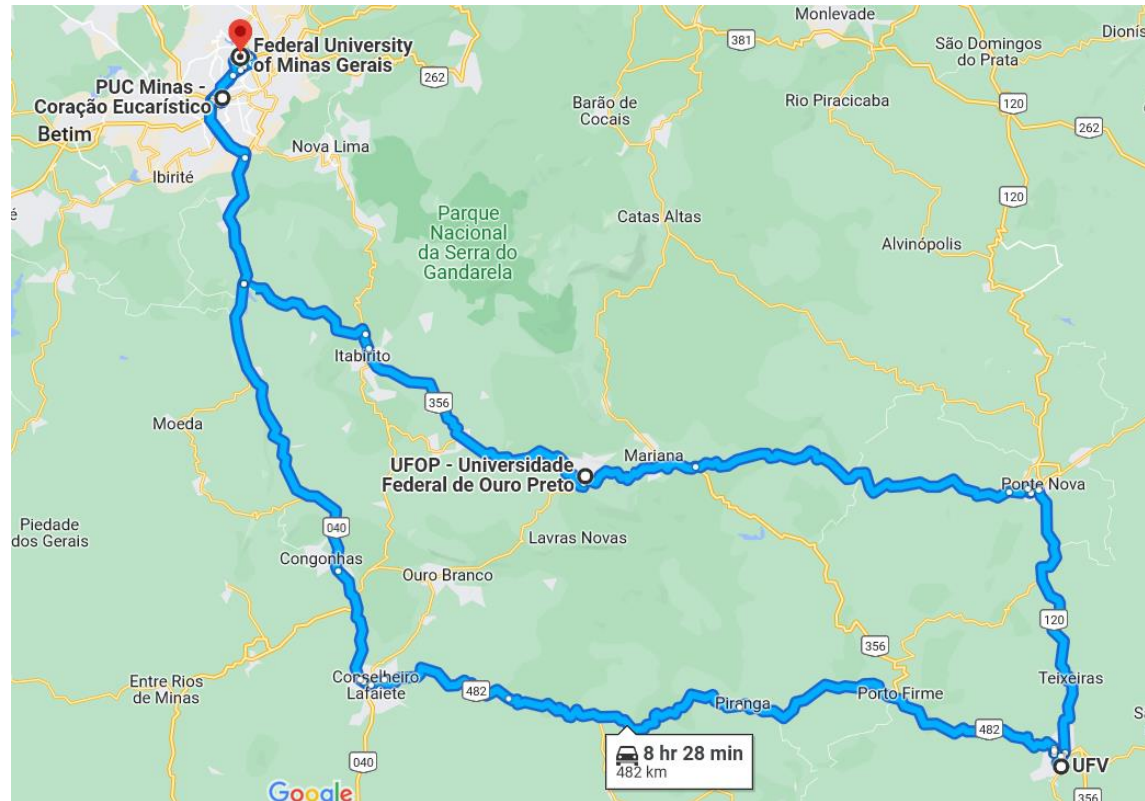


# Living Lab Biobased Brazil

Travel report mission November 2022

Jappe de Best  
Marliene Bos  
Jack Doomernik  
Phoebus Panigyrakis  
Gino van Strydonck  
Iarima Silva Mendonça  
Benno de Vries



