

Topics for internships in Brazil – Living Lab Biobased Brazil (updated 23-01-23)

Topic for internship	Supervisor in BR	Organization	Extra info & Example projects
Eco-efficiency and low-carbon economy	Gabriel Pereira	UFSJ	<p>Improving the injection of trace gases and aerosols on emissions numerical models in South America.</p> <ul style="list-style-type: none"> Biomass burning is a modifying factor of the environment and plays a strategic role in the global biogeochemical cycle. From chemical reaction that occurs in the combustion process, the organic compounds present in vegetation are returned to the atmosphere and the soil in a cyclical behavior, influencing local and regional variables. With the new orbital fire products that have improved in spatial and temporal resolution, it is now possible to better understand fire properties at large scales, such as fire radiative power (FRP), fire spread, heat flux, and fire lifecycle. This project aims to integrate polar-orbit and geostationary satellites' fire-related products to better estimate BB emissions on a continental scale and monitor smoke plumes in near-real-time (NRT). The project will support the scientific development of students, which will benefit from the exchange of knowledge and the development of methodologies in cooperation with international universities. In these interactions, the development of methods to improve satellite orbital data assimilation related to fire detection and the improvement of biomass burning trace gases and aerosols emissions assessment in South America is expected. Consequently, the cooperation will generate interdisciplinary knowledge related to improving the physical processes of Brazilian biomass burning emissions models, mainly associated with the estimate of fire and the smoldering fraction that occurs in the combustion process and its relationship with the vertical injection of smoke in the atmospheric layers.
	Jorge David Alguiar Bellido	UFSJ	<p>Treatment of gaseous effluents</p> <ul style="list-style-type: none"> This project is about the selective catalytic oxidation of VOCs such as acetonitrile, acrylonitrile, etc. The project aims to evaluate the performance of the catalysts in the reaction and the relation between the catalytic behavior and the physical and chemical characteristics of the catalysts.
	Isabela Aroeira Monica Lindner	WayCarbon	<ul style="list-style-type: none"> Consultancy, development of technology and innovation solutions focused on sustainability, environmental assets management, and strategy development. Focus areas: SDGs and GHGs management; climate risk; SDGs academy; consulting; and carbon compensation.
Biodiesel	Fábio de Ávila Rodrigues Marcio Aredes Martins Ronaldo Perez	UFV	<ul style="list-style-type: none"> Simulation and optimization of biorefineries, mainly related to the production of biofuels (e.g., bioethanol, biodiesel, levulinic acid with professors Fábio/Marcio and technical and economic viability, competitiveness, industrial layout, legislation and investments with Professor Ronaldo) Examples of previous internships: <ul style="list-style-type: none"> Energy use of biogas from landfill effluent - Aspen modeling (Fabio / Lex Verheem, 2) Aspen modeling of biodiesel production via oil esterification (Fabio/ Joost Endepoel, 4) Charcoal cooling in a large rectangular furnace: modeling and CFD simulation (Marcio / Rob Hageman, 30)

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	Isabel Cristina Pereira Fortes Vânia Marcia Duarte Pasa	UFMG	<ul style="list-style-type: none"> ● Production and testing of biodiesel ● Heterogeneous catalysis for the valorization of fossil-based hydrocarbon streams (can be residual or crude oil) ● Pyrolysis ● Examples of previous internships: <ul style="list-style-type: none"> ○ Laboratory-scale biodiesel production from waste cooking oil by heterogeneous catalysis or enzymatic catalysis (Robin van Schendel) ○ Biodiesel synthesis from catalytic route using alternative catalysts (Ieva Liobyte) ○ Production and characterization of biocomposites from macauba residue (Hugo Mermet) ○ Biobased polyurethane coatings synthesized from biomass residue (Rick van Eijk, 37) ○ Determination of kinetic model parameters for biodiesel production using heterogeneous catalysts (Rosemarie de ruiten, 21)
