaction and understand the mechanisms of using nanomaterials to treat tumors; NanoCell@GeneDelivery: aims to develop gene carriers to control biological pests and improve the development of bovine embryos; NanoCell@Nanotox: aims to assess the molecular mechanisms of toxicity induced by different materials such as micro- and nanoplastics and silver nanoparticles. Finally, by understanding the molecular aspects of the interaction between nanomaterials and cells, we aim to contribute to the conscious use of nanomaterials for therapeutic purposes and the delivery of oligonucleotides, always paying attention to their toxic effects, trying to strike a balance between biological efficiency and toxicity.
Diego Muraca	dmuraca@unicamp.br	Instituto de Física Gleb Wataghin/IFGW/UNICAMP	This project is to improve the magnetic properties of ferrofluids to optimize the conversion of electromagnetic energy into heat through the magnetohyperthermia (MH) effect, for application in the recovery and transport of oil or any viscous fluid, reducing its viscosity. MH is the phenomenon that allows the temperature to increase in a system with magnetic nanoparticles (NPs) in the presence of an alternating magnetic field, when the electromagnetic energy of the magnetic field is transformed into heat by inverting the magnetization of the NPs. The candidate must carry out experiments to magnetically characterize magnetic colloids and magnetohyperthermia effects.

Name	E-mail	Institution	Abstract
João Paulo Papa	joao.papa@unesp.br	Faculdade de Ciências de Bauru/FC/UNESP	Assisted disease diagnosis through medical imaging, clinical data, and text description has been paramount in recent years. Allied with the astonishing and promising results machine learning delivers, one may achieve even more accurate performance when using all available data sources. On the other hand, we face the problem of combining different data modalities. How to ensure one modality will not bias others, how to learn proper weights for each data source, and how to encode them are some challenges that data fusion techniques address. This proposal investigates shortcomings in breast cancer detection using different imaging (mammography, tomosynthesis, and ultrasonography) and textual (clinical data and physician report) data. The researcher involved in the proposal will investigate data fusion techniques at feature and decision levels and will be in touch with prominent scientists from Sao Paulo State and other countries. We expect the researcher to be involved in other activities, such as working with the lab partners and attending seminars. This proposal links to a more significant FAPESP project (CeMEAI - Center for Mathematical Sciences Applied to Industry), contributing to the medical industry and applied research. Besides, we expect to bring new advances in data fusion strategies concerning Computer Science and machine learning research areas.

Name	E-mail	Institution	Abstract
Pablo Sebastián Fernández	pablosf23@yahoo.com.ar	Instituto de Química/IQ/UNICAMP	Increasing energy demands in recent decades have forced us to search for more sustainable ways of energy production. In this context, green hydrogen is a key energy vector to succeed in the energy transition. The cost-effective production of green hydrogen has still some challenges, being one of the most important to speed up the electro-oxidation of water in electrolyzers. Despite enormous efforts in the last decades, this reaction remains as a bottleneck for the entire process. Thus, an interesting approach to overcome this problem is to substitute the electro-oxidation of water with the electro-oxidation of organic molecules, where the organic oxidation occurs much faster on several catalysts. It is an even more interesting option if the organic is a biomass-derived resource that can produce value-added products through oxidation, for instance, glycerol. It is well-known that alcohols and polyols are oxidized on Pt-based materials in alkaline media at much lower potentials than water in Ir-based catalysts. However, as Pt is an expensive element, catalysts based on this material must be stable and contain as low amount of Pt as possible. Therefore, in the approved FAPESP project (2023/02929-9), we proposed to mitigate this problem by preparing two kinds of materials able to minimize the use of noble metals, i.e., i) exsolved Pt nanoparticles (NPs) from perovskite oxides (PO) and ii) Ag or Ni modified at the surface by small quantities of Pt. Therefore, in this postdoctoral project, we will focus on the exsolution of silver nanoparticles. Exsolution is chosen as it is a well-known method that produces stable nanoparticles with tailored properties. Afterward, we will modify the nanoparticles with slow amounts of Pt and investigate the activity and selectivity of these materials for the electro-oxidation of glycerol in conventional three-electrode electrochemical cells. The experiments will performed in the dark and also under visible-light irradiation to see the effect of the light absorption of the Ag nanoparticles through the well-known Localized surface plasmon resonance (LSPR) phenomena. Finally, the best material will be tested in an Anion exchange membrane (AEM) electrolyzer. Note: I would like to add that my group is an active member of CINE (https://www.cine.org.br/en/). We are taking part in the second phase of the center (2024-2028) and our group will be devoted to the development of materials for the production of green H2, i.e., a topic closely connected to this proposal.
Daniel Martins-de-Souza	danms90@gmail.com	Instituto de Biologia/IB/UNICAMP	Schizophrenia is among the most disabling diseases of humankind, affecting 1% of the world's population (in Brazil, almost 2.5 million people are affected). One of the biggest hurdles faced by most patients is the poor efficacy of current antipsychotic medication. To develop new and more effective medication, we must increase our understanding of the molecular aspects of schizophrenia. Thus, the postdoc hired here is going to employ in vitro pre-clinical models such as human-induced pluripotent stem cell-derived neuronal cells to search for the validation of the key biological processes we previously found associated with schizophrenia such as myelination, and energy pathways-associated alterations preferably in glia cells. Understanding the role of these pathways in these cells will shed light in schizophrenia comprehension and therefore leading to the discovery new molecular targets for innovative treatments.

Name	E-mail	Institution	Abstract
Douglas Fernandes Barbin	dfbarbin@unicamp.br	Faculdade de Engenharia de Alimentos/FEA/UNICAMP	Food security has become a major concern worldwide, leading to the development of new alternative foods. Most of the developing countries are producers of agricultural products to feed the population and provide economical incomes for small and large producers, demanding new advances in food processing methods and quality control of raw food. However, there is little funding available for such countries, and food analysis is traditionally accomplished through chemical, physical and microbiological test. Some of these methods are slow, laborious and require chemicals producing residues. Considering these facts, it is necessary to advance the knowledge on alternative, low-cost techniques for quality control of raw food and in the food industry. More specifically, local products from developing countries are usually little studied. It is necessary to investigate the application of methods to replace or complement most of the drawbacks of traditional analytical methods through indirect, fast and non-destructive techniques. Near infrared (NIR) spectroscopy and other optical methods such as hyperspectral imaging, offers a number of advantages over traditional methods of quality assessment, including current portable, low-cost equipment which are easily adaptable for online systems, allowing simultaneous determination of several attribute. However, there are few studies on the subject in developing countries. This project aims to investigate the application of NIR spectroscopy and hyperspectral imaging to relevant agricultural products in developing countries, considering classification and evaluation of physical and chemical characteristics of food products, developing more sustainable, chemical free analytical methods of food products. The combination of image analysis and NIR spectroscopy in hyperspectral imaging (HSI), may address major challenges in for agricultural products: (1) determination of composition of raw material, (2) identification of food adulteration and authentication and, (3) monitoring product quality. Since there is little information regarding the application of HSI for the study of these products, the new knowledge acquired will be of great scientific value. Considering the multi and interdisciplinary approach of the current project, it is expected that the researcher will contribute either (1) on the statistical analysis/chemometrics approach and programming, thus requiring a background in statistics, computer science or chemistry; or (2) in the agricultural/food sample analysis, thus requiring a background on chemical engineering, agricultural engineering or food science. On the other hand, the researcher will gather knowledge in the complimentary subject related to the main project, and possibly keep future collaborations, thus providing expert human resource to developing country.

Name	E-mail	Institution	Abstract
Marco Aurelio Zezzi Arruda	zezzi@unicamp.br	Instituto de Química/IQ/UNICAMP	Metallomics is an emerging area of omics science that has been growing since its recent conception [1]. This area integrates the research related to biometals, in symbiosis with genomics, proteomics, and metabolomics. Some proteins need metal in their activity centers to develop their precise functions, thus forming metalloproteins or metalloenzymes. They are important in a diversity of biological functions, and, however, some key studies involving how the element (metal or metalloid) is distributed in cellular compartments of a cell, its coordination environment, in which biomolecule is complexed, and, finally, the individual concentrations of the metallic species have an important role in providing integrated information connecting metallomics with others omics [1]. To attain this task, a diversity of analytical and biological platforms is then required for the studies to make sense. Due to their high surface-to-volume ratio, NPs are extremely reactive and catalytic [2], able to pass through cell membranes. They can be present in biological systems and linked to molecules that play different roles in organisms and cells [3-5]. However, their interactions with such systems are not yet well known [6]. Although studies have warned about the possible adverse effects of NP when in contact with some organisms [7-9], in Brazil, as well as in other countries, there is still neither law that determines the allowed concentrations of these elements in foods, nor a law that regulates the disposal of NP in the environment [10]. Then, the main scientific and technological challenges to be overcome to achieve the objectives are: Develop soybean calluses from a donor explant; Cultivate these calluses in the presence or absence of NPs; Extract the (metal)organic species from these calluses; Carry out metallomics/speciomics analyses of the callus samples, and to do so: Coupling inorganic and organic mass spectrometry equipment Interpret the mass spectra of both techniques Identify the species Correlate these species with the biological/biochemical events in the samples. The contribution to the current FAPESP project (2018/25207-0) will be: Opens up a new area inside the project Increase the expertise in the area of metallomics/speciomics/biotechnology Provide the discovery of new biological active elemental species; Explain the function of new species inside our project; Allow for better development of such calluses structures; Obtain a sustainable soybean culture using biotechnology References [1] M. A. Z. Arruda, Metallomics: the science of biometals, 2018. New York: Springer [2] J. Ying, Nanostructured Materials, 2001. New York: Academic Press [3] M. E. Akerman, W. C. Chan, P. Laakkonen, S. N. Bhatia, E. Ruoslahti, Proc. Natl. Acad. U.S.A., 99(2002)12617 [4] A. Hoshino, K. Fujioka, T. Oku, S. Nakamura, M. Suga, Y. Yamaguchi, K. Suzuki, M. Yasuhara, Microbiol. Immunol. 48(2004)985 [5] K. G. Suzuki, T. K. Fujiwara, M. Edidin, A. Kusumi, J. Cell Biol. 177(2007)731 [6] M. Auffan, J. Rose, M. R. Wiesner; J. Y. Bottero. Environmental Pollution 157(2009)1127 [7] F. Mirzajani, H. Askari, S. Hamzelou, M. Farzaneh, A. Ghassempour, Ecotoxicol. Environ. Saf. 88(2013)48 [8] L. Yin, B. P. Colman, B. M. McGill, J. P. Wright, E. S. Bernhardt, PLoS ONE 7(2012) 1 [9] S. M. Hussain, J. M. Gearhart, K. T. Geiss, J.

Name	E-mail	Institution	Abstract
Leonardo Abdala Elias	leoelias@unicamp.br	Faculdade de Engenharia Elétrica e de Computação/FEEC/UNICAMP	MYOREHAB aims to provide an artificial intelligent system that can monitor and deliver a personalized closed-loop neurorehabilitation intervention of the hand based on the amount of electrical activity generated by the muscles. This project will approach different motor conditions (stroke and spinal cord injury) across institutions in four countries (Spain, Germany, Brazil, and Panama) to develop a solid long-term research network between European and Latin American researchers and to provide a transnational framework for standardized motor rehabilitation. The Post-Doctoral Fellow will join the UNICAMP's team to help design clinical protocols and assess the effectiveness of the AI-based neurorehabilitation system in stroke patients. The specific activities of the researcher include 1) recruitment of patients in a medical facility; 2) design of standardized intervention protocols employing the newly developed neurorehabilitation system; 3) assessment of neuromechanical biomarkers to follow the progress of the motor rehabilitation. The research will have contact with cutting-edge techniques such as high-density electromyography, markless motion capture, and deep learning to estimate hand kinematics and extract motor control strategies.
Renato de Mello Prado	rmprado@fcav.unesp.br	Faculdade de Ciências Agrárias e Veterinárias de Jaboticabal/FCAV/UNESP	Cocoa is one of the main products of the Amazon bioeconomy, domesticated more than 3 thousand years ago by pre-Columbian peoples, being used as food and medicine. However, in its region of origin, cocoa cultivation is in a technologically outdated situation, losing economic importance to other agricultural crops that act as strong vectors of local deforestation, such as beef cattle farming and grain cultivation. In this context, the objective of this proposal will be to evaluate current cultivation conditions in order to identify bottlenecks and available technologies to enable the recovery and strengthening of the cocoa production chain, improving its competitiveness compared to other producing regions, also facing vectors of deforestation. To this end, this proposal intends to evaluate the nutritional status of the cocoa crop and the quality of the fruit selected in the Amazon region, comparing its agronomic potential with hybrids and clones used in other regions of the country. Assessments on leaves and fruit will be carried out in laboratories at the UNESP Campus of Jaboticabal, in the state of São Paulo, Brazil.

Name	E-mail	Institution	Abstract
Leonardo Fernandes Fraceto	leonardo@sorocaba.unesp.br	Instituto de Ciência e Tecnologia de Sorocaba/ICTS/UNESP	The unprecedented loss of biodiversity and the imminent threats of climate and environmental changes are among the most important challenges faced by humanity. Biodiversity continues to decline worldwide, mainly in response to urban and agriculture expansion over natural areas. In addition, climate change is projected to commit over one-third of the Earth's animal and plant species to extinction by 2050. Silently, the deterioration of species' habitats also drives the cryptic extinction of biotic interactions, some of which are essential in sustaining nature's contribution to people (e.g. pollination services) essential for human well-being. Therefore, the erosion of biodiversity cascades into the crumbling of the web of life, threatening the ecological functions that support the very existence of mankind. That reality built the unalienated idea of halting biodiversity loss and preventing drastic changes on global and regional climates as convergent goals. The São Paulo State University-UNESP is well-positioned to play a leading role in the establishment of adaptation and mitigation strategies that address threats to tropical biodiversity in times of rapid environmental shifts. It has some of the most renowned and well-established research groups working on Biodiversity conservation and anthropogenic changes, largely supported by FAPESP in the last 20 years. We propose a CEPID on Biodiversity Dynamics and Climate Change: a unique, innovative Center congregating experts on science, diffusion, and innovation to produce global class and cutting-edge research and solutions targeting the current loss of biodiversity, its synergism with climate change and its consequences to human well-being. These threats include climate and other anthropogenic changes (e.g., the frequency and intensity of droughts and fires, sea levels rise, habitat loss, habitat fragmentation, defaunation, invasive species, and unplanned agricultural and urban occupation, leading to geographic expansion of degraded lands) and social (e.g., overpopulation, increasing poverty in urban areas, social and gender inequality). Framed by the United Nation Sustainable Development Goals (SDGs) 15 - Life on land and 13 - Climate Action, the CEPID mission is the establishment of an observatory of biodiversity and climate change research, promoting innovation focused on nature-based solutions and accelerating diffusion, aligned with the SDGs 4 - Quality Education and 5 - Gender Equality. The CEPID will make the state of São Paulo well-poised to collaborate and exchange expertise with the most successful biodiversity and climate change centers around the world.

Name	E-mail	Institution	Abstract
Silvio Alexandre de Araujo	silvio.araujo@unesp.br	Instituto de Biociências, Letras e Ciências Exatas de São José do Rio Preto/IBILCE/UNESP	This project deals with issues that arise in decisions related to the logistic context. In general, decisions in this context revolve around choices that organizations make to optimize the flow of goods, services, and information along the supply chain. These decisions aim to improve efficiency, reduce costs, and ensure customer satisfaction. Among the main decisions to be made are routing decisions, where the Vehicle Routing Problem (VRP) comes into play. The VRP involves creating efficient routes for product delivery, taking into account time, capacity, and cost constraints, ensuring that orders reach customers within the desired timeframe. In this project, the focus is on VRP with applications in the agricultural sector, also known as Agricultural Routing Problems (ARP). These applications include issues related to the mobilization of harvesting fronts in the sugarcane sector aim to minimize routes and harvest sugarcane plots with a higher sucrose content, thereby increasing productivity. The sugarcane planting stage, as well as other stages, also presents interesting logistical applications that can be explored in this project. In a broader sense, other logistical applications in the agricultural sector can also be explored, such as the movement of teams for the control of agricultural pests, prioritizing the control of areas with a higher level of infestation. We note that the proposed activities are directly related to the activities of the Thematic Project (Process 2022/05803-3) in which we serve as the principal researcher, specifically addressing routing problems (E). Therefore, the development of this project will directly contribute to the development of the thematic project.
Carlos Frederico de Oliveira Graeff	carlos.graeff@unesp.br	Faculdade de Ciências de Bauru/FC/UNESP	The current project aims on comprehending the degradation mechanisms involved in Perovskite Solar Cells, and on finding solutions to overcome the stability issues of these devices. Based on this premise, several chemical and physical aspects will be investigated which includes synthesis of different perovskite light harvester materials, analysis of interfacial and defects phenomena, search for optimal electron and hole transport layers materials, use of promising novel techniques for materials and devices characterization and novel device configurations. These investigations will converge toward the primary objective of this work, which it is to propose more stable and more efficient PSCs. Key project aims I. To optimize perovskite compositions to minimize defects during crystallization and thin-film deposition steps. II. To design novel electron and hole transport layers as alternatives for the currently low stable used materials. III. To characterize the structure, morphology, and optical properties of nanomaterials as active components in PSCs. IV. To study defects and their effects on PSCs by using advanced spectroscopic and electrical techniques such as photothermal deflection spectroscopy (PDS) and photo-CELIV. Requirements: - Ph.D. in Physics, Materials Science & Engineering, Chemistry, or related areas. - Experience in fabrication and characterization of solar cells. - Experience on a variety of film deposition methods (blade-coating, roll-to-roll, spray- coating, etc) will be positively evaluated. - Previous experience with the characterization techniques PDS or CELIV is a plus. - English knowledge (fluent in writing and speech).

Name	E-mail	Institution	Abstract
Ana Paula de Moraes	ap.moraes@unesp.br	Instituto de Biociências de Botucatu/IBB/UNESP	The influence of the repeatome (i.e., the genome's repetitive fraction) on taxonomy and systematics is a novel area of research. The expansion and contraction of the repeatome affect genome size, a key trait in plant evolution due to its association with habit. This association played a crucial role in the diversification of Neotropical orchids. Scuticaria's large genome size (and chromosomes) appears to be a novelty in the subtribe Maxillariinae. However, despite its peculiar morphology and karyotype, the phylogeny based on traditional markers suggests Scuticaria is polyphyletic. Its species are positioned in two clades according to their distribution in two biomes: the Atlantic rainforest and the Amazon forest. Is it possible that such a polyphyletic result reflects an explosive radiation of this genus, not captured by the traditional markers used in phylogeny? To test this hypothesis, we aim to generate a new phylogenomic analysis based on Angiosperm353 probes and by using Hyb-Seq technique, we will access its repeatome, which can be explored in phylogenetic analysis as well. If Scuticaria proves to be monophyletic based on phylogenomics, it would support the explosive radiation hypothesis in this genus. Otherwise, if Scuticaria appears to be polyphyletic, it will indicate that the extraordinary Scuticaria morphology and karyotype are homoplastic traits. The phylogenomic and repeatome results will be summarized with karyotype data (chromosome banding and fluorescence in situ hybridization), enabling the exploration of sequence variations between the two biomes. The combination of approaches, covering phylogenomics and chromosome painting, has the potential to offer novel insights into both single and repetitive sequence divergences, contributing to a better understanding of phylogenetic resolution techniques (traditional phylogenetic vs. phylogenomic using Angiosperm353 vs. repeatome phylogeny). Nevertheless, from the ongoing FAPESP project's perspective, the development of this project will help establish new phylogenomic approaches at UNESP and provide a state-of-the-art background for the post-doc fellowship in an interdisciplinary project and laboratory.

Name	E-mail	Institution	Abstract
Milton Cezar Ribeiro	miltinho.astronauta@gmail.com	Instituto de Biociências de Rio Claro/IB/UNESP	Agriculture is replacing native vegetation worldwide, at a faster rate in the last decades. Biodiversity and ecosystem services have severely been affected, thus compromising essential services for human survival, such as food production, water availability, climate regulation, fiber production, and aesthetic values. Nature-based Solutions (NbS) - which included the Payment for Ecosystem Services (PES) initiatives - are alternatives to reverse the negative effects of habitat destruction. The Atlantic Forest Connexion project, an initiative leading by Global Environment Facility (GEF), Brazilian National Government thru MCTI, São Paulo State Infrastructure and Environment Secretary (SIMA/SP), and São Paulo State Funding Agency (FAPESP) had implemented several positive public policy, which includes Payment for Ecosystem Services, Organic Agriculture Certification and Sustainable Value Chains, between other actions. Thus, establishing efficient monitoring metrics to assess the effectiveness of PES programs and other public policy initiatives is essential to ensure beneficial results and the engagement of farmers in these programs for a long time. In this proposal we will quantify new metrics and use previous results of the PES programs already implemented at PSRB in the portion of São Paulo state to define a set of metrics to assess the benefits of these programs in the environmental, and socioeconomic context along space and time. We expect to aid in creating specific and efficient public policies related to PES gains in multiple spatial scales (local and landscape-level). Our proposal have six specific goals: i) to evaluate the contribution of PES programs already implemented in the PSRB to the re-establishing of biodiversity, ecological functions (alpha, beta and functional diversity), soil and water quality at farm level; ii) to evaluate the influence of PES programs already implemented in the PSRB in the carbon stock at the farm and landscape-level scale; iii) to understand the influence of the PES programs and land cover dynamic in the climate change at basin scale; iv) to identify the "core values" and "perspectives" that motivate the engagement of different groups of farmers in environmental conservation; v) to characterize the multiple criteria (cultural, religious, ethical, and economic) that lead the farmers to engage in PES programs; and vi) to identify which PES should be reassessed to establish more efficient public policies related to habitat conservation and restoration actions in the PSRB. To achieve these goals, we will characterize the biodiversity in a multi-taxa approach (plants, birds, mammals, amphibians, insects, and spiders) and estimate socioeconomic, and biotic and abiotic variables (soil and water quality, and carbon stock) at farm and landscape-levels.
Paulo Roberto Bueno	paulo-roberto.bueno@unesp.br	Instituto de Química de Araraquara/IQ/UNESP	This proposal is focused on the development of portable diagnostic assays for the rapid detection of molecules aiming at the diagnostics of diseases based on a new transduction signal and related device, which is one billion times more sensible than the preceding capacitive generation1 developed by our research group. This transduction signal is based on the suitable chemical designing of interfaces that are able to operate within an alternate current (AC) quantum transistor characteristic. Hence, the purpose of the present research is to validate the AC quantum transistor methodology in the diagnostics of diseases using patient samples.

