



Astromaterials Research and Exploration Science Directorate

Newsletter - April 2010

The ARES Newsletter is a 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.

Send your Newsletter inputs and feedback to Greg Byrne.

In the News

Two new live oak trees have been planted with plaques in the JSC Memorial Tree Grove in memory of **Gordon McKay** and his wife Linda Uljon. Both had long, successful careers at JSC; Gordon managed the ARES Astromaterials Research Office and Linda served in the Mission Operations Directorate. An informal gathering for the dedications and to celebrate their lives took place on April 9th, hosted by **Dave Draper** and **Dave McKay** from ARES, and Amy Stencil from Linda's former organization. Special thanks to all who contributed for the trees and to **Loan Le** for organizing it all.

When Gordon passed away suddenly in 2008, he took with him a part of the heart and soul of the ARES Directorate. Linda passed away only a few months later. Now, with their memorial trees planted side-by-side we have beautiful, permanent reminders of how Gordon and Linda touched the lives of the JSC family.

Shortly after Gordon McKay's death, the Meteoritical Society set up a "McKay Fund" in memory of Gordon and to honor his many contributions to the field of meteoritics. In addition to his family's efforts to establish the endowment fund, **John Jones** and former ARES members **Dave** and **Marilyn Lindstrom** were instrumental in initiating the idea and soliciting contributions. Happily, the fund is now fully endowed, and from it the **Gordon A. McKay** Award is to be given each year by the Meteoritical Society to the student who gives the best oral presentation at the Society's annual meeting. The award was presented for the first time to the 2009 winner, Julia Cartwright of the University of Manchester, who spoke about her research on Martian meteorites – right up Gordon's alley.

The newly established Gordon A. McKay Award is now one of four major awards given annually by the Meteoritical Society, and it constitutes almost ten percent of the Society's total endowment. Of the other three Society awards, ARES scientists have garnered one of each over the years. **Fred Hörz** was the 1996 recipient of the Barringer Award recognizing his outstanding work in the field of impact cratering. **Don Bogard** received the 2002 Leonard Medal to honor

his outstanding contributions to the science of meteoritics. And most recently, **Scott Messenger** was recognized with the Nier Prize as the 2004 outstanding young scientist in the field.

The Space Shuttles are peppered by impacts from orbital debris during every mission. It goes with the territory, so to speak. On STS-128, for example, Shuttle Discovery's post-flight inspection metrics were typical of most missions: windows – 14 impacts, radiators – 21 impacts, and so on. Although a couple of Discovery's windows needed to be replaced as a result, which is also typical, the mission in real time was unaffected by the orbital debris impacts. But as Paul Harvey would say, *“And now for the rest of the story”* – a success story years in the making.

As it turns out, an impact on one of Discovery's radiators during STS-128 was a direct hit to a Freon coolant tube. Had the tube been punctured, the outcome of the mission may have been very different; an uncontrolled coolant leak is cause to terminate a mission early. But the tube held, thanks to some “hardening” modifications made to all of the Orbiters back in 1998-99, adding shielding to protect the tubes. Post-flight analysis and comparison with impact test data showed that the tube would have been penetrated without the added protection.

Credit the Shuttle Program management in 1998 for making the tough, costly decision to make those modifications. And those same managers credit their decision as a *“direct result from our basic & applied research of the orbital debris environment and the risk analysis to the Shuttle and other spacecraft.”* Specifically, it was the **ARES Hypervelocity Impact Technology Group** and the **ARES Orbital Debris Program** together that identified the Shuttle coolant tubes as one of the highest areas of vulnerability to orbital debris; and then, through testing, determined the protection to add. As one former Shuttle manager said in regards to the STS-128 success story, *“It is nice to see when our hard work pays off. Great job...”*

The headline in the newspaper read: *“NASA Expert Helps Convict Bank Robber.”* The bank was in Conroe, the robber wore a helmet to conceal his identity, and the NASA expert was an **anonymous** member of the **ARES Image Science and Analysis Group**. The helmet turned out to be a big part of the robber's undoing. According to the news article *“During the four-week trial, a NASA scientist who examines the space shuttle for “anomalies” during orbit before reentry identified two unique marks on the robber's helmet in a video taken of the robbery. He told the jury that the markings on the helmet in the video were “highly correlated” to the helmet seized from (the robber's) garage on the day of his arrest.”*

The jury's verdict was a quick “guilty” and the federal prosecutors credited our expert analyst for providing key evidence.