	Marcela Rabelo Menezes Vilela	PUCminas	<ul style="list-style-type: none"> ● Improvement of biodiesel production ● Examples of previous internships: <ul style="list-style-type: none"> ○ Purification of glycerin derivatives from biodiesel production by adsorption and ion exchange (Tautvydas Kireilis, 10, 39) ○ Reuse of residual cooking oil as raw material for biodiesel production (Enrique Smolders, 11) ○ Production of biodiesel from bovine tallow (Rick Boogaard, 38)
Biogas	André Pereira Rosa	UFV	<ul style="list-style-type: none"> ● Diagnosis and optimization of biogas production from industrial, municipal, and agricultural effluents (e.g., effluent treatment and use of by-products, anaerobic digestion, monitoring of decentralized domestic sewage systems) ● See example assignment descriptions
	Sérgio Francisco de Aquino	UFOP	<ul style="list-style-type: none"> ● Hydrolysis of lignocellulosic waste for biogas production and/or recovery of by-products; Analysis and removal of micropollutants present in wastewater and drinking water, in particular pharmaceuticals, pesticides, and cyanotoxins. ● Examples of previous internships: <ul style="list-style-type: none"> ○ Anaerobic digestion of residues/effluents for energy and added value products recovery (Cindy Giel, 55)> Open: August '22, March '23 ○ post-treatment of effluent from anaerobic biogas reactors treating vinasse and hemicellulose (Arturo Diego Sanchez)
Biorefinery	Boutros Sarrouh	UFSJ	<ul style="list-style-type: none"> ● Projects involving producing hydrolytic enzymes from isolated microorganisms and the fractionation of lignocellulosic residues for producing industrial bio-products of industrial interest by fermentative processes. ● Examples of previous internships: <ul style="list-style-type: none"> ○ Production of enzymes from isolated microorganisms aiming at enzymatic treatment and fermentation of biomass residues for the production of bio-products of industrial interest (Ruben Bond, 43) ○ Chemical and enzymatic treatment of lignocellulosic residues for the production of bio-products of industrial interest by fermentation processes (48, 51)

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	Daniel Bonoto Gonçalves	UFSJ	<ul style="list-style-type: none"> • Bioconversion of macaúba cake into ethanol; • Mobile biorefinery development for integration of ethanol and biodiesel production through the use of lignocellulosic biomasses derived from sustainable extraction; • Development of ingredients from macaúba pulp and cake (<i>Acrocomia aculeata</i>) to improve the protein value, digestibility, and flavor of vegan burgers and plant-based foods.
Biorefinery - ASPEN modeling	Fábio de Ávila Rodrigues	UFV	<ul style="list-style-type: none"> ● Examples of previous internships: <ul style="list-style-type: none"> ○ Aspen modeling of furfural and hydroxymethyl furfural (HMF) production via dehydration of pentoses and hexoses (Fabio / Matthijs Muilwijk, 3) ○ Simulation and economic evaluation of 5-hydroxymethylfurfural (HMF) and furfural production from biomass (Fabio / Jesse Huebben, 45) ○ Simulation and economic evaluation of levulinic acid production from biomass (52)
Wastewater treatment	Ann Honor Munteer	UFV	<ul style="list-style-type: none"> ● Combination of physical, chemical, and biological processes for improved wastewater treatment and management (e.g., reuse of waste and effluents, decentralized sewage systems, environmental quality, advanced wastewater treatment, ecotoxicology). ● See example assignment descriptions: <ul style="list-style-type: none"> ○ Removal of bioactive substances during wastewater treatment (Joris Mallens, 40)
	Bárbara Caroline Ricci Nunes	PUCminas	<ul style="list-style-type: none"> ● Treatment of effluent using membrane distillation. ● Wastewater treatment; water reuse; membrane separation process; membrane distillation; physicochemical analysis.
