Cascadia Meteorite Laboratory

Fifth Newsletter, September 2011

http://meteorites.pdx.edu

Cascadia Meteorite Laboratory

Mission Statement

The mission of our laboratory is to conduct meteorite research to help understand our place in the universe, and to share this knowledge with the wider community. Meteorites provide vital clues about the origin of the Earth and other planets, our solar system, and the molecules that serve as precursors to life. Meteorite research contributes to the larger field of planetary science which can help society evaluate how to utilize extraterrestrial resources, how to protect our planet from the devastating effects of a major cosmic impact, and how planetary climate change might occur. Our lab maintains and increases a carefully curated collection of meteorites which can be used for research and education. Through mentoring, classes, and outreach programs, laboratory personnel help inspire and educate students of all ages, teachers and the general public, and help to prepare a new generation of scientists.

Welcome to our fifth newsletter!

If you've read the previous four newsletters, then you'll notice two things immediately (our new look, and we're later than usual). We think that our new look (and our new Mission Statement) help us appear somewhat more professional than our previous format, and hope you agree. We've had a very busy year, which is one of the reasons we're later than usual. If you haven't read our previous newsletters, they are available in pdf format on our web site at: http://meteorites.pdx.edu/news-CML.html

The Cascadia Meteorite Laboratory (CML) is staffed by Dr. Alex Ruzicka (director), Dr. Melinda Hutson (curator and Alex's wife), and Richard (Dick) Pugh (outreach). We currently have two graduate students (Kristy Hauver and T.J. Schepker) and one undergraduate student (Niina Jamsja) working in the lab on projects that are getting close to completion. We are pleased to welcome a new graduate student (Katherine Armstrong) and undergraduate student (Ryan Brown), both of whom are starting projects in the lab this fall.

We'd like to start off by thanking all of the people who have supported our lab. You've helped us grow from an idea to reality in less than a decade.

Portland State UNIVERSITY

There is a lot to talk about in this newsletter, but the "Big 3" are (in no particular order) Oregon's 6th meteorite, lots of awards, and our lab's last move (we hope).

Until 2010, Oregon had only four officially classified meteorites (Sam's Valley, Willamette, Klamath Falls, and Salem). In the first half of 2010, that number increased by one with the classification of the Morrow County chondrite (described in last year's newsletter). In the latter half of 2010, Oregon gained its sixth officially classified meteorite, the Fitzwater Pass iron meteorite. That makes a 50% increase in the number of official Oregon meteorites in one year!

Images for the Fitzwater Pass meteorite, clockwise from the upper left: Paul Albertson (finder); two hand specimen views of the meteorite; reflected light micrograph of an etched surface showing different metal phases and textures in the meteorite.

Paul Albertson found the Fitzwater Pass meteorite decades ago and stored it in a coffee can that eventually came to rest on his hot water heater. In 2007, he brought his "rock" to one of our lab's public lectures in Lakeview, OR.

Alex and Melinda teamed up with Dr. Stephen Kissin (Lakehead University, Thunder Bay, Ontario, Canada) to analyze, classify, and study this meteorite.