Name	E-mail	Institution	Abstract
Danielle Biscaro Pedrolli	danielle.pedrolli@unesp.br	Faculdade de Ciências Farmacêuticas de Araraquara/FCFAR/UNESP	Exploring metabolic diversity for sustainable bioproduct production. The transition from an economy based on fossil fuels to a bioeconomy is an important step toward reducing global carbon emissions. In addition, safety and health concerns associated with the production and use of synthetic compounds have fueled an increasing demand for environmentally sustainable natural products. An increasing part of the bioeconomy is played by the production of biocompounds from biomass. However, many biocompounds cannot be sufficiently produced and extracted from natural sources. Recently developed synthetic biology and metabolic engineering tools have greatly enhanced our ability to engineer strains with the ability to synthesize natural and unnatural compounds from sugars and plant biomass. We also gained a greater ability to engineer autotrophic microorganisms, capable of fixing carbon and converting CO2 into products of industrial interest. We propose the engineering of bacterial strains for the production of a bioproduct from heterotrophic, mixotrophic, and autotrophic metabolisms. This metabolic diversity will enable the development of productive processes adaptable to different industrial needs and structures.

Name	E-mail	Institution	Abstract
Marcelo Urbano Ferreira	muferrei@usp.br	Instituto de Ciências Biomédicas/ICB/USP	Extensive research has examined why some people have repeated Plasmodium falciparum malaria attacks in Sub-Saharan Africa while others remain free of disease most of the time. In contrast, malaria risk heterogeneity remains little studied in regions where P. vivax is the dominant species. Our current research program aims to explore a wide range of factors that can modulate the individual risk of malaria in well-characterized Amazonian communities. We combine classical epidemiological approaches (prospective cohort studies) with molecular genotyping of humans and parasites, and functional antibody assays with quantitative genetics and mathematical modelling to explore longitudinally collected data and samples from a unique population-based cohort study carried out in the main malaria transmission hotspot of Brazil, with the ultimate goal of improving current strategies for malaria control and elimination in this country. The new post-doctoral fellow is expected to investigate the contribution of human genetics, not limited to known or suspected “malaria resistance genes”, to individual malaria risk variation in Brazil. More specifically, s/he will estimate the heritability of malaria risk in communities, while adjusting for a wide range of sociodemographic and environmental predictors of infection and disease. To this end, s/he will fit mixed models to malaria prevalence and incidence data to estimate the contribution to variance of systematic differences among groups of individuals (“fixed effects”; i.e., individual characteristics), and the contribution of random variation among individuals (“random effects”; e.g., additive genetic or household effects). These models will allow to estimate the relative contribution of fixed effects, such as age, sex, as well as the relative contribution of random effects, such as additive genetic effects (genetic relationship matrix) and household effects (e.g., shared household matrix, housing quality, socioeconomic status etc.), to overall malaria risk variance. This post-doctoral scientist will be based at the University of São Paulo, Brazil — more specifically, at the Department of Parasitology, Institute of Biomedical Sciences (http://www.icb.usp.br/~bmpsite/eng/). The successful applicant will lead data management and statistical analysis at our laboratory. Prerequisites are: (a) PhD degree in an area related to the project (Epidemiology, Public Health, Statistics, Demography etc.); (b) basic programming skills (e.g., writing scripts in R and other languages) and vast experience with common statistics software (e.g., Stata or R); (c) (c) familiarity with generalized linear models; (d) fluency in English. Availability for travel to field sites in the Amazon and fluency in Portuguese or Spanish are desirable, although not mandatory.

Name	E-mail	Institution	Abstract
Sandra Imaculada Maintinguer	mainting2008@gmail.com	Instituto de Pesquisa em Bioenergia da UNESP/BIOEN-UNESP/UNESP	Agroindustry is one of the most important sectors of the economy in the world, with Brazil currently being the third largest fruit producer in the world. Banana production has become one of the prominent segments in agribusiness. However, the generation of waste in the sector has generated increasing environmental and economic concern, since a large part of fruit processing waste is normally dumped into rivers, oceans, landfills and unregulated dumps, causing damage to the environment. The reuse of these wastes as raw materials in microbiological processes allows the recovery of value-added products with concomitant production of bioenergy, emerging as an alternative solution to the problem of discarding fruit waste and reinforcing the concept of biorefinery, where there is valorization of by-products and minimization of remaining waste disposed of improperly. The regular project in force will contribute to the establishment of ideal operational parameters and criteria for the production of hydrogen and methane biogas, in addition to other value-added products (alcohols and volatile fatty acids) in bioreactors, using residues from banana processing, based on prior application of an experimental design. The increase in the co-digestion process, combined with the prior application of the experimental design, will seek to obtain high yields in the generation of products of interest, promoting alternatives for valuing national waste. The Post-Doc project aims to expand knowledge of the microbial consortia involved in the generations of such value-added products in new tests based on the ideal condition obtained; identify the main genera of anaerobic microorganisms involved, in large-scale analyses, making it possible to infer their role in these anaerobic metabolic processes. Keywords: anaerobic digestion, biofuels, organic solid waste, Illumina plataform.
Joao Paulo Fabi	jpfabi@usp.br	Faculdade de Ciências Farmacêuticas/FCF/USP	The objectives of the project are to study the effects of supplementation of modified pectins on the colon (1) by developing and applying new and advanced preclinical methodology (in vitro bio-printed three-dimensional cell cultures as 'colon-on-a- chip') to study cellular effects, including transcriptional and epigenetic changes at single-cell resolution, and to identify the most optimal concentration range of supplementation, and (2) perform a clinical trial to directly evaluate the health benefits and correlate in vitro and in vivo results. The results may help identify the biochemical pathways mediating the biological effects of modified pectins in the human colon, opening perspectives for developing new functional foods as dietary supplements.

Name	E-mail	Institution	Abstract
Guilherme de Araújo Lucas	guilucas@fmrp.usp.br	Faculdade de Medicina de Ribeirão Preto/FMRP/USP	Opioids are the main analgesic for severe pain such as cancer pain, burning, and post-surgery pain. However, the use of opioids such as morphine is often associated with side effects such as tolerance, dependence, respiratory depression, and, paradoxically, hyperalgesia. In this project, we will investigate some of the putative intracellular mechanisms related to opioid-induced hyperalgesia. Preliminary data from our laboratory have shown that RNA-dependent protein kinase (PKR) plays an important role in the nociceptive system, facilitating heat pain transmission during peripheral inflammatory circumstances, likely via interaction with TRPV1. On the other hand, we raised substantial data showing that PKR influences the analgesic effect of opioids under pathological pain conditions. However, low doses of morphine cause hyperalgesia in the absence of peripheral lesions, and analgesia in the presence of peripheral inflammation. This suggested that opioid receptors may signal through different pathways, depending on the dose of opioid and the structural conformation of the receptor. Therefore, the phosphorylation status of de MAPKs (ERK1,2, p38 e JNK) as well as PKR and PACT/RAX will be monitored in the dorsal root ganglion neurons of naïve and lesioned mice by plantar incision in the left paw. Moreover, the effect of pharmacological inhibition of PKR on the phosphorylation status of MAPKs following a low dose of morphine administration will also be investigated. Thus, we will combine molecular and cellular methods with pharmacological and behavioral paradigms to reveal the mechanisms underlying PKR action on different intracellular signaling pathways following μ opioid receptor activation by doses that cause analgesia and hyperalgesia. The project's results must show new mechanisms of opioid action in the nociceptive system and the development of more efficient therapeutic strategies.

Name	E-mail	Institution	Abstract
Marcelo Bussotti Reyes	marcelo.reyes@ufabc.edu.br	Centro de Matemática, Computação e Cognição/CMCC/UFABC	Dilemmas about staying with an action or changing to another permeate human life. However, the processes that govern how and how much we change our actions are far from understood. An experimental paradigm used with animals has given interesting clues: Midsession reversal learning. In this paradigm, the animal chooses between two distinct stimuli, S1 and S2. The choice of S1 is rewarded in the first moment of the session (in the first half, for example) and the choice of S2 is rewarded during the remainder of the session. That is, in the middle of the session, the positive and negative stimuli are reversed. Previous studies show that pigeons adopt a suboptimal strategy, initially preferring S1 but, as the inversion moment approaches, they start to choose S2 more and more, committing anticipation errors. After the inversion, they continue to choose S1 a few times, making perseveration errors, which decrease at the end of the session. Other studies show that rats adapt to the inversion task differently depending on the context in which the task takes place. In one context, in operant conditioning boxes, they learn to choose almost optimally, preferring S1 until this option is no longer rewarded, and then starting to prefer S2. In another context, rats learn suboptimally, similarly to pigeons. There is evidence that in this second context, the rats base their successive choices on the time elapsed since the beginning of the session. The project aims to study why this difference in learning strategy occurs. More concretely, if, by changing the choice procedure, we can determine the strategy that the mouse follows. The results of the proposed studies and the comparison of these results with those obtained with other species, including human beings, will allow us to better understand the basic processes of learning in general and the cognitive flexibility of animals.

Name	E-mail	Institution	Abstract
Talita Martins Lacerda	talitalacerda@usp.br	Escola de Engenharia de Lorena/EEL/USP	Synthetic polymers have revolutionized society in the last century, and modern life without the use of such materials is not possible in many aspects. However, the development of environmentally friendly polymeric materials has become crucial considering the alarming scenario that has been stablished. The predominantly non-renewable origin of polymeric materials implies the emission of greenhouse gases, which must be drastically reduced to ensure the maintenance of the planet's average temperature. Additionally, efforts should be directed towards the responsible management of waste that accumulates in various ecosystems. In 2022, the Environmental Program of the United Nations proposed the creation of a new resolution ("End plastic pollution: Towards a legally binding instrument") and established an intergovernmental negotiation committee to work on drafting its specific content. Some key points include defining global objectives to combat plastic pollution, and global obligations and measures throughout the life cycle of plastics, including product design, consumption, and waste management. The use of plant biomass in the production of polymeric materials is a strategy that is aligned with this initiative. This proposal aims to apply the knowledge acquired in the context of the ongoing research project funded by FAPESP, related to the production of monomers, polymers, and composites derived from renewable sources. In this sense, the proposal includes: (i) the synthesis and characterization of crosslinked polymers via chain-growth mechanisms, using monomers prepared from tung oil and itaconic acid, (ii) the use of crosslinked polymers in additive manufacturing processes, and (iii) the characterization of the produced materials and the evaluation of their potential applications. The project will, therefore, be inserted into the areas of organic chemistry, polymer processing, engineering, and sustainability. The results to be obtained will be relevant and will contribute to the consolidation of environmentally friendly processes and materials for the maintenance of the environment and the quality of life of a society entirely dependent on polymeric materials.

Name	E-mail	Institution	Abstract
Daniel Zanetti de Florio	daniel.florio@ufabc.edu.br	Centro de Engenharia, Modelagem e Ciências Sociais Aplicadas/CECS/UFABC	Electromechanically active smart materials (piezoelectrics, relaxors, and electrostrictors) change size and shape under electrical stimuli. They have many key applications in sensors, actuators, and transducers, ranging from ultrasound imaging to consumer electronics and biomedical implants with associated energy harvesting. These technologies are thus of great relevance and societal impact. Their use is expected to increase over the coming decade as part of advanced defense systems and biomimetic devices with self-diagnosis and self-repairing capabilities. Despite the futuristic applications being at the door, the best-performing electromechanical materials are an old technology: lead (Pb)-based piezoelectrics. Listed among the heavy-metal toxic elements, lead (Pb) is highly toxic and poses a severe environmental threat. It is directly or indirectly absorbed into the human body. Pb, as a waste, may find its way into the air, soils, and especially in water, where it intercepts the food chain. Recently, a new class of electroactive materials, "non-classical ionic electrostrictors", i.e., oxygen-defective metal oxides such as CeO2-x, have been discovered and developed. Governed by a mostly unexplored atomistic mechanism, the origin of phenomena is due to electrodynamic ionic defects in their crystalline structures. The materials are also non-toxic, largely available, and inexpensive. However, to transfer this technology into a practical application, the electromechanical properties must be formalized and quantified, especially in the ultrasonic range (kHz–MHz). The main goal of the project is to promote this new class of environmentally friendly and non-critical materials to replace lead-based piezoelectrics. We propose an innovative concept of electromechanically property-tuning non-classical electrostrictors by designing ionic defects as building blocks. We especially explore their properties over various applied frequencies, from Hz to ultrasound (> 20 kHz). The hypothesis is that alternative dopants and composites can prominently expand ionic properties. Synergetic effects can be achieved via modified defect chemistry, opening a new window for undiscovered properties to emerge. As a proof of concept in an industrial environment, we will design environmentally sound, lead-free, and potentially biocompatible electromechanical multiscale systems that produce high strain (> 1%) and stress (> 500 MPa) in the ultrasound range (> 20 kHz). Such an outcome would significantly impact the European research society through industrial innovation and environmental sustainability, e.g., in ultrasonic imaging and emerging miniaturized devices, e.g., lab-on-chip, fast adaptive lenses, and ultrasonic manipulators. However, we have outlined a plan for impact, focusing on low-frequency applications (

Name	E-mail	Institution	Abstract
Tatiana Teixeira Torres	tttorres@ib.usp.br	Instituto de Biociências/IB/USP	Flies, particularly blow flies (family Calliphoridae), offer a diverse model for studying the evolution of the parasitic habit. With numerous described species, blow flies present an ideal opportunity for a comparative study of the genetic and behavioral determinants of feeding adaptations. The larvae of blow flies exhibit distinct feeding habits, classified as necrosaprophagous, facultative ectoparasites, or obligate parasites. Despite their significance, the origin and evolutionary history of these diverse specialized feeding habits in Calliphoridae remain vastly understudied. To comprehensively understand trophic specialization in blow flies, it is crucial to consider the roles played by microbiomes in their evolution. While the impact of force-feeding different diets to omnivorous species on microbiome composition is known, studies investigating dietary specialization influencing microbiome composition, structure, and function on evolutionary scales are limited. Recent research on the microbiomes of fruit flies and mosquitoes has highlighted phylosymbiotic patterns between flies and their microbiomes, emphasizing the need for similar investigations in blow flies. The primary objective of this post-doctoral project is to investigate how microbiomes influence host development and trophic preferences in blow flies. The study will leverage two "Evolve and Resequence" experiments involving facultative parasites Lucilia cuprina cuprina and Chrysomya albiceps, evolving over 20-30 generations in substrates simulating preferences of parasites and necrophagous species. The candidate will specifically focus on microbiomes, delving into changes in microbiome composition. Microbiomes of each sample will be taxonomically characterized by deep-sequencing of partial 16S rRNA genes, and comparisons before and after the selection process will explore the effects on microbiome composition and potential implications for blow fly trophic specialization. Differences in the distributions of bacterial genes involved in symbiotic digestion of animal tissue, production of secondary metabolites that may play a role in regulating populations of antagonistic microbes in the substrate, and those hypothesized to be involved in communicating with blow flies will be annotated, and compared among different selection substrates. Parasitism has played a major role in the evolutionary history of many insect groups, but the mechanisms contributing to key transitions remain an unsolved problem. Blow flies are a logical choice for comprehensive analysis of coordinated changes in the genotype, phenotype, and microbiomes that give rise to novel parasitic lineages. The ongoing project, "Dimensions US-BIOTA-São Paulo: More to the blow fly than meets the eye - understanding evolutionary and genetic origins of diverse trophic specializations," involves an international team investigating phylogenetic, genetic, and functional dimensions. The ongoing research explores coordinated changes in genotype, phenotype, and microbiomes contributing to the evolution of novel parasitic lineages. The investigation of the role of the microbiome in mediating diet adaptations and maintaining diverse biotic interactions proposed here is one of the dimensions to address key questions surrounding the origin and

Name	E-mail	Institution	Abstract
Murilo Gaspardo	murilo.gaspardo@unesp.br	Faculdade de Ciências Humanas e Sociais de Franca/FCHS/UNESP	The crisis of democracy and legal-institutional frameworks: an analysis based on the relationship between politics and law Abstract: the project aims to investigate how the Brazilian legal-institutional framework of its political regime, in their correlation with factors of a political, economic, global, sociocultural and technological nature, explain the crisis of Brazilian democracy, considering its peculiarities and the global trends. Its specific objectives are: (1) to develop a conceptual mapping based on contemporary bibliographic production on the current crisis of liberal-representative democracy, identifying its correlations with the legal-institutional frameworks; (2) to develop a critical analysis of the conceptual mapping, discussing the limits of the issues, methods and theoretical categories observed; (3) to develop an institutional mapping of the legal arrangements for Brazilian democracy as an explanatory dimension of its crisis; (4) to collate the institutional mapping of Brazilian democracy with corresponding arrangements from other democracies taken as reference (Chile, United States of America and United Kingdom) to, from an exploratory perspective, formulate hypotheses about the specifics of the Brazilian crisis. The analysis period will focus on cases, events and academic work between the years of 2008-2024. The references made to former cases, events and bibliography will be conveyed in settings that relate to the framework established above. The project will employ the methodological approaches of conceptual mapping, institutional mapping and qualitative exploratory comparative study of cases. The techniques employed will be the critical review of the relevant literature, the analysis of normative texts and, in a complimentary basis, of empirical data already outlined and systematized. The scholarship holder must dedicate himself to an investigation into the correlation between one of the explanatory dimensions of the crisis of democracy (economic, global, political, sociocultural or technological) and its correlations with political-institutional arrangements, preferably in a comparative perspective between Brazil and his country.

Name	E-mail	Institution	Abstract
Erick José Ramo da Silva	ejr.silva@unesp.br	Instituto de Biociências de Botucatu/IBB/UNESP	The alarming rate of unintended pregnancies (almost 50%) contributes to the unsustainable world population growth and can have serious health and socioeconomic consequences for women and their families. This scenario underscores the need for novel contraceptives, especially male options, since they are limited to condoms and vasectomy. Druggable proteins with crucial roles in regulating sperm function are compelling pharmacological targets for non-hormonal male contraceptives. The sperm-binding protein EPPIN fits into this male contraception profile. Under normal physiological conditions, EPPIN interaction with the seminal plasma protein SEMG1 on the human sperm surface leads to transient inhibition of sperm function after ejaculation. The ability of EPPIN ligands targeting the SEMG1-binding site to inhibit sperm motility triggered the development of fully innovative spermostatic drugs. We recently showed that EPPIN binds SVS2 (mouse SEMG1 ortholog) in mouse spermatozoa. These facts indicate that EPPIN is evolutionarily conserved in terms of protein-binding partners and roles in sperm function between humans and mice. Indeed, both SEMG1 and SVS2 are seminal plasma inhibitory factors of sperm motility and capacitation-associated events (e.g., hyperactivation and acrosome reaction) and essential for sperm survival in the uterus. These findings pave the way for using mouse models to unravel EPPIN roles on male fertility in vivo. Here, we aim to unfold the mechanisms underlying EPPIN modulation of sperm function, the relevance of its protein-protein interactions in such events using mice as translational models, and to search for novel peptide-based EPPIN ligands displaying spermostatic activity. We will perform protein-protein interaction assays to determine EPPIN/SVS2 binding sequences crucial for their interaction. To test the hypothesis that EPPIN/SVS2 binding is a key event for the regulation of sperm function, we will employ state-of-the-art functional, molecular, and live single-cell imaging methodologies to evaluate whether recombinant SVS2 truncations containing EPPIN-binding sequences inhibit functional parameters (motility, acrosome reaction, and fertilization rates) and signaling pathways (cAMP production, intracellular Ca2+ levels, intracellular pH, and protein phosphorylation profile) governing sperm fertility potential. We will also determine the functional requirement for Eppin in male fertility in vivo generating transgenic Eppin knock-out mice using the CRISPR/Cas9 technology. We will build on this knowledge to rationally design novel peptide-based EPPIN ligands using state-of-the-art microwave-assisted solid-phase peptide synthesis and test their effects on human and mouse sperm motility. This proposal creates a network of scientists from Brazil, Argentina, Portugal, and the United Kingdom in a multidisciplinary team to generate novel insights on EPPIN as a sperm drug target for male contraception, thus providing solid grounds for innovation in Reproductive Pharmacology.