Zuyd University  
of Applied Sciences **ZU  
YD**

**HZ** UNIVERSITY  
OF APPLIED SCIENCES

**avans**  
hogeschool



Living Lab Biobased Brazil - Living Lab Biobased Brazil

<p><b>Department of Geosciences</b>          Professor Sonia Carvalho Ribeiro,          (Gino, Jappe)</p>	<ul style="list-style-type: none"> <li>• They work on use of native species for agriculture / biomass to improve biodiversity and regional water management. For instance, Macauba to replace soy as a source for bio-oil/biofuel and valuable compound</li> <li>• They are focussing on value chain approach with added value for local population</li> <li>• Department of Geosciences would like to cooperate in research project with partners of LLBB. Possible options:             <ul style="list-style-type: none"> <li>○ PhD students come to NL for 3-6 months. They can get scholarship for this. Easier if there is already cooperation abroad</li> <li>○ ICAPES-PrInt. Look into future farming together with UM (Yvonne van der Meer), Avans (Marius Moonen, lectoraat Jappe)</li> <li>○ Look into subsidy options FAPEMIG (and state MG) concerning social biodiversity change. Together with companies?</li> </ul> </li> </ul>
<p><b>LEC - Laboratório de Ensaio de Combustíveis</b>          Professor Vanya Pasa, Henrique          (Gino, Jappe, Marliene, Benno, Iarima)</p>	<ul style="list-style-type: none"> <li>• Focus of their research has not changed although they have more attention on Aviation fuels now (biokerosine). Also look into biocoatings, bioresins, biopolymers.</li> <li>• Option: cooperation on bioresins (Avans). Also, in relation to research lectoraat Biobased building and lectoraat BRE (coatings)</li> </ul>
<p><b>International Office</b>          Professor Mauro Abreu          (Gino, Jappe, Marliene, Jack, Phoebus, Benno, Iarima)</p>	<ul style="list-style-type: none"> <li>• Mauro Abreu is coordinator for the minor International Studies both in English and Portuguese</li> <li>• UFMG offers an online course Portuguese beginning of August. It would be good for students to attend this course</li> <li>• UFMG added some remarks to the MOU. Otherwise, the MOU is ready to be send to legal department. UFMG needs a Portuguese version otherwise document cannot be signed. They already made a translation</li> <li>• Promotion of internships:             <ul style="list-style-type: none"> <li>○ make a video about possibility for internships. Can be placed on website of UFMG</li> <li>○ Mauro will organize meeting with coordinators of interesting departments. They know how to reach students.</li> <li>○ Yearly organize online presentations of LLBB (together with other universities)</li> </ul> </li> <li>• UFMG participates in the CAPES-PrInt 2022-2025 Internationalisation Program <a href="#">Institutional Program of Internationalization - CAPES - PrInt - Portuguese (Brazil) (www.gov.br)</a></li> <li>• They are interested in joining Erasmus CoVe subsidy call</li> <li>• UFMG participates in Worldwide Universities Network (WUN), a higher education and research network of 24 universities across 6 continents <a href="#">About WUN</a></li> </ul>

**Metallurgical lab**

Professor Herman Sander Mansur  
School of Engineering, Department of Metallurgical  
and Materials Engineering



(Gino, Jappe, Marliene, Jack, Phoebus,  
Benno, Iarima)

- Focus on metals, nanotechnology and metallurgical research
  - Ambition to bridge the gap between science and industry
  - Not only interest in student exchange, but also researchers and professors
  - Center of Nanoscience, Nanotechnology and Innovation CeNano2I
  - Interesting for lectoraat Materials & Applications of Amarante Bötger
  - UFMG has also an Electrical Engineering department, which we did not visit. Maybe next time.
- 
- "They can take everything from you except your knowledge; you will lose it yourself"
  - "Nothing is toxic, to a certain amount. If you drink too much water, you will drown"



