

Assignment internship Life Sciences

Living Lab Biobased Brazil

The Living Lab Biobased Brazil is a transnational Living Lab in the field of Biobased Economy, created in 2014 by a consortium of Dutch Universities of Applied Sciences in collaboration with several Brazilian universities. The Living Lab helps students with internships and graduation projects in the Netherlands with the focus on Biobased Economy. We also help students finding accommodation, and offer buddy support and some events.

For more information please see www.biobasedbrazil.org and www.biobasedbrazil.org/student/the-netherlands/ or ask the International Office of your university.

University of Applied Sciences information:

The universities of applied sciences (in Dutch: 'hogescholen') offer programs that focus on the practical application of arts and sciences.

Getting practical work experience through internships is an important part of the professional study programs offered at these institutions. The largest universities of applied sciences enroll 20,000 to 40,000 students. Altogether some 446,000 students are enrolled on professional programs. University of Applied Sciences have also research groups. This groups do applied research and they are so called professorships. This internship assignment is within one of the associate professorships.

NHL Stenden University of Applied Sciences information:

NHL Stenden University is an internationally recognised institution that awards accredited degrees. We have already successfully educated thousands of international students (also from Brazil) with our English-language bachelor and master programmes in a variety of subject areas. These range from International Hospitality Management to International Teacher Education for primary schools (ITEPS) to Information Technology and Life Sciences.

All bachelor's and master's degrees conferred by NHL Stenden are accredited by the Accreditation Organisation of the Netherlands and Flanders, an independent, Netherlands-based accreditation organisation. Your degree will be recognised all over the world. As a graduate of NHL Stenden, you will be prepared for a career anywhere in the world. Our graduates have embarked on successful careers at major multinational companies. Many employers recognise the valuable combination of practical skills and experience NHL Stenden graduates bring to the table.

Our graduates have found employment at many renowned companies around the world, including:

- Hilton Worldwide
- Sony Music Entertainment
- Marriott Hotels & Resorts
- Holland America Line
- G Adventures
- ABN AMRO Bank N.V.



- Thomas Cook
- Booking.com
- Volkswagen
- Nike
- Delta Lloyd

Studying at NHL Stenden is an exciting new experience. You will be challenged to voice your opinion and take the initiative. You do this in a safe learning environment where respect for different views and backgrounds is a shared value. In small and personal groups of students, lecturers, and researchers, you will tackle real-life assignments from the actual field. Together you will test your ideas in practice, to make sure they work as expected. You will work on assignments from both local and international organisations – the best way to prepare for your future line of work. That is why many employers highly value NHL Stenden's education style.

All our bachelor programmes contain one or more of the following practical components:

- Project work in our own training companies including Broadcast Studio, Stenden Hotel and European Tourism Futures Institute (ETFI).
- Integrated Internship at renowned companies.
- Design Based Education: real-world assignments, which you do in collaboration with other students, instructors, researchers, and across different disciplines.

One of the most international educational institutes in the Netherlands, NHL Stenden has a strong and varied student body, with more than 80 nationalities, and 4 international branches located in South Africa, Qatar, Thailand and Indonesia.

More information: <https://www.nhlstenden.com/en/>

Main research topic:

Within NHL Stenden there is a research institute called GreenPAC. Green PAC is the hub for green (fibre) chemistry in the North East Netherlands and the place to develop knowledge. At Green PAC ideas lead to innovations and innovations to new products: products with added value and the power to compete on the market. The research areas are biobased and/or biodegradable polymers, 3D-printing, sustainable fibers, recycling of polymers, biocomposites.

More information: www.greenpac.eu/en

General background:

Within the topic of this internship you will be working in the research area of biocomposites. Depending on your skills you will be working on the chemical part of biocomposites or more on the technological part of biocomposites.

1. Synthesis of biobased resins

Biobased polymers are well-known in the field of thermoplastic materials, *e.g.* PLA, PHA's and starch-based polymers. In constructive applications, thermoset polymer-composite materials are gaining



interest. Composite components are mostly made of thermoset polymers in applications like aeroplanes, bridges, houses and infrastructure. Some of the applications can be fulfilled by biocomposite materials, *e.g.* a combination of natural fibers or synthetic biobased fibers with biobased thermoset resins. Although recent progress is made in the field of polyurethanes (bio-PUR) and phenol resins (from lignin), it is still challenging to synthesize fully biobased thermosets. An important consideration is the interaction with natural fibers like hemp, flax, jute or synthetic biobased fibers like BioPET, PLA and viscose. A detailed study on the interphase properties between matrix and fibers is desired. In addition, the role of water during the processing of the polymers in combination with the natural fiber and the durability of biocomposites in constructive applications, for example civil bridges, is of great importance.

2. Processing of biocomposite materials

The processing of fibers in combination with a thermoset or thermoplastic matrix is an important aspect of producing biocomposite materials. Compounding and extrusion properties, impregnation and consolidation play an essential role. Hence, processing and rheology are important issues regarding this theme. Key techniques are vacuum infusion and resin transfer moulding (RTM) for thermoset composites and pultrusion for thermoplastic composites. A detailed study on the interaction between fibers and resin is required. Additionally, a high volume percentage of fibers within the biocomposite is desired.

Goal of internship:

Main goal is to obtain more knowledge about biocomposites, because these materials are very promising for replacement of wood, steel and concrete.

Activities:

The Project involves:

- Preparing compounds based on natural fibres and a polymer
- Analysing techniques; chemical and mechanical
- Preparing new polymers or compounds (new fibre-polymer combinations).
- Cooperating in a larger project together with PhD's and researchers
- Gain knowledge about the biobased economy

Final product

The student will write a report that contains an overview of all activities and findings.

Starting date

September 2019. The length of the assignment is approximately 5 months (20 weeks). The student who will execute the assignment get a fee of €550,- per month.

The intern will be part of a research team lead by the adviser and supervised by dr. Rudy Folkersma

Desirable skills/qualities of the student

The student should be able to carry out independent laboratory research. The preferred background is polymeric chemistry or otherwise biochemistry, analytical chemistry or bioprocessing. The interest in material science and applications is a pre.



Good knowledge of the English language is required. We have set minimum language requirements for foreign students. The minimum English language prerequisite is: an academic IELTS test (or equivalent*) with an overall band score of at least 6.0. As a foreign student you must provide evidence of your language competences in the form of an official certificate: IELTS, TOEFL, TOEIC or Cambridge ESOL. It is your responsibility to ensure that you meet these requirements. **Please see the requirements on the webpage.**

Information of the company:

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Interested?

Please see the procedure at <https://www.biobasedbrazil.org/student/the-netherlands/>. Please be aware that the process stated at the above mentioned link applies.

PLEASE CONTACT FOR ADDITIONAL INFORMATION THE INTERNATIONAL OFFICE OF UFMG, UFV, UFSJ, UFOP OR PUC MINAS