PHD OPPORTUNITIES (2) IN EARTH OBSERVATION/ENVIRONMENTAL MONITORING

Maynooth University are seeking to recruit 2 x PhD students as part of a Science Foundation Ireland (SFI) funded research project, entitled "*Integrating multidisciplinary geoscientific data into forecasting models to monitor and predict coastal change: Proof of concept in Dublin Bay*". The two successful PhD students will form part of a multi-disciplinary, multi-institute research cluster comprised of Dublin City University, Maynooth University and University College Cork.

Background:
Coastal zones are threatened by forces such as climate change and sea-level rise that combine to drive increasingly intense storms, flooding, and erosion. Assessment and prediction of coastal vulnerability can only be achieved by systematic and sustained monitoring of physical, chemical and biological processes that occur in coastal zones. The objective of our project is a coordinated program of coastal observations that will be used to validate, calibrate and extract as much information as possible from satellite environmental data. We will integrate these datasets to generate forecasting models that can be used to predict environmental change and inform future planning. The project is multi-disciplinary and will integrate mathematical modelling, remote and in-situ sensing, physical and chemical oceanography and seabed mapping. Implementation will be accomplished using a suite of open source tools such as satellite data and validated with comprehensive ground-truthing of water and sediment chemical, biological and physical properties.

PhD 1

"Developing Earth Observation (EO) & Environmental Monitoring methodologies to detect and map physical and bio-chemical interactions over Dublin Bay"

The candidate will be working with Dr Tim McCarthy and Dr Rowan Fealy to develop innovative Earth Observation (EO) & Environmental Monitoring methodologies that can be used to detect and map various physical and bio-chemical interaction over Dublin Bay as part of the PREDICT Project. Sensors will include optical, LiDAR and Environmental systems from Spaceborne, Airborne, Drones and In-Situ platforms. Data processing and analysis methodologies will include conventional image processing, Machine Learning, Land/Water/Air surface modelling to gain a better understanding of the independent and interdependent relationships of both natural and anthropogenic processes that give rise to Dublin Bay environment. Some of this work will be used to understand and better manage water quality, coastal erosion as well as various commercial and recreational activities etc.

Must Have
- Relevant 2:1 degree (or higher) in Computer Science, G. I. Systems, Geospatial Science, Earth Observation (EO), Geography or similar qualification

- Some experience of optical and environment sensors
- Ability to code/script for example; C++/C#, Java, Python, Javascript
- Exposure to GIS/EO applications/tools for example ArcGIS, ERDAS as well as some level of competence in statistics/spatial statistics, image processing
- Excellent written and verbal communication and presentation skills in English

Desirable
- Experience of EO/GIS Open Source tools; QGIS, PostgreSQL/PostGIS, Openlayers, R, SNAP etc
- Interest in becoming proficient in Machine Learing (ML) and Object Based Image Analysis (OBIA)
- Good organisational skills & interpersonal skills

PhD 2

"Joint earth observation, ground truth, and drone analytics for environmental monitoring"

The candidate will work in Prof Andrew Parnell's research group in statistics and machine learning in the Hamilton Institute, and also as part of the wider group funded by SFI for this project. The research programme will involve analysing ground truth, drone and satellite data for monitoring various environmental variables in Dublin bay. The successful student will develop methodology in the areas of Bayesian statistics, spatial modelling, neural networks, and multivariate analysis.

Must Have
- Relevant 2:1 degree (or higher) in Statistics, Machine Learning, Data Science, Mathematics, Engineering, or similar qualification
- Ability to code in either R or Python
- Strong linear algebra and calculus skills
- Excellent written and verbal communication and presentation skills in English

Desirable
- Experience of lower-level programming languages, C, C++
- Knowledge in spatial analytics technologies such as Gaussian Processes and Bayesian Inference
- Good organisational skills & interpersonal skills

Stipend & Fees
The studentships are for 48 months and include a stipend of €18,500 p.a. and the payment of academic fees up to a maximum of €5,500 per annum, as well as a computer and travel allowance.

Application Procedure
Submit an electronic copy of Curriculum Vitae and a letter of interest to:
ncg@mu.ie with either **SFI PREDICT PHD1** or **SFI PREDICT PHD2** clearly indicated in the subject line

Closing Date
17th August 2018

Interview: Interviews will be held in last week in August 2018 – Appointment Sept 2018 start