# UFMG



# PUC Minas



<p><b>International Office</b> Rita Louback &amp; Adriana Libanio Bittencourt (Jappe, Gino, Marliene)</p>	<ul style="list-style-type: none"><li>• Are bilateral agreements needed? Can we cover the student exchange with only the MOU. Maybe we can add a clause to the MOU about student exchange (<b>action Jappe/Margot</b>)</li><li>• Students from PUCMinas need a certificate showing the credits for research. Otherwise, the credits do not count for the study programme. Can we make one general form on Dutch side? (<b>action Jappe/Margot</b>)</li><li>• Interns can follow online classes Portuguese before they arrive in BH</li><li>• A (Youtube) movie about the living lab is helpful for promotion. This movie can be placed on website of PUCMinas via Adriana. Also, an online presentation 2x year is useful.</li><li>• Rita will arrange a meeting with FAPEMIG</li><li>• They are interested in joining Erasmus CoVe subsidy call</li></ul>
<p><b>Chemical Engineering Department</b> Leonardo Mitre, Laura Handam, Bárbara Ricci, Marcela Rabelo, Mônica Schvartzman (Marliene, Benno, Iarima, Jack, Phoebus)</p>	<ul style="list-style-type: none"><li>• They are working on different research areas and are interested in a collaboration in the following topics:<ul style="list-style-type: none"><li>○ Industrial wastewater treatment and water reuse by using membrane separation processes. 2023: Will study nutrient recovery from dairy manure wastewater by precipitation.</li><li>○ Energy production and use: biofuels and hydrogen. Hydrogen production from catalyst reformer of fuels (e.g. ethanol) and is directly used in the automotive.</li><li>○ Corrosion</li><li>○ Geopolymers</li></ul></li><li>• Visit to laboratories associated to the above topics<ul style="list-style-type: none"><li>○ Instrumental chemistry, unit operations (e.g. membrane separation, distillation, adsorption), biofuel and hydrogen lab (partnership with Fiat)</li></ul></li></ul>
<p><b>Civil Engineering Department</b> Luciene Menezes (Marliene, Benno, Iarima, Jack, Phoebus)</p>	<ul style="list-style-type: none"><li>• Resilient cities. Application of the Sendai framework to Porto (Portugal) and Contagem (close to Belo Horizonte)</li><li>• Soil mechanics and environmental geotechnics. Risk management in civil defence landslides.</li></ul>

# PUC Minas



## Electrical Engineering Department

Leonardo Henrique de Melo Leite, Eugenio Amaral Arantes



(Marliene, Benno, Iarima, Jack, Phoebus)

- Programa de Pós-Graduação em Engenharia Elétrica (PPGEE) is a graduate program in Electrical Engineering composed of a masters program, a doctoral program and 3 extension courses. Three major topics: Power Engineering, Signals and Systems and Communications and Computation. [Programa de Pós-Graduação em Engenharia Elétrica - UFMG](#)
- Post-graduate course in Smart Grid: new energy sources, distributed energy resources (distributed generation, energy storage, electric vehicles, demand-side management), distribution automation, PMU, operational telecommunications infrastructure, etc., considering the technical, regulatory and economic aspects. Course leader: Professor Davidson Geraldo Ferreira
- IEC 61850 communication protocols for intelligent electronic devices at electrical substations

## GREEN Energy Studies Group

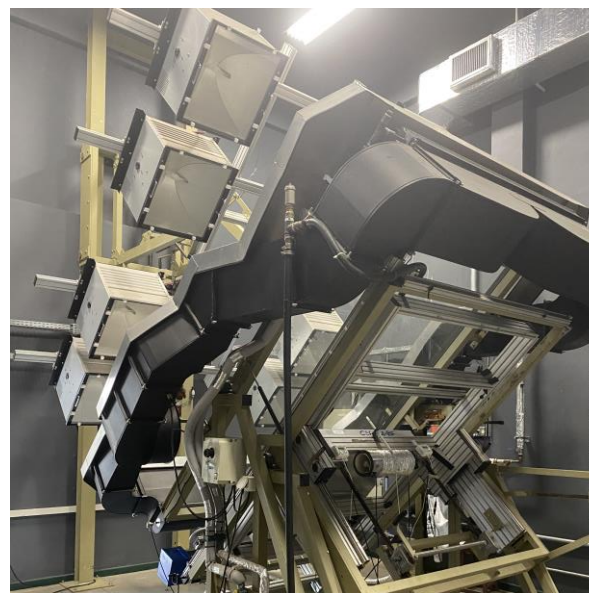
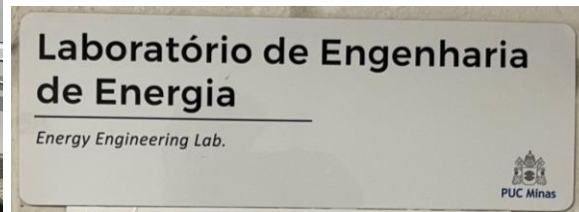
Daniel Sena Braga, profa. Rosalie Maria Velloso Campos

