ELECTRON MICROSCOPY OF ANCIENT MICROFOSSILS

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Description:

Prof. Xiao's current research focuses on the biological evolution and environmental changes in the Proterozoic Eon (2500 to 543 million years ago). He has been working on some of the most important and exquisitely preserved microfossils from the ca. 600-million-year-old Doushantuo Formation in South China. These microfossils include multicellular red algae and animal embryos at successive cleaving stages. In addition, he has been working on single-celled eukaryotes from much older, about 1400-million-year-old, deposits from North China.

Traditional research tools, including acidification, thin section, light microscopy, and scanning electron microscopy (SEM), have been applied in the study of these ancient fossils. Prof. Xiao is currently working with scientists from the Tulane University Coordinated Instrumentation Facility to conduct transmitted electron microscopy (TEM) analysis of these fossils. It is expected that the TEM tool can resolve nano-scale ultrastructures of these ancient microfossils in order to address issues related to their biological affinity and fossilization processes.

LAMP students will participate in the sample processing, SEM, and TEM work together with Prof. Xiao.

Objectives:

LAMP participants will learn basic knowledge about the fossil record of early multicellular eukaryotes and animals. They will appreciate the great magnitude of geological and evolutionary time. They will also learn basic paleontological techniques including thin sectioning and acid maceration (acetic, hydrochloric, and hydrofluoric acid), as well as various microscopic techniques (light, scanning electron, and transmitted electron microscopes). Above all, it is fun to look at microfossils under the microscope.

Prerequisites:

Patient and meticulous. Preliminary training in biology and geology would also help.