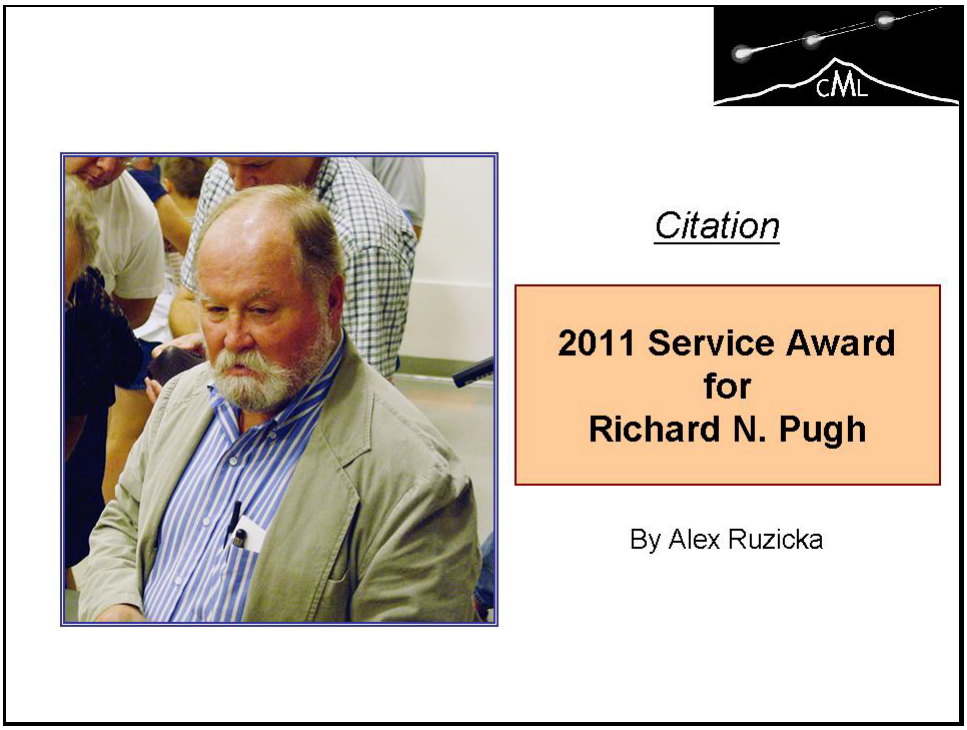
Fitzwater Pass turned out to be a member of a rare iron meteorite group (IIIF irons). There are only 8 other IIIF iron meteorites known. Interestingly, Klamath Falls, which was found 50 miles away, is also a IIIF iron, but the chemistry and textures of the two meteorites are different enough that it is clear that Fitzwater Pass is not a piece of the Klamath Falls meteorite. More information and images can be found on our lab's web site under "Press Releases" at http://meteorites.pdx.edu/news-CML.html

In July 2010, Alex received formal notification that his proposal for an outreach program was selected for funding by NASA. This proposal (Meteorites on the Road II: Expanding NASA outreach in the Pacific Northwest) will continue to support CML staff member Dick Pugh for three more years as he

drives all over the Pacific Northwest giving lectures and letting people (from school kids to senior citizens) handle real meteorites.

Dick Pugh has been the public face of the Cascadia Meteorite Laboratory since its inception. He has traveled all over the Pacific Northwest promoting meteorite/science education. He has also met with thousands of people to look at their "rocks" to evaluate whether or not they are meteorites. In his lectures, Dick offers advice on how to find meteorites. The meteorite and education community has begun to take notice, and this past year has been one in which Dick has received awards for all of his hard work.

At the Meteoritical Society's annual meeting in July 2010, Dick learned that he would be receiving the Society's prestigious Service Award at the 2011 meeting in Greenwich, England. This award "honors members who have advanced the goals of the Society to promote research and education in meteoritics and planetary science in ways other than by conducting scientific research." The awards ceremony is a big deal. The Society gives out four separate awards during the ceremony. Traditionally, a presenter gives a Powerpoint presentation explaining why the recipient is receiving the award, and then the recipient thanks the Society. Of course, this year was a little different. The Service Award was the last of the four given. For some reason the presenters of the previous three awards hadn't prepared a Powerpoint. This confused the projectionist, so as each presenter started, the slide with Dick's face and name (see below) was projected on the screen. To the amusement of everyone, this happened three times before Alex got up to actually present the award to Dick. Our lab definitely got noticed.



Both the official citation (which is printed in *Meteoritics & Planetary Science*) and the powerpoint presentation can be found on our web site at http://meteorites.pdx.edu/news-CML.html.

Dick also received the Duane Marshall Special Service to Science Education Award from the Oregon Science Teachers Association at a conference in Colton, OR on October 8, 2010. This month, to top it off, Dick was selected as a Sigma Xi Distinguished Member. Congratulations!!

Some of our lab's students have also been winning awards. Both undergraduate student Niina Jamsja and graduate student Kristy Hauver presented posters at the Lunar and Planetary Science Conference (LPSC) in Houston in March 2011. They also both presented posters at the Sigma Xi Columbia-Willamette Student Research Symposium in April 2011. Niina received an honorable mention for the 2011 Stephen E. Dwornik Planetary Geoscience Student Paper Award given out by the Planetary Geology Division of the Geological Society of America for her poster at LPSC. She also earned first place in the Earth Science Undergraduate Category at the Sigma Xi Symposium for her poster on R chondrites. Kristy received second place in the Earth Science Graduate Category at the same symposium for her poster on cohenite in NWA 5964. NWA 5964 was an unclassified meteorite donated by Edwin Thompson that turned out to be "weird and wonderful". We'd like to thank Edwin for his very generous donation of an abundant amount of this sample. Having a large amount of material to work with made this project possible.


