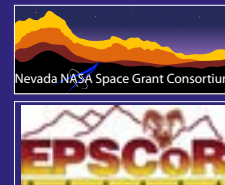


The Launch



Fall 2010

Nevada NASA Space Grant Consortium & Nevada EPSCoR

Prepare for Lift Off

At the end of the road, opposite the football field at Sparks High School there's an unassuming brick building which houses northern Nevada's Challenger Learning Center (CLC). Telescopes, Saturn's rings and eclipses are just a few of the topics presented in the Spaceship Earth Digital Dome, which focuses on "planetary" material, as well as offers a submersible ride through the human body (7th grade to adult) and the Titanic story from an oceanographic perspective (4th grade up).

The dome is one component of Nevada's CLC. Students also take part in technical labs on subjects ranging from making videos to designing spacesuits in one of two mission scenario simulations – housed in a custom trailer, the Advanced Spaceflight Laboratory (ASL). All material is age/grade appropriate and activities focus on problem solving, team building and communication.

Two possible mission scenarios are run in the ASL where light comes from glowing screens and several computers, rather than windows. Here students join teams for a simulation – either a Moon Mission or a Solar System Survey. Educational models, especially designed for the ASL, run these simulations during which students participate in team activities focused on tasks necessary for successful mission operation. These include navigation, medical, engineering, geology and astronomy.



Inside the custom trailer – Advanced Spaceflight Laboratory - which houses the mission simulation component of the Challenger Learning Center of Northern Nevada. The screen at the end of the trailer (on the right of the photo) displays launch, in-flight and landing images, and associated information generated by keypad and touch screen commands.

Each mission is "problem oriented." For example: deciding on a suitable landing site, requiring students to work as a team to collect and interpret data.

"Math that matters" is how Paul McFarlane, a teacher at Sparks High School and Lead Flight Director, describes this learning experience. He added, "communicating information and problem solving is what this is all about, and these missions are very good practice for today's multidisciplinary science."



Paul McFarlane, Teacher at Sparks High School and Lead Flight Director for the Challenger Learning Center of Northern Nevada, outside the custom trailer which houses two mission simulations.

Nevada's CLC is in the developmental stage, but fundraising efforts should soon result in a full-featured center, which will stay at Sparks High School where the present ASL (a prototype for future nationwide use) is currently located. The full CLC will run four Challenger mission scenarios - Encounter Earth, Return to the Moon, Voyage to Mars and Rendezvous with a Comet. McFarlane explained there are 50 CLCs around the world – however, Nevada's will be unique as the only one based at a high school.

We've Moved!
See our new information on the
back page!

Also see the 2010 Fall Semester Scholarship
and Fellowship awardees.

Analog for extra terrestrial life

Analog for extra terrestrial life were explored by students, teachers, faculty and an industry partner during a two-week Geobiology Summer Short Course in Nevada.

The course incorporated Nevada's unique range of environments (snow, hot springs, caves, saline lakes) to teach teachers, students and faculty about microbial life in odd places. Also utilized was the full range of expertise of course participants to learn not only about microbes, but also how to teach, share and learn through team-based efforts - a theme that is highly valued within NASA.



The Geobiology Summer Short Course began with a presentation by Dr. Alfonso Davila (NASA, Ames) entitled *Hygroscopic salts and the potential for life on Mars*.

NASA Ames' Dr. Alfonso Davila challenged participants the first morning to think "outside the planet" by researching extreme environments in the context of planetary analogs. Davila focused on Chile's Atacama Desert, which, as the driest desert on Earth, is analogous to the extremely arid conditions on Mars. Photosynthetic bacteria in the hyper-arid core of the Atacama occur within hygroscopic salts, which provide one of the last habitable niches when liquid water is no longer stable or possible in conditions of extreme hyper-aridity and freezing temperatures. Davila explained that life in dry and cold planets may adopt similar survival strategies as the Atacama bacteria.

Lessons learned from extreme environments

After a day of preparatory lectures, vans were loaded with equipment and people and headed to eastern Nevada for three days of exploratory research on caves, hot springs, rock fields and snowfields. The science was not the only challenge for many of the 17 participants in the Geobiology Summer Short Course – most did not know each other, and it took a few days for people to start talking and sharing ideas unselfconsciously. As Matt Oates (Parent Education Coordinator, Nevada State Parent Information and Resource Center) explained "creating a safe environment in which to share is important for learning,"

Nevada Geobiology Summer Short Course



Geobiology Summer Short Course participants listen to Dr. Henry Sun (DRI), in the center with his back to the camera, talk about photosynthetic patterns of cyanobacteria and lichens.

a comment which was echoed by others on the course – teachers and science students alike.

