



Astromaterials Research and Exploration Science Directorate

Newsletter - November, 2009

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.

<p>You have a story to tell, we want to hear it. Send your Newsletter inputs to KA/Greg Byrne.</p>
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Field Work Galore

We wish **Lindsay Keller** good hunting in his frigid quest for meteorites as a field-team member for this year's Antarctic Search for Meteorites (ANSMET) expedition. Lindsay and the rest of the 8-member team leave for the ice in late November and will return in late January, hopefully with a large bounty of new Antarctic meteorites to add to the already impressive collection in the **ARES Meteorite Curation Facility**. The team will inspect previously unsearched stretches of the icefields near the Miller Range of the Transantarctic Mountains in this 2009-2010 ANSMET campaign, the 40th anniversary of the first systematic recovery of meteorites from the East Antarctica icesheet. Lindsay's serious dedication to his polar task is written all over his face – i.e., the new beard.

After spending five days on foot in Israel's Negev Desert searching for meteorites, **Duck Mittlefehldt** and colleagues from Hebrew University came up empty. Not even one space rock was found. Not surprising? It is to Duck.

The Negev contains some of the oldest continuous landscapes found on Earth, a land virtually unchanged by erosion or other forces of nature for almost 2 million years, according to a recent publication by the Hebrew U researchers. Meteorites landing there over the centuries would not readily decompose into the background as they do in most other parts of the world. Plus, this land offers good meteorite-hunting grounds – it looks like an enormous parking lot, a “desert pavement” of light gray rocks that stretches for miles. The blackened meteorites sitting on that surface should stick out like a sore thumb. Under these near-perfect conditions, the search team estimated it would find a few meteorites per square km. But after searching about 10 km² and finding nothing but the gray Earth rocks, Duck et al. are puzzling over their null result.

The NASA Extreme Environment Mission Operations (NEEMO) program has been conducting “missions” onboard its underwater facility, Aquarius, near Florida's Key Largo since

2001. The NEEMO missions, thirteen in all to date, are designed to study the challenges of living and working in extreme conditions, including EVAs, in preparation for space exploration. Curation's **Mary Sue Bell** has participated in the last five missions, and for the next one, NEEMO-14 in the spring of '10, she will be joined by **Dan Labasse** of the Image Science and Analysis Group. They both recently participated in a 6-day dry run for NEEMO-14. In the Topside Control Center, Mary Sue worked the science communications console to coordinate lunar science analog activities, and Danny used his expertise in imagery and database development to manage the cameras and data collection.

With the mounting evidence that liquid water may exist beneath the Martian surface, thereby providing conditions favorable for life, drilling systems are under development for subsurface exploration of Mars. In a field test of the drilling systems, the Drilling on the Moon and Mars in Human Exploration (DOMMEX) expedition takes place this month in Utah at the Mars Desert Research Station. **Mary Sue Bell** is also participating in this expedition as a member of the science team, led by the Ames Research Center. Mary Sue will assist in site selection for the daily drilling exercises and in the analysis of the collected samples to look for the tell-tale signs of liquid water and any accompanying biomarkers.

Several ARES scientists formed the core of the science team for the most recent Desert Research and Technology Study (Desert RATS) field campaign in the spectacular setting of the Black Point Lava Flow in northern Arizona. The science team, led by **Gary Lofgren** and **Fred Horz**, planned ten days of geology traverses and supporting back-room science operations. The traverses were designed to run the manned Lunar Electric Rovers and the crew members through their paces, as if they were engaging in geology EVAs on the surface of the moon. The long days allowed the science team to think through operational concepts for ground support, as well as to gain insight into some of the logistical challenges astronauts and the ground science team will face during lunar geologic activities.

Also participating on the science team were ARES geologists **Cindy Evans**, **Doug Ming**, **Dean Eppler**, and **Mary Sue Bell** (again?). **David Bretz** from the Image Science & Analysis Lab also supported the traverses by assessing the rover's imaging capabilities and the need for an imagery database. Another Desert RATS exercise is planned for next summer, which will include tests of a lunar living and working enclosure, the Habitat Development Unit (HDU). Within the HDU may be a prototype of an ARES-developed lunar geology laboratory, the GeoLab, where astronauts could perform initial analyses on the collected samples to help select those of highest value for transport to Earth.

