

Topics for internships in Brazil 2025– Living Lab Biobased Brazil (updated 23-09-24)

Topic for internship	Supervisor in BR	Organization	Extra info and 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	<p>Consultancy, development of technology and innovation solutions focused on sustainability, environmental assets management, and strategy development. Focus areas: SDGs and GHG management; climate risk; SDGs academy; consulting; and carbon compensation.</p>
Biodiesel	Fábio de Ávila Rodrigues Marcio Aredes Martins Ronaldo Perez	UFV	<p>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).</p> <ul style="list-style-type: none"> Examples of previous internships: <ul style="list-style-type: none"> o Energy use of biogas from landfill effluent - Aspen modeling (Fabio / Lex Verheem, 2); o Aspen modeling of biodiesel production via oil esterification (Fabio/ Joost Endepoel, 4); o 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 Rooter, 21)
	Marcela Rabelo Menezes Vilela	PUCminas	<p>Improvement of biodiesel production</p> <p>Examples of previous internships:</p> <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"> ● (i) Assessment of treatment plant performance; (ii) Diagnosis and optimization of biogas production from industrial, municipal, and agricultural effluents; (ii) study of resources recovery (biogas and nutrients) in wastewater treatment.
	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	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	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 Mulwijk, 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	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)
	Edgard Dias	UFJF	<ul style="list-style-type: none"> ● Urban and rural, mechanized and natural treatment techniques for domestic wastewater and sewage sludge ● Biosolids and wastewater application in agriculture and degraded areas ● Health-related water microbiology and microbial risk assessment.

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	Renata de Oliveira Pereira	UFJF	<ul style="list-style-type: none"> • Urban and rural water treatment techniques • Reuse of waste from water treatment (sludge and filter wash water). • Water quality - Endocrine disruptors, pesticides, hormones, and other micropollutants. Chemical risk assessment.
	Sérgio Francisco de Aquino	UFOP	<p>"Sludge treatment for biosolids production and micro-contaminants removal.</p> <p>Previous projects:</p> <p>Treatment of wastes and wastewaters for removing micropollutants and/or recovering energy</p> <ul style="list-style-type: none"> • The project involves the use of an anaerobic digestion process on its own or coupled to thermal treatment processes to recover energy from waste (e.g., STP sludge, urban solid waste) and wastewater (e.g. sanitary sewage) and removal of emerging contaminants (e.g. antibiotics, perfluorinated compounds). The student will help in physical-chemical characterization of samples, operation, and monitoring of bioreactors, as well as interpreting experimental data and preparing reports. <p>Water treatment technologies for pesticide removal.</p> <ul style="list-style-type: none"> • 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. <p>Development of chemical and biological processes for the treatment of wastes and Wastewater aiming removal of organic micropollutants.</p> <ul style="list-style-type: none"> • Carry out laboratory experiments which may include monitoring of biological reactors, performing treatability tests (e.g. ozonation, adsorption), as well as run chemical analysis for characterizing waste and effluents, including chromatographic and spectrometric techniques.
	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. <p>Examples of previous internships:</p> <p>Life cycle assessment (LCA) of different oxidation processes applied in the treatment of water and wastewater (29)</p>
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) <p>See the example assignment description:</p> <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)

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			<ul style="list-style-type: none"> ○ Alternatives of energetic recovery of organic residues in pulp and paper plants according to the biorefinery concept (Alessio belmondo, 6)
	Sibele Augusta Ferreira Leite	UFV	<ul style="list-style-type: none"> ● Valorization of agricultural and agroindustrial residues through biorefinery processes (liquefaction, pelletization, and anaerobic biodigestion); ● Anaerobic biodigestion process: Studies on monitoring, control and biogas production.
	Dener Márcio da Silva Oliveira	UFV	<ul style="list-style-type: none"> ● Climate-smart agriculture practices, mainly no-tillage, cover cropping, soil fertilization with organic amendments, and crop-livestock and crop-livestock-forestry systems, and its effects on soil quality and plant yield. Implantation and management of agroforestry systems (smallholding or large scale). Carbon balance of agricultural and livestock systems. Soil organic matter and soil quality, focused on climate change adaptation.
	Cristiana Brasil Maia	PUC Minas	Use of residual heat from thermodynamic cycles for desalination.
	Samuel Castro	UFJF	<ul style="list-style-type: none"> ● Planning and management of municipal solid wastes; ● Resources recovery, reuse, recycling, and treatment of solid wastes; ● Indicators monitoring and data processing for sanitation diagnosis.
	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. <p>Examples of previous internships:</p> <ul style="list-style-type: none"> ○ Microalgae harvesting technologies for increasing oil productivity (Marcio / Michael Boot, 31)
Food Technology	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
	Pedro Henrique Campelo	UFV	<ul style="list-style-type: none"> ● Application of Emerging Technologies for Extraction and Modification of Food Ingredients: Our laboratory focuses on emerging technologies such as ultrasound, pulsed electric field, cold plasma, and ohmic heating for the modification of macromolecules (carbohydrates and proteins) and extraction of bioactive compounds from agro-industrial residues, assessing their techno-functional and nutritional activities.
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 <p>Examples of previous internships:</p>