Katherine Armstrong


Ryan Brown


Kristy Hauver


Niina Jamsja


T.J. Schepker

Speaking of students, the lab now has five students (shown above in alphabetical order by last name). Graduate student Katherine Armstrong is starting her graduate work at Portland State University (PSU) this Fall. She has a B.S. in Earth Science, with an emphasis on planetary science from the University of California/Santa Cruz, where she wrote an undergraduate thesis on asteroids with Dr. Erik Asphaug.

Undergraduate Ryan Brown is starting a project with Alex this Fall, although he's been interacting with the lab for about a year. He'll be working on a project using a CML sample donated by Dennis Asher that is still in the process of being classified (CML 0491). He obtained some initial chemical data on this meteorite using an electron microprobe as part of a summer class taught by Dr. Martin Streck (PSU Geology) in 2010. Melinda obtained additional data during the past year. The meteorite turned out to be a bit more interesting that it initially appeared. To quote Dick Pugh: "There is nothing ordinary about an ordinary chondrite." We'll see what Ryan finds out during the coming year. Funds for Ryan's project are coming from our CML account which is funded entirely by public donations (again we'd like to thank you for donations). Ryan has also helped us move the lab this year (more about that below).

For those of you who remember the previous newsletter, we ended the academic year with a cliffhanger as far as our lab was concerned. In summer 2007, after years of sharing Martin Streck's lab space, the CML finally obtained its own lab space. We moved into Science Building 2 (SB2) and set up shop (and a cozy nook for visitors and sleeping students). In summer 2009, we had to pack up and move the lab to temporary quarters while SB2 was being remodeled. We moved back into our "permanent" quarters in December 2009, and by June 2010 (the last newsletter), we were told that we'd be moving again, but no one knew exactly where we'd be moving.

In November 2010, the half of the lab that represents sample storage and curation moved into remodeled and hopefully permanent quarters in Cramer Hall (where the Department of Geology is located), while the other half (microscopes, the saw, and autodessicators holding thin sections needed for current projects) moved into a temporary space. That latter portion of the lab moved in July 2011 into remodeled and hopefully permanent quarters in Cramer Hall one floor below the curatorial half of the lab.

We've moved again!

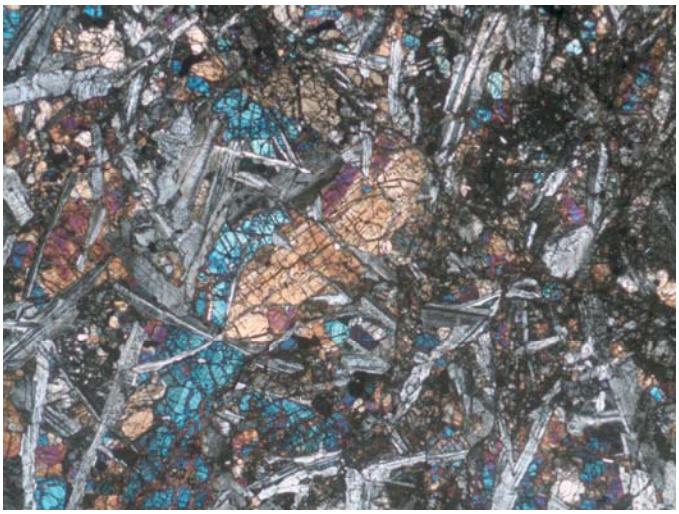
Top row, left to right: Empty lab in SB2; the cozy nook; Alex in front of the microscope and a long gone blackboard.

Middle row, left to right: Dick and Melinda in our former lab in SB2; filled shelves and sample preparation equipment.

