

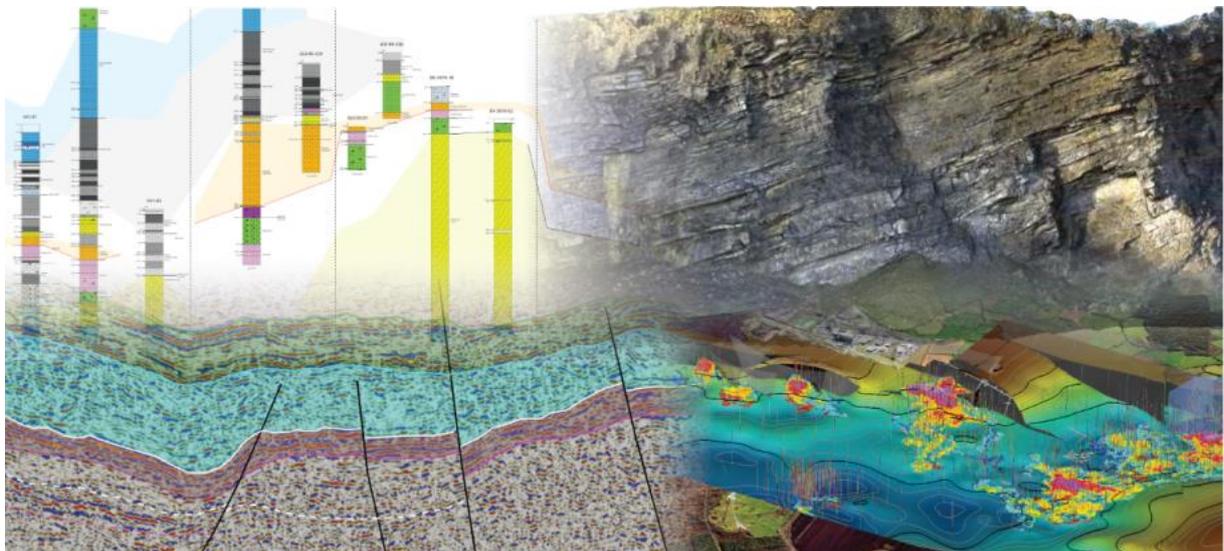
Fully funded PhD opportunity

Tectono-stratigraphic evolution of complexly faulted basin margins in the Irish Carboniferous

School of Earth Sciences at University College Dublin (UCD)

Irish Centre for Research in Applied Geosciences (iCRAG)

Fault Analysis Group, UCD



Closing date: 19th August 2022

Start date: From September 1st 2022. The successful candidate needs to be available to start no later than 1st January 2023.

About the project

This PhD project will investigate the tectonostratigraphic framework and basin evolution near basin-bounding faults systems in the Irish Mississippian, and link this to the development and distribution of suitable carbonate host rocks for earth resources along the basin margin (such as base metal mineralisation, geothermal, groundwater).

It will do this using an integrated methodology combining reflection seismic interpretation, 3D geological modelling, detailed lithological logging, petrophysical characterisation of diamond drill-cores, interpretation of multi-physics potential field datasets, and geophysical inversion.

Many societally critical earth resources occur in such carbonate host rocks, especially in the Irish context, and there is a need to better characterise these and understand their distribution in the subsurface. The insights of this study will contribute to our understanding of faulting and sedimentation patterns along large and complex basin-bounding faults, which have been shown to

be strongly influenced by internal fault complexities, differential uplift-down-throwing along-strike, and by fault scarp degradation processes.

The outputs of this project will provide improved constraints on targets for mineral exploration and deep geothermal reservoirs, and it will therefore contribute to de-risking much-needed investments in these areas.

The Irish Carboniferous basins contain a wealth of subsurface data, they are relatively little deformed after rifting and not intensely metamorphosed. They are therefore ideal for a study bridging observations between basin scale and outcrop and drill core scale. Your research will build on results of a country-wide assessment of faulting and regional lithofacies variation through time in the Irish Carboniferous rocks, as they developed during Tournaisian and Viséan time.

The research project will integrate several types of subsurface data. This includes drill cores, regional drillhole databases, mapping of coastal and quarry sections, 2D reflection seismic lines, and on-core and down-hole petrophysical and geophysical data. The research project will use the large and high-quality drillhole and reflection seismic datasets maintained at UCD/iCIRAG.

What we offer:

While carrying out research you will receive training, develop transferable skills, and critical technical skills in several methodologies, many of which are highly sought after by employers. An integrated methodology will be applied to several interlinked sub-study areas within the larger study area:

- 2D reflection seismic interpretation, and 3D geological modelling, building on regional interpretations, using a suite of workflows, codes and softwares in our labs.
- Detailed lithological and lithofacies logging of historical and current mineral exploration boreholes along key sections across the margins. Detailed petrological work (transmitted light microscopy, desktop SEM on thin sections) will be carried out to constrain the lithologies.
- Integration of visual logging with VIS, SWIR spectral data, XRF data, new and existing petrophysical data, and downhole wireline log data. Constrained and unconstrained classification algorithms will be used to identify co-variance.
- Multi-geophysics interpretation and geophysical inversions will be carried out and compared with seismic and borehole data, using new and incoming petrophysical data as a guide.

Throughout the project, the PhD researcher will collaborate and interact with industry partners in the geothermal and mineral resources industry, and with the Geological Survey Ireland.

The successful candidate will be enrolled for a 48-month Structured PhD programme at UCD. You will join a large team of researchers at the UCD School of Earth Sciences (<https://www.ucd.ie/earthsciences/>), and join iCIRAG, the Irish Centre for Research in Applied Geosciences who are creating solutions for a sustainable society. You will join a diverse group of researchers, and we welcome applications from a diverse set of backgrounds.

Applicant profile:

- You should have a keen interest in the interplay of sedimentology, structural geology, and earth resources. You will need a strong background in at least one of these, with a degree in a related discipline.
- An MSc or equivalent by experience is desirable but not required.

- A keen interest in collaborating with or previous exposure to any industry related to earth resources, for example the hydrocarbons, mineral exploration or geothermal industry, would be considered an advantage.
- You will need proof of oral and written competence in the English language to be admitted to UCD ([details here](#)).

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Funding provided

This is a fully-funded scholarship for 4 years, funded by iCrag, the SFI Research Centre in Applied Geosciences. This scholarship covers university tuition fees, an annual tax-free stipend of €18,500, and a project-specific research grant covering research expenses, conferences and training needs. We encourage applications from across the world.

Interested? How to apply:

Closing date: August 19th 2022 at 17:00 local Irish Time

To apply, please send a CV and cover letter (in pdf format) by email for the attention of Dr Koen Torremans (koen.torremans@ucd.ie). The CV/cover letter should include your motivation to apply, an explanation how you fit the profile for this project, and insights into how you see your career progress. Please include contact details of two referees.

Informal requests for further details can be made to Koen Torremans (koen.torremans@ucd.ie).

Equality, diversity, and inclusion

UCD is committed to creating an inclusive environment where diversity is celebrated, and everyone is afforded equality of opportunity. To that end the university adheres to a range of equality, diversity and inclusion policies. We encourage applicants to consult those policies here <https://www.ucd.ie/equality/>. We welcome applications from everyone, including those who identify with any of the protected characteristics that are set out in our Equality, Diversity and Inclusion policy.

More information:

The University: <http://www.ucd.ie/aboutucd.htm>

College of Science: <https://www.ucd.ie/science/>

School of Earth Sciences: <https://www.ucd.ie/earthsciences/>

iCrag: www.iCrag-centre.org