

# Opportunity to conduct your BSc (thesis or internship) or Master project in The Netherlands.

2023  
NHL Stenden



university of  
applied sciences

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# 1. Introduction

NHL Stenden University of Applied Sciences has opened one positions for non-European students looking for practical internship, final year (BSc) thesis and/or master thesis in the Netherlands. Bachelor's and master's students are welcome to apply for the offered positions. The project(s) will be conducted by the Water Technology Research Group (WTRG) at NHL Stenden (Water Technology Lecoraat)<sup>1</sup>. The selected student will have the opportunity to conduct practical (laboratory) and/or theoretical (model) work, depending on the project. The activities will take place in the Water Application Centre (WAC) and/or the Gilbert-Armstrong Laboratory of Electrohydrodynamics<sup>2</sup>. The projects conducted by the WTRG have a close link with different European companies and industries as well as with other research institutes like Wetsus<sup>3</sup>, Centre of Expertise Water Technology (CEW)<sup>4</sup> and other academic institutes, e.g. University of Amsterdam, Wageningen University and Research, Avans University of Applied Sciences, HZ University of Applied Sciences, Van Hall Larenstein University of Applied Sciences.

## 2. What we offer/ask:

- Approximately and 10 (max) months academic exchange at NHL Stenden University of Applied Sciences,
- 40 hours per week, from Monday until Friday (9am to 5pm);
- A student allowance which will be used to cover visa costs (arranged by the university), health insurance (arranged by the student), transportation to and from the Netherlands (arranged by the university) and a monthly allowance of ~600€/month (depending on the costs done with the before mentioned aspects) throughout the academic exchange duration (finding accommodation is also up to the student);
- Opportunity to work in a project with practical (laboratory) research, linked with the Water Technology subject;

## 3. What we ask from you:

- To be regularly enrolled in a non-European higher education institute following an under graduation (bachelor's) or a graduation (master's) program;
- To be enrolled in one following courses: Chemistry, Environmental Engineering, Sanitation Engineering, Chemical Engineering, Electrical Engineering, Physics.
- Academic excellence, to be demonstrated by the student's academic transcript;

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<sup>1</sup> <https://www.nhlstenden.com/onderzoek/watertechnologie>

<sup>2</sup> <https://www.waterapplicatiecentrum.nl/en/>

<sup>3</sup> <https://www.wetsus.nl/>

<sup>4</sup> <https://www.cew.nl/en/>

- To have (preferably) previous experience with Water Technology (Drinking Water/Wastewater Treatment) and/or Electrohydrodynamics (EHDA or Electrospinning);
- The student has to be proactive and work independently at times;
- Laboratory work experience.
- Some experience with the following procedures (techniques) is appreciated: drinking water/waste water treatment (WAC) process and analysis, high-voltage (low power) related safety, high speed imaging, nanoparticle analysis and imaging treatment (Gilbert-Armstrong Laboratory).
- To be proficient on the English language, to be demonstrated by one of the following examinations:
  - Academic IELTS 5.0 (4.0 for each sub skill). For more information: [www.ielts.org](http://www.ielts.org).
  - TOEFL iBT 500 (paper-based), 173 (computer-based) and 60 (internet-based). For more information: [www.toefl.org](http://www.toefl.org). Original test results must be directly sent from the Educational Testing Service to NHL Stenden. The TOEFL institution code for NHL Stenden is C652.
  - Cambridge ESOL score FCE-C (160–161)

## 4. Projects

The projects that the applicant can work on are in the following subjects:

### 4.1 AECTION – Automatic EHDA Control and Characterization

This project aims to combine high voltage electric current measurement, signal processing, control and machine learning tools to realize a closed loop control system. The student will be asked to develop tools and work with solutions for the following tasks: (i) identifying the best electrical potential raising mode (stepwise or ramping) which can be used to facilitate signal characterization, (ii) build a communication platform (command routine) for operation, synchronization and control of the highspeed cameras which are used in the setup (iii) use different signal treatment or similar tools to improve electric current signal recognition, (iv) work on the combination of all the previews mentioned tasks to automate the electrohydrodynamic atomization system: For this project, the most preferred backgrounds are electrical engineering, mechatronics and/or electronics. Extensive knowledge with programing languages is required (Python). Also, experience with machine learning tools, signal treatment tools, high speed imaging and high voltage systems are appreciated. Experience with electrohydrodynamic, high voltage safety, high voltage system operation and signal treatment are a plus.