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			<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/building materials	Julia Castro Mendes	UFJF / UFOP	Reuse of waste in construction materials; Technical, economic, logistical, socio-environmental, and life cycle assessments; Application of machine learning to engineering problems (requires basic knowledge of Python).
	Guilherme Jorge Brigolini Silva	UFOP	<p>Activated alkaline cement produced with fly ash - Construction and Building Materials</p> <ul style="list-style-type: none"> • The candidate will develop construction materials, prepare raw materials, manufacture mortars and evaluate compressive strength. <p>Production of Bricks using Alkaline Activation of iron ore tailing.</p> <ul style="list-style-type: none"> • The gross production of iron ore in Brazil in 2017 reached approximately 600 million tons. Out of this total, around 75% underwent beneficiation, resulting in significant amounts of waste. When these wastes do not have a useful purpose, they are deposited in dams, which can lead to environmental and social damage in cases of accidents and breaches. On the other hand, another sector that is also rapidly growing and causing environmental impacts is the construction industry. In 2016, cement production generated approximately 2.2 billion tons of CO₂. Study area: civil engineering, material engineering. <p>Use of mining tailings to produce construction materials</p> <ul style="list-style-type: none"> • Carry out tests and other experimental procedures: develop and produce bricks with white marble waste. Evaluate the mechanical properties. Participate in discussions and interpretation of results. participate in the production of technical reports and scientific articles.
Sustainable construction	Guilherme Jorge Brigolini Silva	UFOP	<p>Sustainable cement development.</p> <ul style="list-style-type: none"> • 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/ <p>Production of Bricks Using Alkaline Activation of iron ore tailing</p> <ul style="list-style-type: none"> • The gross production of iron ore in Brazil in 2017 reached approximately 600 million tons. Out of this total, around 75% underwent beneficiation, resulting in significant amounts of waste. When these wastes do not have a useful purpose, they are deposited in dams, which can lead to environmental and social damage in cases of accidents and breaches. On the other hand, another sector that is also rapidly growing and causing environmental impacts is the construction industry. In 2016, cement production generated approximately 2.2 billion tons of CO₂.
Nanomaterials and biomaterials	Herman Sander Mansur	UFMG	<ul style="list-style-type: none"> • Look 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 and 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.
	Orlando David Henrique dos Santos	UFOP	<ul style="list-style-type: none"> ● Development of pharmaceutical and/or cosmetic formulation with products: This project involves the study of natural product composition and/or biological activities and the development of formulations for pharmaceutical or cosmetic applications. Plant extracts will be produced and analysed for antioxidant, antimicrobial, and anti-inflammatory activities. After, nanostructured formulations, especially nanoemulsions and nanoparticles will be produced and characterized.
	Kassio Ferreira Mendes	UFV	<ul style="list-style-type: none"> ● Project 1: The use of herbicides is the main form of weed control in crops, but there have been confirmed cases of resistance of sourgrass biotypes (<i>Digitaria insularis</i>) in at least 10% of Brazilian agricultural areas. Against this background, the aim of this study is to evaluate the status of sourgrass resistance to glyphosate in coffee in the Zona da Mata Mineira. ● Project 2: Agricultural soils can be contaminated by microplastics depending on the agronomic practices used. Therefore, the aim of this project is to evaluate the contamination of agricultural soils by microplastics and their dynamics with the herbicides hexazinone and S-metolachlor. ● Project 3: The use of pre-emergence herbicides applied directly to the soil promotes early and efficient weed control with the possibility of residual control. However, herbicides can contaminate the environment and non-target organisms if applied incorrectly. An alternative to reduce the risk of contamination is to use formulations that increase sorption and provide controlled release of the herbicide into the soil solution. Nanomaterials such as double lamellar hydroxides (DLHs) can be used as herbicide storage matrices for controlled release by forming nanohybrids (DLH + herbicide). In this sense, the aim of this study will be to evaluate the sorption and desorption of the herbicide hexazinone intercalated with lamellar double hydroxides (Hex-HDL) in soils.
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	UFMG	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.

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	Rodrigo Affonso de Albuquerque Nóbrego		<ul style="list-style-type: none"> • 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. <p>Examples of previous internships:</p> <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 Oréface	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. <p>Examples of previous internships:</p> <ul style="list-style-type: none"> ○ Biobased polyurethane coatings synthesized from biomass residue (Rick van Eijk, 37) ○ Improvement and study of bio polyurethane coatings based on Macauba (53)
	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	Extraction and quantification of bioactive compounds from fruits (54)
Ecology	Andrea de Oliveira Barros Ribon	UFV	In response to the growing threat of antibiotic resistance, our research seeks to investigate and characterize the antimicrobial properties of these extracts and explore their synergistic effects when combined with traditional antibiotics. The project employs state-of-the-art methodologies to assess the efficacy of plant extracts against a range of microbial strains, including bacteria and fungi. Additionally, the project explores the synergistic interactions between these plant extracts and conventional antibiotics, aiming to enhance the overall antimicrobial effectiveness. Our goal is to offer innovative solutions to combat microbial infections, address antibiotic resistance, and contribute to the advancement of global health initiatives. Students will work on the production of plant extracts, evaluation of antimicrobial activities of plant extracts and mechanisms of action.

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Solar energy	Marco Antonio Schiavon	UFSJ	In our research group, we are interested in synthesizing and characterizing colloidal quantum dots, carbon dots, and inorganic perovskite 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	Solar drying of agricultural products.
Sustainable transport	Rodrigo Affonso Nobrega	UFMG	Environment and transport: also applicable for computer sciences and engineering transport students.