

Two Postdoc Positions: Integration of Electrically Driven Plasmonic Components in High Speed Electronics

Two postdoctoral fellow positions are available immediately in the Nijhuis group at the National University of Singapore, NUS) to develop plasmonic-electronic transducers for applications in integrated high speed electronics for next generation technologies (Beyond Moore applications such as 3D Integrated Circuits). These transducers interconvert electrical signals directly into plasmonic signals and are based on highly efficient tunnelling junctions. During the first phase of the program, we achieved 10% efficiency. The project is funded by the National Research Foundation for 5 years and is a collaborative effort with several industry partners, the Centre of Advanced 2D Materials (<https://graphene.nus.edu.sg/>), and NUS Nanoscience & Nanotechnology Initiative (www.nusnni.nus.edu.sg/), and the Institute of High Performance Computing at A*STAR (<https://www.a-star.edu.sg/ihpc>).

Position 1: This project aims to develop electrically driven plasmonic interconnects based on tunnel junctions (which are the plasmon sources and detectors) integrated with plasmonic waveguides. These plasmonic interconnects will be optimized for ultra-high speed data transport in plasmonic electronic circuitry.

Position 2: Signal restoration is important in any type of high end electronic circuitry. This project aims to develop the plasmonic equivalent of a signal restorer which are based on a plasmonic-electronic amplifier, and an active tunnel junction for plasmon launching without optical elements.

Candidates should have a strong background in plasmonic waveguiding, quantum plasmonics, modelling, optical characterization, or clean room based micro/nanofabrication. Posts will be offered for the initial period of one or two years with possible extension, subject to review. Competitive salary is negotiable depending on experience. Formal applications (which include CV, cover letter, and the contact details of three references) should be addressed to

Prof. Christian A. Nijhuis
Fellow of the National Research Foundation
Department of Chemistry & Centre for Advanced 2D Materials (CA2DM)
National University of Singapore
6 Science Drive 2,
Singapore 117546,
Singapore
chmnca@nus.edu.sg

Two Postdoc Positions in Molecular Electronics: Synthesis and Characterization of Molecular Junctions based on Molecular Switches

Two postdoctoral fellow positions are available immediately) to develop new molecular junctions that can be electrostatically or optically switched between two, or more, states. Such junctions can be used to develop molecular diodes, molecular memory elements, plasmon sources. In addition, the junctions will give new insights in the conduction mechanisms and allows to study the interplay between light (or plasmons) and charge carriers inside tunnel junctions at the molecular length scale.

Position 1: This project aims to develop synthetic procedures to prepare precursors for self-assembled monolayers (SAMs) that are redox and/or optically active. Besides synthesis, the project also involves the preparation and characterization of the SAMs. The SAM precursors will have conjugated backbones and several redox active and light (or plasmon) switchable groups will be investigated. The project can be extended towards fabrication and characterization of molecular junctions.

Position 2: This project is more physical in nature and aims to study the mechanisms of charge transport across molecular junctions with molecular switches in detail using DC and AC methods, low-temperature measurements, and opto-electronic measurements. The aim is to elucidate how the molecule-electrode interface can be controlled in situ by means of electric and optical fields.

Candidates should have a strong background in synthetic chemistry (pre-requisite for position 1), charge transport measurements (pre-requisite for position 2), self-assembly, micro/nanofabrication, surface characterization, or equivalent. Posts will be offered for the initial period of one or two years with possible extension, subject to review. Competitive salary is negotiable depending on experience. Formal applications (which include CV, cover letter, and the contact details of three references) should be addressed to

Prof. Christian A. Nijhuis
Fellow of the National Research Foundation
Department of Chemistry & Centre for Advanced 2D Materials (CA2DM)
National University of Singapore
6 Science Drive 2,
Singapore 117546,
Singapore
chmnca@nus.edu.sg