



Cascadia Meteorite Laboratory



Cascadia Meteorite Laboratory  
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Fourth newsletter: June 2010

Welcome to our fourth newsletter. For those of you who haven't been with us from the start, the Cascadia Meteorite Laboratory (CML) is staffed by Dr. Alex Ruzicka (director), Alex's wife Dr. Melinda Hutson (curator), and Dick Pugh (outreach). Additionally the lab currently has two graduate students (T.J. Schepker and Kristy Hauver) and one undergraduate student (Niina Jamsja) doing research in the lab.

We'd like to start by thanking everyone who has helped support our lab. Without your support there wouldn't be a Cascadia Meteorite Laboratory.

The past year has been so full that this newsletter is one page longer than last year. One of the more interesting things to local meteorite enthusiasts is that Oregon's official list of meteorites just went from four (Sam's Valley, Willamette, Klamath Falls, and Salem) to five.

The 5<sup>th</sup> meteorite, named Morrow County, was unveiled by the finder during May 2010 at PSU during a media event. The finder, Mr. Donald Wesson, recounted the circumstances of the find for three television crews. The meteorite was found in 1999, and remained unidentified for another ten years. Along the way, it rested in a garden, hung out beneath a barbeque on a deck, visited a county fair, and stopped briefly at Western Washington University, where it was examined by George Mustoe, before arriving at PSU. For more details see: <http://meteorites.pdx.edu/05%2029%2010%20-%20Press%20Release%20-%20CML-v4c.pdf>



*Mr. Donald Wesson with Morrow County, Oregon's fifth meteorite.*

George Mustoe contacted Dick Pugh who immediately recognized that the stone was a beautifully oriented stony meteorite, aerodynamically shaped into a cone during its passage through the Earth's atmosphere. Dick spent a great deal of time interviewing Mr. Wesson to narrow down the find location to Morrow County, Oregon. Melinda and Alex did the analyses necessary to classify the meteorite, which is an L6 ordinary chondrite that has been highly shocked (S5), but minimally weathered (W1).

The name (Morrow County) and the classification have just been approved by the Nomenclature Committee of the Meteoritical Society.



*The Morrow County chondrite. The top of the cone was apparently knocked off by a plow, and there are at least three scars indicating the meteorite was hit repeatedly by plows before being thrown into a ditch alongside the road where Mr. Wesson found it. A cut face in the lower right is where a sample was removed for testing. The center of the cut face shows an elaborate dark shock vein.*

In addition to Morrow County, our lab has finished the classification of 12 additional meteorites that were approved this past year by the Nomenclature Committee, and have finished work on 7 other meteorites that have been submitted for approval. Classification is a necessary first step in understanding a meteorite, but is not considered to be suitable for research funding by government agencies, so our lab has relied on small internal grants from Portland State University (PSU) and donations from the public to pay the equipment costs encumbered during the classification process.

One of the samples approved this past year was NWA 4859, which we were fortunate to receive from Edwin Thompson. Although only required to provide 20 grams for a type specimen for classification, Edwin instead provided our lab with an extremely generous amount of material for study after seeing what appeared to be a huge (~2 cm across) chondrule in a slice of the meteorite.

We try to get undergraduate students involved in classification of chondrites as a way of introducing them to the subject of meteorites.



*A photograph of a slice of NWA 4859 showing a large round inclusion ~ 2 cm across.*

Niina Jamsja started working on the meteorite with Alex when she was a freshman. Two years later, as Niina began her junior year, she and Alex had a manuscript accepted for publication by *Meteoritics and Planetary Science*. Niina's work on NWA 4859 earned her an honorable mention for the 2009 Ninninger Meteorite Award (the winner and the other person receiving an honorable mention were both graduate students).



*Niina at Barringer (Meteor) Crater, Arizona.*





*Niina (center) being presented with a certificate as part of her Oregon Space Grant award. The presenter (on the left) is Marvin Kaiser, the Dean of the College of Liberal Arts and Sciences at PSU, and the person on the right is Gerald Recktenwald, the Chair of the Mechanical and Materials Engineering Department at PSU.*

Niina is continuing to do classification and research on meteorites. She recently received a \$2800 McNair scholarship from PSU and a \$5000 NASA/Oregon Space Grant Consortium research scholarship to classify and study two new Rumaruti-type (R) chondrites and two new mesosiderites.