[Upon \(pucminas.br\)](http://Upon(pucminas.br))

(Benno, Jack, Iarima, Phoebus)

- GREEN is the energy studies group at PUC Minas focussing on renewable energy (mainly solar)
- Combines education and research and performs (certified) tests for third parties
- Has developed and operates a certified solar simulator (ISO/IEC 17025) to test solar equipment like PV(T) panels for research and industry





# UFOP

<p><b>Department of Chemistry, Institute of Biological and Exact Sciences</b> BRUNO EDUARDO LOBO BAETA, Yasmim Arantes da Fonseca , LEANDRO VINICIUS ALVES GURGEL (Jappe, Benno)</p>	<ul style="list-style-type: none"><li>• Group is working on valorisation of soybean hulls. They use steam explosion for this. They also look into valorisation of vinasse, a side stream of ethanol production from soybean.</li><li>• They focus on whole value chain with interest in LCA and TEA. They would like to cooperate on this topic (<b>Action larima</b>: Check possibilities for new HZ project involving LCA)</li><li>• They also would like to cooperate on PHA production from VFAs since VFAs are one of the products from steam explosion.</li><li>• Maybe we can combine their research with Dutch research on valorisation of residual (agricultural) streams. (<b>Action Jappe</b>: Greenjuice, peulvruchten, ...) and modelling? AI</li><li>• They are interested in exchange of researchers via Erasmus+ (Dutch researcher), CAPES PRINT</li></ul>
<p><b>Department of Chemistry, Environmental Science and Pollution Research</b> Sérgio Francisco de Aquino (Jappe, larima)</p>	<ul style="list-style-type: none"><li>• Works on wastewater treatment. Mainly focussed on removal of (micro)pollutants (pesticides, PFAS) but also on valorisation (e.g. biogas)</li><li>• Works with different technologies/processes for wastewater treatment: advanced process catalyst, customized adsorption, photocatalyst, conventional treatment + advanced techniques</li></ul>
<p><b>Instituto de Ciências Exatas e Aplicadas (ICEA)</b> <b>Department of Electrical Engineering</b> <a href="http://icea.ufop.br">ICEA - Institute of Exact and Applied Sciences (ufop.br)</a> Campus Joao Montlevade Renan Fernandes Bastos (Jack)</p>	<ul style="list-style-type: none"><li>• Project on measurement of rail alignment with laser on an unmanned electric vehicle for the mining industry</li><li>• About 2000 undergraduate part-time students in electrical engineering</li><li>• Lab building with labs for power electronics, electrical drives, robotics, industrial process automation, telecoms, physics</li><li>• Interest in visiting professor position</li></ul>



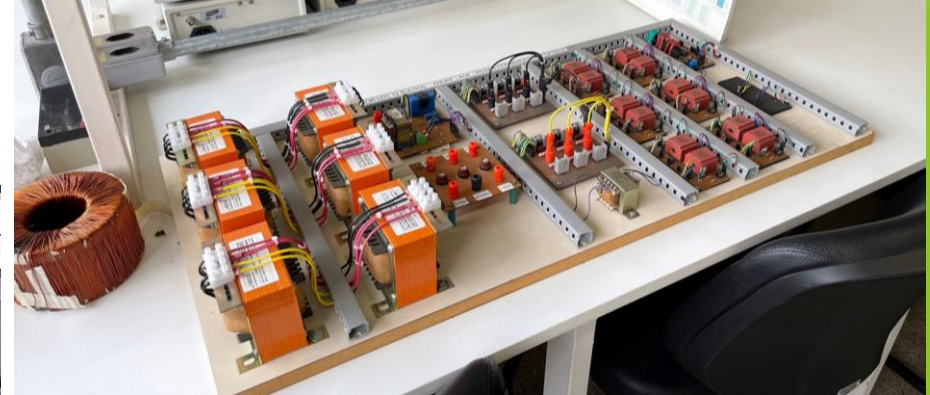
# UFOP

Participants from UFOP: PhD students Bruna Almada, Fernanda Elói, Vanessa Pereira and Marina Altoé + Júlia Castro Mendes (online)