By the second week everyone's "space" felt more comfortable, ideas were being discussed, and the group divided into four teams for field and laboratory work. Each team comprised members from different backgrounds: undergraduate or graduate students, teachers, and faculty. Topics of study were: cryptogammic lichens and cyanobacteria; Soda Lake functions and geochemistry; hot spring nitrogen cycles; and microbial communities in snow. Dr. Henry Sun (Desert Research Institute) described the northern Nevada environments studied during this course as being "from snow to boiling water, from saline to high pH."



Tara Edwards (UNLV) checking in samples in the field at the hot springs site.

The microbiology of these extreme environments is surprisingly varied – although not perhaps as unique as the Atacama bacteria – but even the Nevada environments have unexplained characteristics, which caused considerable debate among students and teachers alike during two weeks of demanding field and laboratory study.

Research approaches varied from team to team, but all relied on observational data – particularly as a starting point where little was known, and as a potential teaching tool.

During presentations on the last afternoon, Bernadette Leonis (who has been teaching in Elko) commented that, in her experience, many teachers had a broad but shallow knowledge of science subjects, adding "the depth of knowledge gained by involvement in research is very important in the classroom, as is building vocabulary – spoken, as well as written." This two-week intensive course generated camaraderie between team members, which was evident during the presentations – everyone was involved, the style emulated classroom teaching techniques rather than formal PowerPoint slide shows. The group had indeed created a safe environment, knowledge was shared and

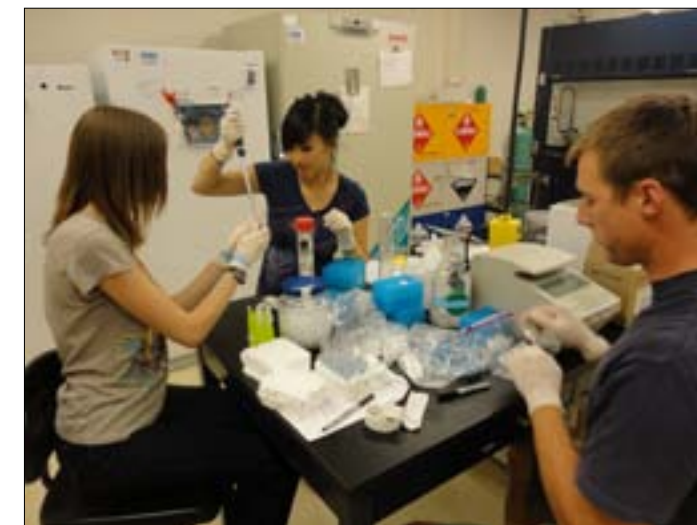


The Soda Lake team collecting samples from the boat – many hands make light work.

Evaluating the Climate Change Debate

Students evaluated differing views on this "hot" topic in Dr. Bronwen Haugland's new course at Truckee Meadows Community College – *Climate Change, the Science Basis*. Haugland, the recipient of a Space Grant Curriculum Development grant for this course, says her goal was to provide her 100-level, non-science major students with "the scientific basis for this, so they can really evaluate what they hear and read." She added, "the challenge is translation of science for non-scientists, but it seems to be working well."

Focused on science, not policy or politics, the course started with an introduction to our modern climate system and how it works. The spring semester course started with past climates, with labs on pack rat middens and tree ring analysis, both of which are proxy indicators –



Members of the snow team, Jessica Guy, Jenny Lam (both at UNLV) and Matt Oates (Nevada State Parent Information Resource Center), analyze samples in the lab.

gained regarding Nevada, life, NASA and learning – and will be passed on.

The Geobiology course was conceived as a pilot consortium development program, whereby the consortium is seeking to run summer short courses on various topics, and was team taught by members of the consortium: the University of Nevada, Reno (Dr. David Crowther); the University of Nevada, Las Vegas (Dr. Brian Hedlund); Lucigen Corporation, an Industry Partner (David Mead) and the Desert Research Institute (Drs. Alison Murray, Henry Sun and Chris Fritsen).

The Geobiology Summer Short Course group comprised five science teachers, two undergraduate students, ten graduate students, five faculty members and one industry partner. The teachers who participated had also attended both 2010 NESSI (Nevada Earth Space Science Initiative) courses organized by Dr. David Crowther (College of Education, University of Nevada, Reno).

using vegetation response over time to infer climatic conditions.

With part of her NVSGC Curriculum Development award Haugland purchased EdGCM, an educational and fully functional software, which



Dr. Bronwen Owen Haugland, Physical Sciences Department, Truckee Meadows Community College, doing field work in Norway.

was used in class and labs to develop a baseline Global Circulation Model – complete with visualization tools.