	Laura Hamdan de Andrade	PUC Minas	<ul style="list-style-type: none"> ● Treatment of industrial effluents using a physicochemical process ● Membrane separation process (micro, ultra, nanofiltration, reverse osmosis, electrodialysis) and advanced oxidation process ● Water reuse ● Examples of previous internships <ul style="list-style-type: none"> ○ Evaluation of nanofiltration and advanced oxidation process for textile wastewater treatment (Enrique Smolders) ○ Electrodialysis for gold mining wastewater treatment (David Huisman Dellago)
	Sérgio Francisco de Aquino	UFOP	<ul style="list-style-type: none"> ● Water treatment technologies for pesticide removal. This project investigates the efficiency of water treatment techniques for removing Brazilian priority pesticides. Conventional (coagulation/flocculation/settling) and unconventional (adsorption, advanced oxidation processes) techniques will be tested on a bench scale to remove acephate and methamidophos from contaminated water.

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	Silvana de Queiroz Silva		<ul style="list-style-type: none"> ● Assessment of the water quality regarding emerging bacterial pathogens and antibiotic-resistant bacteria. Conventional and molecular microbiological techniques will be applied to isolate, identify, and evaluate antibiotic resistance. Emerging bacterial pathogens will be obtained by cultivation in specific culture media, followed by their biochemical and molecular identification (16S rRNA gene sequencing). Subsequently, the isolates will be submitted to antibiogram assays, and the PCR technique will verify the occurrence of antibiotic-resistance genes.
	César Rosas Mota Filho	UFMG	<ul style="list-style-type: none"> ● Reuse of organic waste and treatment of wastewater. It can be municipal wastewater but, for instance, wastewater from festival toilets. ● A pilot plant that turns organic food residues from the university into biogas. The system also involves an UASB-reactor + Anammox ● Examples of previous internships: <ul style="list-style-type: none"> ○ Characterize (measure flow rates, as well as COD, BOD, P, N, NH₃, DO, etc.) the liquid effluent from the food waste mechanization platform in operation at the UFMG campus and provide a preliminary design for the Nitrogen removal pilot-scale systems that will be implemented (Paul Hankinson) ○ Determine the effects of liquid deodorants (those used in chemical toilets) on biological wastewater treatment using anaerobic and/or aerobic processes (Lennard Visser) ○ Investigate the toxic effects of the waste of chemical toilets on the bacterial processes in sewage treatment plants and see if there are possible environmentally friendly alternatives (Niels de Koster, 20) ○ What is the cheapest and most effective way to remove and collect microalgae from water treated in sewage treatment plants? (Sophie Lurquin, 19)
	Camila Costa de Amorim		<ul style="list-style-type: none"> ● Removal of contaminants from different residues (from the dye and mining industries) using chemical oxidation. ● Examples of previous internships: <ul style="list-style-type: none"> ○ Life cycle assessment (LCA) of different oxidation processes applied in the treatment of water and wastewater (29)
Reuse of residual streams	Claudio Mudado Silva	UFV	<ul style="list-style-type: none"> ● Combination of physical, chemical, and biological processes for reuse or recycling of residual streams (e.g., industrial wastewater reuse, industrial waste recycling) ● See the example assignment description: <ul style="list-style-type: none"> ○ Thermophilic treatment of pulp mill effluent using granular sludge (Lynn Joostens, 8) ○ Respirometric tests for prediction of toxic effects in the effluent treatment plant and drainages optimization during maintenance shutdowns on pulp and paper mills (Brian Barbieri, 9) ○ Improvement of the anaerobic digestion process of sludge from the paper & pulp industry (Lara Lobotic, 46) ○ Alternatives of energetic recovery of organic residues in pulp and paper plants according to the biorefinery concept (Alessio belmondo, 6)
	Cristiana Brasil Maia	PUC Minas	<ul style="list-style-type: none"> ● Use of residual heat from thermodynamic cycles for desalination.

