



## Astromaterials Research and Exploration Science Directorate

Newsletter - February 15, 2009

The ARES Newsletter is a monthly snapshot of current events within the Directorate. Each newsletter highlights a small sample of the remarkable breadth and variety of the research activity and facilities in ARES and the people who do the work.

You have a story to tell, we want to hear it. Send your Newsletter inputs, images and comments to Greg Byrne

### In the Labs

As you may recall, the Stardust Mission payload returned to Earth in 2006 with a bounty of comet dust after its close encounter with Comet Wild 2. **Scott Messenger** and **Motoo Ito** have made an exciting discovery within one of the Stardust samples, a presolar silicon carbide (SiC) grain; a tiny dust particle that formed from the remnants of an extinct carbon star (a red giant, for example) long before the formation of our solar system.

Using the ARES **Nano-Secondary Ion Mass Spectroscopy (NanoSIMS)** instrument, measurements of the SiC grain's carbon isotope ratios clearly showed that the grain did not originate in our solar system. The NanoSIMS is the only instrument capable of measuring the isotopic compositions of such an ultra-small object (~200 nanometers). Scott also credits Don Brownlee and Dave Joswiak at the University of Washington for first identifying the SiC grain while doing systematic surveys of material in the Stardust aerogel tracks. Scott and Motoo's discovery is noteworthy because it is the first presolar grain found in a Stardust sample that has known mineralogy (established by transmission electron microscopy), and it is the first presolar grain found in a Stardust aerogel track – three other grains were found in Aluminum foil craters. There has been a spirited debate on the apparent rarity of presolar grains in the aerogel samples; is this comet less “pristine” than expected or were the presolar grains possibly destroyed during the capture process? This latest discovery is sure to add to the debate.

**Alan Brandon** and **John Shafer** are age-dating Martian meteorites, including some recently recovered from Antarctica, in a study to trace the evolution of the interior of Mars. In collaboration with the University of Houston's Tom Lapen and Minako Righter, they are analyzing the meteorite isotope ratios of periodic-table elements that most normal people haven't even heard of; Lutetium (Lu), Hafnium (Hf), Samarium (Sm), and Neodymium (Nd). This isotope chronology study is confirming that the lavas from which the Mars rocks crystallized were formed on the planet surface within the last several hundred million years. This is in contrast to other recent suggestions that the Martian meteorites are as much as 4 billion years old. So, Alan et al.'s confirmation of the relatively young ages of the meteorites using their new isotopic system is crucial for determining when volcanism occurred on Mars.

What treasures are hidden in the nooks and crannies of Building 31? **Gene Stansbery** recently moved offices for the first time in 20 plus years, and during his move he found a small grey metal box tucked away in one of his 2-door cabinets. The writing in black sharpie on the sides of the box intrigued him; “GT-8, Experiment S-7, Cloud top Spectrograph Eq.# CF55010 Sereal(sp) No. 1.” On the back of the box is written “GT-5.” Inside the box is a very 1960s-looking camera – the spectrograph.

Could GT-5 and GT-8 refer to Gemini-Titan-5 (Cooper and Conrad) and Gemini-Titan-8 (Armstrong and Scott)? A quick check of NASA-SP 4203 *On the Shoulders of Titans*, verified that Fuad Saiedy from the University of Maryland was the principal investigator for experiment S-7, “Cloud-top Spectrometer” which did indeed fly on the two missions. The experiment was successful on GT-5, validating a method for determining cloud-top altitudes that could be used on second generation weather satellites; the first generation of weather satellites (TIROS) provided only qualitative cloud information through photography. But you old-timers may recall that GT-8 experienced a stuck thruster shortly after docking with its Agena target vehicle, and the mission was scrubbed after only 7 orbits.

One question remains - Is Gene’s re-discovered spectrograph the flight article, a flight spare, or a ground training article? If this rings a bell for anyone and you can shed some light on the mystery, please contact Gene.

Google Earth has added a new feature of great interest to ARES, Mars! Download the new 2009 release (it’s free), and click on the tiny Saturn icon along the top toolbar to find a browseable Mars in all of its Google glory. This is the latest Google installment of NASA imagery, with Ames as the lead Center for the NASA/Google collaboration.

The first installment of NASA imagery was provided by none other than our own **Crew Earth Observations** (CEO) Group. **Will Stefanov** worked with Ames and Google to provide astronaut photography of the Earth and descriptive content to Google Earth, and this new feature was instantly popular with its users (the metrics don’t lie). In Google Earth you can browse the CEO imagery under the “Layers” toolbar - go to “Gallery” then “NASA” and you’ll find “Astronaut Photography.”

## Comings and Goings

After long-duration stints working the Mars science missions for ARES, **Doug Ming** comes back to Earth (at least until the next mission) as a welcome addition to the ARES management team. Along with his research and cowboy hats, Doug will be also be wearing a new hat as the KX Office Manager.

**Joni Homol** will serve as the ARES Office Secretary while Alexis Davis is on rotation. If you need Joni’s services, as many of us do, you’ll find her now on the second floor of Building 31, Room 223.

**David Fuller** joins ARES as the ESCG safety representative. His bio of over 30 years of experience in the space business in a wide variety of capacities is quite impressive. In his capacity here, David will be looking out for the safety of all ARES personnel.