(Iarima, Phoebus, Gino, Marliene)

- Research into wastematerial from mining for circular recycling options. Civil Construction Lab, Construction Materials Lab and Electronic Microscopy Lab and discussions about the projects developed at UFOP
- Explore clean reduction of metals?





# UFOP

## International Office

Anderson, LEANDRO VINICIUS ALVES GURGEL  
(Jappe, Marliene)



- Internship promotion
  - They would like to yearly update the table with professors that offer internships. Best time is around 15 November. LLBB should include this in year agenda (**Action Margot/Jappe**)
  - IO can promote LLBB via website, Insta & Facebook. They can also send e-mail to students
  - Good to have a promotional video. Maybe even YouTube channel
  - Online presentations of LLBB (2x year) are good idea
  - Show payment on website. This is very important for BR students
- Biobased battle
  - We need to better instruct new professors that are involved
  - Teams is not always accessible for BR students. Maybe organize pre-meeting to make sure everyone can access Teams
  - Brazilian students have doubts about their level of English. How can we address this?
  - Student's participants from homework quite well. Would be nice to have them on location on last day
  - Good idea to tell students about LLBB and internship opportunities after pitches (before jury result)
- UFOP needs student enrolment so they can count them as international students that participated. This is very important for UFOP. UFOP will find out which info they need (name, e-mail, student number? (**Action Anderson**)). Avans will check what is possible in NL (**Action Margot/Jappe**)
- UFOP is interested in joining Erasmus CoVe subsidy call. Possible Portuguese partners are Coimbra, Porto and Aveiro (= smaller university)
- Interns can follow online classes Portuguese before the arrive in Ouro Preto
- UFOP would be interested in a double degree. However currently they only have no English taught programmes
- Bilateral agreement UFOP-Zuyd is not an option as Zuyd AS has Dutch curriculum
- MOU is reviewed by UFOP. They have a few additions. Anderson will send additions to Avans (**Action Anderson**)

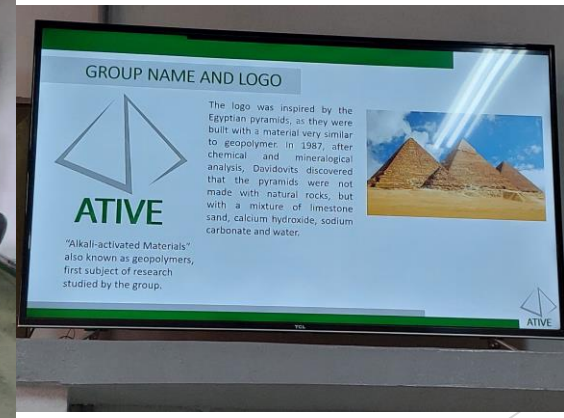
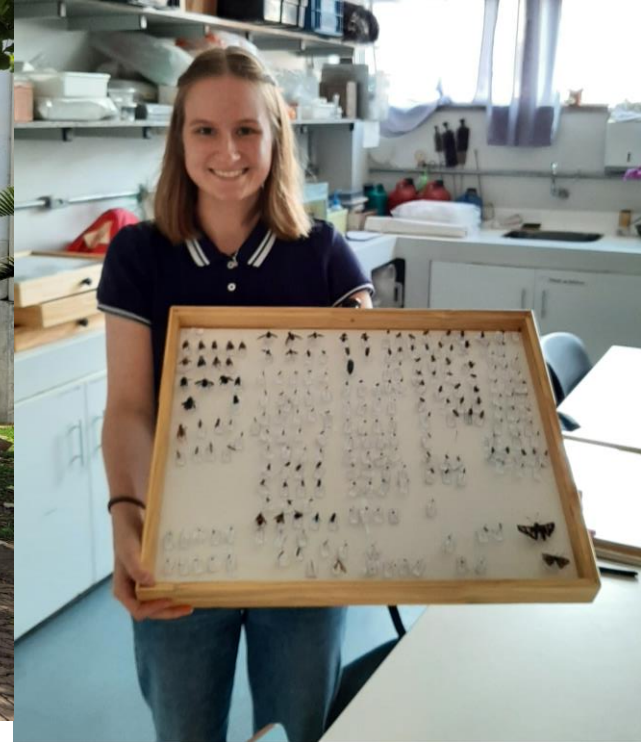