Name	E-mail	Institution	Abstract
Juliana Pereira	julianapereira29@hotmail.com		Peripheral T-cell lymphomas (PTCL) constitute a heterogeneous group of rare malignancies, derived from the monoclonal proliferation of post-thymic and activated T cells and natural-killer (NK) lymphocytes. PTCL encompasses heterogeneous disorders, with distinct clinical, histopathological, immunophenotypic and molecular-genetic characteristics. To date, 29 specific subtypes of PTCL have been described. According to the 2016-World Health Organization (WHO) Classification, these lymphoma subtypes are grouped according to their clinical presentation in predominantly nodal, extranodal, primary cutaneous and disseminated or leukemic. The nodal subtype is composed by peripheral T cell lymphoma, not otherwise specified (PTCL, NOS), angioimmunoblastic T-cell lymphoma (AITL), nodal peripheral T-cell lymphomas with T-helper follicular phenotype (nPTCL-THf), anaplastic large-cell lymphoma (ALCL) anaplastic lymphoma kinase-1 (ALK-1) positive and systemic anaplastic large-cell lymphoma ALK-1 negative (ALK1-negative ALCL). Distinguishing between these nodal PTCL subtypes is quite difficult in clinical practice due to the overlap of clinical, histological and genetic-molecular aspects. In addition, the risk scores used for PTCL have low accuracy in predicting their prognosis. In this sense, there is an unmet medical need in relation to the rapid and accurate establishment of a precise diagnosis of the different subtypes of nodal PTCL. Technologies applied for this purpose should be accessible, cost-effective and universally available. Therefore, performing whole exome sequencing (WES) from patients with nodal PTCL, we aimed to standardize a minimal gene panel capable of assisting in its differential diagnosis and for predicting its prognosis. This work will involves a hard stage of data analysis involving statistics and bioinformatics analysis. The post-doctoral student will be directly involved in this stage of the project and will participate in data analysis and in the scientific publications.
Pedro de Oliveira Conceição Junior	pedro.oliveiracjr@usp.br	Escola de Engenharia de São Carlos/EESC/USP	This postdoctoral research will be related to the Regular Grant supported by FAPESP (grant: 2023/02413-2) entitled "Smart systems for fault diagnosis and monitoring of industrial assets based on the Industry 4.0 concept". The proposed research activities will support the regular grant through the development and application of machine learning algorithms, based on neural networks and fuzzy logic, to map a set of uncertainties related to failure occurrences in structural components subjected to the metal cutting in machining processes. The main objective is to develop a new methodology for the classification, localization, and estimation of remaining useful life (RUL) at different levels of flank wear in machining tools, using drilling and milling processes as a basis. Condition indicators will be applied to signals from inspected samples, employing the acoustic emission technique based on piezoelectric transducers. Additionally, there will be an integration of new approaches using low-cost acoustic emission sensors and piezoelectric transducers within the context of Industry 4.0, contributing to the automation and enhancement of the manufacturing process.

Name	E-mail	Institution	Abstract
Éder Sócrates Najar Lopes	esnlopes@unicamp.br	Faculdade de Engenharia Mecânica/FEM/UNICAMP	This Young Investigator Award project, which is aligned with FAPESP's funding initiatives focused on scientific and technological cooperation on advanced manufacturing topics, aims to conduct systematic studies of processing, monitoring and control in the additive manufacturing (AM) process using the powder bed fusion technique with laser beam (PBF-LB). The objectives include: i) the experimental design and computational simulation of the layer deposition process at a micrometric scale and the mechanical behavior of the product; ii) PBF-LB processing of materials with different degrees of absorbance using a high-power laser with programmable heat distribution shape and beam diameter; iii) the exploration of post-processing routes by heat treatment, and finally iv) the microstructural and the mechanical properties characterization of samples. The processability of materials that have distinct processability characteristics will be discussed, such as AISI-H13 (UNS T20813) and Maraging M300 (UNS K93120) steels and CuCrZr alloy (UNS C18150). At the end of the project, the expectation is that the knowledge base will be established for the definition of processing methodologies, post-processing, and characterization of different materials processed by AM PBF-LB.
Marília Afonso Rabelo Buzalaf	mbuzalaf@fob.usp.br	Faculdade de Odontologia de Bauru/FOB/USP	The acquired pellicle (AP) is a crucial factor in protecting against erosive tooth wear (ETW). Recent advancements in omics techniques have identified acid-resistant proteins in the AP, leading to "acquired pellicle engineering" procedures aimed at enriching this integument with proteins that strongly bind to hydroxyapatite and remain attached after an acidic challenge. CaneCPI-5 stands out among these proteins for its strong interaction with hydroxyapatite and enhanced protective potential when applied directly to enamel. Vitamin E has also been recognized for its protective potential against initial erosive demineralization, possibly due to its ability to penetrate the lipids of the AEP's basal layer, reducing lipid degradation. Recent studies combining Vitamin E with CaneCPI-5 have shown a synergistic effect, regardless of whether the application is made before or after AP formation. However, their separate application is not ideal from a clinical standpoint. Therefore, the study aims to evaluate, in situ, the effect of a hydrogel based on a poloxamer (a triblock copolymer with a central hydrophobic portion flanked by two hydrophilic side chains) that allows for the incorporation of both CaneCPI-5 and Vitamin E, against enamel and dentin erosion and erosion associated to abrasion. It is hypothesized that this hydrogel, containing both agents, could penetrate the lipid layers of the pellicle, facilitating the distribution of CaneCPI-5 and Vitamin E in the basal layer, allowing for the interaction and aggregation of acid-resistant proteins, even when applied after the formation of the pellicle. The present research project is part of the FAPESP thematic project 2019/26070-1 in the form of subproject 3.7.3, which aims at developing hydrogels as vehicles for the adsorption of CaneCPI-5 to enamel. As mentioned above, the combination of vitamin E with CaneCPI-5 showed a synergistic effect in previous studies from our group, but these agents were applied in solution, separately, which is not ideal from a clinical standpoint. Therefore, the present study represents a step forward, since the developed hydrogel will contain both CaneCPI-5 and Vitamin E. In addition, the experimental design will involve an in situ study, which is a model that more closely resembles the clinical condition.

Name	E-mail	Institution	Abstract
Arthur Vieira da Silva Oliveira	avs.oliveira@usp.br	Escola de Engenharia de São Carlos/EESC/USP	Droplets impacting heated walls is a typical problem in engineering as this phenomenon is found is many applications like spray cooling, fuel injection, nuclear reactor, microelectronics cooling. Methods to enhance heat transfer during droplet impact are constantly investigated, but few studies used non-intrusive instrumentation, like visible and infrared cameras, to evaluate the fluid dynamics and heat transfer of the impact. In this project, the research will investigate droplet impact on heated wall and spray cooling with water and water-ethanol mixtures. The effect of adding ethanol to the solution is the reduction in the surface tension, which can increase the droplet spreading and, consequently, the heat transfer area. In the experiments, optical techniques like high-speed Shadowgraph (for the droplet size, velocity and shape characterization) and high-speed Infrared Thermography (for the surface temperature measurement) will be used. A 3D inverse method will be applied to estimate the boundary heat flux to evaluate the effectiveness of ethanol-adittion on the cooling. Finally, after performing the tests with a single droplet, spray cooling tests will also be perform to conclude how ethanol addition would contribute in a real industrial application.

Name	E-mail	Institution	Abstract
Elize Massard da Fonseca	emassard@gmail.com	Escola de Administração de Empresas de São Paulo/EAESP/FGV	The Politics of Strengthening Medicines Regulatory Systems in Low-income Countries The COVID-19 pandemic encouraged national regulatory authorities in low- and middle-income countries (LMICs) to coordinate their pharmaceutical authorization processes in completely novel ways (Nature, 2020). Concurrently, the World Health Organization (WHO) promoted an ambitious agenda to strengthen and revamp medicines regulatory systems in LMICs (Khadem Broojerdi et al., 2020), a strategy that evolved from a previous initiative to act as a central regulator through its prequalification program. Therefore, many low-income countries are now undertaking regulatory upgrading to create the necessary ecosystems for the local development and production of medicines and to ensure their safety and quality. The postdoc will investigate the politics of strengthening medicines regulatory systems in low-income countries, such as Tanzania, and/or the creation of the African Medicines Agency. To explain the process of constructing regulatory capacity and transitioning to a mature regulatory system, we will investigate the diffusion of harmonized regulatory standards that have triggered governments to act, along with local politics -- considering the interests and capacities of regulators. Additionally, the research will examine the contestation by local producers, as such reforms can create market barriers and compliance costs, which in turn can affect the timing and direction of reforms. Our study relies on small-n (qualitative) research and the political economy of regulation literature. The postdoc must have a background in public administration, political science, or related areas. Please consult other eligible requirements in the postdoc call. This proposal is part of a research project investigating the politics of the Health Industry Complex (CIS) in times of change. We define the CIS as a set of policies to align health and industrial goals, which include pharmaceutical regulatory governance and policies—work package 2. This postdoc research will allow us to expand the scope of work package 2, currently focused on Brazil, and validade our findings. Applying the conceptual framework outlined to study Brazil's case in a different context can be an important tool for testing external validity and identifying new avenues for investigation. Our study will produce novel concepts to elucidate medicine regulation in the Global South. From an applied perspective, our findings will provide lessons for global health practitioners and inform initiatives, such as preparedness for future pandemics and the WHO's Health for All strategy (World Health Organization, 2023) and Department of Regulation and Prequalification (Blaschke, Lumpkin, & Hartman, 2020). Blaschke, T., Lumpkin, M., & Hartman, D. (2020). The World Health Organization Prequalification Program and Clinical Pharmacology in 2030. Clin Pharmacol Ther, 107(1), 68-71. doi:10.1002/cpt.1680 Khadem Broojerdi, A., Baran Sillo, H., Ostad Ali Dehaghi, R., Ward, M., Refaat, M., & Parry, J. (2020). The World Health Organization Global Benchmarking Tool an Instrument to Strengthen Medical Products Regulation and Promote Universal Health Coverage. Frontiers in Medicine, 7(457). Nature. (2020). Eyes of the world are on medicines regulators.

Name	E-mail	Institution	Abstract
Niels Olsen Saraiva Câmara	niels@icb.usp.br	Instituto de Ciências Biomédicas/ICB/USP	It is estimated that between 11 and 13% of the world population has chronic kidney disease (CKD). This scenario is particularly alarming when it is found that it may represent an underestimate ratio, and the diagnosis is usually late, since patients do not usually present complaints except in advanced stages, when renal replacement therapy becomes mandatory. CKD is an indolent and asymptomatic condition in its early stages, another reason for the under diagnosis. In fact, as with other chronic degenerative diseases with which it shares risk factors, such as systemic arterial hypertension, diabetes mellitus and, more recently, obesity, CKD falls into the category of preventable diseases. Thus, active investigation of its causal factors, coupled with early intervention, is currently the main strategy available to try to reduce its prevalence. Despite a knowledge of a cost-effective approach to contain its spread, therapeutic options for the more than 200 million patients already living with the disease are scarce, so that, annually, about 850 thousand individuals die DRC, which is the 12th cause of mortality in the world. It is known that regardless of the underlying cause of deterioration of renal function, the pathophysiology of CKD involves a persistent state of local and systemic inflammation that results in loss of renal parenchyma, which is gradually replaced by fibrosis. Therefore, the identification of cellular and molecular targets that allow the interruption of an inflammatory cascade that tends to amplify and feedback, leading to the inexorable loss of function and to the anatomical destruction of the kidneys, represents the core of current research that seeks to overcome the problem. In this project, we believe that the interface - inflammatory response - cellular metabolism - microbiota - is central to the pathophysiology of renal lesions, and that its study implies the discovery of diagnostic and/or therapeutic tools. In this sense, acute kidney injury (AKI) and CKD are established inflammatory conditions, in which both innate and acquired immunity elements are essential in the elaboration of the inflammatory response. Today, inflammation is known to alter the metabolic status of an immune cell, and that the activation of a metabolic pathway leads to a cell-specific functional phenotype. Thus, we believe that renal cells also have their metabolic altered profile by inflammation and that this influences their functions and induces specific pathological states such as podocyte dysfunction and epithelial-mesenchymal transition. The inflammatory response and its consequences on the metabolic profile would be the result of the action of receptors, metabolic sensors, closely connected to receptors of innate immunity, such as inflammasomes. Further, we believe that this response may modulate and be also affected by the intestinal microbiota and thus maintain a positive feedback loop and perpetuate inflammation in renal injury. We use several in vivo and in vitro models of renal injuries, in wild type, cell reporters, knockout and conditional mice to reply all aims of our project. Moreover, we will use update readout technologies such as assessment of cell metabolism, global gene expression by RNASeq, cell image and metagonomic to identify mechanisms and not associative conclusions. We

Name	E-mail	Institution	Abstract
Adriana Castello Costa Girardi	accgirardi@gmail.com	Instituto do Coração do Hospital das Clínicas de São Paulo/INCOR/SSSP	Sodium-glucose cotransporter 2 inhibitors (SGLT2i), commonly known as gliflozins, represent pivotal therapeutic agents in the realm of cardiorenal metabolic (CRM) interventions. Initially designed for type 2 diabetes (T2D) treatment, these agentes have demonstrated efficacy in reducing cardiovascular death and hospitalization rates for heart failure (HF), irrespective of T2D presence. Despite their established clinical benefits, the precise molecular mechanisms underlying the cardioprotective and renoprotective effects of gliflozins remain incompletely understood. Recent findings from our research group have shown that empagliflozin preserves glomerular function, prevents renal apoptosis and atrophy, and significantly reduces sodium reabsorption mediated by isoform 3 of the Na+/H+ exchanger (NHE3) in the renal proximal tubule in a HF experimental model induced by myocardial infarction. Furthermore, our laboratory, along with others, has uncovered that gliflozins exert antiarrhythmic, antihypertrophic, and anti-fibrotic effects in cardiac cells lacking SGLT2 expression, indicating potential "off-target" effects contributing to the gliflozin´s benefits. Building upon these insights, this project aims to test the hypothesis that gliflozins confer cardioprotective and renoprotective effects in HF, at least partially through interactions with proteins beyond SGLT2. Our approach involves investigating whether gliflozins provide additional cardiorenal benefits in SGLT2 knockout mice subjected to acute myocardial infarction to induce HF. Subsequently, employing chemical synthesis in conjunction with immunoaffinity chromatography and mass spectrometry, we aim to isolate and identify novel cardiac and renal targets of gliflozins. This comprehensive analysis will contribute to a deeper understanding of the multifaceted mechanisms underpinning the therapeutic effects of gliflozins in cardiorenal health.

Name	E-mail	Institution	Abstract
Nathalia de Setta Costa	nathaliasetta@gmail.com	Centro de Ciências Naturais e Humanas/CCNH/UFABC	Understanding the abiotic stress responses of forage species Panicum maximum in the face of global climate change Global climate change has challenged the agricultural sector, reflecting negatively on the efficiency of production systems. Of the affected chains, forage production has been impacted, among other factors, by the alternation between severe droughts and floods in recent years. Panicum maximum (syn. Megathyrsus maximus) is the second most cultivated forage grass species in Brazil, being used as forage in conventional and integrated production systems. It has good acceptance by herds, high yield, and digestibility. However, to achieve this good yield, P. maximum needs mild climates and nitrogen-based fertilization. Several cultivars of P. maximum have been developed through conventional breeding, however, it is still necessary to understand its genetic basis of response to abiotic stress, to help the development of cultivars more tolerant to the global climate changes. The main objective of this proposal is to study P. maximum responses to water and nitrogen deficit, including its yield, physiology responses, and gene expression and metabolite profiles. The results will allow understanding the molecular mechanisms behind the abiotic stress responses, enabling the development of genetic engineered cultivars. Obtaining drought tolerant cultivars will make it possible to replace forage species with lower digestibility, such as brachiaria, with P. maximum, thus reducing the emission of greenhouse gases. Postdoctoral researcher will join the Laboratório de Genômica Funcional e Evolutiva (LaGEF) team in the Universidade Federal do ABC (UFABC), led by Dr. Nathalia de Setta. The postdoctoral fellow will be responsible for cultivating P. maximum under water and nitrogen-deprived conditions, performing yield, physiological and metabolic characterization of plants, sequencing and analyzing transcriptomes, as well as prepare manuscripts, result reports and, mentoring or supporting student led research projects. Candidates should hold a PhD degree in plant molecular biology, bioinformatics or similar. The ideal candidate will be self-motivated, intellectually curious, have a strong work ethic, ability to perform self-directed research and to work effectively as part of a team.
Maria Magdalena Rossi	mmrossi@usp.br	Instituto de Biociências/IB/USP	Plant fitness is highly dependent on the ability to cope with multiple (a)biotic environmental cues, such as light and interacting organisms. Complex signaling networks driven by perception of these cues and involving endogenously produced phytohormones, program the appropriate cellular and organismal response and steer plant development and metabolism to promote fitness and survival. Often antagonistic inputs are provided, obliging plants to decide between growth and defense. Signaling by respectively light and the stress phytohormone jasmonate (JA), represents a crucial point of crosstalk between two such conflicting programs. Hence, increased in depth fundamental knowledge of the role and functioning of common players in light and JA signaling is highly desired, and ultimately may allow developing uncoupling strategies to improve plant yield and quality. In this project, we will employ cutting-edge protein-protein interactomics technologies to advance our understanding of crosstalk between light and JA signaling. We will specifically investigate transcription factor complexes that involve a limitedly investigated family of transcription factors, the BBX proteins, using tomato as a model. Unravelling the composition, dynamics, functioning and role of the BBX transcription factor complexes will allow revealing new mechanistic

Name	E-mail	Institution	Abstract
Ivana Cesarino	ivana.cesarino@unesp.br	Faculdade de Ciências Agronômicas de Botucatu/FCA/UNESP	The project to be developed by the researcher will focus on the production, characterization and application of disposable electrochemical sensors for the determination of emerging contaminants (ECs), mainly those arising from pharmaceutical and personal hygiene products, such as hormones, antibiotics, avermectins and parabens. Disposable sensors emerged as an opportunity to democratize analytical chemistry, as they are low-cost sensors and do not require qualified labor for analysis. In the production of disposable sensors, in addition to the use of low-cost materials, such as sodium alginate (natural polymer), graphite (conductive material), water and recycled PET (substrate), biochar will also be used, coming from bamboo biomass residue, as a way of adding value to the product. The development of disposable sensors seeks not only to achieve sustainability goals, but also to introduce a significant advance in the field of monitoring emerging contaminants in water resources through the use of portable and low-cost sensors, enabling the community, small-scale laboratories and regions with limited resources can also monitor water quality reliably and accurately. The current research support from FAPESP under my responsibility involves the development of graphene/B-cyclodextrin-based sensors for the electrochemical detection of ivermectin in effluents. The foreign researcher will be contributing to the miniaturization of the methodology that was possible to be developed in the current project.
Claudinei Fonseca Souza	cfsouza@ufscar.br	Centro de Ciências Agrárias/CCA/UFSCAR	TREATED DOMESTIC SEWAGE AS A SOURCE OF WATER AND NUTRIENTS IN THE SUSPENDED CULTIVATION OF ANTHURIUM (Anthurium Andraeanum) Human activity, in its entirety, depends on natural resources, and in recent years, water resources have been compromised. One way to mitigate these environmental impacts is to explore alternatives for water supply. In this regard, a widely adopted measure is the use of treated domestic sewage in agriculture, which can increase production due to a higher supply of nutrients and organic matter. Furthermore, the expanding market in the cultivation of flowers and ornamental plants prompts farmers to seek soilless cultivation systems, providing enhanced quality in cultivation, as seen in the case of anthurium. Therefore, the aim of this study is to assess the production potential in soilless cultivation of anthurium (Anthurium andraeanum) using treated domestic sewage as a source of water and nutrients. The experiment will be conducted in an agricultural greenhouse, employing the soilless fertigation system (also known as semi-hydroponic), with three treatments: (TA) potable water plus chemical fertilizers, (TRA) reused water supplemented with fertilizers, and (TR) only reused water. The experimental design will be in completely randomized blocks. Quantitative and qualitative results of anthurium cultivation will be evaluated through analysis of variance, followed by the Tukey test at a 5% probability level. It is expected that the treated use of domestic sewage will provide water and nutrients to the cultivation, ensuring production and reducing the use of water and chemical fertilizers with environmental safety. The responsibilities of the scholarship holder will involve monitoring and overseeing the second year of the ongoing research project. This includes analyzing and discussing the results derived from the two years of collected data. Additionally, the scholarship holder will actively contribute to the training of human resources, specifically mentoring master's and undergraduate students involved in the research project.

Name	E-mail	Institution	Abstract
Fernanda de Carvalho Panzeri	ferpanzeri@forp.usp.br	Faculdade de Odontologia de Ribeirão Preto/FORP/USP	This study aims to evaluate the efficiency of the incorporation of curcumin (CAN) anchored in nanosilica into an experimental adhesive system to characterize the mechanical and antimicrobials properties of the suggested adhesive protocols, as well as to evaluate the bond strength to dentin, the morphological characteristics of the adhesive interface and mass variation after dentin biomodification. The first step of this study will determine the two concentrations of curcumin to be used. Thus, an experimental adhesive system containing curcumin anchored in nanosilica will be tested at concentrations of 0%,1% 2,5% and 5%. The flexural strength and the antimicrobial potential will be evaluated. The results found will support the choice of the two most adequate concentrations of curcumin to assess the bond strength (BS). Sound human molars will be selected and cavities (6 x 7 x 4 mm) prepared using carbide burs. Half of them will be submitted to cariogenic challenge by microbiological method with a standard strain S. mutans ATCC25175. Subsequently, the teeth will be separated into groups according to the adhesive protocols to which they will be submitted: Control - Commercial adhesive system (Single Bond Universal - 3M ESPE); CAN0% Group - Exp + CAN a 0%; CAN1 Group - Exp + CAN at a certain concentration; CAN2 Group - Exp + CAN at a certain concentration. After restoration with composite resin (Filtek Z350, 3M ESPE), all the samples will be sectioned into sticks, separated and stored in distilled water at 37 ºC for 24 hours, 6 months, and 1 year. After these periods, they will be subjected to the microtensile test (OM100, Odeme) at a speed of 0.75 mm/min. The fractured sticks will be observed in a stereomicroscope for analysis of the fracture pattern (cohesive, adhesive, or mixed) and then, processed and analyzed by scanning electron microscopy (JSM 5410, Sony). The mass variation after biomodification will be analyzed. The quantitative data obtained will be analyzed statistically according to the data normality analysis. The Postdoctoral fellow will work on supplementary analysis, like confocal microscopy, microradiography, and others to enhance knowledge about the applied treatments on dentin interface.
Denis Gustavo Fantinato	denisfantinato@gmail.com	Faculdade de Engenharia Elétrica e de Computação/FEEC/UNICAMP	Electroencephalographic (EEG) data are records of brain electrical activity, with potential application in a wide range of contexts, ranging from medical diagnosis, assistive technologies and rehabilitation to entertainment devices. In that sense, with the consolidation of signal processing and machine learning techniques, the direct information transmission system between the brain and the computer, called the Brain-Computer Interface (BCI), can be highlighted. However, the high variability of patterns observed in EEG data from BCI users and the application of BCI in increasingly sophisticated contexts, make its use a very challenging problem. In this sense, this research project aims at modifying Independent Component Analysis (ICA) and data alignment methods for application in cross-subject BCI systems. While ICA-based methods are capable of extracting relevant components from signals, data alignment could transform the components among users to obtain the most similar ones. Further modifications on ICA and data alignment methods are expected in order to improve efficiency. The modification of ICA-based methods to encompass the cross-subject perspective is a direct contribution to the current FAPESP project. In a second stage, deep Riemannian networks focused on EEG data processing shall be used for classification. Their great potential to deal with high variability data shall be very useful for robust cross-subject EEG-based BCI systems.