**Cherie Achilles** joins ARES from the University of Arizona where she had worked on the Mars Phoenix Mission, commanding some of the payload instrumentation during the mission surface operations. Cherie will be working with Dick Morris in the Spectroscopy & Magnetics lab, specifically with the Mossbauer spectroscopy equipment. She will be preparing samples for analysis and participate in various planetary research projects originating out of this lab.

Also joining ARES is **Julie Quinn** from Georgetown University where she received her PhD. in Chemistry. Julie will be predominantly supporting ARES Mars research, and will oversee the Chemistry Laboratory and the Atomic Absorption and Ion Chromatograph instruments. She is also learning the proper use of the PANalytical X-Ray diffraction instrument. Julie's knowledge of these instruments will be invaluable in supporting ARES Lunar & Meteoritical research, as well as the Mars-related investigations.

**Peter Urschel** joins the Orbital Debris Program Office in a rotation from the Space Shuttle Program (SSP). He will apply his background in orbital dynamics to help develop orbital debris software models. The SSP has Peter on a short leash; they want him back in 9 months.

**Tim Bell** was working as a project engineer on Advanced Suit Design for the engineering side of the ESC contract, and now he joins ARES as a curation database developer.

Also welcome to **Judy Reustle**. Her background is in web and database design, and she will continue that line of work for the ARES websites (and they do need some work!).

Congratulations are in Order

We celebrate **Don Bogard's** upcoming Length of Service Award, marking his 40<sup>th</sup> year of service to NASA. It's not easy to do justice to Don's amazing career with any kind of summary, but his citation for the Meteoritical Society's 2002 Leonard Medal does a pretty good job (although a few years out of date now). Google it, read, and enjoy...

[http://www.uair.arizona.edu/objectviewer?o=uadc%3A%2F%2Fazu\\_maps%2FVolume38%2FNumber5%2Fp667-668](http://www.uair.arizona.edu/objectviewer?o=uadc%3A%2F%2Fazu_maps%2FVolume38%2FNumber5%2Fp667-668)

**Roy Christoffersen** was presented a Certificate of Appreciation by Center Director Mike Coats, "For outstanding efforts in providing special expertise in materials, proving crucial in one of the ground-breaking findings in the Columbia Crew Survival Investigation Report". Roy was recognized for his great work on Transmission Electron Microscope analysis of a deposit sampled from a recovered portion of a Shuttle Columbia window. Also contributing to the analysis was **Zia Rahman** who had prepared the sample using a Focused Ion Beam instrument.

From the Archives

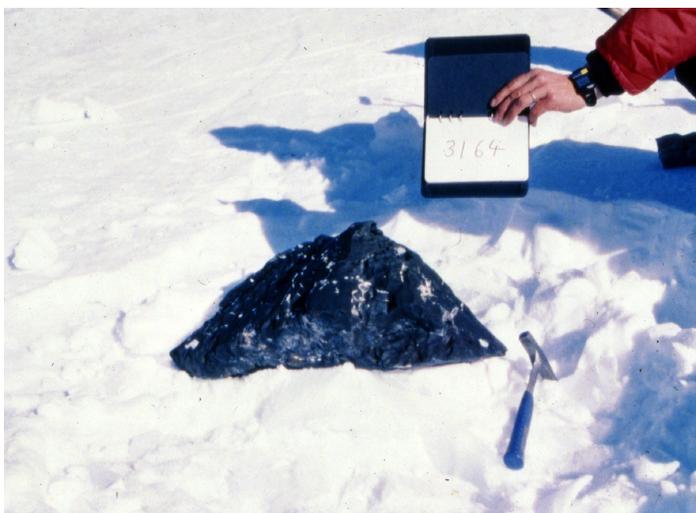
*The meteorite that fell to Earth – twice*

On display in the ARES **Meteorite Curation Facility** and weighing in at 250 pounds sits LEW85320, "Big Lew", the largest meteorite recovered in Antarctica. It was found in the Lewis Cliff area of the Transantarctic Mountain range by the 1985-86 Antarctic Search for Meteorites team, and our own **Mike Zolensky** was on that team. Other than its size, Big Lew is rather

ordinary as meteorites go, in fact, it's an "H" type Ordinary Chondrite, the most common of all meteorites.

Big Lew fell to Earth sometime in the past few hundred thousand years, landing somewhere on the ice of the Antarctic plateau, and through glacial drift ended up at Lewis Cliff. From the time it arrived at JSC its history is well known; the handling and analysis of Big Lew is documented to the nth degree within the ARES **Curatorial Operations Data Center**. What isn't documented is its unusual recovery from the ice.

Big Lew was too big for the ANSMET team to transport the usual way, which is to bag a meteorite and haul it to camp by snowmobile. So a wooden crate was built, Big Lew was man-handled into it, and a helicopter servicing a nearby summer camp was called in to pick it up on the spot. The crate was lifted, dangling by rope below the 'copter, and all was well until about ten feet up the crate came apart. Big Lew popped out and fell onto the Antarctic ice a second time. The crate was repaired and on the second attempt, Big Lew was finally on its way to McMurdo Station to await the long-haul transport to JSC.



Big Lew, on the ice

The 1985-86 ANSMET team is reflected in the sunglasses of team member Twyla Thomas, the self-proclaimed "discoverer" of Big Lew. This claim has been in dispute for over twenty years, the argument being that Lew stuck out so obviously against the ice that the team members surely saw it simultaneously. Mike Z's reflection is to the far right.

