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Carlingford, Ireland
14th-20th May 2023

DIAS
Institiúid Ard-Léinn Bhaile Átha Cliath | Dublin Institute for Advanced Studies

IMPROVE, Summer School, Ireland:

Geophysical data inversion and numerical forward modelling

IMPROVE is a H2020 Marie Sklodowska-Curie Innovative Training Network for the next generation of European volcanologists. Early Stage Researchers in IMPROVE are trained while developing research on quantitative volcanology, from innovative monitoring and prospecting to advanced lab experiments, High Performance Computing, Machine Learning and Artificial Intelligence. IMPROVE organises schools, short courses, and other training and scientific meetings open to participants from outside the network.

Key Training Elements

Geophysical data inversion and numerical forward modelling are key elements in the study of volcanoes. Physics based inversion allows the estimation of a population of models by extracting information from observed data, while forward modelling tools can yield a prediction of the expected data, given a model. Combined use of these approaches permit estimates of volcano source parameters and volcano structure. In the Ireland School we will consider theoretical and practical aspects of both data inversion and forward modelling, drawing on examples from seismic & acoustic (infrasound) source estimations, volcano deformation and volcano imagery using seismology and magnetotellurics. We will also briefly consider the relative merits of physics based versus data driven inversion (e.g. Deep Learning - DL), and briefly explore new hybrid inversion approaches where physical laws are incorporated into DL data driven schemes. Finally the School will also cover topics such as project management, research leadership, and good communication.

Schedule

May 14: Arrivals (late afternoon) & ice-breaker

May 15: Inverse theory: turning data into models; *Mini workshop on preparing material for Open Day

May 16: Inverse Theory practicals; Forward modelling: predicting data from a model; Sea Kayaking (evening, weather permitting).

May 17: Forward modelling practicals; Public open afternoon; **Poster session, BBQ.

May 18: Full day field trip to Giant's Causeway (columnar basalts); School dinner.

May 19: Open format sessions on project management, research leadership, good communication and industry perspectives.

May 20: Departures in the morning

* Particpants will be expected to collaborate (online) to prepare material in advance of the school.

** Participants are expected to bring a poster outlining their research work.

Programme

The programme will involve face-to-face lectures, practicals and participant driven team exercises, a one day field trip to the Giant's Causeway basalts, an open day for the public (led by the School participants) and some recreational water sports.

Location

The School will be held in the small coastal village of Carlingford, about half way between Dublin and Belfast. There is easy access to Dublin airport. The village is vibrant but isolated, ideal for a week of both science and fun.

Target Participants

PhD candidates and early stage post docs with little to no prior knowledge of inversion and forward modelling.

School Costs

Each student will pay a contribution towards the true costs. This includes accommodation in double or triple rooms, breakfast, lunch, coffee breaks and dinners. The cost of school materials, transfers to and from Dublin airport at scheduled times, field trip and kayaking, will be covered by the IMPROVE Project. The estimated maximum cost is €470 (accounting for possible inflation).

Registration

The school is open to a maximum of 15 students, besides IMPROVE fellows. Participants will be selected on the basis of demonstrated relevance of the school for their research and career development.

Deadline for Registration: 3rd April 2023
Information on Acceptance: 10th April 2023

Registration form, programme and lecturer updates will be posted to:

www.improve-etn.eu