### 4.2 ESusMag: Effect of Sustainable Magnetic Treatment on Drinking Water Microbiological Communities

This study aims to investigate the effect that high frequency varied magnetic fields would have on drinking water microbiome. Preliminary results show that a selective growth boost for bacteria with low nucleic acid content which

prevents growth of the high nucleic acid content (HNA) bacteria is promoted. The tests will be conducted with ground water in a pilot scale system. Samples will be analyzed regarding different physical-chemical parameters (color, turbidity, redox potential) as well as for microbial population studies using flow cytometry. For this project, the most preferred backgrounds: Chemical Engineering, Chemistry, Environmental Engineering, Sanitation Engineering. Knowledge about drinking water treatment and microbiology is highly recommended. Experience with analysis of basic physical-chemical parameters for water and wastewater as well as microbiology analysis are desirable as well.

### 4.3 Nanocather: Spatial sampling of micro(nano)plastics using underwater drones equipped with a membrane filtering system

In this study the use of submerged drones as a sampling tool to monitor the presence of submicrometric polymeric particles in water bodies will be studied. The student will be asked to give support to the development of the drone sampling system as well as to support during the sampling period (when the drone will be put in operation). Another expected task is the analysis of the collected samples for different physical-chemical parameters with main focus on (sub-micrometric) particles population. For this project, the most preferred backgrounds: Chemical Engineering, Chemistry, Environmental Engineering. Knowledge about drinking water treatment (specially membrane systems) is highly recommended. Experience with analysis of basic physical-chemical parameters for water and wastewater and experience with particle analysis are also desirable.

### 4.4 NUCLEPAR – Specially manufactured nucleic acids marked nano plastics for water technology applications using Electrohydrodynamic Atomization (EHDA).

This study investigates the use of Electrohydrodynamic Atomization (EHDA) as a tool to fabricate nano and micro sized polymeric particles (NMPs). The particles will be produced from different polymer types, sizes, and shapes and will be coated (or doped) with a biological marker. For this project, the most preferable backgrounds are: Physics or Microbiology. Experience with particle fabrication is highly appreciated as well as with particle identification and analysis. Additionally, experiences with Loop-mediated isothermal amplification (LAMP) are extremely desirable. Experience with electrohydrodynamic, high voltage safety and high voltage system operation are a plus.

### 4.5 Repolymerize

This project will study different separation methods to purify and recover materials from polycotton chemical recycling processes effluents. The student will be asked to operate a pilot scale setup and perform different analysis to characterize the effluent before and after treatment. Preferable backgrounds: Chemical Engineering, Chemistry and Environmental Engineering. Experience

with distillation and membrane separation processes is desirable. Also experiences with lab analysis (water and wastewater effluents) is appreciated.

#### 4.6 Smart Crop Protection in Greenhouses

This project targets the integration of electrohydrodynamic atomization (EHDA) system in flying drones. The student will need to give support to the integration phase and will perform different tasks related to circuit design and tests, mechanical adaptation of the system to the drone and tests. Furthermore, different EHDA tests will be conducted to evaluate the performance of the system using some targeted liquids. Preferable backgrounds: Electrical Engineering, Mechatronics and Physics. Experience with low voltage – high voltage converters, micro-pumps, drone structure and electronics and high-voltage system is highly appreciated. Experience with electrohydrodynamic, high voltage safety, high voltage system operation and signal treatment are a plus.

#### 4.7 VortOx – Aeration and Oxidation with a Hyperbolic Vortex

The aim of the study is to test the applicability of geometrically constrained vortices in a hyperbolic funnel as an innovative aeration technique in wastewater treatment. During the activities the student will be asked to setup and operate a pilot scale aeration system in the demo site facilities of the wastewater treatment plant of the city of Leeuwarden. During the tests different parameters will have to be analyzed as well as calibration and data collection from different sensors, operation of the setup and data treatment and reporting to supervisors and (company) partners. Most preferred backgrounds are: Chemical Engineering and/or Environmental Engineering with specialization in drinking or wastewater treatment. Experience with pilot size setup operation is important as well as with basic analysis of water and wastewater. Experience with inline sensors, dataloggers and data treatment as well.

#### 4.8 Design and test of an EHDA based biogas odorization system

This project aims the design, manufacture and test of an EHDA based odorization system. The student will be asked to perform different real scale tests using EHDA in odorization lines. Also, different tool will be used to treat and characterize the electric current signal acquired during the tests. Preferable backgrounds: Chemical engineering, Electrical engineering, mechatronics, electronics, and physics. Experience with odorization systems is required. Experience with electrohydrodynamic, high voltage safety, high voltage system operation and signal treatment are a plus.

