ARC Training Centre for M3D Innovation

PhD Scholarship

Partnership between: Australian Museum, Sydney and Australian National University, Canberra

The **ARC Training Centre for Multiscale 3D Imaging, Modelling and Manufacturing (M3D)** will train a new generation of PhD candidates in the emerging area of Digital Materials and Advanced Manufacturing, including the Heritage Sciences/Museum Sector.

Projects within the M3D Training Centre are run in collaboration with our industry partners from Australia and overseas and promise to deliver real-world outcomes with ground-breaking results within diverse fields. The program will give PhD candidates a chance to obtain practical experience through industry-based research training with the relevant industry partner. Visit: https://m3d.edu.au

Project Title: Using a neural network to identify biostratigraphically important conodonts

(Full Project Descriptions Attached)

Rate: AUD $32304/pa for 3 years with a possible 6 months extension

Candidates must hold a First Class Bachelor degree with Honours or a Master degree in Material or Mechanical Engineering, Bioengineering, Materials Science, Geology, Zoology, Computer Graphics, Visualisation, or in a related field of research. Knowledge of programming, modelling or image processing is desirable.

Applications open until 10 December 2021 or until position is filled.

Applications and further information:
M3D Innovation Heritage Science Leader: Prof Tim Denham,
Tim.Denham@anu.edu.au

Information about ANU positions:
M3D Innovation Centre Manager:
Dr Ankie Larsson,
Ankie.Larsson@anu.edu.au

Using a neural network to identify biostratigraphically important conodonts

Primary Supervisor: Dr Patrick Mark Smith (The Australian Museum)

Biostratigraphy (the study of fossils from distinct layers of strata) has been used for over 200 years to provide accurate correlations and ages estimates to economically important sedimentary rocks around the world. There is no other reliable means of comparing sedimentary sequences free of contamination or geological alteration. Microfossils are typically used for these correlations as they are generally widespread geographically, evolved rapidly and were numerous in many palaeoenvironments. In particular, conodonts (tiny, enigmatic, eel-like animals) have recently proven to be extremely useful in correlating numerous highly profitably mineral bearing geological sequences in New South Wales (Zhen & Percival 2017). Unfortunately, the ability to distinguish important conodont species often requires painstaking specialist training and slow techniques that have not changed since the 19th century. As a result, this skill is rapidly being lost in modern fast-pace mining sector which has come to rely upon quicker, more inaccurate techniques. This project will aim bring the study of conodont taxonomy and biostratigraphy into the 21st century using cutting-edge technology. Utilizing samples in the collections of the Australian Museum, the project would seek to CT scan select conodonts fossils and train a neural network to taxonomically distinguish interspecific differences. This would be the first step in designing a new system that could rapidly and reliably correlate economically important rock units using computer derived biostratigraphic data. The ideal candidate for this project would have a background in either computer science, software engineering or geoscience. Experience working with 3D data, neural network or palaeontology would be ideal.

Zhen, Y. Y., & Percival, I. G. 2017. Late Ordovician conodont biozonation of Australia—current status and regional biostratigraphic correlations. Alcheringa 41(3), 285–305.

Applications and further information: M3D Innovation Heritage Science Leader:
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