Name	E-mail	Institution	Abstract
João Loures Salinet Júnior	joaosalinet@hotmail.com	Centro de Engenharia, Modelagem e Ciências Sociais Aplicadas/CECS/UFABC	Atrial fibrillation (AF): AF is the most frequent sustained cardiac arrhythmia in clinical practice, affecting 1% to 2% of the world's population. Its prevalence increases with age (8% for octogenarians), and is generally associated with structural heart disease, causing hemodynamic impairment and thromboembolic complications with major economic implications. This disorder has high morbidity and mortality, and it has become a chronic non-infectious cardiovascular epidemic with a large consumption of health resources. AF is characterized by the collapse of organized cardiac electrical activity – responsible for the periodic and synchronized pumping of the atria – to disorganized and self-sustaining electrical activation patterns, a condition resulting from multiple causes. Because of this reduction in the effectiveness of atrial systolic and diastolic functions, there is a significant decrease in cardiac output, increasing the chances of thromboembolic phenomena, heart failure and sudden cardiac death. The progression of AF episodes, from transient and sporadic to persistent and uninterrupted, is associated with the evolution of the complexity of this arrhythmia, whose electrophysiological and structural changes of the cardiac cell are developed, including shortening of refractory periods and the presence of fibrous tissue, leading to the remodeling of atrial electrical activity. Currently, three main mechanisms responsible for the triggering and maintenance of AF are considered: multiple and continuous intra-atrial reentries, focal, and rotor. It is believed that their occurrence varies individually from patient to patient, and multiple can coexist simultaneously, or interspersed with each other in the same patient, favoring the complex heart rhythm. Diagnosis of AF mechanisms and treatment: The main methods used are invasive electrical mapping and optical mapping (restricted to animal experimentation). These methods differ from each other in the measurement of cardiac electrical potential, and the invasive electrical method consists of introducing intracavitary catheters with multiple electrodes into the heart to map the electrical activity of the endocardium and project electrophysiological characteristics onto 3D maps of the atria. Optical mapping, considered the gold standard in electrophysiology, uses voltage-sensitive dyes that alter their emission spectrum according to changes in the transmembrane voltage of the myocardial cells, so that changes in the amount of fluorescent light emission from the cells are proportional to the changes in transmembrane voltage, allowing a non-invasive access and high spatio-temporal resolution of the electrical activity. The application of processing techniques to the signals acquired by these methods allows the generation of 3D panoramic maps of the atria, aiding the diagnosis of AF mechanisms and the areas responsible for their maintenance. The main maps are: isopotential, isochronous, phase and frequency. The patterns of AF mechanisms observed through these maps have intrinsic characteristics that allow for better characterization. These maps assist electrophysiologists in determining the atrial areas to be ablated for the patient's return to sinus rhythm. Limitations of commercial systems: The interpretation of signals

Name	E-mail	Institution	Abstract
Marco Lucio Bittencourt	mlb@fem.unicamp.br	Faculdade de Engenharia Mecânica/FEM/UNICAMP	High strength and low density materials are desirable in the design of engineering components and structures in the context of sustainability and low consume of energy. The traditional design criteria are in most cases unable to fulfill the structural integrity in a reliable way along the life cycle of products. We have used the phase field methodology, to obtain, analyze and validate mathematical models for the behavior of several material classes. in particular those ones with the arising and/or evolution of fatigue, damage and fracture from mechanical, thermal and chemical sources. In parallel with the creation of the models, we have developed numerical models and software to perform reliable simulations of the proposed mathematical models; the simulations are crucial to test them, possibly improve and generalize them and, when possible, validate them with comparisons of their predictions and experimental data. For this specific project, we are interested in the development of phase field models to study damage and fatigue in composite materials. We will adapt our framework to this important class of materials and implement the models in our in house high order finite element software. The results will be validated with experiments.
Raphael Nagao de Sousa	nagao@unicamp.br	Instituto de Química/IQ/UNICAMP	Human activities have significantly disrupted the natural nitrogen cycle. The excessive use of nitrogen-containing fertilizers has led to an increase in nitrate levels in both surface and ground waters. Additionally, the substantial emission of nitrogen oxides has resulted in severe air pollution. While nitrogen gas, a crucial component of the atmosphere, has been utilized for mass ammonia production for more than a century, supporting agricultural needs and accommodating the growing global population, the associated Haber–Bosch process has raised concerns due to its intensive energy consumption and high carbon emissions. In recent years, researchers have dedicated substantial efforts to developing ammonia production processes under ambient conditions. The aim is to address the environmental impact of the conventional method. Among various techniques explored, the electrochemical nitrate reduction reaction (NO3RR) stands out as a promising approach. This method allows for the simultaneous removal of nitrate and generation of ammonia, utilizing renewable electricity as the power source. The research in this direction has witnessed exponential growth in the last decade, providing promissing results to ammonia production from nitrate. In this project we aim to study metal alloys based on transition metals (Cu, Ni, Fe, Co) to enhance the performance of NH3 production in the NO3RR. The system will be characterized before and after the electrolysis by XRD, TEM, SEM, XPS. The molecular information will be obtained by in situ Raman and FTIR. Time-resolved instruments like on line DEMS and operando XAS (synchrotron radiation measurements) will be the key techniques to extract information about the nature of the electrocatalyst’s active sites.

Name	E-mail	Institution	Abstract
Fernando Aparecido Sigoli	fsigoli@unicamp.br	Instituto de Química/IQ/UNICAMP	According to data recently released by the World Health Organization (WHO), cardiovascular diseases and cancer are among the ten diseases that led to the most deaths in recent years. Considered metabolic disorders, these pathologies result, among other factors, in the deregulation of homeostatic parameters such as pH and temperature, for example, some of the most important variables in maintaining balance in human physiological processes. Therefore, the development of probes capable of mapping these heterogeneities at the cellular level with precision and sensitivity can assist in the detection of such pathologies at an early stage, contributing to more effective prevention and local treatment of these diseases. To this end, focus has been given to the development of multimodal systems, which combine the advantages of different modalities and are capable of providing more complementary, effective and accurate information about the environment under study. In this context, the objective of this work is to obtain conjugates based on thermosensitive polymers functionalized with complexes of lanthanide ions and gold nanoparticles (AuNP) for nanothermometry, multimodal molecular imaging and photothermal therapy. Obtaining block polymers involving thermosensitive units and lanthanide ion complexes can result in systems whose optical and magnetic properties are modulated as a function of the thermal response of the polymer, leading to the development of responsive systems with potential application in nanothermometry and optical cell imaging and by MRI. The anchoring of metallic nanoparticles to these polymers further expands the system's detection possibilities, by making use of the plasmonic properties of these nanoparticles in surface-enhanced Raman scattering imaging. Thus, with the effective and precise mapping of these heterogeneities in the medium, it is possible to make guided use of the plasmonic properties of AuNP in photothermal therapy, minimizing damage to healthy tissues and increasing the effectiveness of the therapeutic procedure in the ablation of malignant tumors and cells. pro-inflammatory in environments of chronic inflammation. Therefore, an intelligent theranostic system can be obtained, which responds to variations in physiological parameters and is capable of simultaneously performing the most accurate diagnosis of tumors and inflammations, through different imaging modalities, and guiding photothermal therapy procedures, which have received great attention, compared to other therapeutic procedures, due to their minimally invasive nature, with minimal side effects and great effectiveness.

Name	E-mail	Institution	Abstract
Fabrício Gallo	fabricio.gallo@unesp.br	Instituto de Geociências e Ciências Exatas de Rio Claro/IGCE/UNESP	Title: Public Power, financial capital and uses of territory. The participation of institutional investors and investment funds in the highway concessions in São Paulo. Abstract: The purpose of this project is to reflect on the role of the Brazilian state as a significant agent in the current use of territory process. A change in the role of the state, which now acts as a regulator and no longer as a provider of some services on account of privatizations and concessions of infrastructure and public services, has been observed. This is because the growing interest of institutional investors in the infrastructure sector and the introduction of new agents (investment funds) over the road concession sector to the detriment of the large national construction firms. The actions of institutional investors, mainly investment and pension funds, which are key players in our historical period, have expanded the frontiers of capital, subjecting the most diverse economic activities to the logic of financial gains. In this context, we will analyze here what we consider to be a manifestation of this process. We use the concept of financialization and uses of territory as the guiding threads of the analysis, showing how, through the case study, this process causes reorganizations in the territorial dynamics.
Romain Pierre Marcel Bachelard	romain@ufscar.br	Centro de Ciências Exatas e de Tecnologia/CCET/UFSCAR	Escape dynamics of an excitation in an Anderson localized system Anderson localization of light has eluded experimental observation up to date, due to the vectorial nature of electromagnetic waves. This has stimulated the search for alternative ways to induce the localization transition, using, for example, strong external fields to modify the interactions between scatterers. In this context, it became particularly important to identify unambiguous signatures of the localization phenomenon, which can rule out spurious effects such as absorption. In this project, we propose to monitor the escape dynamics of an initially localized excitation in a sample of cold atoms, created by exciting locally the system: While diffusion usually occurs on a scale-free manner in the diffusion regime, the localization regime rather sets a spatial scale for the light propagation. In particular, we propose to study the configurations where localization is induced by diagonal (energy) disorder, which allows to bypass the high scatterer density requirement for the transition. The dynamics will be investigated both from a classical (single-photon) and quantum (multiple-photon) perspective. The project is part of a collaboration with a French experimental group, and a special attention will be given to the experimental signatures for the localization transition.
Ciro Abbud Righi	ciro@usp.br	Escola Superior de Agricultura Luiz de Queiroz/ESALQ/USP	The sustainable use of natural resources associated with the maintenance of natural forests and the provision of ecosystem services such as carbon sequestration are some of today's challenges. To maintain the Amazon forest and the people who live in it, studies are needed to identify the impacts of human activities and point out ways for the rational use of the areas, in order to promote the preservation of biodiversity and ecological processes. In this sense, we are selecting two people interested in developing their doctorate with: 1. Soil carbon stocks and their relationships with land use and; 2. Development of traditional communities and land use systems. Successful candidates must have a degree in Agronomy or Forestry Sciences or Biological Sciences or Natural Resources or related areas, be interested in rural development and nature preservation.

Name	E-mail	Institution	Abstract
Anselmo Nogueira	anselmoeco@yahoo.com.br	Centro de Ciências Naturais e Humanas/CCNH/UFABC	What are the plant traits and environmental factors driving the evolution of super nitrogen-fixing legumes? The main hypothesis of this project is that certain legume lineages have evolved enhanced nitrogen-fixing capacity tied to specific traits, such as rapid growth, short-lived leaves, and favorable environmental conditions like increased light availability. However, the current research gap on trait macroevolution, root nodulation, and environmental niches limits our ability to detect exceptional nitrogen fixers, hindering our understanding of nitrogen fixer diversity and access to valuable genetic resources for soil enrichment. To address this gap, we will collect data on plant functional traits (e.g., life form, leaf mass area, leaf nitrogen), root nodulation, and environmental descriptors (climate and soil) to test our hypothesis that some legume lineages in Neotropical open vegetations have evolved an increased nodulation capacity, mostly due to enhanced light availability. Field sampling of young and mature plants of the genus Chamaecrista will assess nodulation, bacteria, and other traits. Complementarily, assays will isolate and characterize benefits from these bacteria, including nitrogen fixation and other functions like nutrient solubilization. Understanding how native legume species meet nitrogen needs in nutrient-scarce environments and evolve their association with nitrogen fixers is a scientific gap. This research explores the unknown evolutionary dynamics of nitrogen fixation in tropical legume lineages. The findings can impact forest restoration and sustainable agriculture, enhancing our understanding of ecosystem functioning. Furthermore, these data will complement the investigation carried out within the scope of the young researcher project coordinated by Dr. Nogueira, focused on the evolution and joint functioning of multiple mutualisms in the same legume plants, including the mutualism of pollination with buzzing bees, the protection mutualism with defensive ants, and the nutrition mutualism with nitrogen-fixing bacteria. This project can generate a large amount of data that may help us to understand factors driving the functioning of the ecological services resultant from the mutualism approached here. In Brazil, Fabaceae is the most species-rich angiosperm family in several ecosystems, with some lineages being highly endemic. Therefore, understanding the role of mutualistic partners in the evolution of some clades and the role of those plants in the functioning of mutualisms may help us to understand part of the ecological services in our native ecosystems.

Name	E-mail	Institution	Abstract
Fausto Bruno dos Reis Almeida	fbralmeida@gmail.com	Faculdade de Medicina de Ribeirão Preto/FMRP/USP	Extracellular Vesicles (EVs) play an important role in export systems. They act as vehicles for the transference of complex cargoes with broad biological functions. These vesicles cross the fungal cell wall to reach the extracellular space and transport its major virulence factors contributing to fungal infection outcomes. Our group has demonstrated that fungal EVs exerts immunomodulatory functions during fungus-host interactions and mediate intra-species cellular communication. Furthermore, we have verified that fungal EVs may also plays crucial roles regarding to inter-species cellular communication. These observations motivate the proposal to study the fungal inter-species cellular communication, and to better understand the role of fungal EVs in immunomodulation and intra-species cellular communication. More specifically, we propose to do the following aims: (1) to clarify the immunomodulatory properties of EVs from C. neoformans, P. brasiliensis, A. fumigatus, and C. albicans; (2) to dissect the responsible interactions of EVs from C. neoformans, P. brasiliensis, A. fumigatus, and C. albicans in intra- and inter-species communication by several approaches. Our expectation is that fungal EVs are responsible for important functions on fungal infection process, and will provide opportunities to develop new strategies against fungal infections.
André Takeshi Endo	andreendo@gmail.com	Centro de Ciências Exatas e de Tecnologia/CCET/UFSCAR	In software projects, automated tests are widely adopted and represent a valuable asset capable of bringing the system under test (SUT) to states of interest, applying relevant inputs, and verifying correct output behavior. To enhance the return on investment, various approaches have been proposed to reuse automated tests in the verification of other software characteristics. These test amplification approaches could be notably powerful when coupled with dynamic analysis. In particular, the analysis can pinpoint performance-related data, revealing sections of code that exhibit slower execution or consume more memory or CPU resources. This project aims to explore lightweight dynamic analyses to collect performance-related data in Node.js and Python applications. This collected performance data will be leveraged to uncover performance regressions in the SUT, serving as a test amplification approach. Our hypothesis posits that performance-related data and issues have an impact on event race bugs and flaky tests. Consequently, this research will contribute to the related FAPESP project titled "Amplification of Automated Tests via Dynamic Analysis".

Name	E-mail	Institution	Abstract
Marcia Dalastra Laurenti	mdlauren@usp.br	Faculdade de Medicina/FM/USP	STABLISHMENT OF IN VITRO AND IN VIVO EXPERIMENTAL MODELS TO STUDY THE HOST-PARASITE INTERACTION IN ATYPICAL CUTANEOUS LEISHMANIASIS CAUSED BY Leishmania infantum Introduction The infection by Leishmaia infantum causes visceral leishmaniasis (VL) in the American continent, which is fatal if not treated. But, in some countries of Central America, L. infantum causes an atypical clinical manifestation called nonulcerated cutaneous leishmaniasis (NUCL) in adolescents and young adults, in addition to VL in children under five years of age (Ponce et al., 1991). However, there are very few reports describing skin infections caused by L. infantum in South America (Lyra et al., 2015; Salvioni et al, 2017), but similarly to Europe (del Giudice, et al., 1998) these skin lesions ulcerate with the time of evolution, unlike those described in Central America. The skin lesions in patients with NUCL are characterized by small papules that did not ulcer with the time of evolution and histologically these papules show a predominance of mononuclear inflammatory infiltrate in the dermis with the presence of lymphocytes and macrophages that contain very few parasites (Sandoval Pacheco et al., 2018). Furthermore, the M1 macrophage subset, expressing both markers CD68 and NOS, predominates in the inflammatory infiltrate. In addition, a predominance of IFN-□, producing CD8+ T lymphocytes was observed, which may be responsible for the low tissue parasitism and absence of ulceration of the lesion (Sandoval Pacheco et al., 2021, 2023). Despite this inflammatory response, the host cannot heal the skin lesion. Possibly the persistence of a low number of parasites in the skin may be related to the presence of regulatory T cells and TGF-□ production. In contrast, the low tissue parasitism may be responsible for maintaining a memory cells capable of controlling the visceralization of the parasite (Araujo Flores et al., 2018). On the other hand, immunity in patients with VL is characterised by suppression of the Th1 type immune response with a decrease in the production of IL-2, IFN-γ, and IL-12, associated with an increase in the production of IL-4 and IL-10 (Ramos et al., 2016). Despite efforts of our research group, in recent years, to better understand the pathophysiology of NUCL in the southern region of Honduras, where the disease has a high prevalence (73.6%) (Sosa Ochoa et al., 2020), there remain important gaps in knowledge of this host-parasite interaction, in which a viscerotropic parasite L. infantum establishes cutaneous infection in humans and does not spread to the spleen and liver. Furthermore, how can we explain that the same species of parasite can cause non-ulcerated skin involvement in Central America and ulcerated cutaneous leishmanosis in South America? Probably, the host and parasite genomic studies could help to explain this issue. A preliminary study on the parasite genome suggest that the parasite isolated in Honduras is more ancestral than that isolated from Brazil, Europe and Asia (Silveira et al., 2022). Furthermore, the Honduran parasite revealed a single structural variation on chromosome 17, and the highest frequency of genomic SNPs, more than twice observed in the Brazilian, suggesting the possibility of being a new specie of parasite (Silveria et

Name	E-mail	Institution	Abstract
Hermes Senger	hermes@ufscar.br	Centro de Ciências Exatas e de Tecnologia/CCET/UFSCAR	Edge Computing (EC) is an enabling paradigm for developing technologies like the Internet of Things (IoT), 5G, online gaming, augmented reality, vehicle-to-vehicle communications, smart grids, and real-time video analytics, among others. In these scenarios, a remarkable trend is the increasing adoption of Artificial Intelligence (AI) and Machine Learning (ML) techniques to execute tasks like data classification, spam filtering, anomaly detection in network traffic for cybersecurity, real-time image classification and segmentation, driving support applications, autonomous driving vehicles, and many others. Many of these applications demand the online processing of continuous data streams, which demand (almost) real-time processing. The EC paradigm raises the opportunity to move the execution of many AI and ML operations to the network's edge, closer to the users, applications, and data sources. Many studies estimate that the energy demand to power information and communication technologies ICTs) surpassed 14% of global electricity usage in 2018. Moreover, growing around 6-8% per year, it will rise above 20% by 2030 in a non-pessimistic scenario. In this project, we will develop novel strategies for efficient, scalable and accurate execution of AI and ML operations on edge computing resources. The objective is to optimize AI and ML operations for the analysis of data streams by reducing processing latency, energy consumption, and financial costs in edge computing environments. The role of the postdoc in this project The postdoc will contribute to the proposal and evaluation of new scheduling strategies for machine learning applications running on edge computing devices to process continuous online data streams. The goal of such a strategy is to optimize AI and ML operations for the analysis of data streams by reducing processing latency, energy consumption, and financial costs in edge computing environments.