## 5. Application procedure and deadlines

The application process and planning can be seen in the table below:

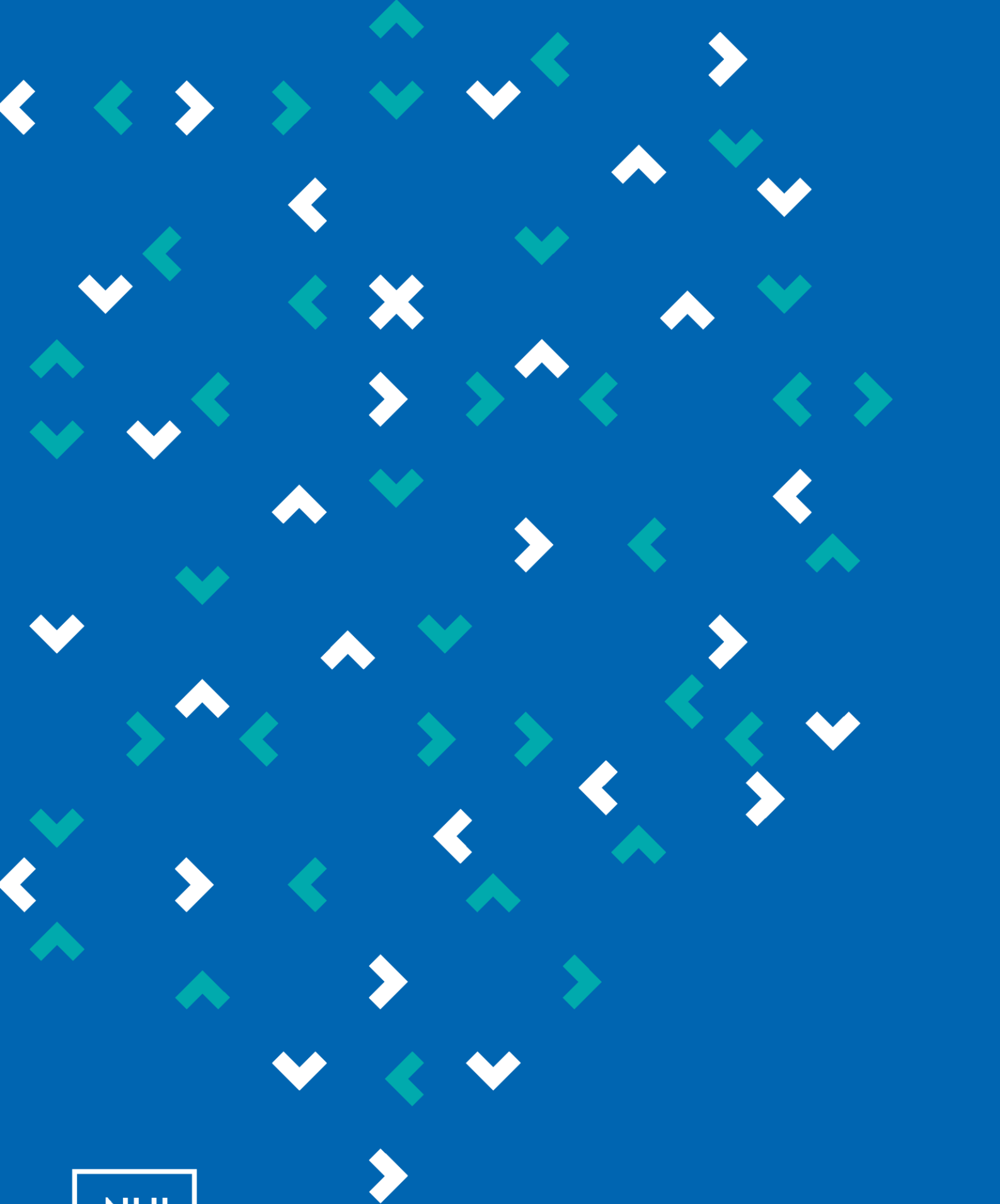
Table 1 - Application procedure and deadlines.

Stage	Period
Documents submitted per e-mail	Between 15/01/2023 and 20/02/2023
Document's assessment and selection for interviews	21/02/2023 and 24/02/2023
Interview period	06/03/2023 and 10/03/2023
Final result and selection	15/03/2023
Visa application start	16/03/2023
Start of activities in Leeuwarden, The Netherlands (estimation)	September, 2023

Please mention which project subject you would like to apply for in your e-mail. The applicants have to submit the following documents to [claudia.sousa@nhlstenden.com](mailto:claudia.sousa@nhlstenden.com) and to [luewton.agostinho@hvhl.nl](mailto:luewton.agostinho@hvhl.nl) (please mention in the e-mail's subject "NHL Stenden WTRG scholarship – Your name and academic institution") before the deadline seen on Table 1:

- CV (in English);
- Passport;
- Language exam;
- Enrolment certificate;
- Academic transcription;
- A letter from your supervisor (professor) from your university stating that this academic exchange period will be beneficial for your bachelor's or master's thesis;
- An official English translation made by a sworn translator of the enrolment certificate and the academic transcription;

If you have any questions, you can reach us by e-mail on [claudia.sousa@nhlstenden.com](mailto:claudia.sousa@nhlstenden.com) and to [luewton.agostinho@hvhl.nl](mailto:luewton.agostinho@hvhl.nl)



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