**PhD Scholarship Advertisement Template**

Fully Funded PhD Scholarship in Gamma Radiation Dose Evaluation (GRaDE) - Outdoor gamma dose evaluation for the Irish population

College of Science and Engineering / School of Natural Sciences / Earth and Ocean Sciences / Ryan Institute

Application(s) are invited from suitably qualified candidates for full-time funded PhD scholarship(s) starting in [September/October,2024] affiliated to the [College of Science and Engineering / School of Natural Sciences / Earth and Ocean Sciences / Ryan Institute] at the University of Galway.

**University of Galway**

Located in the vibrant cultural city of Galway in the west of Ireland, the University of Galway has a distinguished reputation for teaching and [research excellence](https://www.universityofgalway.ie/our-research/)

For information on moving to Ireland please see [www.euraxess.ie](http://www.euraxess.ie)

**Detailed Project Description**

External exposure to terrestrial gamma radiation represents a significant component to the total average annual dose received by a person living in Ireland from all sources of ionising radiation. External gamma ray doses from natural radionuclides originate largely from the decay of radionuclides belonging to the radioactive decay series of 238U, 235U and 232Th, as well as from the decay of 40K, all of which have been present on the Earth since its formation. In addition, a number of artificial radionuclides (e.g., 137Cs and 241Am) have been deposited throughout Ireland as a result of fallout from nuclear weapons testing and accidental releases such as those from the Chernobyl and Fukushima nuclear accidents. Since terrestrial gamma radiation depends on the nature of the underlying bedrock and soil composition, as well as the pattern of deposition of artificial radionuclides, an individual’s annual dose as a result of this exposure pathway will largely be determined by their place of residence. Several studies of gamma dose rates from natural and artificial radionuclides in Ireland were conducted in the 1980s and 1990s, and these have formed the basis for the estimation of terrestrial gamma radiation doses in the periodic assessments which are carried out by the EPA on the average annual radiation doses received by the Irish population from all sources of ionising radiation. By undertaking a comprehensive new survey of natural and artificial radionuclide concentrations and gamma ray dose rates throughout Ireland, and linking the results of these ground surveys to the detailed radiometric data generated by the Tellus airborne surveys which have been conducted by the Geological Survey of Ireland since 2012, the GRaDE project aims to develop a better understanding of the geographical distribution of natural and artificial gamma-emitting radionuclide concentrations in the Irish terrestrial environment with a view to providing a more accurate, up to date estimate of the average annual effective dose that a member of the Irish public receives as a result of exposure from terrestrial gamma radiation. By making use of a combination of high-resolution gamma spectrometry measurements, direct gamma dose rates gathered in the field using calibrated field monitors, and the gamma dose rates inferred from available aerial radiometric data on uranium, thorium and potassium concentrations, and 137Cs deposition from the Tellus programme, a set of new, high-resolution maps on radionuclide concentrations and gamma ray dose rates throughout Ireland will be generated using appropriate Geographical Information Systems (GIS) tools. These maps, together with information on population density, will be used to generate a map of outdoor gamma ray doses in Ireland and to investigate the range and average annual doses to a member of the Irish public arising from terrestrial gamma radiation.

The work undertaken by the PhD student will include a combination of fieldwork (soil sampling), radiometric determination using high-resolution gamma spectrometry with HPGe detectors and in-situ air kerma dose rate measurements using portable detectors. In addition the student will analyse the Tellus airborne radiometric survey blocks and seek how best to integrate them with the ground samples within a GIS framework to construct the new national map. The student will also get to spend a period of time in EPA’s radioanalytical laboratories which are based in Dublin.

**Living allowance (Stipend):** €25,000 per annum, [tax-exempt scholarship award]

**University fees**: €5,890 including levy

**Start date**: 01/10/24

**Academic Entry Requirements:**

Essential

* Applicants should hold, or expect to attain, as a minimum a 2:1 Honours degree, or equivalent, in Earth Science, Physical Geography, Physics and Engineering with an interest in environmental monitoring.
* Excellent mathematical, computational and instrumentation skills.

Desirable

* Expertise in Geographic Information Systems (GIS), Geospatial Data Analysis and Remote Sensing
* Programming and or machine learning experience.
* Research or industrial experience in any of the following Data Analytics, Remote Sensing and GIS
* Strong communication and teamwork skills.

**To Apply for the Scholarship:**

Expressions of interest comprising submission of a covering letter, CV, statement of personal research interests, evidence of performance or equivalent and the contact details of two referees, to be submitted via e-mail to:

**Contact Name:** Dr Liam Morrison and Dr Eve Daly

**Contact Email:** liam.morrison@universityofgalway.ie / eve.daly@universityofgalway.ie

**Application Deadline:** 22/07/2024and time 17:00 (Irish time 24hr format)

**Primary Supervisor name** (if applicable): Dr Liam Morrison and Dr Eve Daly