DESIGN EID

Project Information: The Device Modelling Group at University of Glasgow (UK) in collaboration with IBM Research Zurich (IBM) in Switzerland and Synopsis QuantumATK (ATK) in Copenhagen is seeking **to appoint three** high-calibre Early Stage Researchers (ESR) in the framework of the Marie Skłodowska-Curie European Industrial Doctorate Network on 'Defect Simulations and Material Growth of III-V Nanostructures – European Industrial Doctorate' (DESIGN-EID).

Project overview: There is a great interest in integrating compound semiconductors either monolithically or heterogeneously on silicon to exploit their complementary properties. Particularly to exploit the direct bandgap of III-Vs for opto-electronic devices densely integrated with CMOS. However, lattice and thermal mismatch between materials makes epitaxial growth on silicon challenging. In this project we will address the challenges associated with the formation of defects and material growth in compound semiconductors such as III-Vs as well as their impact on device performance. Defects may be exploited in the development of novel devices, but more often we wish to mitigate their deteriorating impact on electro-optic device performance, by growth and materials optimization. The project combines experimental work at IBM with modelling and simulation efforts at University of Glasgow and Synopsis QuantumATK.

Candidates' Profile: We are looking for three candidates with a master's degree in physics, engineering or chemistry with knowledge in solid-state physics, materials science or electrical engineering with an outstanding academic record. The candidates must be fluent in English, have good communication skills and be able to work efficiently in a team and navigate in an international environment.

Individual projects: The three ESRs (ESR1, ESR2 and ESR3) will be addressing different tasks and projects but will be working closely together.

ESR1 will mainly focus on aspects related to III-V materials epitaxial growth on silicon, TEM analysis and development of a machine learning algorithm for defect classification. We also foresee the development of simulation framework to model the electronic and optical properties of individual defects.

Employment: IBM Research Zurich (Switzerland) (22 Months) & University of Glasgow (UK) (14 Months).

Skills: Solid-state physics, materials science, python programming, atomistic simulations

ESR2 will explore the role of defects in the context of opto-electronic device performance, this will be done first via simulation where optimized designs will be developed, and later these will be fabricated by the ESR at IBM.

Employment: University of Glasgow (UK) (14 Months), IBM Research Zurich (Switzerland) (22 Months)

Skills: Solid-state physics, device fabrication, TCAD, electro-optical characterization

ESR3 will develop theoretical models which will describe the complexity of the material growth process and defect formation in III-V materials. Those models will be implemented in state-of-the-art QuantumATK commercial simulation framework.

Employment: University of Glasgow (UK) (12 Months), Synopsis QuantumATK (Denmark) (24 Months)

Skills: Computational chemistry and physics, programming and software development

Duration: Fixed-Term (3 years)

Starting: Jan 2020 or soon thereafter, but no later than end of May 2020

Practical: A highly competitive salary package is offered in accordance with the MSCA rates in the respective countries. The mobility and qualifications eligibility rules of the MSCA program must be respected:

Mobility: At the date of recruitment by the host institute, the ESR must not have resided or carried out his/her main activity (work, studies, etc.) in the country of the beneficiary for more than 12 months in the 3 years immediately prior to his/her appointment. Short stays such as holidays are not taken into account.

Qualifications: ESRs are required to have a master's degree, they cannot have more than 4 years of full-time research experience and have not been awarded a doctoral degree.

Usual MSCA Eligibility Criteria apply and will be verified during the application process. For more information on MSCA, please see: https://ec.europa.eu/research/participants/data/ref/h2020/other/guides_for_applicants/h2020-guide-appl-msca-itn_en.pdf

The ESR must physically relocate between the two partners in question during the project, thus spending the time specified in Glasgow and at either IBM or Synopsis.

The PhD will be awarded from University of Glasgow.

Application: Please send your application as a .pdf file, including the following documents:
-Curriculum Vitae
-Covering letter
-Official transcripts
-2 Reference letters
Your application should be sent to the following contacts:

ESR1 & ESR2: Dr. Vihar Georgiev, Vihar.Georgiev@glasgow.ac.uk, Dr. Kirsten Moselund, kmo@zurich.ibm.com and Marilyne Sousa, sou@zurich.ibm.com

ESR3: Dr. Vihar Georgiev, Vihar.Georgiev@glasgow.ac.uk

Please be aware that your application will be shared amongst the relevant supervisors at each institution.

Links:
University of Glasgow: https://www.gla.ac.uk/schools/engineering/staff/vihargeorgiev/
IBM: https://www.zurich.ibm.com/st/nanodevices/monolithicgrowth.html
Synopsis QuantumATK: https://www.synopsys.com/silicon/quantumatk.html