Fully funded PhD Opportunity

Fault Analysis Group, School of Earth Sciences, University College Dublin

Project Title: Geometry and nature of inversion structures in the Irish Orefield and their impact on mineral deposits and associated mineralisation.

Applications are invited from suitably qualified candidates for a full-time PhD (Structured PhD programme) on structural inversion of the Irish Zn-Pb Orefield. The project is funded by iCRAG, the SFI Research Centre in Applied Geosciences.

Project background and description

The original geometry and configuration of Irish Zn-Pb mineral deposits has been subjected to varying degrees of inversion since their formation in the Lower Carboniferous. The main phase of inversion is generally attributed to the Variscan orogeny, but there have been more recent deformation events potentially into the Oligocene. Inversion-related structures can have an impact on Zn-Pb deposit-scale structure, either by deforming the original deposit or by remobilising mineralisation, can complicate regional-scale geometries and make it much more difficult to identify potential deposits, and can also generate the main groundwater pathways, including veins and faults, for Ireland's groundwater and geothermal systems. Despite the importance of inversion, the proposed study will be the first to investigate the geometry and nature of inversion-related deformation, ranging from folding through to faulting. It will examine the principal spatial, rheological and temporal controls on the inversion of Carboniferous basins, from regional down to mineral deposit, outcrop and borehole scale. The project will capitalise on the improved geological constraints of iCRAG's 3D geological modelling and recently acquired geophysics arising from mineral exploration (e.g. 2D seismic and boreholes) and the Tellus survey (e.g. aeromagnetics). A broad range of geological and geophysical modelling techniques will be utilised in the project, including Leapfrog, Maptek Vulcan, Petrel, SKUA-GOCAD and Traptester/T7, and the PhD student will become an expert in 3D structural analysis and modelling and its application to academic research and a variety of application areas (e.g. economic geology, hydrogeology and geological storage). The project will be conducted within the Fault Analysis Group, with Professors John Walsh, Koen Torremans and Conrad Childs as supervisors.

Requirements: Applicants should have a minimum 2.1 BSc degree (2nd class honours, upper division) in Earth Science, Geology, Geoscience or equivalent (e.g. MSc or industry

experience). Some experience in field geology, structural geology and 3D modelling would be advantageous, but appropriate training will be provided in all aspects of the project.

Award: The successful candidate will be enrolled for a 48-month (Structured) PhD programme in the School of Earth Sciences, University College Dublin. The Fellowship provides University fees and a stipend of €18,500 per annum over four years. The successful candidate will join a vibrant research community in iCRAG and the Fault Analysis Group.

Start date: Between 1st September 2022 and 1st January 2023, with the agreement of principal supervisor.

Further Information: Please contact John Walsh (john.walsh@ucd.ie), School of Earth Sciences, University College Dublin, if you require further information about the project.

Application Procedure: E-mail a CV, including the names of two referees, as well as a cover letter, outlining your experience and motivation, to John Walsh (john.walsh@ucd.ie).

Closing date: 19th August 2022 at 5pm (local) Irish time.