Liliane Assis Sade (IO)

Professors: Cristiane Medina Finzi Quintão, Keyller Bastos Borges, Maíra Nicolau de Almeida, Victor Augusto Araújo de Freitas (Iarima, Jappe)

• Iarima: sent an email to Liliane Assis (IO UFSJ) to





## Departamento de Engenharia Agrícola

Marcio Aredes Martins  
(Jack, Iarima, Jappe)

- Works on:
  - Growth of microalgae on residue streams (wastewater). Research on the purification of crude microalgae oil for biodiesel and food production.
  - Simulation and optimization of biorefineries, mainly related to the production of biofuels (e.g., bioethanol, biodiesel)
  - Pyrolysis
  - Carbon capture for Petrobras
  - Gas burner modelling
  - Optimisation of heating-cooling thermo cycle for ovens by forced cooling with heat exchangers
  - Using ANSYS Fluent for fluid dynamics simulation
- Is open for further collaboration on pyrolysis. Maybe we can involve him in new project that Avans is developing. Jappe will inform with Qian (**action Jappe**)

## Departamento de Microbiologia

Marcos Totola  
(Iarima, Jappe)

- Marcos is interested in working together on 2 topics:
  - Nano-bubbles to improve soil quality and plant growth. See YouTube movies and company Moleaer. He is particularly interested in the use of this technology in agriculture (including the use of brackish water and the impact of using water containing nanobubbles on the activity and composition of microbial communities, cycling and conservation of organic matter) and also in the treatment of effluents (including here the effect of nanobubbles on methane production in anaerobic digesters) and pathogen control (both in hot water environments such as chicken and pig farms, stables, etc.). **Action Iarima:** investigate options to cooperate
  - Kon-Tiki. Simple pyrolysis to produce biochar for soil improvement or maybe water treatment (wetlands) **Action Iarima: involve Mireille (HZ)**. Marcos is interested in soil microbiology part. Idea: improve biochar with nutrients using sludge. Especially about the use of sludge from effluent treatment systems and the enrichment of biochar with nutrients that remain soluble in water after treatment. **Action Jappe:** investigate options to cooperate
- Marcos is willing to receive students for an internship



<p><b>Biobased Materials</b>          Renata Pereira Lopes (donderdag)          Valeria Monteze and Gabriela Maitan-Alfenas (vrijdag)          Fred Barros (niet aanwezig), Caaroline Woelffel Silva (Ph D) en Icallin Attema (NHL student) (Gino, Benno, Phoebes)</p>	<ul style="list-style-type: none"> <li>• Gebruikt biochar als stabilisator voor katalysatoren e.d. vooral trial and error</li> <li>• Will graag naar Europa (CV pimpen)</li> <li>• Spreekt slecht Engels (nadeel)</li> <li>• Wij ander beeld bij biobased</li> </ul> <ul style="list-style-type: none"> <li>• Student companies zijn interessant concept</li> <li>• Vooral analytische chemie (valorizeren van apparatuur)</li> </ul> <ul style="list-style-type: none"> <li>• Fermentatie</li> <li>• NHL student wist niet van LLB</li> </ul>
<p><b>Clarissa Ferreira Albrecht</b>          Department of Architecture and Urban Planning</p>	<ul style="list-style-type: none"> <li>• Technology and Environmental Aspects of the Built Environment</li> <li>• Building and Urban Spaces Production in Towns and Cities</li> <li>• Interested on international research collaboration on sustainability certificates</li> </ul>
<p><b>Ítalo Itamar Caixeiro Stephan</b>          Department of Architecture and Urban Planning</p>	<ul style="list-style-type: none"> <li>• Urban and Regional Planning</li> <li>• Interested on more student exchange</li> </ul>



