Postdoc: Nonlinear dynamic atomic force microscopy

Hours	38.0 hours per week
Salary	€ 3255 - € 4274
Education	PhD level
Job number	3mE19-05
About employer	Technische Universiteit Delft (TU Delft)
Short link	www.academictransfer.com/52176

Apply for this job only today

Job description

Atomic Force Microscopy (AFM) has evolved into a useful tool for nanoscale imaging of surfaces with high resolution in many technical and scientific application areas. Major efforts are invested into quantitative measurement of nano-mechanical properties of samples. However, these measurements typically rely on nanoindentation techniques where the large contact force during snap into contact can cause irreversible damage to the tip and the sample. This poses a big challenge in proper mechanical characterization of ultra-thin membranes where such damages could rupture the membrane and yield unreliable measurements.

As a postdoc you will be working on developing new techniques to accurately probe tip-sample interactions utilizing nonlinear dynamic response of AFM in contact with hard as well as soft suspended nanomaterials.

Your tasks will involve:

1. Developing, conducting and supervising research on nonlinear dynamics at the nanoscale with focus on atomic force microscopy and atomically thin membranes.
2. Performing experiments for probing nonlinear nanoscale forces between AFM and suspended atomically thin membranes.
3. Developing a nonlinear identification technique for estimating sample properties in dynamic mode AFM using tip-sample interaction nonlinearities.
4. Engaging in the writing of scientific articles and proposals to secure funding for further work on the topic.

Requirements

Applicants must have the following qualifications:

- PhD in Mechanical Engineering, Electrical Engineering , Physics or Mathematics.

- Solid background in either nonlinear dynamics or atomic force microscopy techniques and a strong interest in the other field is essential.
- Experience in numerical nonlinear dynamic techniques. In particular, harmonic balance method, continuation packages such as AUTO or COCO, or nonlinear system identification.
- A good publication record.
- High motivation for teamwork and good communication skills.

Experience in signal processing using FPGA, experimental dynamics of MEMS/NEMS, or molecular dynamics will be additional valued knowledge.

Conditions of employment

TU Delft offers a customisable compensation package, a discount for health insurance and sport memberships, and a monthly work costs contribution. Flexible work schedules can be arranged. An International Children's Centre offers childcare and an international primary school. Dual Career Services offers support to accompanying partners. Salary and benefits are in accordance with the Collective Labour Agreement for Dutch Universities.

Contract type: Tijdelijk, 1 year with possible extension to 2.5 years upon satisfactory performance

Employer

Delft University of Technology

Delft University of Technology (TU Delft) is a multifaceted institution offering education and carrying out research in the technical sciences at an internationally recognised level. Education, research and design are strongly oriented towards applicability. TU Delft develops technologies for future generations, focusing on sustainability, safety and economic vitality. At TU Delft you will work in an environment where technical sciences and society converge. TU Delft comprises eight faculties, unique laboratories, research institutes and schools.

Department

Faculty Mechanical, Maritime and Materials Engineering

The 3mE Faculty trains committed engineering students, PhD candidates and post-doctoral researchers in groundbreaking scientific research in the fields of mechanical, maritime and materials engineering. 3mE is the epitome of a dynamic, innovative faculty, with a European scope that contributes demonstrable economic and social benefits.

The Department of Precision and Microsystems Engineering (PME) focuses on developing knowledge and methods for small, innovative, high-precision devices and systems, such as precision equipment and scientific instrumentation for the high-tech industry. Increasing miniaturisation and function density along with improving precision, speed and reliability are the key topics in our work. Our approach is multidisciplinary, fundamental and inspired by industry needs.
The vacant position is in the Dynamics of Micro and Nanosystems (DMN) group. The group focuses on exploiting dynamics of small scale systems to create technologies that can lead to new products in

the fields of scientific instrumentation, consumer electronics and healthcare. Our research spans from measuring and manipulating materials at the micro and nano scale, to the design of world-class MEMS and NEMS sensors and actuators.

You will be working in an international environment in one of the leading technical universities of Europe, with access to state-of-the art micro-nano testing facilities and advanced numerical modelling tools. You will be contributing to a challenging topic in a team comprising of mechanical engineers and physicists. Your work will be part of the European Research Council (ERC) starting grant, of Dr Farbod Alijani.

Additional information

For more information about this position, please contact Dr. Farbod Alijani, e-mail: f.alijani@tudelft.nl. To apply, please send a letter of motivation, a list of three reference contacts, a complete CV and publications list highlighting your three most important contributions before 1 March 2019 to Irina Bruckner, HR advisor, by e-mail to application-3mE@tudelft.nl. The position can start as early as May 2019.