Internship topics Living Lab Biobased Brazil Netherlands (updated 08-10-24). Scholarship/internship fees: € 650,- / month (but may vary per project).

Topic for internship	Professor in the Netherlands	University	Extra info & Example projects
Biorefinery	Qian Zhou	Avans	• Waste plastics/Biomass pyrolysis process optimization (reactor, chemical engineering, simulation, laboratory work). Pyrolysis product purification (chemical engineering, simulation, laboratory work). • Example of previous internships: pyrolysis of cashew nutshell using Auger pyrolyzer (23). • Performing LCA on pyrolysis processes of converting different kinds of feedstocks into valuable end-products by taking into account the whole chain value. Examples: literature research, modelling the pyrolysis process, writing a report, and contact with clients (17).
	Gino van Strijdonck/Tom den Hartog	Zuyd	• Biotechnical conversion: biotechnology is one of the modern ways to produce chemical products. Together with companies we research how this technology can be used most sustainably, for instance by using agrarian waste streams. Entry from a wide number of programs such as Chemistry; Chemical Engineering, Chemical Technology; Applied Science; Materials science; Sustainable Energy.
Wastewater treatment	Hans Cappon	HZ	• Recycling of surface and process water for industry, agriculture and aquaculture. • Recovery of valuable content in wastewater, like nutrients and humid acids. • Process monitoring and control, like smart sensors to monitor water quality • Examples of previous internships: Reduce the total organic carbon content of industrial condensate using IX and adsorption (11)
	Luewton Agostinho	NHL Stenden	• Electrohydrodynamic Atomization. Examples of previous internships: supporting and conducting experiments in the laboratory, writing reports, performing literature reviews, work with data analysis and data treatment. The research topic is the application of electrohydrodynamic atomization (EHDA) as an emulsification tool. The process has many applications both in food technology and water technology. The experiments will be conducted in the EHDA laboratory inside the Water Application Centre in the city of Leeuwarden, Netherlands (30).
Biocomposites	Rudy Folkersma	NHL Stenden	• Obtain more knowledge about biocomposites: these materials are very promising for the replacement of wood, steel and concrete. Example of previous projects: Depending on skills you work on either 1. Synthesis of biobased resins or 2. Processing of biocomposite materials. 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 PhDs and researchers - Gain knowledge about the biobased economy (31).
Environmental Impact Assessment	Alexander Compeer	Avans	• Practical research by performing environmental impact assessment, for example life cycle analysis. You will be part of the environmental impact assessment team and be able to work with LCA for Experts software and databases such as EcoInvent. You will be busy with literature research, learning about environmental impact assessment and life cycle analysis principles, contact with project partners and processing environmental impact data. • Examples of topics: performing environmental impact assessment/LCA on the process of chemical recycling or valorisation of residual streams from nature or agricultural sources.
Biopolymers & biomolecules	Qian Zhou	Avans	• Biocarbon-based biopolymer composites (polymer processing, polymer characterization). Preparing biobased thermosets (chemistry, analytical chemistry, laboratory work).
	Rudy Folkersma, Corinne van Noordenne	NHL Stenden	• Research of PHA's: processing, behaviour and possible application of PHA's. Example of previous projects: Preparing compounds based on PHA's, and other biopolymers. - Analysing techniques; studying biodegradability of these materials - Preparing new polymers or compounds (combination with natural fibres based on cellulose). - Cooperating in a larger project together with PhD's and researchers (58 1-2)
	Guilherme De Souza Reis	Avans	• Conversion of agro-industrial residual streams into VFAs (short-chain organic acids) for the potential production of PHA bioplastics.

