

Internship topics Living Lab Biobased Brazil Netherlands (updated 25-09-23). 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	<ul style="list-style-type: none"> • 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 kind of feedstocks into valuable end-products by taking into account the whole chain value. Example: literature research, modelling the pyrolysis process, writing a report, contact with clients (17).
Wastewater treatment	Hans Cappon	HZ	<ul style="list-style-type: none"> • 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)
	Lewton Agostinho	NHL Stenden	<ul style="list-style-type: none"> • Electrohydrodynamic Atomization. Examples of previous internships: support and conduct experiments in the laboratory, write reports, perform literature review, 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, The Netherlands (30).
Reuse of residual streams	Michiel Michels	Avans	<ul style="list-style-type: none"> • Optimization of green extraction of PHA. Example of previous project: Accumulation of PHA bioplastic in microorganisms from secondary sludge (microbiology, bioreactors, analytical chemistry, simulation). Solvent extraction of PHA bioplastic from dry biomass (solvent extraction laboratory work, analytical chemistry) (33)
Environmental Impact Assessment (EIA)	Alexander Compeer	Avans	<ul style="list-style-type: none"> • Life cycle analysis for the process of pyrolysis. Working with GABI modelling software, client contacts, environmental impact assessment. Examples of previous internships: performing LCA on converting biomass into useful products by pyrolysis (24)
Building and Construction	John van Oorschot	Zuyd	<ul style="list-style-type: none"> • Practical research in the field of sustainable and circular building and construction, both on building on urban scale. Running projects cover sustainable material development for the construction industry, circular material application, LCA of construction materials and components, architectural and technical designing, and energy-efficient installations aspects. Projects are in close collaboration with (inter)national partners.rs.
Biocomposites	Rudy Folkersma	NHL Stenden	<ul style="list-style-type: none"> • Obtain more knowledge about biocomposites: these materials are very promising for 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 PhD's and researchers - Gain knowledge about the biobased economy (31).
Advanced Materials	Gino van Strijdonck	Zuyd	<ul style="list-style-type: none"> • Nano structured coatings for energy management e.g., switchable heat blocking coatings. (Biobased) Materials for 3D printing (e.g., light weight automotive and prostheses). Mechanical recycling. Circular product engineering. All projects are conducted with companies in the laboratories of CHILL (www.chillabs.nl) situated at Chemelot, a major chemical production and research site. (16)
Biopolymers & biomolecules	Qian Zhou	Avans	<ul style="list-style-type: none"> • Biocarbon based biopolymer composites (polymer processing, polymer characterization). Preparing of biobased thermosets (chemistry, analytical chemistry, laboratory work).
	Rudy Folkersma, Corinne van Noordenne	NHL Stenden	<ul style="list-style-type: none"> • Research of PHA's: processing, behaviour and possible application of PHA's. Example of previous projects: Preparing compounds based PHA's, and other biopolymers. - Analysing techniques; studying biodegradability of these materials - Preparing new polymers or

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			compounds (combination with natural fibres based on cellulose). - Cooperating in a larger project together with PhD's and researchers (58 1-2)
	Michiel Michels	Avans	<ul style="list-style-type: none"> ● Accumulation of PHA bioplastic in microorganisms from secondary sludge (microbiology, bioreactors, analytical chemistry, simulation). ● Solvent extraction of PHA bioplastic from dry biomass (solvent extraction laboratory work, analytical chemistry). ● Examples of previous internships: optimization of green extraction of PHA (22).
	Gino van Strijdonck	Zuyd	<ul style="list-style-type: none"> ● Polymer processing (3D printing). Polymeric materials. The project is conducted by a project group consisting of students, researchers/lecturers and experiences professionals in the Chemelot Innovation and Learning Labs (www.chillabs.nl) situated at the Brightlands Chemelot Campus an international hotspot in Chemistry and Materials Research 16).
	Wim Gakeer	Avans	❖ Supercritical Carbon dioxide and cotton dyeing (6 months, starting September 2022). The traditional way of dyeing cotton uses a large amount of fresh water and energy. A water-free dyeing process with SuperCritical Carbon dioxide (SCC) will save energy and lower the environmental pollution from wastewater. In this project, you will perform experiments with an SCC pilot plant to develop an SCC-dyeing process for indigo to cotton. This process will be implemented and tested in a commercial small-scale SCC dyeing machine.
	Wim Gakeer	Avans	❖ Supercritical Carbon dioxide and removal of colourants from recycled plastic (6 months, starting September 2022 or later). The recycling of plastic waste streams is a fast-growing industrial branch. However, colour differences in recycled plastic reduce its utilisation. In this project, you will perform experiments with an SCC pilot extraction plant to evaluate the usage of this technique for the decolourisation of recycled plastic. You will also make a preliminary design for a commercial SCC decolourisation plant to make a techno economic evaluation of this process.
Sustainable synthesis and production	Gino van Strijdonck	Zuyd	<ul style="list-style-type: none"> ● Solar conversion (CO₂ valorization, nano-catalysis, photo reactors), microreactor technology, biotechnological conversions, polymers, pharma, depolymerisation, chemical recycling, downstream processing and scaling.
Building with nature (mycelium)	Ilse Rovers	Avans	<ul style="list-style-type: none"> ● In general: Mycelium biocomposite research for material application and development. Also research possible on pure mycelium materials. ● In September 2023: prototyping a mycelium wall / different other mycelium biocomposite products (design and fabrication, together with industrial partners). Optimising the energy and water usage. User experience is a topic. ● September 2023: building / developing (designing) a pasteurization device (engineering) for de-contaminating the substrate material before turning it into the mycelium material. ● September 2023: Research on shadow costs (New Economy) in a True Pricing research on mycelium biocomposite products.
Smart Energy	Jack Doomernik	Avans	<ul style="list-style-type: none"> ● 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
Biodegradation	Samet Azman	Avans	<ul style="list-style-type: none"> ● 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.

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Membrane technology	Bruno Bastos Sales	Avans	<ul style="list-style-type: none"> • Investigation of the suitability of micro-, ultra-, nanofiltration and reverse osmosis for the valorisation of industrial residual streams. • In September 2023: we build upon a theoretical investigation of matching membrane techniques with different residual streams. The idea is to test these results experimentally, and further improve the theoretical knowledge. We want to test real complex solutions with our membrane characterization setup.
Precision fermentation	Miao Miao	Avans	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • NGS data analysis, use big data and cloud computing to discover fungal potentials • Use long read RNA-sequencing data to find predictive targets to monitor fermentation process • Functional genomics and simple expression-flux balance modelling