**PostDoc positions on “*Live*” Visualizations of Single Nanoparticle Catalysts at the Atomic-Scale – DTU Physics**

Could you envision “*seeing*” chemical reactions being catalyzed at the atomic-scale? Two or more PostDoc positions are now open for experimental research in nanoparticle catalysis using advanced *operando* electron microscopy at the Center for Visualizing Catalytic Processes (VISION).

VISION is developing and applying a new unique platform for visualizing catalytic nanoparticles and reactions at the atomic-level by integrating cutting-edge electron microscopy, microfabricated nanoreactors, nanoparticle synthesis and computational modelling. This approach enables new, direct *operando* observations that are urgently needed to advance mechanistic insight into catalytic processes at the atomic-scale.

The interdisciplinary approach aims at relating the atomic-scale structure, dynamics and functions of isolated, single nanoparticles in both thermal catalysis and electrocatalysis as a radical new approach for developing new and more efficient catalysts needed to tackle the environmental challenges of our time.

In the autumn 2023, VISION’s new *one-of-a-kind* electron microscope will be housed in DTU’s new "Climate Challenge Laboratory" building. The new laboratory will host the VISION center, the Surface Physics and Catalysis section, the CatTheory section and the Pioneer Center, CAPeX, as a vibrant collaborative research environment with internationally leading scientists in the fields of catalysis and power-to-X.

**Responsibilities and tasks**

*Position 1*: You will work quantitatively with the atomic structure and functionality of single nanoparticles in thermal catalysis. The tasks can include:

* Preparation of microfabricated nanoreactors with single or few nanoparticles for catalysis of chemical reactions in gas phase.
* *Operando* studies of single nanoparticles using atomic-resolution transmission electron microscopy techniques.
* Development of new ultrasensitive and quantitative methods for investigations of gas-surface interactions on nanoparticles at the atomic-scale.
* Relating the three-dimensional atomic surface structure and catalytic functions of single nanoparticles.
* Exploring the structure-function relations to develop strategies for designing uniquely active catalyst nanoparticles for sustainable chemical processes.

*Position 2*: You will work quantitatively with the dynamic behaviour of single nanoparticles in thermal catalysis. The tasks can include:

* Visualization of single nanoparticles in thermal catalysis using time-resolved, atomic-resolution transmission electron microscopy techniques.
* Development of quantitative image analysis to extract dynamic information encoded in single and series of atomic-resolved images of single nanoparticles.
* Investigation of dynamic processes at the heterogeneous surface of single nanoparticles as catalytic reactions progress.
* Understanding of atomic mechanisms and kinetics to develop strategies for stabilizing uniquely active but metastable surface motifs of nanoparticles as catalysts for sustainable chemical processes.

In both positions, you will collaborate closely with a group of PhD students, postdocs and international leading scientists, all working at the technological edge of modern electron microscopy for advancing catalysis science.

As a formal qualification, you must hold a PhD degree (or equivalent).

We favor candidates with a degree in physics, chemistry or materials science. Candidates should have documented skills in atomic-resolution electron microscopy and, preferably, experience with *operando* electron microscopy experiments, microfabricated devices, catalysis or surface science. Experience in scientific programming, e.g. using Python, is important. The candidate should also have demonstrated outstanding problem-solving skills as well as very good communication skills in both spoken and written English.

**We offer**

DTU is a leading technical university globally recognized for the excellence of its research, education, innovation and scientific advice. 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.

**Salary and terms of employment**

The appointment will be based on the collective agreement with the Danish Confederation of Professional Associations. The allowance will be agreed upon with the relevant union.

The starting date is 1 December 2023(or according to mutual agreement).The period of employment is 2 years.

Experimental work will be conducted at VISION, DTU Physics and Topsoe A/S (all in Kgs. Lyngby, Denmark) and as well as at affiliated laboratories abroad.

You can read more about [career paths at DTU here](http://www.dtu.dk/english/about/job-and-career/working-at-dtu/career-paths).

**Further information**

Further information may be obtained from Professor Jakob Kibsgaard, e-mail: [jkib@fysik.dtu.dk](mailto:jkib@fysik.dtu.dk), Professor Peter Vesborg, email: [vesborg@fysik.dtu.dk](mailto:vesborg@fysik.dtu.dk), Professor Joerg Jinschek, e-mail: [jojin@dtu.dk](mailto:jojin@dtu.dk) and Professor Stig Helveg, email: [stig@fysik.dtu.dk](mailto:stig@fysik.dtu.dk).

You can read more about VISION at [www.vision.dtu.dk](http://www.vision.dtu.dk) and DTU Physics at [www.fysik.dtu.dk/english](http://www.fysik.dtu.dk/english).

If you are applying from abroad, you may find useful information on working in Denmark and at DTU at [DTU – Moving to Denmark](https://www.dtu.dk/english/about/job-and-career/moving-to-denmark).

**Application procedure**

Please submit your complete online application no later than**25 September 2023 (23:59 Danish time)**. Apply online here: [*PostDoc positions on “Live” Visualizations of Single Nanoparticle Catalysts at the Atomic-Scale*](https://efzu.fa.em2.oraclecloud.com/hcmUI/CandidateExperience/en/sites/CX_1/job/2296/?utm_medium=jobshare)*.*

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:

* Application (cover letter)
* CV
* Academic Diplomas (MSc/PhD – in English)
* List of publications

*In the cover letter, we kindly ask you to consider which of the positions appeal most to you.*

Applications 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.

***DTU Physics***  
*At DTU Physics, we carry out cutting-edge research in modern physics, with particular focus on four main areas: quantum technology, sustainable energy, materials, and biophysics. Our focus is both to acquire greater knowledge about basic scientific problems and to conduct research oriented towards use in societies and companies.*

***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 mission to develop and create value using science and engineering to benefit society. That mission lives on today. DTU has 13,500 students and 6,000 employees. We work in an international atmosphere and have an inclusive, evolving, and informal working environment. DTU has campuses in all parts of Denmark and in Greenland, and we collaborate with the best universities around the world.*