



Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin



Fully funded PhD Studentship available

Constraining carbon cycle dynamics and the latitudinal (poleward) expansion of climate belts during past global change events

– Deep Time Earth System Group –

Dep. of Geology, School of Natural Sciences, Trinity College Dublin, The University of Dublin

Applications are invited from suitably qualified candidates for a full-time PhD (Structured PhD programme) on “Constraining carbon cycle dynamics and the latitudinal (poleward) expansion of climate belts during past global change events”. The project is funded by iCRAG, the SFI Research Centre in Applied Geosciences.

Project background and description:

Humanity is unlikely to limit anthropogenic climate change to within 1.5°C, or even 2°C, making it ever more crucial to quantitatively constrain possible end-member climatic and environmental responses to major and abrupt carbon release and global carbon cycle disturbance.

Importantly, anthropogenic climate change will impact regionally and locally on dominant environmental conditions, specifically humidity. The projected poleward expansion of climate zones will likely cause significant aridification in lower mid-latitudes and expand wetter conditions to higher latitudes.

Model predictions suggest this to also have occurred during past global change events, making their study essential to provide end-member constraints on the magnitude of latitudinal shifts in/expansion of climate zones in response to climate forcing.

This project will study some of the largest climate change events in Earth history, in the Early Jurassic (the Triassic–Jurassic mass extinction event and the Toarcian Oceanic Anoxic Event), characterized by a doubling–tripling of atmospheric $p\text{CO}_2$, similar in magnitude as extreme-scenarios projected by the IPCC.

The project will focus on 3 integrally linked Research Objectives, to:

- (i) Constrain the rate and magnitude of carbon cycle change across major past global change event(s),
- (ii) Assess the magnitude of carbon release and sequestration at these times,
- (iii) Reconstruct the magnitude and rate of latitudinal changes in the position of climate belts in response to extreme global climate forcing.

For this, the project will sample (from cores and outcrops) and geochemically study (in the lab) sedimentary archives, and fossil plant tissue preserved therein, that deposited along a palaeo-latitudinal transect and that span the Early Jurassic global change events.

The successful applicant will be based at Trinity College Dublin (TCD), The University of Dublin, at the Department of Geology, where they will work together with Dr Micha Ruhl (PI) and affiliated iCrag, TCD and international partners. They will be expected to undertake national/international fieldwork and/or core-sampling activities, as well as present results at national and international conferences.

The project will directly link to international research programs, including the International Continental Drilling Programme (ICDP) associated Jurassic Earth System and Timescale (JET) project.

Requirements/ Person specification:

Applications are invited from students who can demonstrate a solid background in integrated stratigraphy, organic/inorganic geochemistry, palaeobotany, palaeoceanography and/or palaeoclimatology. The project will combine field and lab-work with carbon-cycle modelling. Passion for laboratory work, as well as fieldwork and/or core sampling, and a keen interest and self-motivation for solving problems is essential. Candidates must have obtained an excellent, relevant geoscience honours degree or (ideally) a geoscience MSc degree.

Award:

This project is funded by iCrag, the SFI Research Centre in Applied Geosciences. The successful candidate will be enrolled for a 48-month (Structured) PhD programme at Trinity College Dublin, The University of Dublin, Ireland. The Fellowship provides University fees and a stipend of €18,500 per annum over four years. Funds for project costs are also available.

Start date:

The projected start date is on the 1st of September 2022, or as soon as possible thereafter (with a latest start date on the first of January 2023).

Further information:

The successful applicant will be based at Trinity College Dublin (TCD), The University of Dublin, at the Department of Geology, where they will work together with Dr Micha Ruhl (PI) and affiliated iCrag, TCD and international partners. They will be expected to undertake national/international fieldwork and/or core-sampling activities, as well as present results at national and international conferences.

For further information please contact Dr Micha Ruhl.

Email: micha.ruhl@tcd.ie

Application procedure:

If interested, please apply by sending an e-mail containing (in PDF-format): (1) a full CV (when applicable including a publication list), (2) a cover letter stating why you are interested in this project, and why you and your academic background make you the ideal candidate, and (3) the names and contact details of two academic referees, to **Dr Micha Ruhl** (micha.ruhl@tcd.ie).

Closing date:

The closing date for applications is **12th of August 2022, at 5pm (local) Irish time.**