



January 21st, 2011

Research Positions in Geophysics, School of Geological Sciences, University College Dublin.

Through the SFI funded Wave-Obs project, the Geophysics Group at the School of Geological Sciences, University College Dublin has a cluster of two PhD positions and one Postdoctoral position on 'ocean waves to seismic' coupling. The team will work on two specific problems (i) methodological developments in the area of ocean wave quantification from seismic noise data (ii) computational and observational investigations of the heterogeneity in ocean generated seismic noise, at a 'local' scale.

PhD Position: Quantification of ocean wave heights from seismic data

Duration: 4 years

Wind driven ocean gravity waves generate pressure fluctuations on the sea floor leading to microseismic noise generation which can be detected by terrestrial seismic stations. When calibrated against ocean buoy data, microseismic noise levels can, in certain circumstances, be used as a proxy for ocean wave height. However ocean wave-to-seismic transfer functions can be complex and spatially variable. This PhD project will comprise a determination of transfer functions for pairs of ocean buoy and terrestrial seismic stations on the west coast of Ireland with an emphasis on spatial variability associated with local ocean bottom conditions and wave propagation path effects. A further aim of the project will be to use legacy seismic data to determine wave climate, prior to the installation of ocean buoys in the year 2000. This project will involve a field work component.

The project will be undertaken in collaboration with Met Éireann and Nowcasting International Ltd.

The successful applicant will hold a minimum B.Sc. degree level 2.1 in geosciences or physical sciences. *Proposed start date:* September 2011.

To apply, please send a cv and cover letter to geophysics@ucd.ie

Postdoctoral position: Spatio-temporal tracking of the largest waves in the near Atlantic offshore Ireland, using a terrestrially based seismic observation system.

Duration: 2 years

Wind driven ocean gravity waves generate pressure fluctuations on the sea floor leading to microseismic noise generation which can be detected by terrestrial seismic stations. When calibrated against ocean buoy data, microseismic noise levels can, in certain circumstances, be used as a proxy for ocean wave height. However at any given time there will likely be multiple noise sources or hotspots active on the ocean floor so the locations of which will be unknown. Hence a key challenge will be to separate these individual 'voices' into separate channels for (i) detailed analysis in terms of wave height information and (ii) in order to locate the major microseismic source positions. This will involve both methodological/algorithm development in source separation using multiple station pairs and/or seismic arrays and the application of these methods to real data. The final component of the work will be to apply the methodology to one year of seismic data, in order to determine spatio-temporal statistical measure of wave heights.

This project will involve a fieldwork component.

The project will be undertaken in collaboration with Met Éireann and Nowcasting International Ltd.

The successful candidate will have a strong mathematical/computing background, will have (or have submitted) a PhD in signal processing with an emphasis on source separation and source localization. A background in geosciences is not a requirement.

Proposed start date: March 2011. This position will be advertised soon on <http://www.ucd.ie/hr/jobvacancies/>



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PhD Position: Determining the spatial variability of seismic noise generation in the Atlantic Ocean, West of Ireland.

Duration: 4 years

Background seismic noise can be used for seismic imagery, without the need to ‘shoot’ seismic. For the most part, the source of this noise is the world’s oceans. This realization is driving a rapidly expanding new field in seismic imagery over the past decade. However problems arise in the reconstruction of seismograms if the noise sources are not uniformly distributed in space. In this project we will look at the spatial heterogeneity of the noise field using ‘small scale’ seismic arrays both in field and computational data. The field area is the Atlantic seaboard, west of Ireland – one of the hotspots for noise generation globally. The field data will be complemented by full wavefield numerical simulations of seismic noise in models derived from detailed bathymetric maps of offshore west of Ireland. This project will involve a field work component and requires a strong interest in computation. The project will be undertaken in collaboration with l'Université Joseph Fourier, Grenoble.

The successful applicant will hold a minimum B.Sc. degree level 2.1 in geosciences or physical sciences. *Proposed start date:* September 2011.

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