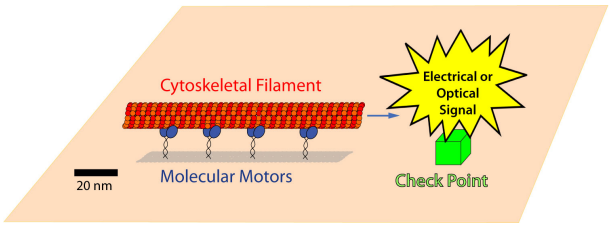
TECHNISCHE UNIVERSITÄT DRESDEN

Position in Bionanotechnology

B CUBE
Center for Molecular Bioengineering TU Dresden

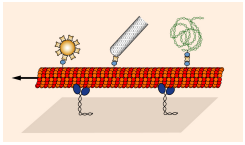
Microscope-free operation of molecular motor based nano-devices

Background: Cytoskeletal motor proteins hold promise as robust, efficient and cheap nanomachines to be employed in synthetic, macroscopic environments. Toward this end, motor-propelled cytoskeletal filaments have recently been demonstrated to transport nano- and microscopic cargo, image structured surfaces, and diagnose the presence of specific biomolecules. However, readout has so far exclusively relied on bulky optical-microscope setups. Thus, one of the distinct advantages of molecular-scale devices, namely their small size, is ultimately lost.



Project: The current project aims to design and test novel strategies to detect and quantify the activity of biomolecular transport systems at a single-filament-level in a manner that is microscope-free. In particular, we will use the kinesin-microtubule transport system to read out the presence of gliding filaments as electrical signals (using nanowire-based field-effect transistors) or optical signals (using plasmonic nanostructures) suitable for direct processing by digital electronics. Critically evaluating the performance of the detection schemes in terms of sensitivity, potential for integration and production costs we will work towards one proof-of-concept device. As a result of this project, we foresee significant advances in the development of novel sensor systems, as well as in a new class of miniaturized protein detection systems relevant for point-of-care medical diagnostics and large-scale biocomputation.

Qualifications: We are looking for enthusiastic candidates with a degree in physics, engineering or related fields. Experience in electronics and/or biosensorics is desired but not compulsory. Work in the project will encompass the design (together with external technology providers), testing and optimization of the sensor devices in our biophysics laboratory. The project is funded by the Volkswagen Foundation and will be carried out in collaboration with the University of Lund (Sweden).



Prof. Stefan Diez - Professor of BioNanoTools

B CUBE - Center for Molecular Bioengineering
Technische Universität Dresden
Tatzberg 41, 01307 Dresden, Germany

fon: +49-351-463-43010
email: stefan.diez@tu-dresden.de
web: www.tu-dresden.de/bcube/diez

Start of the position:
1 October 2019
(for up to 2 years)