Each student created their own scenarios for climate change, running predictions and visualizing associated impacts. So far as Haugland is aware, she is one of only two instructors in the region who is teaching a climate change course from a non-meteorological perspective.

Hands-on-Engineering

Each spring, proof-of-concept, human-powered vehicles compete in NASA's Great Moonbuggy Race and a high school team from Nevada is gearing up to take part in spring 2011.

Each competing Moonbuggy must fit within a four foot cube, must be assembled at the starting line, and will then cover a half-mile course which simulates lunar terrain – powered by two students, one female and one male. The race, held at the U.S. Space and Rocket Center in Huntsville, Alabama, has become an international event and is unique in that there is the college division, as well as one for high school students.

A six-member team of sophomore students from the Engineering and Manufacturing academy at the Academy of Arts, Careers and Technology (AACT) high school in Reno have acquired many used bicycle parts for their buggy already. "This is super, super exciting" said Dan Ruby, Associate Director, Fleischmann Planetarium & Science Center, University of Nevada, Reno, who found out about the Moonbuggy race when he accompanied Christian H. Fritsen (NVSGC Director) to the National Space Grant Meeting in March 2010.

Ruby explained the AACT's engineering track is unusual at high school level and speculates that "students will be hooked into engineering and the Space Grant system as a result of working on this project, and may end up doing internships with industry partners, who could benefit Nevada as NASA increases privatization."



The 2010 winners of the high school division of the Great Moonbuggy Race – a team from the International Space Education Institute of Leipzig, Germany.

The AACT team will be assisted by two students from UNR's College of Education, who will experience hands-on-engineering at high school level, as well as the opportunity to incorporate NASA-related topics into curriculum development. NVSGC seed money will help fund the project, with follow-up activity funded by a partial match from the AACT's Service

Learning program. Following the race, the high school students on the Nevada team will tour middle schools in the region talking about the Moonbuggy project and may also build an exhibit for the Fleischmann Planetarium & Science Center.



Students from the Nevada Virtual Academy learn how to use the Kepler Star Wheel with help from Pam Mahler, Coordinator for the NASA Educator Resource Center at the College of Southern Nevada's Planetarium.

Hands-on-Teaching

Starting this fall, the College of Southern Nevada (CSN) has a pilot project to offer 25 pre-service teachers each semester the opportunity to teach children, as part of their Planetarium presentations. Funded by NASA as part of the Science, Technology, Engineering and Mathematics (STEM) program, the goal of the CSN project is to increase teacher participation in science, math and engineering.

"Hands-on experience is invaluable" says Pam Maher (Coordinator for the NASA Educator Resource Center at CSN's Planetarium) adding "our students will gain practical class management skills in a field-trip context, as well as ideas and resources for their teaching." Maher adds, "NASA has great educational material, and kids are so excited about travel in space."

This project is a partnership with Clark County School District and the Teacher Education, and Math and Science Departments at CSN. NASA funding provides small stipends and a materials fee directly to the students, who will report to their Math and Science Department faculty mentors regularly to discuss lesson plans and share results. The pilot project will run through the summer of 2011.

The Nevada NASA Space Grant Consortium program office has moved!

Please note our new information below.



Nevada NASA Space Grant Consortium
2601 Enterprise Road
Reno, NV 89512
775-784-3476
nvspacegrant@nshe.nevada.edu
www.nvspacegrant.org



Nevada EPSCoR
5550 W. Flamingo Road, Suite A2
Las Vegas, NV 89103
702-522-7070
nshe-spo@nevada.edu
www.nevada.edu/epscor/

Fall 2010 Fellows

Christopher Adcock, UNLV, Geology/Planetary Science, Ph.D.
Kelly Robertson, UNLV, Geology, Ph.D.
Robert Thompson, UNLV, Astronomy, Ph.D.
Katie Bowden, UNR, Environmental Engineering, Masters

Fall 2010 Scholars

Ann Frappier, UNLV, Mechanical Engineering, Senior
Chequala Fuller, UNLV, Computer Engineering, Junior
Justin Galli, UNLV, Mechanical Engineering, Junior
Gabe Herz, UNR, Mechanical Engineering Senior
Jason Jaacks, UNLV, Computational Physics, Sophomore
Susan Konkol, UNR, Hydrology, Senior
Rachel Lambin, WNC, Engineering, Junior
Daniel Mayes, UNR, Physics/Astronomy, Senior
Danae Moser, UNR, Mechanical Engineering, Sophomore
Leah Preston, UNLV, Civil Engineering, Junior
Marvin Smith, UNR, Computer Engineering, Junior
Sarah Trabia, UNLV, Mechanical Engineering, Junior