Name	E-mail	Institution	Abstract
Renê de Oliveira Beleboni	reneusp@yahoo.com	Universidade de Ribeirão Preto/UNAERP	Depression is a neuropsychiatric disorder that affects 10-20% of the world population, and is therefore a serious universal public health problem. Although the understanding, diagnosis/monitoring and treatment of this disorder have progressed in recent decades, much still needs to evolve in order for more significant advances impact the reality of medical practice and patients' health. Regarding the neurobiological explanations of depression, the modern complementation of the monoamine theory by the neurotrophin theory has pointed to the neurotrophic factor BDNF and its pro-isoforms as entities with great practical potential as biomarker and/or treating the disorder. The BDNF factor is found at reduced levels, especially in the hippocampus and prefrontal cortex of depressed patients, and increases in level after effective treatment with conventional antidepressants. Blood levels of BDNF accompany the reduction of its brain content and severity of the disorder, and also rise in the course of its effective treatment. The objective of this work will be to provide the recombinant and nationalized production of BDNF and its human and main proisoforms, as well as to provide the diverse structural/functional validation of these actives with an innovative emphasis on the potential treatment/biomarker of depression. Heterologous production will take place in E. coli using pET-26b(+) plasmid expression vectors with expected initial productivity in the mg/L range. Purification will be carried out using affinity chromatography in a nickel column, and the actives will then be quantified and analyzed for the degree of homogeneity/purity. The structural identification/validation will be carried out by mass spectrometry, while the functional validation will be carried out by various in vitro and in vivo tests. Functional validation will occur simultaneously with the identification of the best active(s) in terms of extending the study of alternative routes of administration, especially intranasal, and increasing general brain bioavailability and/or directed to specific areas of the brain. In the context of this last issue, it is necessary to consider the hypothesis that pro-BDNF isoforms seem to be more protected from proteolysis than mature BDNF, in addition to being able to target more specific areas of the brain, where they are more important, and easily activated. In this context, brain bioavailability and targeting can vary widely between BDNF and proisoforms and, above all, between different proisoforms. Still in the stock of actions of this project and based on the evaluation of performance in the functional validation, the best asset(s) will be elected for tests on a chronic scale of the disease and treatment in animal models of choice. Indeed, this will additionally make it possible to monitor the role of blood BDNF as a biomarker in the evolution of the treatment provided by itself and/or from the activation of proisoform(s) at the brain level. Finally, and still conditioned to the results obtained, it is part of the proposal to request the patenting of the use of the active(s) of greatest performance/interest for the treatment of depression, as well as to initiate studies for pilot/semi scaling. -industrial production of these same assets. In this way, the present project has marked biotechnological value, as

Name	E-mail	Institution	Abstract
Silvia Helena Taleb Contini	scontini@unaerp.br	Universidade de Ribeirão Preto Campus Ribeirão Preto/UNAERPRIBPRETO/UNAERP	The empirical knowledge about the therapeutic potential of medicinal plants with antimicrobial action has raised questions in the scientific community about the effectiveness of herbal medicines. In Brazil, there is a program instituted by the Ministry of Health called Farmácia Viva, whose purpose is to produce herbal medicines, starting with the cultivation of the species until the production of the drug and its dispensation. Since each Farmácia Viva produces its own raw material in the agricultural field, it is essential to perform the identification of the chemical markers of the plant species and the chemical quality control of the herbal medicines. Thus, the objective of this work is to conduct the chemical study and evaluate the microbiological activity of essential oils and herbal medicines produced by a Farmácia Viva, aiming to contribute to the quality, safety, and efficacy of herbal medicines distributed in the SUS. The essential oils will be extracted from aromatic plant species collected from the Horto Medicinal da Farmácia da Natureza and the herbal medicines will be produced, from these medicinal species, in ethanol/water (7:3) in the proportion of 90% solvent and 10% plant drug. The extraction of the volatile chemical constituents of the herbal medicines will be performed by headspace mode solid phase microextraction (HS-SPME). During the development of the project, the scholarship holder can help to characterization of the chemical markers of the essential oils and herbal medicines performed by GC-MS, as well as assisting in the chemical quality control of the herbal medicines using TLC and HPTLC techniques. The antimicrobial potential of the essential oils and herbal medicines will be evaluated against different strains of ATCC bacterial species as well as clinical strains isolated from a patient with Pandrug-resistant hospital infection (PDR). This study is expected to be useful to identify the chemical markers of the target species, and to correlate the antimicrobial action presented by the herbal medicines produced from these plant species with the identified volatile chemical constituents.
Luiz Felipe Domingues Passero	felipepassero@yahoo.com.br	Instituto de Biociências - Campus do Litoral Paulista/IBCLP/UNESP	Project title: Evaluation of antileishmanial and immunomodulatory properties of natural and synthetic products Currently, our research group is looking for antileishmanial and immunomodulatory agents in natural and synthetic products. Frequently, products able to reduce the parasite load in vitro and/or in vivo enhance protective immunity, which has been analyzed almost uniquely by quantifying Th1, Th2 and/or Treg immune responses. Only a few studies analyze whether such immunomodulatory activities cause major changes in macrophage phenotype, which is essential to conclude that a compound modulates macrophage host immunity and it is possible to achieve sterile cure. Thus, basically, the candidate will analyze the activity of some compounds (repurposed and from a natural source) in infections (in vitro and in vivo) caused by Leishmania (Leishmania) amazonensis or L. (Viannia) braziliensis and by using classical parasitological protocols the efficacy of compounds will be measured, furthermore by using some immunological techniques (ELISA, flow cytometry, cell sorting) the candidate will quantify surface markers associated with macrophage activation (MHC molecules, CD80, CD86, CD40, PD-L1, Nitric Oxide, hydrogen peroxide, etc) to observe if select compounds could be able to target directly infected macrophages. Furthermore, cytokines associated with Th1, Th2 and T-reg will be analyzed and quantified.

Name	E-mail	Institution	Abstract
Vinicius de Andrade Oliveira	andradevinicius1@gmail.com	Centro de Ciências Naturais e Humanas/CCNH/UFABC	Intestinal homeostasis is maintained by a regulated network of interaction involving immune system, gut epithelial cells, diet, and the microbiota. The gastrointestinal tract faces persistent challenges as it executes canonical functions, including nutrients absorption, vitamin production and tolerate foreign antigens while it needs to effectively respond to pathogens. Disruptions in these intricate interactions can trigger an inflammatory process linked to a myriad of diseases. Extensive research dedicates in elucidating the crosstalk between gut microbiota and immune system allowed us to understand the impact of gut microbiota in the developing of immune cells and how this contributes for the onset of several diseases, ranging from local inflammatory bowel disease to distant and systemic diseases such as cardiovascular disease, type 2 diabetes and metabolic syndrome. Despite that, less attention was given to the cross-talk among gut epithelial enteroendocrine cells (EECs), the immune system and gut microbiota. EECs, dispersed throughout the intestinal epithelium, secrete over twenty hormones, including the gastric inhibitory polypeptide (GIP) and the glucagon-like peptide (GLP). Functioning as sensor for nutrients and microbiota metabolites, EECs exert not only paracrine effects neighboring epithelial cells and immune within the gut but endocrine effects. However, how EECs interact with these other cells and their impacts on intestinal and non-intestinal diseases re unknown. Here we have hypothesized that EECs influence immune cells other epithelial cells by the secretion of hormones, primarily incretin hormones GIP and GLP-1. To address this question, by doing intestine organoids, we will use sophisticated genetic mouse model to generate organoids to isolate and/or eliminating EECs as well as hormone production and assess their impact om organoid formation structure and functioning. We also evaluate the secretion of mucus, antimicrobial peptide in organoid generation. To explore the potential reciprocal impact of EECs on immune cells activation and function, reporter mice for T cells and macrophages will be utilized. We will evaluate immune cell activation and function, as well as hormone and mucus production and peptide secretion from intestinal organoid with or without stimulation with cytokines and microbiota products. This approach aims to elucidate the intricate interplay between immune cells in gut secretory-lineage epithelial cells. This project aligns with our laboratory's broader objective of unraveling how EECs interacts with microbiota, epithelial ad immune cells within the gut and discerning the consequences of these interactions in maintaining gut homeostasis or contributing to gut diseases such as acute and chronic colitis and colorectal cancer. Thus, we strongly believe that this project will contribute to uncover the mechanisms through which EECs influence and are influenced by immune cells in the gut.

Name	E-mail	Institution	Abstract
Anna Rafaela Cavalcante Braga	anna.braga@unifesp.br	Instituto de Ciências Ambientais, Químicas e Farmacêuticas/ICAQF/ UNIFESP	Spirulina (Arthrospira platensis) whole biomass (WB) consists of a cluster of green colored cyanobacteria, being commonly consumed as a food or food supplement rich in bioactive compounds with antioxidant activity, predominantly C-phycocyanin (C-PC), which is related to anti-inflammatory action and anticancer potential when consumed frequently. C-PC is a water-soluble blue pigment that can be used as a natural food coloring to substitute synthetic ones related to hyperactivity and hypersensitivity in humans. With a focus on promoting health and environmental sustainability, the demand for high-quality ingredients with the necessary techno-functional attributes is growing so that they can potentially replace proteins of animal origin. C-PC as a functional and technological ingredient for food drove the elaboration of this project. The stages proposed meet this current demand from the food industry, proposing the design of intelligent protein systems that combine technological and nutritional improvements with mixing proteins with emerging technologies, 3D printing, and electrospinning, utilizing primarily C-PC but also other Spirulina components. The present proposal would be intrinsically connected with my current project under the FAPESP financial support. Since we expect to produce vegan emulsions using Spirulina whole biomass (WB), C-phycocyanin (C-PC), or residual biomass (RB) from Spirulina (after C-PC extraction), evaluating their effect on pH, color, texture, and rheological properties, as well as determinate chemical and nutritional composition of the formulations. Additionally, incorporate WB, RB, and C-PC into bioinks for 3D printing and bioprinted products. The processes and methods developed will be fully scalable and can be proposed for the industrial production of foodstuff, opening up opportunities for university/industry partnerships. Besides the technical-scientific results, the proposed project will contribute to the aggregation of economic, environmental, and social value to the microalgae biodiversity, fomenting the bioprospection of new biomass sources from the natural biodiversity.

Name	E-mail	Institution	Abstract
Thiago Rojas Converso	trconverso@hotmail.com	Universidade São Francisco - Campus de Bragança Paulista/USFBP/USF	Staphylococcus aureus is a bacterium of great interest worldwide being responsible for high levels of hospital and community acquired infections. The impact of S. aureus infections in worsened by the rapid increasing of multidrug resistant strains, which limit the therapeutic options and increase the death toll. Despite the great burden associated with S. aureus infections, there is no vaccine available against this pathogen. S. aureus infections are initiated by asymptomatic colonization of host niches, where the bacterium produces biofilms – complex structures composed of microorganisms surrounded by extracellular matrix, providing increased resistance to antimicrobials and host defense molecules. From biofilms, the bacteria can spread to other tissues causing several diseases. The present research project proposes a new approach for selection and validation of vaccine candidates against Staphylococcus aureus, combining bioinformatic, transcriptomic and proteomic analysis of bacteria in colonizing biofilms and biofilm-dispersed, virulent phenotypes. The combination of techniques will allow us to identify molecules involved on the transition from colonizing biofilms to invasive biofilm-dispersed forms; these molecules will be produced and evaluated in immunization experiments looking for protection against invasive disease. The research goals associated with this scholarship involve the immunological analysis of the selected proteins, including but not limited to antibody detection by ELISA; analysis of antibody function by flow cytometry; adhesion to host cells and bactericidal assays; evaluation of cytokine production by CBA; generation of memory T and B cells; protection against lethal challenge. The applicant should be able to work well in group and good communication skills, have experience with immunology and microbiology. Previous experience with mouse infection models is highly desired, as well as knowledge in flow cytometry and ELISA.

Name	E-mail	Institution	Abstract
Zila van der Meer Sanchez Dutenhefner	zila.sanchez@unifesp.br	Escola Paulista de Medicina/EPM/UNIFESP	Delaying the initiation of alcohol use among adolescents is particularly effective in reducing future alcohol consumption and its associated harms. Community-based interventions have been shown to have more consistent and long-term effects in reducing adolescent alcohol use than one-off, isolated prevention programs. These interventions are typically multi-component, involving school-based programs for adolescents, family programs, and community environmental strategies, all applied in an integrated manner. A key feature of these interventions is the active involvement of stakeholders in all stages of implementation. A significant gap in public policy on adolescent alcohol use prevention is the lack of a community-based multi-component intervention that integrates existing programs like Unplugged and SFP 10-14 with effective community environmental strategies, considering proper stakeholder involvement throughout the process. The proposed research involves a hybrid implementation-effectiveness study, following the World Health Organization's implementation research cycle. The phases include identifying an appropriate intervention, adapting and piloting the intervention, implementing and evaluating it (including implementation research outcomes like reach, adoption, fidelity, and a pragmatic trial for real-life effects), and scaling up, focusing on how the findings will be translated, disseminated, and sustainably applied in the studied and similar communities. A mixed-methods approach will assess outcomes such as readiness, appropriateness, acceptability, feasibility, fidelity, adoption, reach, sustainability, and effectiveness. The study will involve two small municipalities in São Paulo State and two districts in the city of Maputo (Mozambique) as part of the GACD implementation science call. The postdoctoral researcher's role will involve comparing the development and implementation of the community based alcohol prevention in two distinct cultural and social settings: Maputo, Mozambique, and Cordeirópolis, São Paulo, Brazil. This comparative study aims to understand how the creation and implementation processes of programs like "Unplugged" and "Strengthening Families Program" adapt to and are influenced by different community contexts. By examining these interventions in diverse environments, the researcher will explore the challenges and opportunities of tailoring and applying evidence-based prevention strategies across varied settings, thereby contributing to a more nuanced understanding of effective global health strategies for reducing adolescent alcohol use.

Name	E-mail	Institution	Abstract
Ricardo Augusto Souza Fernandes	ricardo.asf@gmail.com	Centro de Ciências Exatas e de Tecnologia/CCET/UFSCAR	Locating and identifying harmonic sources are essential procedures for power distribution systems, as they improve the monitoring of power quality and support utilities' decisions regarding actions aimed at mitigating the problems arising from harmonic distortions. In this sense, this research project presents an approach that should carry out the location and identification tasks embedded in FPGA (Field Programmable Gate Array) hardware, based on three-phase voltage and current measurements simulated at the substation and points of common coupling along the radial feeder. In order to proceed with the analyses, the acquisition of 20 cycles (at steady-state) with a minimum sampling rate of 15,360 Hz (256 samples/cycle) must be considered. These signals should represent the pre- and post-connection periods of the harmonic source that most contributes to increase the total harmonic distortion measured at the substation. Next, the FPGA must be capable of carrying out the signal processing stage so that only a feature vector will be used by the location and identification algorithms (based on metaheuristics). It is worth mentioning that, in addition to proposing an FPGA embedded approach, this project innovates in the sense of using a reduced set of meters to decrease the utility's investment. Validation of the proposed approach will occur through modeling and simulation of the IEEE 34-bus test feeder, as it is characterized as long and lightly loaded. Therefore, this feeder is suitable as it allows the connection of large non-linear loads and inverter-based distributed generators.
Orlando Luis Goulart Peres	orlandop@unicamp.br	Instituto de Física Gleb Wataghin/IFGW/UNICAMP	Phenomenology of supernova neutrinos in DUNE experiment In recent years that a lot of activity in the prediction of fluxes of neutrinos from supernovae. It have incredible advances for the knowledge of these neutrino fluxes. DUNE is preparing to build the last pieces of detectors in the far side and using the contribution of ARAPUCA devices to improve the energy resolution. Our goal it will be create an expertise in neutrino phenomenology to be applied in DUNE neutrino experiment. Our requisites are 1) to have an background in particle physics 2) to have some background in computer simulation We endorse to have preference for women researcher to increase the diversity in particle physics.

Name	E-mail	Institution	Abstract
Diana Gonçalves Vidal	dvidal@usp.br	Faculdade de Educação/FE/USP	Since we started with the walk, where are we and where are we going? The study involves exchange between Mozambique and Brazil, thus responding to the viability of pillar 4 of the Thematic Project. The approach to Inclusive Education policies is an emergency, a process in which the teaching-learning procedure in the classroom context meets diversity. Both Mozambique and Brazil are member states of the United Nations, and signatories to international Conventions and Declarations that focus on quality Education for All and the possibility of creating learning environments for all people regardless of their social and physical condition. and psychological. The idea is corroborated by several authors, linked to struggles and achievements at the level of implementation of inclusion policies that require a complex exercise that ranges from curricular organization (macro), to pedagogical transformations - in the removal of possible barriers that make the system exclusionary (micro). The entire transformation depends in part on two assumptions: investment in teacher training and the strategic capacity for the production of playful and digital resources and teaching materials. It is important to emphasize that on the Mozambique side, the different actors and social movements promote a practice of inclusion, based on 'fragility'. And, the key figure to answer the challenge is the 'teacher'. Thus, we mapped out the objective of analyzing the expansion mechanisms in the production of teaching resources with a playful and digital interface. Today, in Mozambique and Brazil, the Constitution of the Republic reinforces the idea of respect. Although they are very well defined, in schools it is not always easy, due to the lack of preparation and lack of resources to support learning. The survey of research shows that in Mozambique, history cannot highlight cross-border experiences that serve the legacy of education in terms of the production of teaching resources. With the study, we intend to consolidate the results achieved and, at the same time, expand contact with teachers and invest in the playful and digital interface, equally, support the reorganization of the inclusive collection. In this way, we take as a theoretical basis the contributions of various actors who promote pedagogical and cooperative work based on inclusive models/paradigms and solutions related to good practices. Therefore, they must be guided by the proposals of the so-called Universal Learning Design – DUA. The justification of the research, theoretical and practical relevance (policy and models). Motivation is associated with professional life (experiences capitalized on other borders, which makes it possible to transition and operationalize practices). The methodological trajectory of the study will fall within qualitative research, using the 'ethno-cartographic' approach, following careful, coherent and conscious planning, creating possibilities for modification. It will be a research with an exploratory dimension that is positioned as intervention research in which researchers in contact with informants, the community as well as in their homes, the sample will be constituted by convenience and in saturation. For theoretical and documentary research, we used works and academic articles by national and international

Name	E-mail	Institution	Abstract
Eduardo Romero de Oliveira	eduardo.romero@unesp.br	Faculdade de Ciências e Letras de Assis/FCLASSIS/UNESP	This post-doctoral research investigates relationships of social vulnerability in urban voids of medium or small cities associated with processes of deindustrialization - in particular, protected and/or non-operational railway sites, derived from the process of privatization of the Brazilian railway network. The main ongoing project (Transport Production Systems) is gathering historical-territorial data on industrial use and the evolution of urban occupation around railway areas in ten cities; normative data and legislation on the areas; and social data from oral narratives of residents and observational surveys of the surrounding population. Many non-operational railway infrastructures in urban areas have not yet been systematically planned for treatment and new uses, either because of problems in transferring ownership of non-operational properties, or because of the absence of public policies for inactive infrastructures or railroad right-of-way through urban areas. The post-doctoral project should carry out the spatial treatment and analysis of social, legislative and historical-spatial data in order to identify and categorize the vulnerability conditions of the population living around these areas, with analysis based on the indicators of the Sustainable Development Goals (UN Agenda 2030) for sustainable cities and communities. In-depth analysis of vulnerability relationships can be proposed in three areas: housing, cultural heritage and inclusive public space. The analysis of the overlapping of various public policies that affect non-operational areas and heritage sites should be oriented towards the search for humanized solutions to the fate of these assets. The expected results include a) support for the modeling of a spatial database as an instrument for cross-cutting analysis of the historical, legislative and social information gathered in the current Main Project; b) systematizing a bibliographic reference on vulnerability and living conditions in urban space that allows "sustainable cities" to be qualified in humanistic terms (of dignified conditions of existence and human settlement); c) proposing and identifying possibilities for future research in the field of social sciences and urban public policy; d) collaboration in the current Main Project with the goals of data access and professional training for public policies. For the post-doctoral position, candidates should have skills and experience in developing spatial and statistical data collection tools, quantitative and qualitative data analysis, use of qualitative data analysis software, application of statistical research tools. Knowledge of cartography and experience with programming languages are considered a plus. In addition, the candidate must have a doctorate in areas related to geography, sociology, urban planning, or another related disciplines.

Name	E-mail	Institution	Abstract
Michelle Darrieux Sampaio Bertoncini	sampaiomichelle@uol.com.br	Universidade São Francisco - Campus de Bragança Paulista/USFBP/USF	RECOMBINANT PRODUCTION AND PRE-CLINIAL ANALYSIS OF FIMBRIAE SUBUNITS AS VACCINE CANDIDATES AGAINST Klebsiella pneumoniae Klebsiella pneumoniae is a Gram-negative bacterium that commonly colonizes human mucosae, from where it can spread and cause serious infections. The high morbidity and mortality rates associated with K. pneumoniae, coupled with the alarming increase in antimicrobial resistance, encourage the development of strategies to prevent these infections. In that sense, vaccines based on surface proteins are a promising approach since these antigens are usually conserved among clinical strains and accessible to the host immune system. Fimbriae are macromolecular structures exposed at the bacterial surface that play a role in adhesion and biofilm formation. K. pneumoniae expresses two types of fimbriae, I and III, that are important for its virulence. The present work aims to investigate the vaccine potential of K. pneumoniae fimbriae subunits in mouse infection models. The antigens will be produced as recombinant proteins in E. coli, purified and used to immunize mice. The immune responses will be characterized, and protection will be assessed against urinary and respiratory infections, as well as sepsis. The induced antibodies will be evaluated in functional assays to test their ability to bind to the native fimbriae on the bacterial surface, promote complement deposition and phagocytic killing. The effect of antibodies on biofilms formation and bacterial adhesion to respiratory and urinary epithelial cells will also be investigated. The candidate will be involved with molecular cloning, recombinant protein production/purification, evaluation of immune responses by ELISA, western blot and flow cytometry. Therefore, knowledge on basic molecular biology techniques, including PCR, procariotic systems of recombinant protein expression and FPLC and are required. Previous experience with in vivo infection models (mouse) and cell culture techniques are desirable, but not mandatory. The results of this study should contribute to the development of prophylactic measures against K. pneumoniae and help understand the role of fimbriae in bacterial virulence.

Name	E-mail	Institution	Abstract
Douglas Fernandes Barbin	dfbarbin@unicamp.br	Faculdade de Engenharia de Alimentos/FEA/UNICAMP	Food security has become a major concern worldwide, leading to the development of new alternative foods. Most of the developing countries are producers of agricultural products to feed the population and provide economical incomes for small and large producers, demanding new advances in food processing methods and quality control of raw food. However, there is little funding available for such countries, and food analysis is traditionally accomplished through chemical, physical and microbiological test. Some of these methods are slow, laborious and require chemicals producing residues. Considering these facts, it is necessary to advance the knowledge on alternative, low-cost techniques for quality control of raw food and in the food industry. More specifically, local products from developing countries are usually little studied. It is necessary to investigate the application of methods to replace or complement most of the drawbacks of traditional analytical methods through indirect, fast and non-destructive techniques. Near infrared (NIR) spectroscopy and other optical methods such as hyperspectral imaging, offers a number of advantages over traditional methods of quality assessment, including current portable, low-cost equipment which are easily adaptable for online systems, allowing simultaneous determination of several attribute. However, there are few studies on the subject in developing countries. This project aims to investigate the application of NIR spectroscopy and hyperspectral imaging to relevant agricultural products in developing countries, considering classification and evaluation of physical and chemical characteristics of food products, developing more sustainable, chemical free analytical methods of food products. The combination of image analysis and NIR spectroscopy in hyperspectral imaging (HSI), may address major challenges in for agricultural products: (1) determination of composition of raw material, (2) identification of food adulteration and authentication and, (3) monitoring product quality. Since there is little information regarding the application of HSI for the study of these products, the new knowledge acquired will be of great scientific value. Considering the multi and interdisciplinary approach of the current project, it is expected that the researcher will contribute either (1) on the statistical analysis/chemometrics approach and programming, thus requiring a background in statistics, computer science or chemistry; or (2) in the agricultural/food sample analysis, thus requiring a background on chemical engineering, agricultural engineering or food science. On the other hand, the researcher will gather knowledge in the complimentary subject related to the main project, and possibly keep future collaborations, thus providing expert human resource to developing country.