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			● Semi-continuous production of PHA by mixed culture fermentation in bioreactors.
	Sandra Corderi Gandara	Avans	● Sustainable materials: Development of innovative bio-based polymer materials (PU, acrylics, epoxy,…) and bio-additives (flame retardant, plasticizers, …) based on lignin (most abundant natural aromatic polymer on earth) ● Involved techniques: FTIR, P-NMR (OH content in lignin), GPC (Mw), DSC, TGA, mechanical properties, compounding, injection molding, among others. ● In collaboration with our partner VITO (Flemish Research Institute).
	Gino van Strijdonck	Zuyd	● Circular materials: with an ever-increasing shortage of raw materials, it is of great importance to start using materials in a circular way. Within this research minor, together with companies, opportunities for circularity within polymeric materials are examined. You can think of: conversion of thermoset to thermoplastic; or of multi-layer and multi-material packaging to mono-material. Entry from a wide number of programs such as Chemistry; Chemical Engineering, Chemical Technology; Applied Science; Materials science; Sustainable Energy. ● 3D printing makes it possible to create truly customized products. However, there are still many challenges in the field of material science. Entry from a wide number of programs such as Chemistry; Chemical Engineering, Chemical Technology; Applied Science; Materials science; Sustainable Energy.
	Wim Gakeer	Avans	❖ Process Engineering, Supercritical Carbondioxide, dying and decolouring textile. Traditional recycling textile (natural and synthetic) leads to a lower quality of product because of the used dye in the original product. In this project you will design and test a method to dye and decolour textile with supercritical carbondioxide. These water-free processes with supercritical carbondioxide (SCC) will save energy and lower the environmental pollution from wastewater. In this project, you will perform experiments with an SCC pilot plant for process development. Starting February 2025, for 6 months
	Eric Matheussen	Avans	❖ Analytical Chemistry, Process Engineering, Seaweed, Natural Colourants. The company Zeefier, together with Avans, is developing natural colourants from seaweed. In this project you will do research into the seaweed compounds that can be used as a textile dye. Extracting seaweed, dying textile, measuring light stability of the colourants and analysing the extracts with HPLC are the main activities. Also the seaweed extraction and purification process needs to be developed resulting in a mass and energy balance and a process flow diagram. Starting February and September 2025, for 6 months
Sustainable synthesis and production	Gino van Strijdonck	Zuyd	● The chemical industry will have to become more sustainable to start meeting climate goals. Process intensification is of great importance here. Product purification (downstream processing) is one of the most energy-consuming parts of obtaining chemical products. Membrane technology can be a new sustainable alternative here. Entry from a wide number of programs such as Chemistry; Chemical Engineering, Chemical Technology; Applied Science; Materials science; Sustainable Energy. ● The chemical industry needs to become more sustainable to start meeting climate targets. Process intensification is of great importance here. Flow chemistry is one of the new techniques for process intensification. We carry out company assignments on various modern flow chemistry installations. Entry from a wide number of programs such as Chemistry; Chemical Engineering, Chemical Technology; Applied Science; Materials science; Sustainable Energy.
Smart Energy	Jack Doomernik	Avans	● Integration of new energy technology like heat pumps, solar PV, batteries, electrolyzers, fuel cells and electric cars in existing electricity networks ● Vehicle to Grid applications so that car batteries can support the electricity grid ● Hydrogen applications for balancing of electricity grids at waste-water treatment plants and business parks ● Collection of energy data, transformation to useful information and visualisation to control energy networks ● Artificial Intelligence for predictions of energy generation from renewable sources and consumption to balance supply and demand ● Artificial Intelligence for asset management and predictive maintenance of electricity networks ● Artificial Intelligence for controlling energy demand related to market circumstances (energy prices, contracts) ● Virtual Reality applications to promote the energy transition in residential areas and to improve the collaboration between partners in the supply chain for renovation

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Biodegradation	Samet Azman	Avans	• Investigation of the biodegradation potential of biomaterials, synthetic composites and biodegradable products. • Optimization and application of standard biodegradation testing, namely, OECD 301 methodology. • Determination of functional groups, improving the biodegradability of compounds.
Precision fermentation	Miao Miao	Avans	• Focus on bioprocess design: 1, feedstock design and comparison; 2, bioprocess design; 3 conduct fungal fermentation • Fermentation process monitoring: 1, run RNA-sequencing to monitor the process; 2 use qPCR to double validate the analysis
Bioinformatics	Miaomiao	Avans	• NGS data analysis, using big data and cloud computing to discover fungal potentials • Use long-read RNA-sequencing data to find predictive targets to monitor the fermentation process • Functional genomics and simple expression-flux balance modelling
Plastic waste recycling	Sandra Corderi Gandara	Avans	• Chemical recycling of different types of polymer materials & plastic waste (PET, PC, epoxy, PU, PIR). Process optimization (solvent selection, temperature, concentrations, catalyst) • Characterization of recycled materials: FTIR, GPC, NMR, DSC and TGA • In collaboration with our partner VITO (Flemish Research Institute)