Innovation Workshop 2018

UQ - NTU - KAIST - DTU

DTU is proud to host the annual Innovation Workshop 2018, and we are excited to invite five excellent final-year undergraduate students or (post)graduate students from UQ NTU, KAIST and DTU respectively to join the innovation workshop. The focus of the workshop will be on engineering sustainability with emphasis on energy and environmental engineering topics.

Tentative Schedule	
May 15	Nomination/application deadline: Partner universities forward a list of selected students including a prioritized list of chosen projects
June 11-24	Preparation before arrival: Formation of groups and supervisors provide reading material, which should be read before arriving at DTU
June 24	Arrival at DTU campus
June 25 - July 5	Working on projects at DTU
July 6	Internal presentation, defense and peer review
July 7	Departure from Denmark

Date: **June 25 – July 6 2018**
Place: **DTU Lyngby campus, main venue will be DTU Skylab http://www.skylab.dtu.dk/**
Participants: **Priority given to 5 final-year undergraduate or (post)graduate students from each institution. Others may apply.**
Costs: **No tuition. Housing, meal plan, social activities and sightseeing will be provided by DTU.**

Information about the coming and past Innovation Workshops, please see the official website:
http://www.nanotech.dtu.dk/Uddannelse/Innovation-workshop

Projects for 2018

List of offered projects during the Innovation workshop 2018 (descriptions may be updated and more projects might be added)

Groups will be formed to ensure that groups have students from different universities with the highest possible priority. Hence, only projects with high enough prioritization will be running and given the number of students, one or more projects will likely be added to the list. Some projects may be run by two groups with slightly different focus if needed.

- **Characterization of aerosols for human toxicological assessment**
  - Aerosol pollution is found to be an increasingly important aspect of human health, affecting millions of people worldwide especially in densely populated areas. This project will develop a method to provide a more detailed characterization of aerosol pollution by using automated electron microscopy to get statistics on individual aerosol particle properties, thereby giving more information to assess toxicological impacts and locate the origin of the pollution.
  - Supervisor: Anders Brostrøm Bluhme abbl@dtu.dk

- **Scaling prevention**
  - Scaling, precipitation and adhesion of colloidal particles cause efficiency reducing deposits in many types of processes and equipment that increase energy consumption. This project will look into ways study the details of the process to understand and control it to avoid deposits.
  - Supervisor: Murat Nulati Yesibolati nuye@nanotech.dtu.dk

- **Nanobiosensors to Detect Antibiotics in Milk Samples**
  - Persistent concerns over contamination of water and food with antibiotic residues, rapid antibiotic screening tests are urgently needed. Biosensors that can selectively detect particular compounds in natural or only minimally pre-treated samples are a good option for the on-site assessment, for instance of milk quality. The project will study how to develop biomimetic receptors using molecularly imprinted polymer nanoparticles for this.
  - Supervisor: Associate Prof. Yi Sun, Sun.Yi@nanotech.dtu.dk, and PostDoc Jon Ashley, jash@nanotech.dtu.dk

- **Electrocatalysis with non-noble metal organic frameworks (MOF)**
  - New catalysts are needed to replace the expensive and scarce noble metal catalysts. For electro catalysis in e.g. fuel cells, the new materials need to possess several unique advantages including low cost, excellent electrical conductivity, mechanical strength, chemical stability, high surface area, as well as tolerance and durability on the process they are involved in. This project aims at finding new low cost synthesis procedures and candidate materials as electro catalysts for electrochemical process.
  - Supervisor: Professor Jingdong Zhang jz@kemi.dtu.dk , PhD student Wei Huang, weihua@kemi.dtu.dk

- **Chemical production of nanoporous metal materials as electrocatalysts**

- Nanoporous metal films can be formed by nanoparticle assembly at liquid/air interface and used for electrochemical applications. The most successful case is nanoporous gold film (NPG). In this project, we plan to play NPG and modify it by introduction of monolayer of another metal. Scanning probe microscopy such as atomic force microscopy (AFM), scanning tunneling microscopy (STM) and electron microscopy will be used to characterize porous structures.
- Supervisor: Professor Jingdong Zhang jz@kemi.dtu.dk , Post doc Hongyu Sun hsun@nanotech.dtu.dk

Course learning objectives for students

1. The objectives of this course are:
   - In a project group you will research how a chosen method or technology best can be developed further, based on a review explaining the fundamentals of the subject and describing state-of-art in a report. The subject of the project is within the scope of engineering sustainable solutions to societal challenges.

2. In your report and presentation

   - Explain the fundamentals of your topic and likely include a short experimental test in the report.
   - Describe state-of-art and develop a suggestion for an innovative idea on how to advance state-of-art, based on a more detailed analysis.

3. Plan and execute your work.

   - To the extent possible, you can perform basic experimental tests or modelling to support your idea.
   - Gain experience in the challenges of international research collaboration and project planning.
   - Developing your skills in the creative application of learned knowledge, when solving a research challenge to formulate a new research project.
   - Writing a report in international collaboration.
   - Presentation, defense, and peer review evaluation of your work

Assessment

- Feedback is provided at the defense by the other participating groups (and later by researchers).
- The projects are judged by all participating students and researchers
- The final judging is based on a report, presentation and defense of project at the host university
- Pass/fail assessment evaluated by supervisors, is based on a report, presentation and defense of project by the group.
- Should individuals appear to lag behind, an individual assessment can be made on the last day as an individual oral examination to establish whether the person passed or failed.

For any inquiries please contact Kasper Dam Schultz (practical matters) – kadam@adm.dtu.dk