The Image Analysis Group has been involved in a number of other investigations over the years, enhancing crime-scene imagery at the request of local law enforcement. Their analyses have helped identify people, autos, various other objects, and even fingerprints. It's tangible community outreach, but also provides valuable training for our analysts. As **Anonymous** put it, his experience in the Conroe bank case *“has exercised my ability to carefully defend an imagery analysis product in front of a non-expert audience.”*

The 2009-2010 Antarctic Search for Meteorites (ANSMET) team, including our own **Lindsay Keller**, enjoyed particularly good weather this meteorite hunting season, and they made it pay off. The team was able to spend more days than usual out in the field to search a much larger

area than expected, collecting 1010 meteorites in all. That's about twice the number found by last year's weather-hampered team (sorry Duck).

The entire set of meteorites has arrived at JSC for processing in the **ARES Meteorite Curation Facility**, including several very "cool" specimens that are out of the ordinary (non-ordinary chondrites, that is). We anxiously await their official classifications to know just how cool they really are.

A geology training program, the first of its kind since Apollo, kicked off earlier this year for the 2009 Astronaut Class with lectures on Apollo science operations and scientific results. **Dean Eppler** and **Cindy Evans** facilitated an all-star cast of instructors: Apollo 15 Commander Dave Scott; Apollo 17's Harrison Schmitt; Lead Flight Director for both Apollo 15 and Apollo 17 Gerry Griffin; Jim Head, a geologist with the BellComm systems engineering team at NASA Headquarters; and our own **Don Bogard** who has worked with Apollo samples since Apollo 11. By all reports, the class was extremely successful. The day was topped off with a tour of the Lunar Lab for a first-hand look at the (rock) hard returns from the Apollo Program. This "Moon Day" of training was followed by a first field mapping trip in Gila Bend, Arizona. Two additional weeks of classroom sessions in April introduced the astronauts to fundamentals of geophysics, igneous rocks, remote sensing, and other stuff. Hands-on exercises included field techniques in JSC's rock yard and examination of lunar and meteorite samples.

Geology training for the new astronauts will continue over the summer, including week-long field sessions in New Mexico's Rio Grande Rift Valley. In addition to visiting sites where Apollo astronauts trained, the 2009 astronauts will conduct a geophysical survey near Taos and map volcanic units near Los Alamos. A day-long field trip to map coastal change along the Bolivar peninsula is also planned.

Field training for manager-types has also become a big hit. Dean has conducted several field mapping trips for key personnel in the Constellation program, MOD, Engineering and the EVA office. The boots-on-the-ground approach is critical for setting the stage and building a common vocabulary across NASA's program, operations, engineering and science offices.

Congratulations are in Order

The Silver Snoopy is the Astronaut Office's personal achievement award "for dedication, professionalism, and outstanding support that greatly enhanced space flight safety and mission success". The Snoopy is a special award, and the list of awardees over the past forty years reads like the Who's Who in the history of manned spaceflight programs. Now joining that distinguished list are four more ARES personnel; **Fred Hörz**, **Gary Lofgren**, **Chris Cloudt**, and **Mike Trenchard**.