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	Raphael Tobias de Vasconcelos Barros	UFMG	<ul style="list-style-type: none"> ● Reuse of industrial and municipal solid waste (e.g., reuse of construction and demolition waste, e-waste, composting of organic waste) ● See the example assignment description: <ul style="list-style-type: none"> ○ Possibilities for the reuse of construction waste (Hugh Rhodes, 1B) ○ Possibilities for the reuse of E-waste (Peter Huaman, 1A) ○ Possibilities for the improvement of composting of household waste in Minas Gerais (Jens Vloedgraven, 24) ○ Improvement of collecting, separating, and reusing domestic organic waste (Max Post, 32, 47)
	Marcio Aredes Martins	UFV	<ul style="list-style-type: none"> ● Growth of microalgae on residue streams (wastewater). Research on the purification of crude microalgae oil for biodiesel and food production. ● Examples of previous internships: <ul style="list-style-type: none"> ○ Microalgae harvesting technologies for increasing oil productivity (Marcio / Michael Boot, 31)
Food Technology	Orlando David Henrique dos Santos	UFOP	<ul style="list-style-type: none"> ● Evaluation of the potential of plant extracts as an environmentally friendly product for food and pharmaceutical applications. Undergraduate program for Pharmacy, Biotechnology, Chemistry, or related. Per March '23
	Frederico Barros	UFV	<ul style="list-style-type: none"> ● Bioactive compounds in foods: extraction, quantification, and antioxidant properties. Laboratory work; food natural colorants; anthocyanins; solvent extraction; ultrasound; antioxidant capacity. ● Improving food quality and human health through grain chemistry and technology. Laboratory work; dietary fiber; resistant starch; tannins; bioactive compounds; food processing
Environmental Impact Assessment (EIA)	Camila Costa de Amorim	UFMG	<ul style="list-style-type: none"> ● Study procedures for EIA dairy industry, wind energy, and biogas production in Brazil and NL ● Examples of previous internships: <ul style="list-style-type: none"> ○ Compare and contrast EIA procedures and requirements for dairy industries, wind energy facilities, and biogas generation for energy production in Minas Gerais and The Netherlands (28)
Sustainable construction	Guilherme Jorge Brigolini Silva	UFOP	<ul style="list-style-type: none"> ● Sustainable cement development. Development of a study on low-carbon cement, specifically the reuse of waste. The internship will be part of a doctoral student's research project. Currently, we have a doctoral student developing a study of LC3 cement with industrial waste. The student will work with: 1. literature review on the topic; 2. characterization of materials: physics, chemistry, and mineralogy; 3. Mortar production; 4. Assess fresh and hardened properties; 5. Discussion 6. Report and contribute to the article. ● <i>Not recommended if you have a dust allergy.</i> ● For more information, please look at https://reciclos.ufop.br/
Nanomaterials and biomaterials	Herman Sander Mansur	UFMG	<ul style="list-style-type: none"> ● Looks for links between industries. The waste of one company can be a resource for another company. Works mainly with nanomaterials and biomaterials. For instance, for medical purposes & environmental engineering.

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			<ul style="list-style-type: none"> ● Quantum dots-sensitized hybrid solar cells ● Nanomaterials for Energy Conversion and photocatalysis ● Nanomaterials for Wastewater Treatment
	Rodrigo Lambert Oréfica	UFMG	<ul style="list-style-type: none"> ● Biobased hydrogels containing biobased derived nanoparticles: these hydrogels can flow under stress due to a supramolecular architecture and physically promoted crosslinks: chitosan, collagen, and cellulose derivatives can be used together with carbon derivatives, cellulose or chitin nanocrystals. Intended applications include cosmetics, sprayable adhesives, and other active molecules. ● Preparation of electrospun nanofibers from recycled polymers, such as PET, to yield bactericidal and viricidal materials.
