PhD Fellowship in 'Integrated Nanomagnetic Devices'

Tyndall National Institute
Institiúid Náisiúnta
Cork, Ireland
www.tyndall.ie

Title – PhD Fellowship in "Integrated Nanomagnetic Devices"

Project: The rapid growth of miniaturized handheld electronic devices & 'Internet of Things-IoT' has highlighted the issue of efficient powering, processing and transmission at ultra small scale. Lately, integrated nano-magnetic devices have become core building blocks of such miniaturized/monolithic powering, processing & transmission devices such as ultra compact nano-oscillators (SHNO/STNO), Quantum/Neuromorphic computing (Spin-Qbit), nano-antenna array (Magnonic, Magnetoelectric) etc. The focus of the present project will be on modeling, development and characterization of such devices, suitable nano-structured magnetic films/materials using patterned structures on Si/SOI in a CMOS compatible technique, while identifying & analyzing relevant exchange/super-exchange coupling phenomena and interactions in multi-nano-layers of patterned magnetic nano-hetero-structures.

Position available: PhD Position: Applications are sought for a four year PhD position with fellowship (€ 22,000/annum - tax-exempted + Tuition fees (~ €6,000/annum), will be paid from the project) under supervision of Professor Saibal Roy in the 'Micropower Devices & Nanomagnetics' research group, Tyndall National Institute, National University of Ireland - University College Cork (UCC), Ireland. The successful applicant will work as part of a multidisciplinary team with a focus on the development of integrated nano-magnetic devices.

The research of this particular position will involve elements of the following;

- Review of state of the art (publications in Journals and Patents)
- Electromagnetic modelling (MuMax3, COMSOL) of micro-nano-magnetic structures
- Development of nano-structured magnetic materials in relevant physical (dc/rf Magnetron Sputtering, PVD) and chemical (ALD, electroplating) synthesis techniques
- Material characterization (structural- XRD, SEM, TEM, AFM; magnetic- including static & dynamic – SQUID magnetometer, MFM, BLS) of nano-structured magnetic films/materials and their analysis
- Device batch fabrication using microfabrication techniques on Si (Optical / Ebeam-lithography)
- Device characterization (electrical, magnetic) of fabricated devices

Requirements: Qualifications: a) Masters (or Bachelors with high grades) degree in Physics/ Chemistry/ Materials Science/Electrical/Electronic Engineering or similar.
b) Proficiency in English, non-native English speakers should have required IELTS/TOEFL score
c) Knowledge in magnetism/ nano-magnetic materials and some experience in micromagnetic simulation & magnetic measurements such as in MuMax3 & SQUID/ VSM / TRMOKE respectively.

Preferable: Candidates will be given preference having one or more of the following experiences;
a) Experience with micro-fabrication (lithographic) to produce micro-patterned structures & their characterization would be desirable
b) Experience in micromagnetic simulation (MuMax3, COMSOL) of nanomagnetic devices/patterns
c) Experience in writing the project reports, articles in journals/conference proceedings

Candidates should submit a brief statement outlining their motivation/suitability for the position and their curriculum vitae, to include list of publications, the names, addresses and email IDs of three referees to Professor Saibal Roy at email: saibal.roy@tyndall.ie.