Fred and Gary were recognized for their geological field work and science training for the past and present generations of astronaut explorers. Their contributions to human spaceflight from Apollo to the present each span over forty years of service. Chris was recognized for his contributions to Space Shuttle mission safety, specifically his critical role in Shuttle launch imagery reviews and analysis. And Mike was recognized for his outstanding work in ground support for the ISS Crew Earth Observations payload and his contributions over the years to utilization of the Earth Obs imagery.

Michael Rollins of the Image Science and Analysis Group has been recognized with a highly prestigious NASA award – the Quality and Safety Achievement Recognition (QASAR) Award. Mike is the 2009 Agency recipient (i.e., for all of NASA) of the QASAR, Category 4, “Most significant quality and safety contribution from a NASA prime or subcontractor employee.” Mike’s nomination is in recognition of his outstanding contributions and leadership in assessing and quantifying damage by debris impacts to spacecraft to ensure safe reentry and landing. Those who know Mike’s work ethic and his dedication to manned spaceflight safety also know that there is no better selection for this award.

This marks the second QASAR Award for the ARES Directorate – **Eric Christiansen** took home the Agency prize in 2007 for his many years of work to reduce the risks posed by micrometeoroids and orbital debris impacts.

Kevin Beaulieu, also of the Image Science and Analysis Group, was recently recognized by his company, Barrios Technology, for his work on Shuttle missions. Kevin is the winner of the top Barrios award for the year, the 2009 Gold Award! Kevin was specifically recognized for his leadership in developing and executing a plan for inspecting the Shuttle thermal tiles during the STS-125 Hubble repair mission.

The Mars Exploration Rover Operations Team continues to receive accolades for its role in the amazing success of the over-achieving twin rovers on Mars over the past six-plus years. Now the team, which includes our own **Doug Ming, Duck Mittlefehldt**, and **Dick Morris** (the three DMs), has been selected to receive the International Space Ops Award for Outstanding Achievement for 2010. The citation for the award reads: “*For remarkable success in meeting unique and varied challenges of operating a rover on Mars and establishing a model for future in-situ operations.*”

The latest round of NASA Length of Service awards celebrated a combined total of more than 2000 years of federal service by employees of JSC. Contributing to that total and still going strong are our own **Mike Zolensky** (25 years) and **Mario Runco** (40 years!).

Comings and Goings

We welcome **Beverly Haygood** to ARES as the new KR/KX Office secretary. She brings a wealth of secretarial experience to ARES, over 25 years worth in both Federal and corporate settings, most recently working with the JSC Engineering Directorate. Beverly replaces **Nicole Braddick**, who has taken a new position in the JSC Mission Operations Directorate.

Jacob’s newest employee, **Elaine Garlington**, joins ARES as a Curation Technician. Her 20 years of industrial cleaning experience is now valued for helping to maintain the pristine clean-room environment for our astromaterials collections.

Justin Simon has joined the KR Office where he will continue his novel astromaterials research. For the past four and a half years, Justin has been a post-doc with UC Berkeley developing and implementing exciting new laboratory techniques in petrology and isotope

geochemistry. His research investigates a wide range of research questions in the formation and evolution of planetary materials. We wish Justin all the best as he embarks on what will undoubtedly be a long, successful career with NASA.

And speaking of long, successful careers – **Don Bogard** has retired after 41 years of civil service in astromaterials research. Besides his many science research accomplishments, many of us in ARES have enjoyed and benefitted from our daily interactions with Don over the years – he will be sorely missed.

Don’s career at JSC began with the establishment of the Lunar Receiving Lab (LRL), designed to accommodate and analyze the samples returned from the Apollo missions. Since then, his research accomplishments are legendary. One of Don’s early crowning achievements was the discovery announced and published in 1983 that a rare type of meteorite, a Shergottite, contained trapped gases that matched the components observed in the Martian atmosphere by the Viking spacecraft. And so it is that Don’s discovery was to become the prime evidence that the so-called SNC Group of meteorites are indeed Martian rocks.



LRL staff, circa 1970. Don Bogard signed himself in the middle with the purple ink.