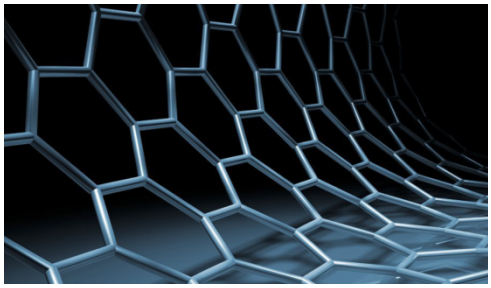


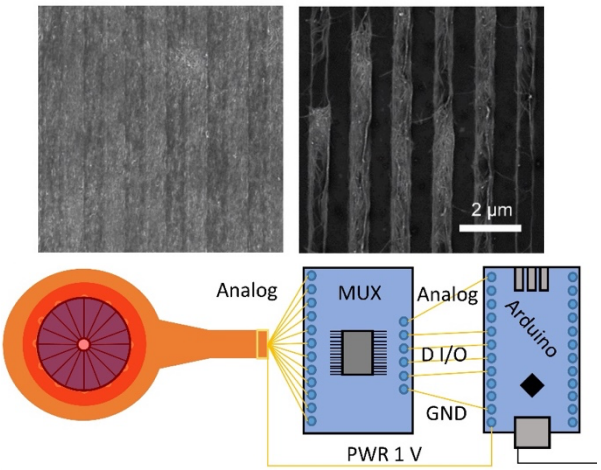
TECHNISCHE UNIVERSITÄT DARMSTADT

Karlsruhe Institute of Technology

Master Thesis

Strain Sensing with Carbon Nanotubes

Motivation: Multidimensional force sensing and stretchable electronic skins made of nano materials are of great importance in the fields of robotics and consumer electronics. This project will employ radially aligned carbon nanotube films in multichannel electronic systems towards the development of a wearable detector of human motion.



Aim: This master thesis will employ hot embossing of a polycarbonate membrane to direct the assembly of carbon nanotubes into an aligned and radially orientated films via high precision microfluidic dead end filtration. Whilst still on the membrane, the CNT film will be pierced in the middle and adhered to a flexible printed circuit board (FPCB). The CNT stripes will be electronically contacted on the inner and outer periphery of the film and changes in resistance read out by using a multiplexer sweeping through the channels of the FPCB at the clocking speed of 16 MHZ of the Arduino Nano. This allows for a channel map to be generated and this can be related to the strain of the sensor.

Task: You will learn and use instruments and methods for the assembling and characterization of carbon nanotubes. This includes techniques like Raman and optical spectroscopy, scanning tunneling electron microscopy, and atomic force microscopy. You will be responsible for the fabrication of the carbon nanotube films, their integration and electronic read-out in

Interested?: Highly motivated candidates can send their application (CV, full academic transcript, BSc thesis) to ralph.krupke@kit.edu or benjamin.flavel@kit.edu. A background in materials sciences, electronic control systems or physics is desired and knowledge of Python and Labview is beneficial. English C1 level is required. The workplace is at the Institute of Nanotechnology near Karlsruhe, info at www.int.kit.edu/krupke-group. For TU Darmstadt students, the work counts as an internal master thesis. Thesis guidelines at bit.ly/3nir67A