



PhD : optimisation of the write process and performance of a ultra-high speed 3D nanoprinter

Context and description

The IMT Atlantique is a French graduate (“Grande Ecole”) engineering school in information technology and related fields located near Brest in Brittany on France’s Atlantic coast.

The Optics Department of the IMT Atlantique currently has a position vacant for a fully funded three year PhD position to work on recently obtained French National (ANR) and European (“Phenomenon” H2020) research projects. The successful candidate will contribute to the optimisation of the photo-chemical processes in a prototype “3D nanoprinter” application. The extremely high plot-rate demonstrator system is to be based on the combination of multi-photon and spatial light modulator (SLM) enabled massively parallel direct-write techniques into novel photopolymer materials with very high non-linear, multi-photon absorption sensitivity, developed by the Ecole Normale Supérieure de Lyon (France). Targeted applications of EU project partners include flexible LED displays, security holograms, flexible opto-electronics, automotive displays and photonic light concentrators.

Objectives

To fulfil the tasks assigned to the IMT Atlantique in these projects, the selected candidate’s roles will include:

- helping to define the architecture of the prototype 3D nanoprinter
- select, implement, test and optimise the use of novel photopolymer materials to maximise plot rate, resolution and structure strength
- contribute to the running of the ANR/EU projects: participate in progress meetings, liaison with international partners (Spain, Germany, UK, Switzerland), report writing ...
- fabricate nanostructure test devices for the industrial partners using the prototype 3D nanoprinter
- disseminate the scientific results (patents, conferences, publications ...).

The candidate should have a strong theoretical and practical background in chemistry/photo-chemistry and will be expected to contribute his/her own innovative ideas to develop new concepts and devices for ultra-fast nano-fabrications. The work will be performed in a team with optics department researchers (Profs, PhD students ...) and with external partners, both academic and industrial.

Candidate profile

- Masters or engineering student and with a solid grounding in photo-chemical processes,
- Practical experience of the preparation of photo-polymers and resins, including introduction of photo-initiators and the chemical development of the plotted structures
- Practical experience of characterisation techniques: optical/electronic microscopy, spectroscopy ...
- Cleanroom and photo-lithography experience would be an advantage
- Taste and aptitude for laboratory experimentation (fabrication) and practical applications.
- Ability to work and write scientific reports and articles in English
- Knowledge of French an advantage but not required initially.

Practical details

Start date : September 2018

Financial conditions : salary of ~1800€ (gross)/month

Applications close : 1st July 2017

Please send candidatures to: Prof. Kevin Heggarty kevin.heggarty@imt-atlantique.fr

Websites : <http://www.imt-atlantique.fr/fr> and <http://www.phenomenonproject.eu/project>