

The Division Microrobotics and Control Engineering (Prof. Dr.-Ing. habil. S. Fatikow), Department of Computing Science of the University of Oldenburg invites applications for a

### **Postdoctoral Research Associate (m/f/d)**

with the focus on **“Emerging nanoscale force sensors for the next generation of medical diagnostics and material characterisation”**

The position is full time (100%), pay rate E13 TV-L, for a period of 3 years, with the possibility of extension.

Our Divisions' research activities focus on the manipulation and characterization of nanomaterials supported by advanced microscopy and robotic automation. The research work covers a broad range of related topics, including vision-guided robotic handling, image processing inside the scanning electron microscope (SEM), novel adhesion characterisation techniques, nanomaterial-based microwave components. Several unique state-of-the-art robotic setups for automated handling at the nanoscale are in operation in the Division for applications including nanoscience tools, communication, and in life sciences.

### **YOUR FOCUS:**

We look for a candidate with the strong motivation for research achievements on the way to higher academic qualification. The focus of your research work is to further develop two cutting-edge nanoscale mechanical sensor technologies for their application in the next generation of medical diagnostic devices and materials characterization tools, respectively. Both sensor technologies have been intensely researched within our laboratory, and so you will have the opportunity to build on top of a fundamental knowledge base. The working principle and intended application for each sensor is as follows:

1. Nanogranular tunneling resistance (NTR)-based strain sensors for use in implantable blood pressure monitoring devices that are further miniaturized with very low power consumption. The sensors operate based on the principle of piezoresistance with electrical readout.
2. Highly-compliant one-dimensional adhesion sensors are to be used as a standard laboratory tool to characterize the adhesive surface properties of advance materials. Sensor readout is achieved via optical microscope image processing and laser Doppler vibrometry.

You will fabricate both sensors using advanced nanomanipulation strategies that exploit visual feedback via electron microscopy, as well as focused ion beam milling and deposition via a gas injection system. You will develop experimental strategies for sensor alignment, operation, and readout. You will analyze and visualize the obtained data in Python or MATLAB. You will optimize and automate the sensor fabrication process using machine vision / image detection. You will interpret the sensor behaviour using solid mechanical and surface science theory. You will collaborate with a consortium of research, industrial, and clinical partners, where you will present your finding, provide advice, as well as provide functioning sensors to the partners for further analysis (as part of the ongoing projects).

### **YOUR PROFILE:**

- Completed academic Masters level university degree, preferably in Engineering, Material Science, or Physics.
- Experimental experience in electron microscopy and associated laboratory equipment, in particular, scanning electron microscopy (SEM), and focused ion beam (FIB) milling, and gas injection systems (GIS).
- Experience hardware-software interfacing and automation.
- Experience in data processing (including model fitting) as well as data visualization using either Python or MATLAB.
- Very good command of English language and good technical writing skills. First author article publications in international journals will be a strong indication of good writing skills.
- Experience in machine vision-based object detection and tracking (desirable).
- Experimental experience in laser Doppler vibrometry, or a theoretical understanding of solid mechanics or surface science (desirable).
- Good command of German language (desirable).

## WHAT WE OFFER:

- Unique laboratory infrastructure for research into nanoscale characterisation and fabrication using robotic automation.
- An experienced interdisciplinary team that works on adjacent topics and is highly visible within the international research community.
- Excellent opportunities for professional development towards cutting edge research.
- Opportunity to obtain hands-on experience with some of the world's most advanced nanorobotic systems.
- Intellectual freedom to explore and implement new approaches.
- Strong involvement in project cooperation with national and international partners, both from industry and research.
- Regular participation in international research conferences is possible and desired.

The University of Oldenburg is striving to increase the proportion of women in the field of science. Therefore, female candidates are strongly encouraged to apply. According to § 21 paragraph 3 of the Lower Saxony Higher Education Act (NHG), female applicants should be given preferential consideration if their qualifications are equivalent. Applicants with disabilities will be given preference in case of equal qualification.

Please send your application (letter of motivation, CV, certified copies of degrees, references, list of publications) by email in a single pdf document with the keyword "**SensorDev**" to Prof. Dr. habil. S. Fatikow [fatikow@uni-oldenburg.de](mailto:fatikow@uni-oldenburg.de), [anja.hiller@uni-oldenburg.de](mailto:anja.hiller@uni-oldenburg.de), and [james.mead@uni-oldenburg.de](mailto:james.mead@uni-oldenburg.de). The closing date for applications is **12.02.2023**.