Departamento Quimica - CCE  
Bart Grubben (Zuyd) - Fabio Rodrigues  
(Gino, Marliene, Benno)

- Works on:
  - Aspen modelling
  - Student models reactive distillation
  - Gino will explore possibility of collaboration; modelling at UFRJ; experimental data in Dutch universities (e.g. kinetic data; validation)



# UFV



Universidade Federal  
de Viçosa

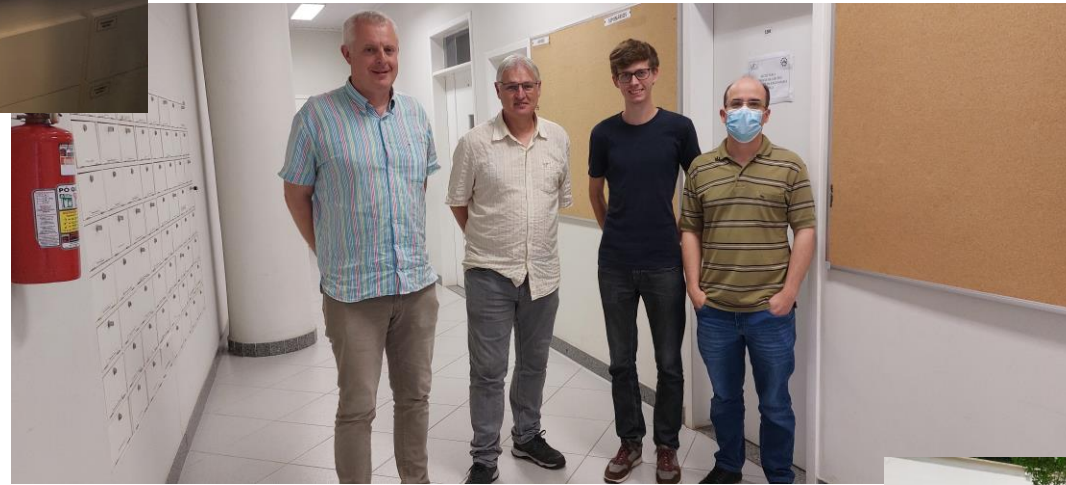
Departamento de Engenharia Elétrica  
GESEP Management of specialists in electrical  
power systems <https://www.gesep.ufv.br/>  
Prof. Dr. Heverton Pereira Oliveira  
(Jack)

[Fredbarros@ufv.br](mailto:Fredbarros@ufv.br)

[Caroline.w.silva@ufv.br](mailto:Caroline.w.silva@ufv.br)

- GESEP since 2010
- Collaboration with university of Aalborg (Dk), CEFET-MG, UFMG
- Works on:
  - PV inverter degradation using own firmware
  - Batteries for grid stability and smart batteries with micro BMS per battery
  - G-tracer app to monitor performance of PV panels
  - Wastewater treatment with electrolysis using aluminum plate electrodes
  - PCB software design with Eagle
  - Plex software (from Plexim) besides Matlab/Simulink and TI launchboards
  - Python programmed dashboard for PV systems
- Is open for further collaboration. Maybe we can involve him in new projects that Avans is developing.







Living Lab Biobased Brazil  
Education Research Innovation

For more information:  
[www.biobasedbrazil.org](http://www.biobasedbrazil.org)