Name	E-mail	Institution	Abstract
Leandro Machado Colli	leandroc@fmrp.usp.br	Faculdade de Medicina de Ribeirão Preto/FMRP/USP	Identifying etiological factors is a fundamental step to understanding the factors that lead to tumor development, thus proposing strategies for dealing with these diseases. Large-scale epidemiological studies such as case-control and cohort studies are the primary tools for investigating tumor etiology. Although these studies have unquestionable success and impact, they are complex, expensive, require a large operational structure, and require a long evaluation time. Thus, studies that evaluate multiple factors simultaneously, in a shorter time, and the specific patient care setting can accelerate the understanding of oncogenesis. Identifying mutational patterns (mutational signatures) has made it possible to characterize various etiological mechanisms and correlate them in populations individually. The study hypothesizes that using genomic signatures in a large cohort of cancer patients will allow us to describe tumor etiological factors specific to the Brazilian population, which can be used to establish population-based public policies to reduce risk. 1,200 patients will be recruited from 16 different tumor types, giving preference to the most common tumor subtypes for the other tumors. Specifically, 100 samples will be from pediatric patients (
Patricia Sartorelli	patty.sart@gmail.com	Campus Diadema/CD/UNIFESP	Antimicrobial resistance (AMR) acknowledged today as a global health crisis is posing a significant challenge to the control and eradication of multiple infections. To make matters worse, there is a shortage in effective drugs and the antimicrobial drug discovery pipeline is dry. Right now, there is a race against the clock to search and develop the next generation of antimicrobials before all available drugs become ineffective. Fortunately, natural products have always served as the provider for the most potent medicines known to date. Therefore, going back to nature for answers in time of desperation seems a scientifically reasonable strategy. Sub-Saharan Africa, the region most affected by infectious diseases, has a rich biodiversity composed of thousands of medicinal plant species including Annickia chlorantha, Terminalia brownii, and Terminalia superba, three potent medicinal plants used by local populations from Cameroon to prevent and treat various infections. The present project aims to explore the genome and metabolome of endophytic microbiome of these plants to discover novel antimicrobial leads and study their mode of action. To achieve this aim and meeting the objectives of the research project to which it is associated, we are proposing a multidisciplinary and complementary approach that combines cultivation strategies (culture starvation and chemical elicitation), oriented fractionation, and metabolomics to explore the secretomes of fungi, and genome mining to reveal their full biosynthetic capability since many fungal biosynthetic gene clusters (BGCs) remains cryptic or not expressed under laboratory cultivation conditions and cannot be unearthed by metabolomics alone,. By harnessing the untapped potential of endophytic microbiome of these plants, we seek to discover novel antimicrobial leads that can be developed into effective drugs. This project will not only identify new potent chemical scaffolds and their potential drug target(s) to supply the drug discovery pipeline, but also characterize the unknown biosynthetic ability of talented isolates that could help accelerate the discovery of more new bioactive compounds to solve the AMR crisis

Name	E-mail	Institution	Abstract
Carlos Henrique Inacio Ramos	cramos@iqm.unicamp.br	Instituto de Química/IQ/UNICAMP	Our research group has dedicated over 20 years to investigating the intricate relationship between the structure and function of molecular chaperones and heat shock proteins (HSPs), generously supported by FAPESP. The significance of our work lies in understanding the multifaceted roles of chaperones/HSPs, which encompass aiding in the folding of nascent proteins, preventing aggregation, facilitating protein translocation within organelles, protein homeostasis, and even reactivating amyloidogenic proteins associated with various diseases. Over the years, our research has encompassed diverse organisms, but recently, we have focused on proteins from Aedes aegypti, a vector responsible for numerous diseases in Brazil and now spreading globally due to rising temperatures. Additionally, our research direction has evolved to explore the liquid-liquid phase separation (LLPS) properties of proteins, as emerging evidence suggests that both amyloidogenic proteins and chaperones/HSPs naturally undergo LLPS. Previous findings from our group have already identified two Aedes chaperones/HSPs capable of LLPS. We are seeking a candidate with fundamental knowledge in protein studies to aid in identifying chaperones/HSPs from Aedes that undergo LLPS. Once identified, the next steps involve establishing conditions conducive to LLPS, both in vitro and in the cell. Furthermore, we aim to investigate how post-translational modifications (PTMs) may influence the LLPS properties of these proteins. To achieve our objectives, proficiency in one or more protein analysis techniques is essential, which we master in our research group. These include molecular biology, spectroscopy, thermodynamics, hydrodynamics, microscopy, cell biology, and biochemistry. While expertise in at least one of these techniques is preferable, we are committed to training the selected candidate in others. By the culmination of this research, our aim is to construct a comprehensive LLPS phase diagram for at least one chaperone/HSP from Aedes, providing valuable insights into their functional properties. We aim to integrate these findings with others from our group to develop a comprehensive understanding of the proteostasis system specifically in Aedes. By doing so, we hope to lay the groundwork for designing therapeutic interventions to combat this terrible vector of diseases.

Name	E-mail	Institution	Abstract
Anna Catarina Morawska Vianna	morawska-vianna@ufscar.br	Centro de Educação e Ciências Humanas/CECH/UFSCAR	The aim of the Post-Doctoral research project is to undertake a comparative analysis of indebtedness in Maputo and Recife. Recent literature on the widespread impacts of indebtedness among low-income groups in Brazil have pointed to the role of the state in facilitating access to financial markets through credit to beneficiaries of cash transfer programs (Müller 2014; Lavinas 2017; Lavinas, Gentil 2018). Focusing on the particularities of the experience of indebtedness in different Latin American and African ethnographic contexts (Müller 2014; James 2014; Cavallero, Gago 2021) allows for analyses that highlight how indebtedness is grounded in particular landscapes made up of historically rooted racial and gender inequalities (Vergès 2020; Federici 2003; Davis 2000). Such approach opens up the possibility of comparing not only the impacts of indebtedness, but also modes of resilience that accompany it and that rely on a black episteme in the mobilization against objectification and exploitation that are at the basis of racial capitalism (Gonzalez 2020; Ferreira 2022; Vaz 2020). By comparing the experiences of dealing with indebtedness in post-pandemic economic landscapes (Gibson-Graham 2006; Gibson-Graham & Cameron 2013; Hossein 2018; Nembhard 2014) in Brazil and Mozambique, this project proposes an ethnographic and comparative approach to indebtedness that seeks to highlight: a) the role of the state in expanding financialization processes in Mozambique; b) aspirations that lead to practices such as investing in the formal financial market and in cryptocurrencies; c) informal practices of borrowing and informal betting in urban peripheries of two cities of the Global South. The post-doctoral recipient is expected to contribute to the FAPESP-funded research project entitled “Economic Landscapes in peripheral territories: ecologies of circulation and redistribution in Olinda (Pernambuco)” by advancing theoretical discussions on the challenges of undertaking ethnographic comparisons of indebtedness and financialization, as well as connecting the recently created network of ethnographers of debt in Brazil with other scholars in the African continent.

Name	E-mail	Institution	Abstract
Ana Candida Martins Rodrigues	acmr@ufscar.br	Centro de Ciências Exatas e de Tecnologia/CCET/UFSCAR	The project below involves glass and glass crystallization and, therefore, fits perfectly within the objectives of the CEPID/CERTEV project. The project also aims to contribute to developing solid-state batteries, especially sodium-ion batteries. For this reason, it also attends the Fapesp M-ERA-NET project (regular project) 2023/06275-3 (under contract). Joining electrode material and solid electrolyte by flash-sintering crystallization to be used in solid-state batteries Materials with a NaSICON structure (short for "Na Superionic Conductor") have shown significant promise for serving as electrolytes in the next generation of all-solid-state batteries (ASSBs) [1,2]. These solid-state electrolytes (SSEs) enable the utilization of high-voltage cathodes and metallic anodes, leading to batteries with heightened energy density [3] and enhanced safety compared to those employing currently prevalent liquid electrolytes, which are prone to flammability [4]. Despite the acknowledged advantages of ASSBs, several challenges still need to be addressed before their widespread adoption. Among these challenges, one prominent issue is the elevated interface resistance between the electrolyte and the electrodes [4,5]. This heightened resistance may arise due to various factors such as insufficient interfacial contact [6], interfacial degradation stemming from mutual diffusion [7], and mechanical deficiencies in the contacts [8], such as cracks or pore formation. These interfacial degradation processes can be categorized by their origin as either chemical or mechanical [9]. Mechanical interfacial problems can be mitigated through the implementation of improved surface joining methods. For instance, an assembly comprising an anode || electrolyte || cathode (NVP-NZSP-Csp || NZSP || NVP-NZSP-Csp, respectively) was successfully sintered at once using the Spark-Plasma Sintering (SPS) technique, resulting in an optimized interface between the battery components [10]. In this context, investigating the Flash-Joining [11] technique presents an intriguing avenue. This technique shows promise in bonding ceramics and metals by reducing micro shear and bending stresses, which prevents crack and defect formation at the interface due to differences in thermal expansion coefficients and sintering rates within multilayer systems [11–16]. Flash-joining essentially involves applying Flash-Sintering [17] to a multilayer material. Flash Sintering involves applying an electric field to heat an NTC (negative thermal coefficient) type ceramic material. At specific combinations of electric field and temperature, a flash event occurs—a moment when the electric current passing through the material abruptly increases, leading to a corresponding rise in temperature. Once the electric current reaches a predetermined value, the source transitions to current control mode, maintaining it constant. This establishes a thermal equilibrium between Joule heating and heat dissipation to the environment, known as a steady-state regime. Recently, our research group has developed the Flash Sinter Crystallization technique for concurrently sintering and crystallizing glass powder compacts, as well as Flash Crystallization for solely crystallizing monolithic glasses. Through Flash Sinter-Crystallization, we achieved a remarkable reduction in

Name	E-mail	Institution	Abstract
Ronaldo Adriano Christofoletti	christofoletti@unifesp.br	Instituto do Mar/IMAR/UNIFESP	The world is experiencing a climate and biodiversity crisis, where it is essential to build paths of transformation, highlighting the importance of joint and transformative action from all sectors of society to achieve sustainable development, as established by the 2030 Agenda and the UN's Decade of Ocean Science for Sustainable Development (2021-2030). In this proposal, a Postdoctoral Researcher will investigate the role of ocean literacy in the Global South as a tool for conflict transformation towards sustainability. The Postdoctoral Researcher will work with data from the Global South Ocean Literacy Network, led by Brazil and involving over 30 countries from the Global South (Central and South America, Africa, Asia). This project aligns with the findings of the OceansPact project (FAPESP Belmont Forum), currently ongoing, which presents study results from 6 countries on pathways for transforming small scale fishing conflicts. This proposal will expand knowledge beyond artisanal fishing and focusing on the role of ocean literacy, as a transformative science that integrates scientific, traditional, and indigenous knowledge, promoting diversity and looking for solutions to current problems through understanding our relationship with the ocean. In this proposal, we aim to understand the priorities, challenges, and potentials for ocean literacy at local, regional and Global South scales, evaluating similarities, peculiarities of each place, and how they align with global planning, identifying pathways to promote ocean literacy in a Global South view.

Name	E-mail	Institution	Abstract
Leandra Regina Gonçalves Torres	goncalves.leandra@unifesp.br	Instituto do Mar/IMAR/UNIFESP	Esse projeto tem como objetivo principal aplicar os conhecimentos e as reflexões que vem sendo construídas no Projeto “Maretórios” no território Amazônico, para avaliar as ameaças ao ecossistema e à sociobiodiversidade provocadas pelo atual modelo de desenvolvimento nas zonas costeiras do litoral de São Paulo. Especial atenção é dada às comunidades tradicionais de pesca, que enfrentam desafios semelhantes aos observados na zona costeira paraense, como a pressão do desenvolvimento urbano, turístico e industrial, ameaçando a biodiversidade marinha e costeira e os modos de vida tradicionais dependentes desses ecossistemas. Este projeto busca não apenas identificar essas ameaças e avaliar seus impactos, mas também promover um diálogo interdisciplinar e transdisciplinar entre o conhecimento científico, os saberes tradicionais locais e a gestão do território. A metodologia envolve oficinas e encontros para o diálogo de saberes, focando no reconhecimento e valorização dos maretórios locais, legislação aplicável à pesca tradicional e a visibilização das comunidades e seus desafios. Pesquisas participativas serão desenvolvidas para mapear a sociobiodiversidade das áreas estudadas, identificar conflitos socioambientais e propor alternativas de gestão costeira, com uma perspectiva decolonial. Os impactos esperados incluem a ampliação do reconhecimento dos maretórios e das práticas de pesca tradicional, a formação de profissionais capacitados para atuar em contextos similares, a contribuição para a elaboração de políticas públicas de gestão costeira integradas, e a criação de um modelo replicável de gestão das zonas costeiras, alinhado com os Objetivos de Desenvolvimento Sustentável (ODS) e a Década do Oceano. Ao focar na valorização da sociobiodiversidade e na co-criação de soluções sustentáveis, este projeto propõe uma abordagem inovadora e inclusiva para enfrentar os desafios ambientais e sociais nas zonas costeiras de São Paulo. Visa proteger os ecossistemas marinhos e garantir o bem-estar e a continuidade das práticas culturais das comunidades de pesca tradicional, contribuindo para um futuro mais justo e sustentável para as zonas costeiras do Brasil.

Name	E-mail	Institution	Abstract
Ana Melva Champi Farfán	ana.champi@ufabc.edu.br	Centro de Ciências Naturais e Humanas/CCNH/UFABC	Advanced nanomaterials are known to be smart materials, that is, they can be manipulated externally or functionalized with each other, modifying their physicochemical properties. A very interesting fact that also occurs is its easy functionalization with biological systems for biomedical applications, specifically in the biomonitoring of viral diseases through the development of biosensors from these materials. Among the advanced nanomaterials to be used in this project are those derived from graphene, TiO2 nanotubes, carbon dots and metallic nanoparticles. In particular, the supervisor has development a electrochemical biosensors based on graphene and derived materials such as graphene oxides (GO) and reduced graphene oxides (RGO). These nanomaterials, being biocompatible, have excellent reception with organic molecules such as DNA, enzymes and viral antibodies, due to the π-π bonds, hydrogen bonds, Van der Walls type bonds, electrostatics, among others, which allows us to measure the electrochemical current when interacts with viruses or viral RNA. In this context, The pos doctoral candidate will synthese: TiO2 nanotubes, carbon dots and/or metallic and/or magnetic nanoparticles with Graphene derivatives to study the physical, chemical and biological effects on the electrodes of works developed with these nanomaterials, when exposed to biological systems such as viruses and/or bacteria, for which it would be of great value to be able to count on the resources of this Research Foundation.
Arlene Gonçalves Corrêa	agcorrea@ufscar.br	Centro de Ciências Exatas e de Tecnologia/CCET/UFSCAR	The γ-lactam is a conspicuous scaffold in medicinal chemistry and, due to its important properties, the synthesis of this ring has attracted the attention of the scientific community. In this sense, we have recently reported a simple one-pot diastereoselective synthesis of novel γ-lactams from ketoaziridines, via the Horner-Wadsworth-Emmons reaction. In this project, a new and efficient one-pot protocol for the synthesis of highly substituted γ-lactams, such as 2-oxopyrrolidine-3-carbonitrile derivatives, is proposed via Ugi multicomponent reaction followed by intramolecular Michael addition. The multicomponent reactions are consecrated as an outstanding instrument in the organic and medicinal chemistry, emerging as multifaceted approach which provides quick access to complex/bioactive molecular structures in a single vessel with minimal synthetic effort and waste generation, therefore perfectly aligned with the principles of Green Chemistry. The asymmetric version of the method will be evaluated using chiral organocatalysts, such as cinchona alkaloid derivatives. The 2-oxopyrrolidine-3-carbonitriles are versatile synthons in organic chemistry since the nitrile can be easily converted into other functionalities such as carboxylic acids, amines, and aldimines, for instance. Thus, it is also proposed in this project to employ these derivatives in subsequent MCRs to achieved highly diverse structural compounds.

Name	E-mail	Institution	Abstract
Ivo Freitas Teixeira	ivofreitasteixeira@gmail.com	Centro de Ciências Exatas e de Tecnologia/CCET/UFSCAR	Photocatalysis is a promising alternative to selectively convert methane into high-valuable chemicals, e.g. methanol, under mild conditions. As recently demonstrated by our group1 highly dispersed copper sites stabilized in poly (heptazine imide) structure (PHI) can selectively convert methane into oxygenated liquid products, especially methanol. Our Cu-PHI sample displayed a remarkable methanol production of 2900 μmol g−1 in 4 hours, under photocatalytic conditions. This result is a record in the field under mild conditions (r.t. and 1 bar of CH4). Despite the important progress obtained by our group in the last years, the impressive activity presented by the Cu-PHI photocatalyst remains poorly explained. Herein, we aim to complement the project JP (2020/14741) by focusing on the mechanism investigations, aligning advanced characterization techniques (e.g. STEM-HAADF and XAS) with in situ techniques (e.g. CO-DRIFT-FTIR and UV-Vis). First, we intend to determine which copper sites are responsible for the selective methane photooxidation. Our catalytic data indicate that clusters might display greater activity compared to single-atoms. Once the active copper sites are verified, we plan to investigate their mechanism of action, in order to understand how they drive the methane photooxidation in a selective manner. Last, the pieces of information gathered in characterization and mechanism investigation will be used to retro-designing the Cu-PHI photocatalysts, seeking to improve even further their performance in this paramount reaction.
Camilo Andrea Angelucci	camilo.angelucci@ufabc.edu.br	Centro de Ciências Naturais e Humanas/CCNH/UFABC	The present project aims to develop a new electrocatalytic methodology for the oxidation of glycerol and similar polyols in products with higher added value. The proposed electrochemical system consists of using molecules with high power of homogeneous catalysis that are regenerated on the electrode surface forming the indirect electrocatalysis cycle. These molecules, known as mediators, can overcome some of the main problems that prevent the application of the electrochemical transformation of glycerol on an industrial scale, such as the cost of metallic electrocatalysts, low control of the selectivity of the products formed and high energy expenditure required for these reactions. The development of the project is designed to occur in two main areas: (i) Fundamental Electrosynthesis: Finding the optimal conditions for the indirect electrocatalysis of glycerol and other similar alcohols, identifying the products via analytical techniques. (ii) Spectroelectrochemistry: with optimized electrochemical parameters, evaluate by spectroscopic (Raman and UV-vis) and computational techniques the possible mechanisms of this reaction.

Name	E-mail	Institution	Abstract
Laura Moutinho	lmoutinho@usp.br	Faculdade de Filosofia, Letras e Ciências Humanas/FFLCH/USP	In periods of great social instability, arts and culture played a fundamental role in contesting and solving social conflicts (violence and wars). In Mozambique, during the national liberation struggle (1964 - 1974) and during the post-civil war (1977 - 1992) period, artistic-cultural creations - represented by painting, sculpture, literature, dance and music - were instruments of colonial resistance, of questioning and contesting the armed violence in the country. In this context, the present research, linked to the thematic project “From the heart of wars to poetics of plasticity: creation and engagement in artistic thought in African contexts from the 1980s to our days”. It aims to analyse the developments and agencies of arts and culture in times of terrorism in the Cabo Delgado province, northern Mozambique. The project will also bring contributions to the thematic project by providing ethnographies and analyses of ongoing artistic-cultural experiments in affected areas and settlements of displaced people by terrorist violence. It will also encourage debates about the arts, the transformation of subjectivity and its poetics of relationship with activism and human rights in places with situations of violence and threats to human life.
Felipe Fernandes Fanchini	felipe.fanchini@unesp.br	Faculdade de Ciências de Bauru/FC/UNESP	This research project aims to investigate the potential and applications of quantum algorithms in optimization and machine learning, focusing on open quantum systems and the integration with classical machine learning techniques to enhance the performance of these algorithms. Additionally, the project also seeks to study simple quantum machine learning problems considering open quantum systems. The research will explore specific case studies to demonstrate the advantages and challenges associated with this hybrid approach. Firstly, the project will analyze various algorithms, especially QAOA and VQE, examining their properties and limitations. Then, in addition to including improvement strategies, the research will investigate the combination of classical machine learning techniques, such as Support Vector Machines and neural networks, with quantum algorithms, in order to improve the efficiency and accuracy of the quantum methods. Finally, the project will explore a series of case studies that illustrate the practical application of variational algorithms and hybrid techniques, especially in the areas of logistics and finance. These case studies will allow for the evaluation of the effectiveness of the proposed approaches, mainly in open quantum systems, and identify possible challenges and opportunities for future research.

