

# LERU STudent REseArch Mobility Programme (STREAM) Project proposal



**Host University:** Leiden University

**Main Research Field (drop-down list):** 13.3 Chemistry

**Specified field, subject:**

Materials Science, Chemistry, Physics

**Research project title:**

Operando research in heterogeneous catalysis

**Possible starting month(s):**

Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
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*The exact starting and end dates will be discussed between the supervisor and the student.*

**Possible duration in months:**

Minimum: 3 months

Maximum: 2 semesters

**Suitable for students in:**

Bachelor level

Master level

**Prerequisites:**

- Minimum GPA 3.2 out of 4
- Sophomore level chemistry or physics or materials science with strong interest in physical chemistry and/or heterogeneous catalysis.

**Description:**

The nanoscale structure of a catalyst under reaction conditions determines its activity, selectivity, and stability. For the production of sustainable energy and materials, new catalysts are needed. By understanding the structure-activity relationships of catalysts under reaction conditions, insight in the development of these new catalysts can be obtained. Using in situ imaging techniques under industrial conditions, we are currently studying Fischer-Tropsch synthesis, NO reduction and oxidation, hydrodesulfurization, CO oxidation, and chlorine production. The student will be involved in ongoing research investigating the relationship between the structure of the active phase of a catalyst and its activity under industrially relevant conditions. These studies will be performed using scanning tunneling microscopy in high-pressure, high-temperature



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conditions. The student will learn the following experimental techniques: scanning tunneling microscopy, X-ray photoelectron spectroscopy, low-energy electron diffraction, and mass spectrometry. Catalyst preparation consists of physical vapor deposition of nanoparticles onto oxide films on single crystals.



**Faculty:** Science

**Faculty Department:** [Leiden Institute of Chemistry \(LIC\)](#)



LUND  
UNIVERSITY

**Deadline for nomination to reach host university:**

1 April or else 1 October.

Please note: Due to the COVID-19 situation and measures taken, we expect to offer this project again per Fall 2021. However, the project might be cancelled if empirical research in the institute is impeded by COVID-19.



**Notification of admission given by the end of:**

Approximately 6 weeks after receipt of the application.



**Additional information:**

- Number of places available per semester: 1.
- Duration for at least 6 months, but preferably longer.



**Contact person:**

Ms. Usha Mohunlol - Student and Educational Affairs - Coordinator LERU  
STREAM

**Contact email:**

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