

# Obtaining Reliable Paleomagnetic Poles for Plate Tectonic Reconstructions of China in the Paleozoic

## PROJECT DESCRIPTION

"Paleomagnetism has always played a crucial role in plate tectonic reconstructions, aiming at obtaining paleomagnetic poles to build the Apparent Polar Wander Path (APWP) of different continents. Such paths are used to reconstruct position of continents in the past which is necessary to decipher how mantle convection relates to plate tectonics and how dynamical processes control seafloor spreading, volcanic activity, earthquakes, faulting and topography. All these dynamic processes control the geological environment for mineral resource formation, impact the climate change and evolution of life thus are important to understand. Paleomagnetism is the only geophysics method to provide quantitative reconstructions of the positions of the continents in the geological past.

Recently we published a reliable APWP for the major Chinese tectonic blocks from Permian to the present day (Wu, Kravchinsky, Potter, 2017). An older Paleozoic APWP was constructed for Asia from Cambrian to Permo-Triassic (Cocks and Torsvik, 2013) but the majority of the poles were published in the 90s, and lack critical field tests or laboratory procedure description. Chinese APWPs have only one–two paleomagnetic poles for most geological periods before 260 Ma, and there are no reliable Carboniferous poles at all. For comparison, Paleozoic part of the European APWP contains about 70 reliable paleomagnetic poles (Torsvik et al., 2012). Therefore, the requirement of high quality paleomagnetic data is of the utmost importance for the construction of reliable apparent polar wander paths and for performing quantitative plate tectonic reconstructions. For example, South China has only two reliable early Paleozoic poles, one in the Late Cambrian at 510 Ma and the other in the Early Ordovician at 480 Ma. The Late Cambrian pole suggests South China was positioned at equatorial latitudes whereas the Early Ordovician pole suggests it was at a paleolatitude of 50° South or North. Obtaining new measurements of the remnant magnetization in Paleozoic rocks from South and North China will enable the construction of the first reliable early Paleozoic APWP for China.

A student will (1) perform paleomagnetic sample measurements with the 2-G cryogenic magnetometer and progressive alternating field and thermal demagnetizations at the Paleomagnetic laboratory of the University of Alberta, (2) learn basic processing and analysis of the data using various softwares, (3) prepare a final report and give a talk to present the results of his / her 3 month work. Some basic knowledge of programming in Matlab is a useful asset although is not required."

## FACULTY-DEPARTMENT

Science - Physics

Contact: Brendan Cavanagh, Internship Coordinator (Inbound)  
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**DESIRED FIELD OF (STUDENT) STUDY**

geophysics, geology, earth sciences, physics

**INTERNSHIP LOCATION**

University of Alberta Main Campus - Edmonton

**NUMBER OF INTERNSHIP POSITIONS**

1

**INTERNSHIP START DATE**

July 4, 2018

**INTERNSHIP END DATE**

October 3, 2018

**ARE THE DATES FLEXIBLE?**

Yes, I am flexible regarding the internship dates. Selected students can contact me to request a date change.