Our two graduate students have also been busy. Kristy (a past McNair scholar) received a Creative Scholarship Grant last year to help fund a research project that grew out of the classification of NWA 5964 (which was accepted by the nomenclature committee this past year). This meteorite has experienced an extremely complex thermal and shock history. One of Kristy's first discoveries was that this meteorite contained cohenite (an iron-nickel carbide), which appears to have been produced as part of its shock history. Prior to this, cohenite had been reported in chondrites only as the result of aqueous alteration.

T.J. has been juggling two projects. One involves using x-ray diffraction as a tool to classify ordinary chondrites. He presented a poster on his work at the Lunar and Planetary Science Conference (LPSC) in Houston in March 2010. T.J. is also working with Alex on a pilot project involving HED meteorites (howardite, eucrite, diogenite suite—believed to come from the asteroid Vesta). He has been involved in collecting data and helping to classify four new HED meteorites.



*From left to right: Kristy Hauver, Niina Jamsja (holding Kristy's 4 year old son Phenex), and T.J. Schepker.*

The students haven't been the only ones who've been busy this past year. Alex's NASA grant on olivine aggregates ended, and there has been a great deal of work trying to finish this project, particularly as we have had to work around not having a scanning electron microscope (SEM) since last October. The old SEM had been on its last legs for several years, and PSU received grant funding last Fall for a new one, which arrived in the past few weeks.

In the last newsletter, we mentioned that we had done a small pilot study using PSU's high-resolution transmission electron microscope (HR-TEM) to study shock effects in a meteorites, and that based on the results of that study, we would be submitting a proposal to NASA for funding for a bigger project. We are happy to report that Alex was awarded a 3 year grant from NASA's Origins program for \$125,000 to study the shock histories of chondrites.

The Education/Public Outreach Grant that has kept Dick driving all over Oregon for the past three years was linked to the olivine aggregates grant and has just ended as well. Dick would like to report that during this time he drove over 13,000 miles, visited 68 towns, and spoke to almost 6000 people (over half of them students). People brought in over 1000 rocks that were not meteorites, 40 samples of already

known meteorites, and 2 newly discovered meteorites. Alex has submitted an Education/Public Outreach grant proposal linked to his newly funded NASA/Origins grant, but has not yet heard whether or not it will be funded. For the time being, Dick is continuing to drive around giving lectures and demonstrations using funding from the Libraries of Eastern Oregon (LEO).

Since last year, Alex has been serving as an Associate Editor (AE), for *Meteoritics and Planetary Science (MAPS)*, as well as serving on the Membership Committee of the Meteoritical Society, and the Faculty Development Committee at PSU. Since January 2010, Alex has also been serving on the Nomenclature Committee of the Meteoritical Society. Around all of this service, Alex has taught four classes this year, presented a talk and a poster at LPSC in March 2010, and has had two journal articles accepted for publication (one of which was published earlier this year in *Geochimica et Cosmochimica Acta*). Alex has also been busy writing grant proposals. In addition to his successful NASA/Origins proposal and the add-on Education/Outreach proposal, Alex has written proposals for two more research grants that would take him and the lab in new directions. One would involve working on lunar samples, while the other would allow Alex to become a participating scientist in the Dawn mission to Vesta. Alex also recently helped write a proposal submitted to NASA with Biology faculty Radu Popa.



Melinda standing in front of the display posters she created for the Arizona exhibit.

Late last fall, Melinda was contacted by Dolores Hill at the Lunar and Planetary Lab at the

University of Arizona in Tucson. For their 50<sup>th</sup> anniversary, the university developed a three hour special exhibit about the meteorites that had been discovered in Arizona. The exhibit was timed to coincide with the opening of the Tucson Gem and Mineral Show. Dolores asked Melinda if she could create two posters: one about the founding of the Cascadia Meteorite Laboratory, and the other about the Arizona meteorites that had been classified at our lab. Dolores also asked if Melinda could come to Tucson for the exhibit and hand-carry samples from the meteorites that had been classified. Dick accompanied Melinda to Tucson for this event. Estimates are that between 400 and 500 people went through the exhibit during the three hours that it was open to the public.