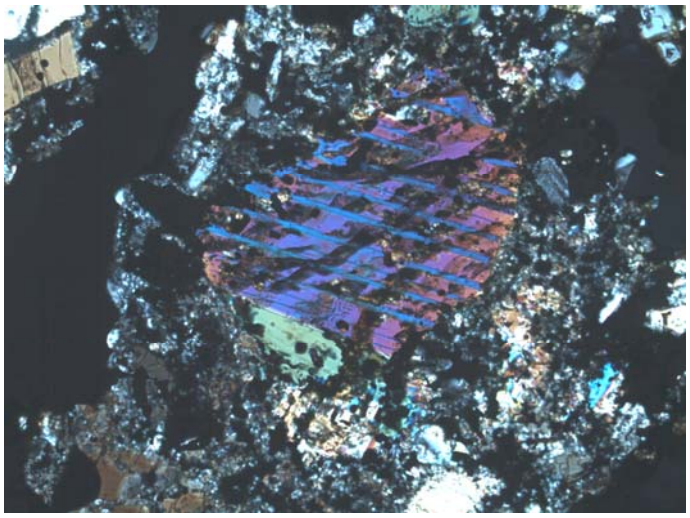
Bottom row, left to right: Melinda and Dick discuss where to cut a sample; Dick using the "bricksaw", while Niina looks on.

Dividing the lab into two pieces has several advantages. Most importantly, the CML meteorite collection is now in a secure room which almost no one can access (including janitors). Documents related to the running of the lab, including financial documents are also inaccessible to everyone except Alex and Melinda. Rare and collectible books which have been donated to the lab are also kept in this secure facility. Additionally, Alex and Melinda are getting more exercise running up and down stairs between the two lab spaces.

The downside is that we've had to spend limited lab funds to duplicate things (such as computers) which are needed in both lab spaces. Each time the microscopes are moved, they become misaligned and have to be serviced. There's been some slight damage to one of our environmental cabinets. The comfy nook is gone (the furniture is being stored in the Ruzicka garage). Also, all of this moving is time we have not spent on research or classification. We are still unpacking and getting organized, so we don't have any pictures of the new lab space yet. But, in our upcoming annual fundraiser, we hope to have the lab spaces not only functional, but decorated and ready to show off.



CML 0612 – classified as NWA 6711 (eucrite), in cross-polarized transmitted light. The large pyroxene grain in the center (brownish) is cut by microfaults, as is the feldspar grain to its immediate upper right (elongate gray striped grain).



CML 0613 – in cross-polarized transmitted light. One of about two dozen meteorites in the process of being classified at present, this contains numerous unusual objects, such as this oddly barred clast.

CML faculty and staff have been extremely busy this year. Alex was awarded two NASA grants, one for a research project on shock effects in meteorites, and the other for outreach. Partly because of Dick's lectures for the outreach project, and partly because of referrals to CML from other institutions, we have been overwhelmed with samples from the public. We now have a huge backlog of interesting unclassified meteorites to work on, as well as our primary grant-funded research.

During the past year, PSU obtained a world-class scanning electron microscope (SEM). However, it was a bit over a year between the time that the old SEM was dismantled, and Melinda was checked out as an official user of the new SEM. During that time we worked on a large number of samples using the optical microscope (see images above). We are just beginning to work through the backlog with the SEM and to finish classification on these samples.

Since the last newsletter, Alex finished the manuscripts related to his previous grant (on olivine aggregates) and has begun work and publication on his current funded project (a study of shock effects in meteorites). He's doing all of this while mentoring students, teaching classes, serving on numerous committees at PSU and for the Meteoritical Society (membership and nomenclature committees, and Associate Editor for *Meteoritics and Planetary Science*). He has also served on two NASA panels. These are groups of people who look at reviewed grant proposals and rank them for funding. In August 2010, he was a panel reviewer for the NASA Origins of Solar Systems Program. In June 2011, he served on another panel: the NASA Lunar Advanced Science Exploration Research Program.

Alex at Times Square in New York in August 2010 for the Meteoritical Society Meeting, which Dick also attended. Our students joined Alex and Dick in Houston in March 2011 for the Lunar and Planetary Science Conference. Finally, Alex and Dick went to Greenwich (London) in August 2011 for another Meteoritical Society Meeting. Melinda sent posters to the first two of these meetings, but stayed home to watch the twins. Melinda had eye surgery (Trabectome for glaucoma) in June 2011, and had blurry double vision for about two months until she healed and got new glasses (the main reason this newsletter is late). The London conference occurred during some riots, which added excitement to an already exciting meeting.