Entrepreneurship and Innovation	Adriana Ferreira de Faria	UFV	<ul style="list-style-type: none"> ● Research on innovation environments in Minas Gerais (e.g., startups in biotechnology, business management, incubators, and technology parks) ● Support the development of new technology-based companies and startups in the Technology Park of Viçosa (tecnoPARQ)
Geosciences	Sônia Maria Carvalho Ribeiro Rodrigo Affonso de Albuquerque Nóbrego	UFMG	<ul style="list-style-type: none"> ● The look at the economic and environmental value of nature reserves and the effect of environmental disasters on these values (for instance, the mining industry) ● The group works a lot with GIS and the program that the department developed. ● Landscape Ecology (participatory approaches to land management, landscape management) ● Forest Science (Mapping Ecosystem Services from the forest). ● Geosciences (geospatial analysis). ● Use of biodiversity in Brazil. ● Examples of previous internships: <ul style="list-style-type: none"> ○ From environmental disaster to sustainable socio-biodiverse futures: technical innovations for sustainable land use management in the buffer area of Rio Doce State Park, Brazil (Ivo Verhaar, 44)
Biopolymers & biomolecules	Rodrigo Lambert Oréfica	UFMG	<ul style="list-style-type: none"> ● High entropy polymer blends from recycled polymers: preparation of blends using a series of recycled polymers and a high-pressure torsion process that can produce ultrafine-grained materials. ● Surface modification of polymers allows harvesting atmospheric moisture for irrigation in dry places of the northeastern state of the State of Minas Gerais. ● Development of multi-scale porous polymer systems for removal of pesticides during water treatment.
	Renata Costa Silva Araújo Daniel Bastos de Rezende	UFMG/LEC	<ul style="list-style-type: none"> ● Research on waste pyrolysis, from which it is possible to obtain fuel fractions that can be studied. ● Development of polyurethane coating synthesis and analysis to find applications for coatings. ● Examples of previous internships: <ul style="list-style-type: none"> ○ Biobased polyurethane coatings synthesized from biomass residue (Rick van Eijk, 37) ○ Improvement and study of biopolyurethane coatings based on Macauba (53)

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	Cláudio Gouvêa dos Santos	UFOP	<ul style="list-style-type: none"> The candidate will be involved with the synthesis and characterization of phenolic resins using fractions of Eucalyptus wood tar. They are expected to have basic knowledge of General, Organic, and Polymer Chemistry as well as some basic laboratory skills. The student will work with other project students in a friendly lab atmosphere and is supposed to present the project's outcome in a seminar at the end of the internship.
	Frederico Barros	UFV	<ul style="list-style-type: none"> Extraction and quantification of bioactive compounds from fruits (54)
Ecology	Yasmine Antonini	UFOP	<ul style="list-style-type: none"> Restoration of forests using animals as ecological tools to improve the process of colonization and ecological succession (57) Plant pollinator interactions in high mountains of Quadrilátero Ferrífero, Minas Gerais. Open: August '22, March '23.
	Alessandra Rodrigues Kozovits		<ul style="list-style-type: none"> Production of native tropical grass plugs for ecological restoration. The student will participate in all project activities depending on the time of year: seed collection in the tropical rocky outcrop ecosystems, seed germination, production of carpets and plugs, planting and monitoring of grass plugs in areas degraded by iron and bauxite mining, team meetings, data analysis, paper writing.
Solar energy	Marco Antonio Schiavon	UFSJ	<ul style="list-style-type: none"> In our research group, we are interested in synthesizing and characterizing colloidal quantum dots, carbon dots, and inorganic perovskites nanocrystals and using them in innovative solar cells for energy conversion. So, we will discuss all aspects of nanomaterials and nanoscience applied to energy conversion. The goal of the internship is to allow knowledge of abroad students in this subject and exchange of experiences in research laboratories of Brazil and the Netherlands from the student's point of view. The internship involves laboratory activities such as the synthesis of nanoparticles, characterizations, solar cell preparation, and characterization. It also involves seminars and group meeting discussions.
	Cristiana Brasil Maia	PUC Minas	<ul style="list-style-type: none"> Solar drying of agricultural products
Sustainable transport	Rodrigo Affonso Nobrega	UFMG	<ul style="list-style-type: none"> Environment and transport: also applicable for computer sciences and engineering transport students.