We have also been busy packing and unpacking the lab as a result of a remodel to Science Building 2 (SB2). Over the summer, we had to pack and move from the fourth floor of SB2 to temporary quarters in a basement level. Some of our furniture had to be put in storage, but we were able to keep operating once we finished unpacking supplies, organizing and putting away meteorites, and setting up the microscopes. Then in December, we had to repack and move back up to our former lab space on the fourth floor of SB2. Moving day was memorable. Many thanks to the people who helped: Alex, Melinda, Dick, Niina, Kristy, T.J., Maggie Rogers, and Dick's nephew Lance. We started moving at 2pm, and at 3pm someone said that snow was falling. Yup, we were moving on the one and only day in December 2009 that Portland became gridlocked due to snow. We finished moving around 8pm and spent the next several hours trying to get out of downtown Portland. The irony is that the university has decided we will be moving yet again to accommodate a new remodel as part of an NSF grant. We're not yet sure when, and we're not yet sure where, just that we won't be staying in the lab space on the fourth floor of SB2. We'll let you know in the next newsletter.



**We would like to thank all of you for your support!**

We held our annual fundraiser in November 2009, and despite the poor economy, we raised as much money for the lab as we had the previous year. We would like to especially thank meteorite dealer Blaine Reed and two anonymous collectors who provided material for our auction. We would also like to thank Peter Abrahams for serving as our auctioneer. Blaine Schmeer, Steve Carlson, and Doug McCarty bought samples and donated part or all of them to our lab specifically to help with student projects.

The biggest surprise of the evening came when Gene and Susan Frederiksen showed up before the fundraiser and handed us a box containing a collection of ~100 meteorite samples. Then they left without staying for the fundraiser (and the accompanying food and drinks). It turns out that Gene had started collecting in 1999 and worked to put together a collection that had at least one of each type of meteorite. He had found our web site (and noted that he had graduated from the same university where Alex and Melinda got their undergraduate degrees) and decided to donate part of his collection to our laboratory.



*From left to right: Susan Frederiksen, Gene Frederiksen, Alex Ruzicka, and Melinda Hutson*

The samples are greatly appreciated and include pieces that we had hoped to get for specific research projects. We also suddenly have a great variety of iron meteorites.



*A close-up of the intricate texture of the 2 kg end piece of the Mont Dieu iron donated by Gene and Susan Frederiksen. Dark areas are inclusions of sulfide. A portion of a dime is visible.*

Again, many thanks to the Frederiksens for their generosity. The Cascadia Meteorite Laboratory now has over 600 different meteorites in its collection, an amazing number considering that PSU had precisely one meteorite in 2003. Many people have donated meteorites to our collection, including an individual who donated one very rare and expensive meteorite. Three people in particular belong to the “hundreds club”, meaning they have donated 100 or more meteorites to the lab. These are Dick Pugh, Edwin Thompson, and Gene Frederiksen. Dick and Edwin donated some of the very first meteorites in our collection and are still donating samples to the lab today.



*A close-up from a large slice of the Muonionalusta IVA iron donated in April 2010 by Edwin Thompson showing Widmanstätten texture. The large ellipsoid is a sulfide inclusion. A portion of a dime is visible.*

CML is very pleased to be recognized by Pi Lambda Theta, an international honor and education society. The Portland Metro Chapter has made a substantial donation to the E.F. Lange Endowment for education/outreach to teachers, students, and communities. The Chapter has a long tradition of awarding scholarships to individual students, but this is the first donation they have given to a program. A unanimous vote by members was made to donate to CML after a tour of our lab facility by society representatives.

We would like to thank the following people for their financial support during the past year and apologize if we have overlooked anyone.

Dennis Asher  
Michael Baker  
Marvin and Tammy Breach  
Dick Burton  
Diane Bushell  
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Oliver Ede  
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Andy Kim  
Sam Kimpton  
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Dick Pugh  
Jason Rasmussen  
Erik Sanchez  
Mark Simpson  
Barbara Stross  
Sheryl Vineyard  
Beverly Weber  
Anonymous donors

**Many heartfelt thanks from the members and students of the Cascadia Meteorite Laboratory to all of our supporters.**

Particularly during these economic times, your support is more important than ever. Donations make a huge difference in maintaining our lab, undertaking small research projects that can lead to bigger ones, promoting science education through public outreach, and involving students in meteorite research.

There are many ways you can help.

You can donate samples or supplies.

You can leave samples or funds in your will to the Cascadia Meteorite Laboratory in the department of Geology at Portland State University, knowing that we are an official repository and that your collection will be properly handled and maintained.

Also appreciated are donations of funds, which can be made either to our endowment or to our everyday operating account.

Stay informed and help save a tree by going paperless. Send us your e-mail address so you can receive these newsletters electronically.

*You can donate to our endowment. The principal cannot be spent. The lab receives only the interest that is generated by the endowment.*

*The form below is for donations to the endowment.*

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*You can donate to an operating account in which all of the donated funds are immediately accessible for use.*

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