

Connect. Exchange. Innovate.

IDEA League Doctoral School Program

Advanced Atomic Scale Characterisation

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IDEA League | Doctoral School Programme

Advanced Atomic Scale Characterisation

Chalmers University of Technology

Department of Physics

October 14-18, 2024

 **IDEA** League

RWTHAACHEN
UNIVERSITY



POLITECNICO
MILANO 1863

 **TU**Delft

ETH zürich

CHALMERS
UNIVERSITY OF TECHNOLOGY

Aims and scope of the Doctoral School

Knowledge of the atomic-scale structure, processes, and properties of advanced materials is a prerequisite for improving their properties and behavior in technological applications across a broad range of disciplines. Atomic-scale characterization makes it possible to shorten development cycles, improve lifetimes, and enable new technological innovations. Furthermore, knowledge of structural behavior and atomic-scale mechanisms provides important input for modeling and simulation.

The aim of the School is to encourage and strengthen a sustainable network of young and talented researchers between the IDEA League universities and to equip that network with improved competencies in Atomic Scale Characterisation

Purpose

The School at Chalmers University of Technology will focus on advanced techniques for high-resolution electron microscopy, specifically for scientists currently using transmission electron microscopes in materials science studies. Laboratory sessions will showcase state-of-the-art instrumentation.

Participants should have a basic understanding of conventional electron microscope operation.

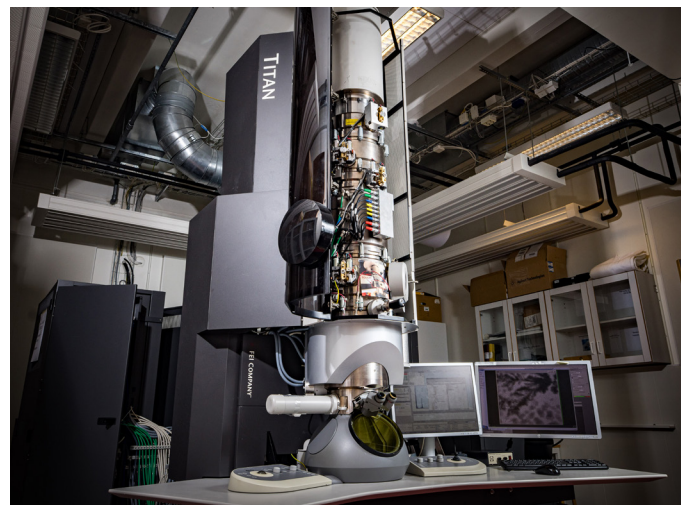
Participants

The school will be open to PhD candidates and postdoctoral researchers from the participating universities. The school specifically addresses young researchers in the following disciplines:

Chemistry, Physics, Materials Science and Engineering, and Electrical Engineering

Examples of application fields include:

Nanoscience and nanomaterials, solid state physics/chemistry, catalysis, functional materials, materials for IT, quantum materials and 2-D materials. No prior knowledge in the specific experimental techniques is needed but a basic understanding of conventional electron microscope operation is required.



Lectures

The School will feature lectures on High precision STEM

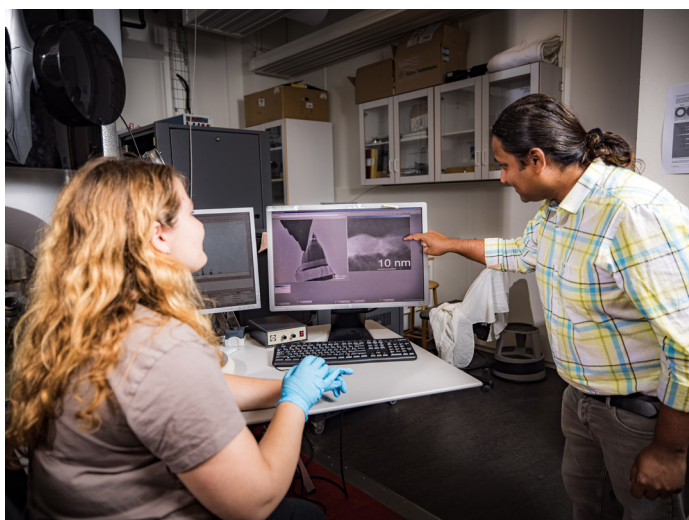
- TEM Tomography
- Image Processing
- In situ
- EDX
- EELS
- Monochromated EELS
- Differential Phase Contrast
- Electron Beam Dose Considerations
- Applications of Advanced TEM

Laboratory sessions

The School will include laboratory sessions on:

- TEM tomography
- High precision STEM
- Monochromated EELS and Atomic Resolution EDX (JEOL 200F NEOARM)
- Specimen Preparation

The laboratory sessions will be carried out using monochromated and double-corrected JEOL-ARM200F NEOARM, the monochromated and probe-corrected Titan 80-300, the Tecnai G2 TEM and the FEI Versa 3D.



Application

Application is open to PhD candidates and postdoctoral researchers of the member universities from the IDEA League Alliance. Applications must be accompanied by a CV, motivation letter including a description of acquired experience of TEM, and a letter from the supervisor. Participation will be selected based on personal achievements.

Costs

There are no participation or accommodation fees. Students from IDEA League member universities selected to participate in a doctoral school only have to pay for their own travel (and visa) costs.

	Monday	Tuesday	Wednesday	Thursday	Friday
09:00 - 10:30		Lecture 3	Lecture 5	Lecture 7	Lecture 9
10:30 - 10:45		Coffee/Tea	Coffee/Tea	Coffee/Tea	Coffee/Tea
10:45 - 11:30		Lecture 4	Lecture 6	Lecture 8	Clea Room Tour
11:30 - 12:15	Arrival	Lecture 4	Lecture 6	Lecture 8	Conclusion
12:15 - 13:15	Sandwich	Lunch		Lunch	Lunch
13:15 - 15:00	Lecture 1	Lab Session	Lab Session	Lab Session	
15:00 - 15:30	Coffee/Tea	Coffee/Tea	Coffee/Tea	Lab Session	
15:30 - 17:15	Lecture 2	Lab Session	Lab Session	Lab Session	
17:30 - 20:00	Pizza Gathering	Free Time	Free Time	Free Time	
18:30 - 21:30		Dinner Chalmersska Huset			

