Cascadia Meteorite Laboratory / Portland State University

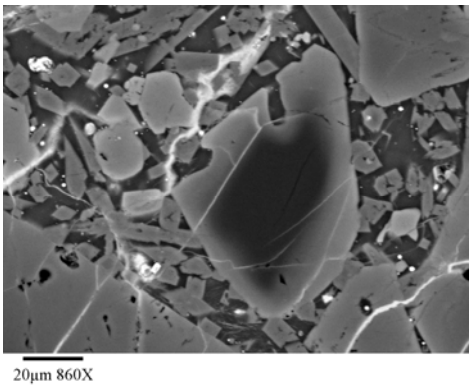
Researchers at **Portland State University** travel back in time 4.5 billion years to understand broad-scale processes that occurred at the birth of the solar system, by studying the minute mineralogical and chemical features of meteorites. These activities stem from the creation of the **Cascadia Meteorite Laboratory** (CML) at Portland State in 2003.

Alex Ruzicka, Melinda Hutson, Dick Pugh and students are involved in various projects funded both by NASA and direct public support.

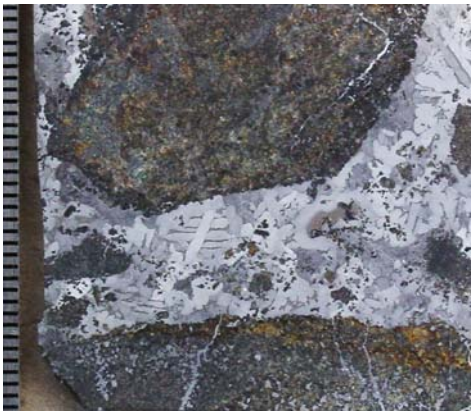
Melinda Hutson uses a petrographic microscope, the basic tool of a meteorite petrologist, to study a meteorite thin section.

One major research track focuses on primitive meteorites known as chondrites and the components they contain. This includes studies of so-called “relict grains” and “ameboid olivine aggregates”, materials that are believed to have existed in the dusty, gaseous cocoon that existed prior to planet formation and widespread melting events. Another major research track focuses on studies of differentiated meteorites, including enigmatic meteorites known as “silicate-bearing irons”. Unlike other melted meteorites that can be understood to be parts of differentiated bodies composed of cores, mantles, and crusts, these meteorites contain both the metallic core and sometimes petrologically evolved “crust” components of a differentiated body. Both of these research tracks aim to understand the processes that affected the building blocks of planets.

Besides these NASA-funded projects, students have been particularly active in working on serendipitous projects involving new meteorites, which sometimes show novel features not previously described.



(Above) Backscattered electron image of a relict grain of olivine (dark grain core) in a chondrite (NWA 3127). (Below) reflected light image of an etched silicate bearing iron (Udei Station) containing both silicates (dark) and metal (light). Tick marks at left = 1 mm.



Ruzicka, A. and M. Hutson (2009) Comparative petrology of silicates in the Udei Station (IAB) and Miles (IIE) iron meteorites: Implications for the origin of silicate-bearing irons. In Press, *Geochimica et Cosmochimica Acta.*

Jamsja, N. and A. Ruzicka (2009) Unusual igneous textures and pentlandite in a meteorite of LL-chondrite parentage, NWA 4859. Submitted to *Meteoritics & Planetary Science.*

Ruzicka, A., C. Floss, and M. Hutson (2008) Relict olivine grains, chondrule recycling, and implications for the chemical, thermal, and mechanical processing of nebular materials. *Geochim. Cosmochim. Acta* 72, 5530-5557.

Hutson, M., A. Ruzicka, R. Pugh, L. Sloan, and E. Thompson (2007) Complex brecciation and shock effects in the Buck Mountain Wash (H3-5) chondrite. *Meteorit. Planet. Sci.* 42, 963-978.

Ruzicka, A., H. Hiyagon, M. Hutson, and C. Floss (2007) Relict olivine, chondrule recycling, and the evolution of nebular oxygen reservoirs. *Earth Planet. Sci. Lett.* 257, 274-289.

For more information:
http://meteorites.pdx.edu
http://web.pdx.edu/~ruzickaa