

# MONASH CENTRE FOR ELECTRON MICROSCOPY

## Stardust, Asteroid Goo and Moon Water: EELS as a Tool for Astromaterials Exploration

**Date:** Monday, 21<sup>st</sup> July 2025

**Time:** 11:00 – 12:00PM

**Venue:** Theatre S2,  
16 Rainforest Walk, Monash Clayton Campus

### Abstract

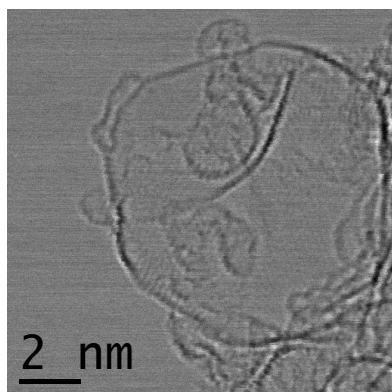
The Universe is my Nano-Fab: an Electron Microscopist's Guide to the Diversity of Astro-Nanomaterials

Many materials of recent technological interest including nanodiamond, graphene, and SiC, were first produced in the outflows of ancient stars older than our Sun and at the edges of our nascent solar system. Although we often think of nanoscience and technology as emerging in the late 1900s, nature has been producing such materials for billions of years, through a wide range of astrophysical processes, from condensation of dust particles in circumstellar envelopes to space weathering on airless bodies. The principles of physics and chemistry that constrain materials formation are the same in space as they are on Earth, although the relevant temperatures, pressures and time scales are often quite different. This seminar will discuss the use of state-of-the-art transmission electron microscopy to investigate the compositions and structures of astro-nanomaterials, including doped nanodiamonds and SiC nanocomposite grains, in order to constrain their astrophysical formation and processing histories, and to potentially aid in development of novel synthetic nanomaterials.



**Dr. Rhonda Stroud,**

*School of Earth and Space  
Exploration  
Arizona State University*



Bright-field scanning transmission electron micrograph of > 4.56 billion-year-old graphene platelets that can sequester noble gasses from the early solar system. Image Credit: R.M. Stroud.

### Biography

Dr. Rhonda Stroud is Director of the Buseck Center for Meteorite Studies and Professor in the School of Earth and Space Exploration at Arizona State University. Her research focuses on the application of electron microscopy studies of nanoscale materials formed in astrophysical environments and in the laboratory. Prior to joining ASU in 2022, she was Head of the Nanoscale Materials Section at the US Naval Research Laboratory (2007-2015), where she directed the DoD's premier electron microscopy facility for nanoscience. She has served as an advisor to the Microscopy Australia program and was President of the Microanalysis Society from 2018-2020.

**Convener:** Professor Laure Bourgeois

Email: [mcem@monash.edu](mailto:mcem@monash.edu) Tel: 9905 5563