Name	E-mail	Institution	Abstract
Márcia Regina Cominetti	mcominetti@ufscar.br	Centro de Ciências Biológicas e da Saúde/CCBS/UFSCAR	Population aging in Brazil is accompanied by an alarming increase in cases of dementia, primarily related to Alzheimer's disease (AD), which is the leading cause of dementia in older adults. The current demographic trend points to a challenging scenario, with projections indicating a possible quadrupling in the number of older adults diagnosed with dementia by 2050. Early detection of AD is crucial, considering that late diagnoses reduce the effectiveness of available treatments. Metabolomics has emerged as a valuable tool for identifying non-invasive peripheral biomarkers, such as lipids and amino acids, that may indicate the early stages of the disease. However, most metabolomics studies focus on high-income countries, limiting global representation and understanding of metabolic variations. Thus, this project aims to conduct metabolomic studies to identify and quantify metabolic changes associated with AD, emphasizing lipid and amino acid metabolism imbalances, not only considering the influence of the ApoE4 genotype. It is well known that variations in the aging process, genetics, lifestyle, intestinal microbiome, and several other factors, such as socioeconomic determinants such as education since these factors play an essential role in health and food choices affect the profiles of human metabolomics. However, in the overwhelming majority of metabolomics studies, a significant concentration of research participants from high-income countries such as countries in Asia, Europe, and America is observed, limiting the representativeness and comprehensive understanding of metabolic variations on a global scale. Individuals aged 60 or over will be recruited, users of the Medical Clinic Outpatient Clinic of the UFSCar University Hospital, divided into four groups: older adults with mild AD, older adults with moderate AD, older adults with severe AD, and cognitively healthy participants. After blood collection, the serum will be stored at -80°C for subsequent metabolome analysis. Using a non-targeted approach, this analysis will be performed using advanced techniques, including liquid chromatography-coupled mass spectrometry (LC-MS) and nuclear magnetic resonance (NMR). State-of-the-art 14.1 T (600 MHz for 1H frequency) NMR equipment will be used, the only one in South America. This device incorporates the new BI-LISA method (Bruker IVDr LIpoprotein Subclass Analysis) from Bruker BioSpin, Rheinstetten. BI-LISA was specially developed for Bruker's AV4600IVDRS (In-Vitro Diagnostics Research) based on 600 MHz for hydrogen. This method includes advanced hardware, specialized software, automation, spectral libraries, and Standard Operating Procedures (SOPs; Bruker IVDr Methods) to ensure accurate and reliable analyses.
Gabriel Luiz Cruz de Souza	gabriellcs@ufscar.br	Centro de Ciências da Natureza/CCN/UFSCAR	The main target of the project is the investigation of ionization processes for a series of small molecular aggregates. These features are important to the elucidation of photoinduced mechanisms that are relevant to several biological issues. Electronic structure computations based on high level of theory will be used for accurately determining all the structural and energetic properties of the systems. In this sense, the post-doc scholar is expected to learn how to use the computational tools and, thus, contribute in applying composite approaches in combination with electronic structure calculations at coupled-cluster level of theory, large basis sets with correlation consistent, extrapolation to the complete basis set limit, and consideration of core-valence correlation effects.

Name	E-mail	Institution	Abstract
Lauro Tatsuo Kubota	kubota@unicamp.br	Instituto de Química/IQ/UNICAMP	This study focuses on developing integrated miniaturized electrochemical aptasensors for quantifying marine toxins at trace levels. These toxins are ubiquitous, commonly found in water and seafood, potentially threatening human health and ecosystem safety. The proposed devices will consist of miniaturized electrochemical (bio) sensors, emphasizing building prototypes with reliable operation and high robustness for large-scale fabrication and in-field application. Porous gold nanostructures will be synthesized to modify the electrode surface to achieve high sensitivity toward the desired analytes (in our case, marine toxins). Nanoporous gold (NPG) nanostructures will be synthesized via a simple procedure that involves acidic treatment of a commercially available complex white gold alloy. The surface morphology, size, and shape of the mesopores and the surface roughness of the prepared porous gold samples will be characterized using SEM and AFM. Taking advantage of their high surface area, high electrocatalytic activity, tunable pore morphology, and easy functionalization ability, porous gold nanostructures can be employed to modify the electrode surface and fabricate electrochemical sensors for detecting marine toxins with high sensitivity. The specificity and selectivity of electrochemical biosensors for targeting marine toxins can be achieved by combining nanoporous gold (NPG) with thiolated aptamers. Then, different relevant strategies will be investigated to integrate the developed NPG-based aptasensing probes into microfluidic systems to enable marine toxin detection in more complex samples with high analytical frequency. The main subjects are i. Developing miniaturized sensors for obtaining in situ and real-time concentrations of marine toxins in water and seafood; ii. An electrochemical aptasensor based on nanoporous gold is coupled into paper substrates and with microfluidic structures. In this context, this study aimed to develop an electrochemical aptasensing platform composed of gold nanopores coated with specific thiolated aptamers to detect marine toxins in seafood and water samples. This project will contribute to INCTBio in developing analytical tools based on aptamers using nanoporous material. This new procedure to prepare aptasensor can allow obtaining biosensors with higher sensitivity.

Name	E-mail	Institution	Abstract
Erick de Moraes Franklin	franklin@fem.unicamp.br	Faculdade de Engenharia Mecânica/FEM/UNICAMP	Title: Dynamics of barchan dunes: upscaling from the laboratory to Earth's and Mars' dunes Abstract: Barchans are dune of crescent shape that can be found on Earth, Mars and other celestial bodies, usually forming large dune fields in which barchans interact with each other. These bedforms are the result of the interaction between a sandy surface and a fluid flow, and, since they are ubiquitous in nature, understanding their behavior represents important hints on the composition and motion of atmospheres of other planets and of the expansion of Earth's deserts, for example. Although their morphology and dynamics present similarities, the scales involved are very different: tens of centimeters and minutes under water, hundreds of meters and years on terrestrial deserts, and one kilometer and millenniums on Mars. Therefore, we usually take advantage of the much faster scales under water to carry out experiments in water tunnels and numerical simulations using water as the fluid. In this Post-doctoral project, we propose to carry out experiments in a water channel in which barchan dunes will interact with each other while high-speed and high-definition cameras will measure their dynamics in both the bedform and grain scales. At the same time, CFD-DEM (computational fluid dynamics – descrete element method) will be carried out for obtained data that cannot be measured in experiments (such as the resultant force acting on each individual grains). The specific problem to be studied here is the migration of dune fields over terrains containing craters and other large obstactles, such as happens on the surface of Mars, and also in some regions on Earth where dunes are encroaching buildings and hindering human activities. Our group in the School of Mechanical Engineering of UNICAMP has successfully employed these techniques over the last years, with publications in important journal (Phys. Rev. Lett., Phys. Rev. E, Geophys. Res. Lett., etc.) and reportages in the general media (Tv Brasil, Revista Pesquisa FAPESP, Physics Today, Cosmos Magazine, etc.), so that the project is feasible and can be completed in two years. The project is directly linked to the Auxílio Jovem Pesquisador n. 2018/14981-7, whose title is "Modeling of dense granular flows: experiments, numerical simulations and stability analyses", and will complement the experiments that we have done until now. In particular, because project n. 2018/14981-7 has no longer available post-doctoral positions while still needing experiments, simulations, and in-depth analyses, the proposed post-doctoral project will be of great importance for us. As a result, we expect to obtain important relations for the motion of dunes and their interactions with the terrain, helping to understand how they take over buildings and other structures on Earth and Mars. This represents, thus, a significant contribution to the exploration of Mars and for understanding the expansion of deserts on Earth (which is becoming a huge problem with global warming), areas in which the research in the State of Sao Paulo could become a major player in the next few years.

Name	E-mail	Institution	Abstract
Marcella Pecora Milazzotto	mazamila@hotmail.com	Centro de Ciências Naturais e Humanas/CCNH/UFABC	The effects of succinate reach far beyond its conventional role in mitochondrial ATP production. It plays diverse roles in cellular processes, including influencing protein post-translational modification, regulating the epigenetic landscape, and acting as a paracrine signal to neighboring cells. Initially generated as a metabolite within the mitochondrial TCA cycle, succinate and its activated form, succinyl-CoA, exert regulatory effects across various cellular compartments. In the cytosol, succinate can impede the activity of α-ketoglutarate-dependent dioxygenases (2OGX) enzymes, such as PHD enzymes, thereby modulating the stability of hypoxia-inducible factor alpha (HIFα) subunits and their activity on hypoxia-response elements (HRE). In the nucleus, succinate inhibits histone demethylases (HDMs) and DNA demethylases of the Ten-eleven translocation (TET) family, influencing histone or DNA methylation levels, respectively. Moreover, in the extracellular milieu, succinate can activate its receptor SUCNR1, which regulates glucose metabolism, glucose levels, cell proliferation, and motility. Notably, increased SUCNR1 levels in the placenta are closely linked to gestational diabetes. Given succinate's pivotal role in early development and healthy pregnancy establishment, this project aims to examine the methylome and transcriptome of bovine blastocysts cultured in media supplemented with succinate. By deciphering the impact of succinate supplementation on early embryo molecular regulation, the subsequent phase involves co-culturing embryos with oviduct spheroids to explore the influence of embryo-maternal communication on succinate signaling.
Marcelo Bussotti Reyes	marcelo.reyes@ufabc.edu.br	Centro de Matemática, Computação e Cognição/CMCC/UFABC	Dilemmas about staying with an action or changing to another permeate human life. However, the processes that govern how and how much we change our actions are far from understood. An experimental paradigm used with animals has given interesting clues: Midsession reversal learning. In this paradigm, the animal chooses between two distinct stimuli, S1 and S2. The choice of S1 is rewarded in the first moment of the session (in the first half, for example) and the choice of S2 is rewarded during the remainder of the session. That is, in the middle of the session, the positive and negative stimuli are reversed. Previous studies show that pigeons adopt a suboptimal strategy, initially preferring S1 but, as the inversion moment approaches, they start to choose S2 more and more, committing anticipation errors. After the inversion, they continue to choose S1 a few times, making perseveration errors, which decrease at the end of the session. Other studies show that rats adapt to the inversion task differently depending on the context in which the task takes place. In one context, in operant conditioning boxes, they learn to choose almost optimally, preferring S1 until this option is no longer rewarded, and then starting to prefer S2. In another context, rats learn suboptimally, similarly to pigeons. There is evidence that in this second context, the rats base their successive choices on the time elapsed since the beginning of the session. The project aims to study why this difference in learning strategy occurs. More concretely, if, by changing the choice procedure, we can determine the strategy that the mouse follows. The results of the proposed studies and the comparison of these results with those obtained with other species, including human beings, will allow us to better understand the basic processes of learning in general and the cognitive flexibility of animals.

Name	E-mail	Institution	Abstract
Fernando Carlos Giacomelli	fernandogiacomelli@gmail.com	Centro de Ciências Naturais e Humanas/CCNH/UFABC	Gold nanoparticles (AuNPs) has emerged as a promising biotechnological tool for the transport and release of drugs and biomolecules for a myriad of biomedical applications. In this framework, nanoparticles in contact with biological fluids are rapidly coated by a protein layer forming the so-called protein corona. The chemical nature and composition of the biological identity is dependent on the surface and structural characteristics of the colloidal material (size, surface charge, shape, chemical nature of the stabilizing shell). The detailed understanding of nanoparticle-protein interactions and the biological consequences of biomolecular coronas is of due relevance towards the designing of nanomaterials with enhanced therapeutic effects. Respectively, this proposal is focused on the identification and quantification of biomolecular coronas developed at the surface of AuNPs stabilized by a variety of chemically-modified polyethyleneimines (PEI). The alkyl and-or sugar modification of PEI is expected to induced the formation of protein coronas of different chemical nature and composition that will lead to different biological consequences amongst those investigated (cellular uptake, intracellular trafficking, cytotoxicity and hemolytic activity). The proposed investigations are directly linked to one of the subtopics of interest within the scope of the current thematic project 2021/12071-6.
Guilherme Menegon Arantes	garantes@iq.usp.br	Instituto de Química/IQ/USP	The electron transport chain in mitochondria and bacteria is a fundamental bioenergetic process. This project aims to uncover catalytic and inhibitory mechanisms of the first three respiratory complexes within this chain. We aim to understand the proton-electron coupled transfer (PCET) reactions of the substrate ubiquinol (or coenzyme-Q) and its competitive inhibition by small-molecules in respiratory complexes I (or NADH-oxidoreductase), complex II (or succinate dehydrogenase), and complex III (or cytochrome bc1). These mechanisms are of significant interest in basic research in molecular biophysics and have practical implications in biomedicine and agrochemistry. Our research group in Brazil pioneers the use of computational techniques to study these processes. Thus, we are looking for candidates experienced in electronic structure methods (such as DFT or QM/MM) or in molecular simulation (e.g., molecular dynamics with force-fields) to contribute to this ongoing research.
Dalva Maria da Silva Matos	dmatos@ufscar.br	Centro de Ciências Biológicas e da Saúde/CCBS/UFSCAR	Invasive species can alter ecosystems through changes in the physical environment and community ecological processes. In Brazil, the concern with the subject is recent and the decisions related to the control of invasive species are taken without necessary knowledge. The main objetive of this project is to evaluate how invasive and over-dominant species, occuring at the Estação Ecológica Juréia-Itatins affect the ecosystem services provided to the local residents. For this, we will map the locations of occurrence of these species, assess the diversity of macroinvertebrates for communities and not invaded areas and survey the ecosystem services provided as local. Based on From the results we will develop models that can help predict how an invasive species can influence the diversity and ecosystem services, including epidemiology and public health, support policy management and control of invasive species through the development of protocols for the diagnosis of an invasion the susceptibility of the environment and the direct and indirect impacts.

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Wagner Alves Carvalho	wagner.carvalho@ufabc.edu.br	Centro de Ciências Naturais e Humanas/CCNH/UFABC	This project is part of a strategic area at the national and global levels, focusing on advancing scientific and technological knowledge while emphasizing the development of skilled personnel and addressing environmental, social, and economic sustainability. Aligned with Sustainable Development Goals (SDGs), notably Goal 2 (Zero Hunger and Sustainable Agriculture) and Goal 6 (Clean Water and Sanitation), the current project funded by FAPESP aims to establish optimal conditions for removing phosphorus and nitrogen nutrients from sewage treatment plant effluents. Nitrogen, central to this postdoctoral proposal, poses a significant challenge, with nitrate being the most prevalent contaminant in aquifers globally, serving as an indicator of groundwater contamination. The discharge of raw or partially treated sewage, where organic matter is removed but not nutrients, leads to the eutrophication of water resources, further emphasizing the critical need for effective nitrogen removal methods. Our efforts have focused on developing active and selective nitrate adsorbents from a variety of low-cost raw materials, mainly modified carbonaceous materials, with the insertion of functional groups being highly dependent on the methods employed and the surface structure. The limited efficiency of nitrate removal by non-functionalized carbons likely stems from electrostatic repulsion between the negatively charged biochar surface and the nitrate anion. The presence of active sites, if available, should facilitate favorable and selective interactions with nitrate. Modification methods primarily involve inserting or modifying surface functional groups through amination processes, as well as incorporating metal oxides into the biochar matrix (e.g., MgO, Fe2O3, and AlOOH). This postdoctoral proposal aims to explore the feasibility of converting carbons derived from abundant and low-cost biomass sources into active and selective nitrate adsorbents from aqueous media. For instance, while commercial coconut shell carbons have been used in water and sewage treatment to remove organic compounds (particularly those imparting color to effluents), they do not possess nitrate removal capabilities. This study seeks to expand the applications of biochar, enhancing its utility in water and sewage treatment and potentially as a nutrient source, particularly for nitrogen.
Jacqueline Sinhoretto	jacsinhoretto@gmail.com	Centro de Educação e Ciências Humanas/CECH/UFSCAR	Mapping the tug-of-war between authoritarians and defenders of democracy in the legal and police fields, their forms of professional and associative organization, professional discourses and practices, the international circulation of knowledge, are the objectives of the thematic project in which we are inserted. Mapping the composition of far-right networks in Mozambique in the police and judicial segments, as well as the organization of democratic resistance within the professions is the objective of the postdoc fellowship. With regard to the international circulation of knowledge about security, justice and punishment, it is intended to observe the flows and dynamics between Mozambique, Brazil and Portugal, to understand how the entry of the extreme right in the African country has been nourished by international connections, as well as cooperations for the strengthening of democracy and human rights.

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Nathan Jacob Berkovits	nathan.berkovits@gmail.com	Instituto de Física Teórica/IFT/UNESP	Influenced by a pharmacokinetic/pharmacodynamic approach based on physiology [1-3], this project will address a mathematical model whose structure starts from a micro electrodynamic system model and the laws of physics to model a mechanized hormonal secretion that can be used as a substitute in the regulation of a faulty hormonal system or in the administration of maintenance Anti-Retroviral hormones. This opens the possibility of using this model to develop controllers in the regulation and monitoring of patients in a phase of chronic hormonal dysfunction. This proposed MEMS model will essentially consist of an exciter part in this case an electric resonator, and an actuator all coupled to a nano fluid (Fluid with nano particles) ejection system. We can thus envisage that the coupling of electromechanical resonators constitutes a particularly promising route for the production of extremely integrated, low-cost and low-consumption transducers, actuator sensors or regulators. In this regard, interacting with Prof. Hilda A. Cerdeira whose work on different aspects of the dynamics of Josephson junctions is extremely encouraging for the development of the project. Her experience, not only on Josephson Junctions but also in many practical aspects of nonlinear dynamics and chaos, will allow us to fulfill our ambition of extending this pioneering work [4-14] , by developing and if possible, experimentally validating a theoretical framework conducive to the design of sensors based on coupled resonators, in synchronized, quasi-periodic or chaotic regimes thanks to the previous published research on MEMS, nonlinear dynamics, AND chaos IN the Josephson junction [15-17]. Prof. Hilda A. Cerdeira is a retired researcher from ICTP in Trieste and an Associated Researcher of ICTP-SAIFR/IFT-UNESP. She organizes every year an international school on topics in nonlinear systems, and was winner of the Spirit of Abdus Salam Award in 2021 and the Latin American Complex Networks Award (LANET) in 2023. The specific objectives of this project are as follows: • Develop mathematical, numerical and, if possible, experimental modeling of MEMS/NEMS that can serve as a nanofluid micropump and can be useful in the regulation and maintenance of hormonal regulation systems or in ultrafine ejection systems using regimes of frequency combs (quasi-periodic oscillations) obtained by cou pling of appropriate electrical and mechanical resonators. Propose metrics characterizing the sensitivity of the oscillation state to the parameters of the resonators. • Carry out a study of the different clinical anomalies in which these models could be used and find the modes of operation, the characteristics and the conditions of adequacy which could allow possible use of the proposed models. • Based on these models and experiments, we intend to propose a concrete application of these operating regimes for a sensor, actuator, and regulator type application in each case. The candidate's research project fits into ICTP-SAIFR's interest in promoting advances in the area of physics of nonlinear systems with technological applications. Specifically, the project aims to study concrete applications: mathematical modeling of a mechanized hormone secretion substitute, in the case of a system that does not work well. [1]

Name	E-mail	Institution	Abstract
Lucia Helena Mascaro Sales	lmascaro@ufscar.br	Centro de Ciências Exatas e de Tecnologia/CCET/UFSCAR	Green hydrogen (H2V) also known as low-carbon hydrogen, is obtained from water electrolysis, provided that the energy source employed is renewable (solar, wind, hydroelectric). While this system is commercially recognized, numerous technical hurdles remain concerning the longevity and stability of systems, as well as the efficiency of catalysts. These challenges underscore the importance of continued research in this field, particularly given the imminent surge in demand for H2V, with Brazil seen as a country that could play a leading role in its production. Our research group has achieved excellent results in the developing catalysts based on phosphides and sulfides. These catalysts offer more efficient processes, utilizing cost-effective, stable, and environmentally friendly materials, enhancing the economic viability of H2V production (https://agencia.fapesp.br/cientificos-brasilenos-obtienen-un-material-que-puede-ser-util-para-la-produccion-de-hidrogeno/51080; https://agencia.fapesp.br /cientistas-obtem-material-que-pode-ser-util-para-a-producao-de-hidrogenio/50804; https://revistapesquisa.fapesp.br/ brazil-prepares-to-start-production-of-green-hydrogen/). AWE-type alkaline electrolyzers are notable for their use of liquid electrolytes based on alkaline hydroxides and the are the focus of this projetc, which allows the utilization of non-noble metal catalysts and simplicity in construction. However, despite being a relatively mature technology, AWE finds challenges in porous separators and catalysts some bootlenecks associated associated with the formation of H2 and O2, leading to alterations in electrolyte concentration, reduced energy efficiency, shortened electrolyzer lifespan and, consequentely, reduce overall performance. For green hydrogen to become economically feasible, its cost must decrease substantially to match the cost of grey hydrogen. Within this context, this proposal aims to evaluate the hydrogen production process in alkaline electrolysis, under scalable conditions,and electrolyzer prototypes using catalysts based on nickel phosphides and molybdenum sulfides previously investigated by our group. The main project in which the scholarship project “Generation and Storage of New Energy: bringing technological development to the country” is included is financed by FAPESP/SHELL, with H2V generation as one of the main subprojects The scholarship holder would greatly contribute in advancing the development and application of these innovative catalysts, helping to disseminate our research and accelerate the development of the project with the addition and training of specialized human resources.

