



## **iCRAG MSc by Research: Feasibility of machine learning for seismic forward modelling and inversions**

**Full title:** Feasibility of machine learning for seismic forward modelling, location and source inversion for volcano- seismic events

**Supervisors:** Dr. Ivan Lokmer (UCD), Dr. Gareth O'Brien (UCD), Prof. Christopher Bean (DIAS)

**Start-date:** 1<sup>st</sup> September – 31<sup>st</sup> December 2024

**Duration:** 2 years

**Stipend:** €22,000 per annum + student fees

The School of Earth Sciences, University College Dublin (UCD) seeks applicants for a MSc by Research position funded through the Geodata Platform of the Irish Centre for Research in Applied Geosciences (iCRAG). The successful candidate will be based in The School of Earth Sciences at UCD. They will collaborate with researchers from the School of Computer Sciences, UCD, and Dublin Institute for Advanced Studies (DIAS).

**Projects scope:** The interpretation of fluid-related seismicity is of key importance for gaining a better understanding of physical processes beneath volcanoes, hydrothermal areas and for monitoring the development of geothermal reservoirs. It includes both the modelling and inversion of seismic wavefields, where the accuracy and speed are often compromised by large uncertainties in velocity models and lengthy numerical simulations. This project will apply Fourier Neural Operator (FNO), machine learning (ML) based method, to perform both the forward modelling and the source inversion of seismic wavefield. In particular, the ability of FNO to perform the source location and inversion in the presence of the velocity uncertainty will be investigated, as well as the feasibility of the method in generating more accurate velocity models.

The results will be presented at iCRAG meetings, and Irish and international conferences (IGRM, EGU).

**How to apply:** Applications are invited from motivated geophysics, physics, applied mathematics, and computer science graduates with good grasp of basic computer use, familiar with Python, Matlab and Linux operating system, who have interest in machine learning methodology. The position is fully funded for 2 years (stipend + student fees)

To apply send a full CV, contact details for 2 academic referees and a letter of motivation.

Applications or requests for further information should be sent to Ivan Lokmer at [ivan.lokmer@ucd.ie](mailto:ivan.lokmer@ucd.ie). The deadline for receipt of applications is **August 2<sup>nd</sup> 2024**.