We would like to thank ALL of the people who have continued to support our lab during these difficult economic times. We'd especially like to thank Edwin Thompson (ET Meteorites) for holding our annual fund-raising event at his home last year. At the time this newsletter was written, Edwin was a few days away from a serious surgical procedure on his spine. Everyone is hoping that it goes well.

Our fundraiser this year will be held in the Department of Geology (Room 17 Cramer Hall) on Saturday October 15, from 2:00-7:00. We have confirmations from two meteorite dealers who will have samples for sale there to help raise funds for our lab. The fundraiser is a pot-luck—if you attend, please bring a food or drink item to share.

Below is a listing of our publications since the last newsletter. A lot of this work was funded by public donations. Again, we want to thank each and every one of you who has contributed to the CML.

Refereed Journal Articles:

Jamsja N. and A. Ruzicka (2010) Shock and thermal history of NWA 4859, an annealed impact-melt breccia of LL-chondrite parentage containing unusual igneous features and pentlandite. *Meteorit. Planet. Sci.* 45, 828-849.

Macke, R.J., G.J. Consolmagno, D.T. Britt, and M.L. Hutson (2010) Enstatite chondrite density, magnetic susceptibility and porosity. *Meteoritics & Planetary Science* 45, 1513-1526.

Ruzicka A. and M. Hutson (2010) Comparative petrology of silicates in the Udei Station (IAB) and Miles (IIE) iron meteorites: Implications for the origin of silicate-bearing irons. *Geochim. Cosmochim. Acta* 74, 394-433.

Conference Abstracts:

Ruzicka A. and R. Hugo (2011) A shocking tale: TEM observations of deformed olivine in ordinary chondrites. *Meteorit. Planet. Sci.*, Abstract #5368.

Jamsja N., A.M. Ruzicka and M. Fries (2011) New insights on hydrous phases in R chondrites NWA 6491 and 6492. *Meteorit. Planet. Sci.*, Abstract #5377.

Ruzicka A. (2011) 2011 Service Award for Richard Norman Pugh. *Meteorit. Planet. Sci.* (May 15, 2011).

Hauver K. and A. Ruzicka (2011) Cohenite in NWA 5964 (L3-6 melt breccia): A possible product of shock-induced contact metamorphism. *42nd Lunar Planet. Sci. Conf.*, Abstract #2627.

Jamsja N. and A. Ruzicka (2011) Presence of hydrous phases in two R chondrites, Northwest Africa 6491 and 6492. *42nd Lunar Planet. Sci. Conf.*, Abstract #2324.

Ruzicka A., M.L. Hutson and C. Floss (2011) Amoeboid olivine aggregate condensates and the origin of the refractory element fractionation. *42nd Lunar Planet. Sci. Conf.*, Abstract #1336.

Hutson M.L., R.N. Pugh and A. Ruzicka (2011) Meteorites on the road: Taking meteorite science to rural communities. *42nd Lunar Planet. Sci. Conf.*, Abstract #1269.

Pugh R.N., M. Hutson and A. Ruzicka (2010) Oregon's two new meteorites: Morrow County and Fitzwater Pass. *Oregon Academy of Sciences* (Dec. 23, 2010).

Ruzicka A., M. Hutson and S.A. Kissin (2010) Classification of four new irons, including common (IIAB) and uncommon (IIIF, unusual IAB) types. *73rd Annual Meeting of the Meteoritical Society*, Abstract #5330.

For all who have asked: The twins are 4 ½ (not babies any more). They visited Mt. Hood in July 2011 (left), and the coast in Crescent City, California (right with Melinda), as part of a week-long trip along Highway 101 to see coastlines and the giant redwood trees.

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

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CML staff member Dick Pugh (on left) with Meteoritical Society President Ed Scott (right) in July 2010, shortly before Dick learned that he would be receiving the Society's prestigious Service Award in August 2011.

For more information about the Cascadia Meteorite Laboratory
visit http://meteorites.pdx.edu

CML's Fifth Newsletter 2011

Inside you'll find out what we've been doing in the last year, including classifying Oregon's sixth official meteorite, winning awards, moving the lab again, and everything else. We'd also like to take this opportunity to thank all of you for your interest in and support of the Cascadia Meteorite Laboratory. We wouldn't be here without you.