Name	E-mail	Institution	Abstract
Felix Guillermo Gonzalez Hernandez	felixggh@if.usp.br	Instituto de Física/IF/USP	Terahertz Time-Domain Spectroscopy (THz-TDS) is a valuable tool for material studies. One advantage of THz-TDS over traditional far-infrared spectroscopy, based on Fourier transform spectrometers, is its ability to simultaneously measure the amplitude and phase of the THz electric field (transmitted or reflected). In the related thematic project, we apply THz-TDS under high magnetic fields and at low temperatures to determine the complex optical conductivity and refractive index in quantum materials. That is, materials that show strong correlations and interactions between the various degrees of freedom (charge, spin, orbital and dynamics of the crystalline lattice) and that lead to exotic phenomena and new phase transitions. Now, in this particular postdoctoral fellowship, the candidate will focus on the study of modes of terahertz lattice motion in thin films. These phonons, collective excitations of a crystalline lattice, determine many of the physical properties of solids, including electrical, thermal, and optical. By exciting or controlling particular phonon modes, one can modify material properties or even induce quantum effects such as superconductivity. The candidate will receive technical training in several experimental tools such as: lasers for optical spectroscopy, techniques of spectroscopy with temporal resolution, low-temperature equipment, vacuum equipment, high magnetic field techniques, materials handling, device fabrication, electronics, and scientific programming. For this opening, previous experience in condensed matter physics at PhD level is expected.

Name	E-mail	Institution	Abstract
Mayra Elena Ortiz D' Avila Assumpcao	meoaa@usp.br	Faculdade de Medicina Veterinária e Zootecnia/FMVZ/USP	The in vitro production of bovine embryos (PIVE) is an important tool in animal reproduction, with academic and commercial applications and with great economic relevance. Despite its applicability, the efficiency of PIVE is considered limited when compared to the in vivo process. The effect of sperm on embryonic development has already been described, but it is still unclear whether it is the sperm attributes, the individual, or the communication of this cell with the environment, that directly impacts the rate of blastocysts produced in vitro. The objective of this project is to develop a technology to separate the same sperm subpopulation that arrives at the oviduct isthmus, as well as to characterize the authors of oviduct and sperm communication metabolically and molecularly. The hypothesis is that in contact with the maternal environment, the morphological and physiological events that occur in the sperm cell will promote fertilization, increasing the efficiency of the technique. Description of Objectives The main objective of this project is to characterize the environment and cells involved in the conversation between the oviduct and the sperm. The specific objectives are: i. Characterize in vivo the sperm subpopulation that reaches the oviduct and reproduce this subpopulation in vitro. ii. Characterize the morphological and molecular parameters of high and low fertility spermatozoa in vitro cultured in the presence or absence of EMEFOs, aiming to highlight fertility markers Work plan and Methodology All the sperm will be characterized by imaged-based flow cytometry, evaluating the morphology and functionality of the cell. Kinetics by CASA. Spermatozoa – analysis of sperm attributes by flow cytometry (plasma and acrosomal membrane integrity), mitochondrial membrane potential, chromatin susceptibility, oxidative status), zinc signatures, measurement of NO in the medium and sperm capacitation, immunofluorescence EMEFOs - The cells will be analyzed for morphology (scanning electron microscopy and immunofluorescence as per subproject 1, mitochondrial metabolism and assessment of epigenetic modifications (DNA methylation, histone post-translational modifications) by immunofluorescence, carried out in conjunction with cellular specification markers. Culture medium - the culture medium will be collected and evaluated for total metabolite content, proteomic analysis and characterization of extracellular vesicles. Justification for the plan In this study, the main objective is to characterize the environment and cells involved in the oviduct/sperm conversation during the fertilization stage. The proposed project has well-defined objectives and the potential to generate scientific articles and patents. As this is a complex problem, which involves integrated analyses of models and pathways, including the proposition of in vivo experiments, a post-doctoral researcher must be involved in its implementation. Have studied Biological Sciences, Biotechnology, Biomedicine, or related areas of Veterinary Medicine. Know good laboratory practices, fluent English, bioinformatics, in vitro embryo production techniques, and/or cell cultivation and/or molecular biology. Knowledge of bioinformatics.

Name	E-mail	Institution	Abstract
Luciana Correia de Almeida Regitano	luciana.regitano@embrapa.br	Centro de Ciências Biológicas e da Saúde/CCBS/UFSCAR	Microbiome research is gaining attention in livestock species, as it assists in understanding diseases and important metabolic processes within animals. The fecal microbiome is emerging as an essential component of gut microbiota and host metabolism, and in cattle, fecal microbiome characterization is still foundational. Performance traits and feed efficiency are livestock traits with economic and environmental impacts, and there is increasing evidence that the gut microbiota plays a vital role in its regulation. Therefore, the modulation of an animal's microbiota composition can promote more sustainable efficient livestock production. In an ongoing project, we produced innovative results from metabarcoding, metagenome, metatranscriptome, host mRNA and miRNA data in a Nelore (Bos indicus) reference population. These results highlighted the significant role of diet in shaping the Nelore microbiome composition and gene expression (metatranscriptome). In the current proposal, we want to expand the data analysis to another Nelore population to further integrate the different levels of genomic and phenotypic information. We propose to investigate the metabarcoding, metagenomics, metatranscriptomics and metabolomics from feces of Nelore cattle population belonging to the National Young Bulls Evaluation Program (PNAT) of the Brazilian Association of Zebu Breeders (ABCZ). DNA and RNA sequencing, as well as metabolites profile of fecal samples from Nelore cattle will be performed, followed by the integrative analysis of these different meta omics data using the most up-to-date software available. The integration of the meta-omic data will allow us to answer crucial questions about the interrelation of functional diversity of the microbiota and the host. Furthermore, it may be possible to identify cross talk between the fecal microbiota and the host, which could be potentially used to regulate production traits. Therefore, this project aims to investigate at which extent the microbiome can regulate and influence sustainability traits and thereby impact bovine production.

Name	E-mail	Institution	Abstract
Rossana Pulcineli Vieira Francisco	rossana.francisco@hc.fm.usp.br	Faculdade de Medicina/FM/USP	As part of the Research Project "RESTRUCTURING AND REDESIGN OF THE MATERNAL AND PERINATAL CARE NETWORK IN THE STATE OF SÃO PAULO TO REDUCE MATERNAL, FETAL, AND NEONATAL MORTALITY RATIO (ReMaP)" – FAPESP/PPPP Process nº 2023/10075-0 – Principal Investigator: Prof. Dr. Rossana Pulcineli Vieira Francisco, we submit a sub-project named "Training of specialized human resources in maintenance, analysis, and interpretation of maternal and child health data and data panels for action in government health agencies and for the production of scientific knowledge in this area." High values of maternal mortality ratio (MMR) and infant mortality are indicators of precarious socioeconomic conditions, low education, and difficulty accessing quality health services, constituting important goals for achieving sustainable development among countries. In 2015, the agenda of the Sustainable Development Goals (SDGs) of the United Nations was consolidated. This agenda has in its Goal 3 "ensure healthy lives and promote well-being for all at all ages." To adapt the global indicators of the 2030 Agenda to the reality of each country, especially those that are underdeveloped or developing, the UN proposed global targets, by 2030, as follows: (3.1) to reduce the global maternal mortality ratio to less than 70 per 100,000 live births, and; (3.2) to end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births. Achieving these goals requires political, scientific, and strategic efforts. One of the strategies is to provide access to public data in a structured and responsible manner so that society has access to information, public officials can make evidence-based decisions, and discussions on public policies are based on reliable data, a necessity that becomes evident in Obstetrics due to the difficulty we have faced in reducing mortality in this population. Thus, the main objective of this sub-project is the training of specialized human resources in the field of data science, epidemiology, and maternal and child health care who, in collaboration with public officials, will perform maintenance, analysis, and interpretation of maternal and child health data and data panels for action in government health agencies and for the production of scientific knowledge. We are seeking a candidate for a 12-month Post-Doctoral Scholarship.

Name	E-mail	Institution	Abstract
Sidney José Lima Ribeiro	sidney.jl.ribeiro@unesp.br	Instituto de Química de Araraquara/IQ/UNESP	Among visible light-active photocatalysts, 2D materials stands out prominent for its high photocatalytic activity towards the degradation of different pollutants together with H2 production. Graphene oxide (GO) derived hybrids are very promising materials for many different applications including photocalysis. Additionally the reported synergy arising from GO-lanthanide compounds seem to be very interesting in this direction, New composites displaying lanthanides compounds decorated graphene oxide nanorods wil be prepared as photocatalysts for reducing dyes, free radicals and water split to produce H2 in sun and infrared light. The development of broad-spectrum photocatalytic materials that allow the use of a larger portion (UV to NIR) of the solar spectrum for photocatalytic processes has attracted great attention. Smart photocatalytic systems may conceived by combining the interesting upconversion property of NaYbF4:Tm3+ upconverting particles (UCPs) with the exceptionally high photocatalytic activity of graphene derived materials. The convertion of low energy NIR photons into high energy UV-visible photons that can be absorbed the photocatalyst is the base for the properties of these new materials.
Dalmo Mandelli	dalmo.mandelli@gmail.com	Centro de Ciências Naturais e Humanas/CCNH/UFABC	Use of Metal-Organic Frameworks (MOFs) in the development of new drugs against neglected diseases Brazil's vast and diverse ecosystems are home to an extraordinary variety of plant species, making it a treasure trove of biodiversity. Among the countless compounds these plants produce, lignoids, neolignans, and terpenes stand out for their fascinating structures and promising applications in both traditional. Natural products have always been a source of medicines or prototypes for the design of drugs with improved properties. A recent collaboration between U. Rennes and UFABC has shown that the antiparasitic activities of natural products, extracted from Brazilian plants, can be enhanced by some chemical transformations. In this project, the extracted molecules will be modified using catalytic tools. Oxidation reactions will be carried out using hydrogen peroxide and heterogeneous catalysts, including Metal-Organic Frameworks (MOFs). Another key transformation involves metathesis reactions, which will initially be conducted in the presence of functionalized alkenes with shortened chains and homogeneous Ru-based catalysts (later heterogenized in MOFs), under mild conditions and using environmentally friendly solvents, such as dimethyl carbonate. The molecules synthesized from the oxidation and metathesis reactions with lignoids, neolignans, and terpenes will undergo evaluation for their biological activities against Chagas disease, Leishmaniasis, and Schistosomiasis. This evaluation will be conducted in partnership with research groups from the Adolfo Lutz Institute, U. Guarulhos, and UFABC. The utilization of Metal-Organic Frameworks (MOFs) prepared in the current FAPESP-sponsored project, along with the biological application of these new compounds, will provide significant contributions to the ongoing research.

Name	E-mail	Institution	Abstract
Fernando de Faria Franco	franco@ufscar.br	Centro de Ciências Humanas e Biológicas/CCHB/UFSCAR	TITLE: Toward Understanding Plant Genome Evolution: Characterizing the Repeatome of genus Cereus (Cereeae, Cactaceae) Using Whole-Genome Resequencing Data and Bioinformatic Tools ABSTRACT: Whole-genome data are a powerful resource for evolutionary studies in model and non-model plant species, shedding light on the processes underlying species diversification and genome organization. These datasets enable diverse analytical approaches using bioinformatics tools, eliminating the need for additional expenses related to data sequencing. The objective of this postdoctoral research project is to reuse existing whole-genome resequencing (WGR) data from the FAPESP 2020/15161-3 project to characterize the repeatome of seven species within the Cereus genus (Cereeae, Cactaceae): C. jamacaru, C. calcirupicola, C. pierrebrauniannus, C. albicaulis, C. mirabella, C. hildmaniannus, and C. fernambucensis. Briefly, the repeatome comprises repetitive DNA sequences, primarily satellite DNAs and transposable elements (TEs), within an organism genome. Understanding the composition and structure of the repeatome is crucial for investigating genome evolution, genetic diversity, and functional genomics. In this study, the postdoctoral researcher will assemble WGR data using the C. jamacaru reference genome. Software such as RepeatExplorer 2 will be utilized for annotating repetitive elements. TEs will be categorized by family, and their composition will be compared across species. Tandemly arranged repetitive elements with a high likelihood of belonging to satellite DNA families will be identified, characterized, and compared among species. There is growing evidence suggesting that environmental conditions influence the amount of repetitive DNA. Therefore, the outcomes of this project will be integrated with other genomic resources and environmental data surveys conducted by our research group to comprehend the selective pressures driving niche evolution during geographic transitions, aligning with the primary objective of the FAPESP 2020/15161-3 project.

Name	E-mail	Institution	Abstract
Odair Aparecido Fernandes	odair.fernandes@unesp.br	Faculdade de Ciências Agrárias e Veterinárias de Jaboticabal/FCAV/UNESP	Exploration of Silicon Functions in Improving Drought Tolerance Mechanisms and Stalk Borer (Diatraea saccharalis) Resistance in Sugarcane 1. Problem Statement Climate change is expected to increase the frequency of drought stress in several regions resulting in yield losses of crops including sugarcane production. Drought stress significantly impacts sugarcane physiological processes and the decline in the photosynthesis rate leads to the consequent reduction in the yield during drought (Zargar et al., 2017). The antioxidant defense mechanism has a significant role to prevent drought stresses and promote crop growth (Gupta et al., 2022). Drought-tolerant sugarcane cultivars exhibited better photosynthetic performance than the sensitive cultivars (Graca et al., 2010), showed antioxidant defensive mechanisms of superoxide dismutase (SOD), ascorbate peroxidase (APX) and catalase (CAT) activities and contributed to the crop performance under water deficit (Sales et al., 2015, Jain et al., 2015). It is critically important to evaluate physiological and biological traits to identify tolerant and susceptible sugarcane genotypes, and the mechanisms involved. Many strategies have been developed to increase tolerance or adaptation to stress conditions. Effective drought response generally consists of improved plant water relations, reduced stomatal conductance, reduced transpiration, enhanced photosynthesis, and improved antioxidant activity. Silicon (Si) has been considered a beneficial element for plant growth and development, especially under biotic or abiotic stresses (Etesamia et al., 2018, Malik et al., 2021). However, it is necessary to clarify the exploration of Si application in crop improvement of sugarcane by elucidating physiological fitness and operation of antioxidative machinery under water deficit conditions. In Brazil, the sugarcane borer, Diatraea saccharalis (F.) (Lepidoptera: Crambidae), is considered one of the major pests in sugarcane crops (Dinardo-Miranda et al., 2013). Sugarcane crops infected by borer caused losses of 1.50% in stem productivity, 0.49% in sugar productivity and 0.28% in alcohol productivity (Dinardo-Miranda et al., 2011). Si has a greater effect in protecting susceptible sugarcane cultivars against borer attack, especially in water-stressed plants (Kvedaras et al., 2007). It remains unclear whether improvements in tolerance mechanisms under drought stress provide greater protection to the sugarcane borer. The present study will explore the role of Si in improving drought stress tolerance mechanisms by detecting physiological and biochemical responses, as well as whether these tolerance mechanisms interact with sugarcane borer resistance. This proposal is aligned with ongoing research on insect-plant interaction at the Engineering Research Center – Plant Health in Sugarcane – CEPENFITO (FAPESP Grant no. 2017/25258-1) to enhance current decision-making protocols in sugarcane pest management as well as to improve agricultural practices under a climate change scenario, including support to sugarcane breeding programs. Therefore, the objectives of the studies are (1) To detect physiological and biochemical responses of sugarcane cultivars under drought stress conditions; (2) To determine the beneficial effects of Si

Name	E-mail	Institution	Abstract
Marcos Roberto Chiaratti	marcos.chiaratti@ufscar.br	Centro de Ciências Biológicas e da Saúde/CCBS/UFSCAR	Oocyte mechanisms shaping the mitochondrial DNA genetic landscape Mitochondria are the principal source of cellular energy which is produced by oxidative phosphorylation (OXPHOS) leading to the synthesis of adenosine triphosphate (ATP). Thirteen essential OXPHOS proteins are synthesised within the mitochondrion from mitochondrial DNA (mtDNA) which is exclusively inherited down the maternal line. MtDNA is highly polymorphic in humans, but its single nucleotide variants (mtSNVs) are not randomly distributed throughout the molecule. Family and population studies indicate that selective forces have shaped the mtDNA genetic landscape. Recent studies have provided evidence that mtSNVs influence common physiological parameters including kidney and liver function, our height and lifespan. Thus, understanding how mtDNA variants are propagated has important implications for human health and longevity. Most cells contain thousands of mtDNA molecules, and new mutations initially only affect a proportion of the mtDNA pool (heteroplasmy). Human data provided evidence of selection for and against heteroplasmic mtDNA variants. This was detectable between mothers and their child, and contributed to the genetic architecture of mtDNA at the population level. Precisely when and how the selection occurs is not known. We aim with the current project to investigate potential candidate mechanisms responsible for influencing mtDNA inheritance in the female germline. Objectives. 1) To characterize oocyte transcriptome, mtDNA replication, mitochondrial dynamics, and mitophagy during oocyte development and to determine if these pathways associate with the levels of heteroplasmic mtDNA variants; 2) The association between these pathways and mtDNA heteroplasmy will be confirmed by disruption of key genes and analysis of its impact on mtDNA heteroplasmy and copy number in oocytes. Work plan. This work will be done using homoplasmic C57BL/6J mice and heteroplasmic mice carrying 60 to 80% of NZB/BINJ mtDNA in a background with nuclear and mitochondrial DNA from C57BL/6J (PMID 26274500). Mother-to-offspring transmission of these heteroplasmic mtDNAs show a shift towards higher levels of C57BL/6J mtDNA, which agrees with evidence of mtDNA selection acting during oocyte development (PMID 31588014). MtDNA heteroplasmy and copy number will be determined from ear clips and oocytes isolated from primary, secondary, early antral, and antral follicles using quantitative PCR (qPCR). Also considering these follicle stages, oocyte transcriptome and mtDNA replication will be assessed using RNA sequencing (RNA-Seq) and in situ localization based on EdU incorporation, as previously reported (PMID 32281181, 33990696). Altogether, these experiments will inform the key oocyte stages during which mtDNA selection is acting. These findings will be complemented by assessing mitochondrial dynamics and mitophagy in oocytes, which will be carried out by using fluorescent proteins targeted to mitochondria: DsRed2-Mito-7 and Mito-PAGFP for analysis of mitochondrial dynamics (PMID 14769861) and mKeima-Red-Mito-7 for mitophagy (PMID 28703790). Vectors encoding these fluorescent proteins (Addgene) will

Name	E-mail	Institution	Abstract
Reinaldo Otávio Alvarenga Alves de Brito	brito@ufscar.br	Centro de Ciências Biológicas e da Saúde/CCBS/UFSCAR	True fruit flies of the genus Anastrepha harbor some of the most important pests in South America. Most of these species are in the fraterculus group, composed of several closely related species. Studies show limitations in our ability to identify species in this group, partly due to recent diversification with gene flow, but also because the diagnostic morphological characteristics of these species are plastic, even between individuals from the same population originating from different fruits. Such variation may even be epigenetically influenced, since other studies indicate differential methylation at least in A. fraterculus. We used thousands of regions in the genomes of different species of Anastrepha to study evolutionary forces shaping their differentiation across their distribution and association with different host fruits at different hierarchical levels in Anastrepha. In this project, we proposed to expand sampling, both of species and of localities, and resequencing of regions on the genome to investigate their role on the differentiation and adaptation of Anastrepha in Brazil and South America. A potential postdoc might be interested in studying the evolutionary forces involved in the differentiation of different regions in the genome and how their epigenetic marks may be associated with adaptation to different edaphic conditions, or even to different hosts. The identification of differently methylated regions across the genome may provide important information for the understanding of their role in ecological differentiation, since it can allow greater plasticity and facilitate both the adaptation to different hosts to be transferred to the progeny, but also between different species. These data also promise to help identify regions on the genome which are preferentially associated with differentiation between lineages, which we refer to as the unknown land. This is particularly relevant for the differentiation of species in the fraterculus that diverge with gene flow, so the combination of population and genomic data generated in the current project will allow for better identification in the Anastrepha genome of regions, and even genes, that are refractory to introgression between species. By better characterizing genetic variability and diversity throughout the genome, such results will also allow the identification of a set of genes that can be used as markers for differentiating species and populations of the genus, which has important economic and practical potential by allowing the creation of a set that can be amplified in Anastrepha and assist in solving taxonomic problems of one of the most important economic pest worldwide.

Name	E-mail	Institution	Abstract
Leonor Patricia Cerdeira Morellato	PATRICIA.MORELLATO@GMAIL.COM	Instituto de Biociências de Rio Claro/IB/UNESP	Phenology is considered the simplest and most effective way to monitor and detect plant responses and shifts related to climate change. The use of phenocameras or digital time-lapse cameras to capture repeated photographs for monitoring plant leaf exchange patterns has been established as a reliable and accurate method for tracking vegetation responses over time and their relation to environmental changes worldwide, including in tropical regions. The PhenoChange initiative is a trans-continental network constructed to monitor plant phenology in the dry tropics, which cover 18% of the global landmass and play a critical role in climate-vegetation feedbacks but remain understudied. The timing of leaf display and the associated fluxes of energy and matter pose a major uncertainty in earth system modeling, particularly for the dry tropics, limiting projections of vegetation responses to climate change. The recently launched IPCC Report 6 - WGII underscores the relevance of phenology and the need for information from tropical regions. Similarly, the UNEP Frontiers 2022 report identifies phenology mismatches as a frontline research topic. A critical barrier to progress has been the lack of coordinated and geographically representative phenology data, which the PhenoChange initiative aims to overcome. In this proposal, the candidate will work on comparative data provided by the Brazilian phenocam network and the PhenoChange transcontinental monitoring system to determine the drivers of leaf production across the dry tropics and responses to climate changes and extreme events. PhenoChange is the first cross-continent, standardized monitoring network for the phenological dynamics of tropical dry vegetation, laying the foundation for a broader network. Initially seeded by a small FAPESP-UKRI joint project, the network now receives support from CBioClima - the Center for Research on Biodiversity Dynamics and Climatic Change (CEPID FAPESP 2021/10639-5). This post-doctoral proposal will address work packages (WP) 1 and 3 of CBioClima, focusing on knowledge synthesis and long-term monitoring networks to detect biodiversity responses to climate change. Collaborative efforts among research groups in Africa, Brazil, and the UK have started, facilitated by sites across these regions. The post-doctoral fellow from an African country will be trained in this frontier research topic and may establish a new site to join the PhenoChange network.