Yet another recent field campaign with ARES participation was the Arctic Mars Analog Svalbard Expedition (AMASE) Project in Longyearbyen, Norway, designed to test rover operations and protocols in a simulated Mars sample return mission. While a rover and its instrument package traversed this arctic land for several days to cache samples under realistic Martian operating conditions (except for the constant threat from polar bears), a science team in the remote science control center interpreted the data and commanded the rover. The rover was also monitored first-hand by a field team to provide ground truth data to the science team. **Doug Ming** was a science team lead, and **Mary Sue Bell** (is she ever home?!) was a co-investigator in

charge of the curation database development to track samples and their associated science products. The exercise was complete with the time pressures of receiving data from the rover, assessing the information, making key decisions on how to continue, and uploading the next set of instructions to the rover.

In the News

An upcoming JSC press release highlights two recent publications by the ARES research team of **Kathie Thomas-Keprta, Simon Clemett, David McKay, Everett Gibson and Susan Wentworth**. The publications build upon the team's research discovery first published in 1996 on the evidence of potential ancient bacterial activity on Mars, observed in the Martian meteorite ALH84001. Look for the press release and access to the publications on the JSC Press Release site in the coming days at <http://www.nasa.gov/centers/johnson/news/releases/index.html>

Comings and Goings

Welcome to **Dean Eppler** joining the KX Office in October. Dean is well known around JSC; for the past twenty years or so he has made his mark in developing and integrating a variety of space flight hardware, science payloads, and operations to help NASA achieve its science research goals. We're fortunate to have Dean join ARES to lend his expertise in planning and developing science operations for the era of Constellation exploration.

Welcome also to **Steven Sendejo** who joins ARES as the newest Electro-Mechanical Technician. His background is in electrical and mechanical maintenance and he will continue the same line of work in his new position with ARES.

Al Brandon resigned from NASA in August to take a faculty position just up the road at the University of Houston in the Department of Earth and Atmospheric Sciences. As an Associate Professor, he will teach and continue his laboratory research studying the isotopic compositions of terrestrial and extraterrestrial materials. We thank Al for his highly productive eight years of ARES research and wish him well in his new job.

Congratulations are in Order

The American Society of Civil Engineers, Aerospace Division has selected **Wendell Mendell** for one of its highest awards for 2008, the Outstanding Professional Service Award. The award is given annually to "*an individual who has contributed substantially by an objective and lasting achievement in improving the conditions under which civil engineers advance aerospace sciences and technology and space exploration and construction.*" For this prestigious award, Wendell will be honored at the ASCE conference banquet next year in Las Vegas.

Grabbing Space Flight Awareness Awards are **Tracy Calhoun** and **Kevin Crosby**, both of the Image Science and Analysis Group. As the group lead, Tracy is playing a key role in

ensuring that imaging capability and operations are an integral part of the Constellation Program. Kevin has developed imagery software tools that have greatly improved the efficiency of the Shuttle on-orbit inspections performed each mission. As STS-129 launch honorees, they were guests at KSC for the launch of Shuttle Atlantis.

Eric Christiansen has received another patent award, the fourth of his esteemed NASA career. The latest patent award is for the innovative development of hypervelocity impact shielding material that incorporates fiber optic threads woven through it – a design that could provide a means to remotely detect and locate an impact breach in the shield.

Celebrating a quarter century of service to NASA with 25-Year Length-of-Service awards are **Mark Cintala** and **Mary Luckey**.

Thanks and congratulations are extended to **Brad Sutter** and **Julie Quinn** for earning “Top Accomplishment” during the annual ARES Safety and Total Health Day activities. Brad and Julie were nominated *“for cleaning out the acids and corrosives cabinets (in the highbay) and forming a plan to excess the empty cabinets and move the remaining chemical cabinets up to their labs.”*