

PhD Scholarship in Hybrid metal-organic Nanostructure Engineering for Photonics

A 3-year PhD scholarship in **Organic Chemistry and Photophysical studies** is available starting from January 1, 2023 or as soon as possible thereafter. The project will be carried out as a collaboration between the groups of Assoc Prof Katrine Qvortrup (**Technical University of Denmark** (DTU), Department of chemistry) and Prof Christophe Galland (**EPFL**, Switzerland, Laboratory of Quantum and Nano-Optics). The PhD-student will be enrolled at DTU and spend a minimum of 6 months at EPFL.

Gold nanoparticles (AuNPs) are the most widely used inorganic nanoparticles for nanostructure-based materials. The synthetic engineering of organic ligands on the AuNPs leads to almost endless possibilities for tuning material properties (e.g. optical, electrochemical, photothermal, electronic, etc.).

The PhD project will focus on the **design, synthesis, and characterization of new types of Au-organic nanostructures with engineered and optimised metal-molecule interaction** for applications in **nano-plasmonics, nonlinear optics, molecular electronics chemical sensing, and photo-induced chemistry**. Characterization will include the elucidation of structural and physical properties, optical response (Raman scattering, infrared absorption, etc.), electronic structure and charge transport – both at the ensemble and individual nanoparticle level. Many experiments will be performed at EPFL in Switzerland. The project will have significant impacts on the understanding of AuNP chemistry and hybrid Au-organic photo-physics, and will clarify the correlations between chemical and electronic structures and the ensuing nanostructure properties. Active dissemination of the obtained results in scientific articles and through participation in international conferences is an integral part of the thesis.

References: *Nano Lett.* **22**(14): 5859–5865 (2022); *Nano Lett.* **22**(17): 7254–7260 (2022); *Electrophoresis* **40**:18-19 (2019); *Chem. Sci.* **14**, 3927 (2019); *Electroch. Comm.* **124**, 106962 (2021).
Applications in photonics: *Nature Materials* **18**, 668–678 (2019), *ACS Photonics* **8**, 1863–1872 (2021), *Science* **374**, 1264-1267 (2021)

Qualifications

The successful candidate should have a Master's degree with focus on organic chemistry or physical chemistry. **Experience with organic synthesis is a requirement** for the position, while experience in optical spectroscopy, surface science, or nanotechnology will be advantageous.

Most importantly, the candidate should be highly motivated, able to work independently and should be fluent in both written and spoken English. The applicant should strive towards scientific excellence, be ambitious and hard working. Only applicants who seek to be among the brightest in their field and do science at the highest international level will be considered.

Approval and Enrolment

The scholarship for the PhD degree is subject to academic approval, and the candidate will be enrolled in one of the general degree programmes at DTU. For information about our enrolment requirements and the general planning of the PhD study programme please see the [DTU PhD Guide](#).

Assessment

The assessment of the candidates will be made by Assoc Prof Katrine Qvortrup and Prof Christophe Galland.

We offer

DTU and EPFL are two leading technical universities globally recognized for their excellence in research, education and innovation. We offer a rewarding and challenging job in an international environment. We strive for academic excellence in an environment characterized by collegial respect and academic freedom tempered by responsibility. DTU and EPFL strive to be equal opportunity employers and a family-friendly universities.

Salary and terms of employment

The appointment will be based on the collective agreement with the Confederation of Professional Associations. The allowance will be agreed upon with the relevant union. The period of employment is 3 years.

You can read more about career paths at DTU [here](#).

Further information

Further information about the project should be directed Assoc. Prof. Katrine Qvortrup, kaqvo@kemi.dtu.dk or Prof Christophe Galland, chris.galland@epfl.ch.

You can read more about “the Department” at www.kemi.dtu.dk.

Application procedure

Please submit your online application no later than **November 30, 2022**.

Apply online at www.career.dtu.dk. Applications must be submitted as **one PDF file** containing all materials to be given consideration. To apply, please open the link "Apply online", fill out the online application form, and attach **all your materials in English in one PDF file**. The file must include:

- A letter motivating the application (cover letter)
- Curriculum Vitae
- Grade transcripts and Diploma (BSc/MSc)
- Excel sheet with translation of grades to the Danish grade system – see guidelines and Excel spreadsheet [here](#).

Applications and enclosures received after the deadline will not be considered.

All interested candidates irrespective of age, gender, disability, race, religion or ethnic background are encouraged to apply.

Technology for people

DTU develops technology for people. With our international elite research and study programmes, we are helping to create a better world and to solve the global challenges formulated in the UN's 17 Sustainable Development Goals. Hans Christian Ørsted founded DTU in 1829 with a clear vision to develop and create value using science and engineering to benefit society. That vision lives on today. DTU has 12,000 students and 6,000 employees. We work in an international atmosphere and have an inclusive, evolving, and informal working environment. Our main campus is in Kgs. Lyngby north of Copenhagen and we have campuses in Roskilde and Ballerup and in Sisimiut in Greenland.