PhD: Two dimensional material micro/nano patterning and integration

Project description:

Two-dimensional (2D) nanomaterials exhibit exceptional multifunctional properties, including high-electron mobilities/saturation velocities, high surface-to-volume ratios, unique layered structures and mechanical compliance, positioning the class of materials to be influential in next-generation flexible electronics for applications in wearables and the Internet of things. Among them, two-dimensional 2D transition metal dichalcogenide (TMD) semiconductors are highly promising, owing to their large mechanical resilience coupled with superior transport properties and van der Waals attraction-enabled relaxed assembly. Generally, fabrication of 2D TMD devices requires wafer-scale 2D TMD growth, layer-by-layer integration, precision patterning, 2D heterolayers and applications. This project aims to develop precision patterning and integration technology of 2D materials with various potential applications in electronic devices, flexible electronics, biosensors and nanophotonics.

Qualification:

The candidate should have a 1st or 2:1 Bachelor’s degree and a Master’s in Material Science and Engineering, Physics, Chemistry, electronic engineering and mechanical engineering or a related area. The ideal candidate should have experience with 2D materials, synthesis, lithography, PVD/CVD and material characterization. The candidate should have excellent communication and organizational skills; be highly motivated and passionate about fundamental research; and have strong written, oral and interpersonal skills. The candidate should be able to work independently and as a part of a team.

Funding:

This project has been fully funded for four years. The PhD studentship covers tuition fees for EU applicants and a tax-free stipend of €18,000 per year, and an allowance is provided for research consumables and conference attendance.

To Apply:

The successful applicant will join the MNMT-Dublin, group of polymer micro/nano manufacturing. The group has 10 years of experience in precision fabrication of micro/nano mould tools, replication of multi-scale polymeric structures and application towards nanomedicine synthesis and molecular diagnostics. Our team has been funded by many sources from H2020, Science Foundation Ireland and Enterprise Ireland. We have a full set of equipment from Lithography, physical vapour deposition, chemical vapor deposition, precision electroforming, nanoimprinting, micro injection moulding, 3D microscope, AFM and Bruker NPFlex etc.

Applicants should submit a cover letter outlining their suitability for the post, a detailed CV, transcripts and the contact details of three referees. The application pack should be emailed to Dr Nan Zhang (nan.zhang@ucd.ie).