

Applications are invited for the following a PhD studentship for the following project:

Low Temperature III-V nanostructured transistors.

The position will be based with the Nitride Materials and Devices and Epitaxial and Physics of Nanostructures Groups led by Professor Peter Parbrook and Dr Emanuele Pelucchi in Tyndall National Institute, University College Cork. The project will form part of the Engineered Functional Materials Platform within the Advanced Materials and Bioengineering Research Centre (AMBER) centre.

Summary of project

The IT sector has been driven for over 50 years by Moore's law, where the number of transistors on a chip integration increases exponentially, doubling every 18-24 months. However, the device shrinkage that this requires means that this trend cannot be maintained in Si indefinitely. III-V semiconductors can make much faster transistors but there are challenges to their integration with silicon. In this project we focus on alternative nanostructured routes to create higher quality material, with also allowing integration of such devices with Si, and in particular ensuring that the processes are compatible with the CMOS Si industry as regards temperature in particular. We will look to prepare nanostructures transistors based on polycrystalline or quasi single crystal III-V semiconductors, focusing in particular on indium nitride (InN) and indium (gallium) arsenide(In(Ga)As) while potentially also looking at integration of both on the one surface through sequential depositions. Growth will be using the industry standard technique of metalorganic vapour phase epitaxy and particular areas of novelty will be the examination of the prospective creation of nanostructures using selective area deposition. The ultimate target is to create simple proof-of-concept devices and look to test them, in collaboration with the group of Prof. Paul Hurley (also at Tyndall, and a Deputy Director of AMBER)

For more information please contact Professor Peter Parbrook (see email in How to apply below)

The ideal applicants will have a 1st Class Honours Bachelor's degree in Physics, Materials Science, Electronic Engineering, Chemistry or similar. Educational experience of Semiconductor Materials and/or Devices would be advantageous.

How to apply:

CVs with the names and addresses of three referees should be submitted to: Professor Peter Parbrook via email at p.parbrook@ucc.ie

Positions will remain opened until filled but preferred start date is [September 2 2020](#). Only short-listed applications will be acknowledged.

This position is funded by the SFI-research centre AMBER.

The AMBER research centre, as a community of researchers, welcomes its responsibility to provide equal opportunities for all. We are actively seeking diversity in our research teams and particularly encourage applications from underrepresented groups.