

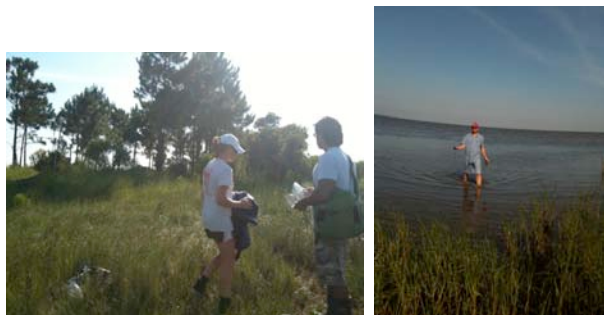
Dear Homestake Collaboration,

Welcome to the July 2010 monthly newsletter for Homestake DUSEL and South Dakota's Sanford Laboratory. We gladly receive your input on news, links to news articles, upcoming workshops, conference notices, scientific updates, information concerning the Collaboration, employment opportunities, and other highlights relevant to our shared goal.

Important Dates

July 27-28: PAC (Program Advisory Committee) Meeting – UC Berkeley

September 2-3: First Annual DuRA Users Meeting – Fermilab, Batavia, Illinois - (More details on page 6)



Figures 1-2: Dauphin Island, Alabama coastal salt marsh study site

FOCUS ON: Science and the Oil Spill

Dr. Patricia Sobecky and Dr. Behzad Mortazavi from the Biological Sciences Department at the University of Alabama received a National Science Foundation Rapid Response Research grant in June to explore environmental solutions for the Deepwater Horizon oil spill occurring in the Gulf of Mexico. The primary goal of their project is to determine means of enhancing rates of biodegradation of the hydrocarbons in the coastal zone of the Northern Gulf of Mexico. The goal of the project is to identify sources of naturally occurring organic matter in the affected areas that enhance biodegradation rates, identify the composition and genomic potential of the microbial consortium to promote hydrocarbon degradation, determine if the

microbial consortia undergo horizontal transfer of beneficial genes, and examine changes in the rate processes and composition of the microbial consortium as the oil is weathered over the course of a year.

Dr. Sobecky is an environmental microbiologist with long-term interests in the metabolic activities and evolutionary adaptations of microbial populations to extreme environments such as cold seeps in the Gulf of Mexico, terrestrial subsurface systems contaminated with metals and radionuclides, and to sites within the deep underground science and engineering laboratory (DUSEL). Dr. Sobecky is also a member of the DUSEL Program Advisory Committee (PAC) chosen to provide a thorough and critical review of the proposed multidisciplinary science program for DUSEL. The PAC will meet later in July to review the science program and proposed generic suite of experiments to be included in the MREFC.

Drs. Sobecky and Mortazavi have been featured on the PBS NewsHour. *Scientists Turn to Microscopic Bacteria for Help With Spreading Oil* aired on July 8. More information on the report can be found at: <http://www.pbs.org/newshour/extra/>

Dr. Mark Zoback, Professor of Geophysics at Stanford, and Earth Sciences Chair for the DUSEL Program Advisory Committee (PAC) has just been appointed a member of a committee which will conduct a technical analysis of the causes of the Deepwater Horizon explosion and oil spill in the Gulf of Mexico, and recommend preventive measures for the future.

In June, the US Department of the Interior requested that the National Academy of Engineering (NAE) and the National Research Council undertake this significant task. Additional members are still in the process of being selected. The committee will hold its first meetings later this summer including public sessions in the Gulf Coast region. An interim report will be released October 31, 2010 and a final report will follow in 2011.



DUSEL Outreach to the California Congressional Delegation

Given DUSEL's importance to the State of California, UC Berkeley has been working with its partners to secure and reinforce support for DUSEL with the California Congressional delegation.

In June, UC Berkeley Vice Chancellor Graham Fleming met with staff from the offices of Senator Dianne Feinstein and Congresswoman Barbara Lee, who represents Berkeley and nearby communities.

During the week of July 12, DUSEL Principal Investigator Kevin Lesko and UC Davis Professor Bob Svoboda (co-spokesman for the Long Baseline Neutrino Experiment) met with staff for the following California representatives: Speaker of the House Nancy Pelosi, Mike Honda, Jackie Speier, Jerry McNerney, John Garamendi, Dan Lungren, Mike Thompson, and Doris Matsui. During the course of these staff visits, Congressman Garamendi asked for more information on the project so that he could review it later.

Vice Chancellor Fleming has also provided updates for staff in the South Dakota delegation offices with the assistance of colleagues from Lewis-Burke Associates LLC.

These visits represent an important step in strengthening national support for the project. Looking forward, we will continue to update these and other key Members of Congress on DUSEL's importance and progress.

Large Cavity Advisory Board

On July 6-7, the Large Cavity Advisory Board (LCAB) met in Lead to discuss pertinent issues and review the stability of the rock for the mega-caverns of DUSEL. The Board also inspected 3,500 feet of core samples amounting to 2 tons worth from the 4850 Level. The samples were laid out in the Yates Dry building, in five 80-foot rows of boxes such as those shown in Figure 3.



Figure 3: Core samples



DUSEL IN THE NEWS

To read about DUSEL stories:

"Getting down with CO₂" - Symmetry Magazine, June 2010 - Paul Preuss

When Princeton University geoscientist Catherine Peters learned about a plan to build the world's deepest science laboratory in an abandoned gold mine in South Dakota, she saw a chance to tackle an urgent challenge: how to store carbon dioxide deep underground so it can't escape into the atmosphere and contribute to global warming. Joined with colleagues from Princeton as well as Lawrence Berkeley National Laboratory Earth Scientists Patrick Dobson, Curt Oldenburg, Joe Wang, and Rohit Salve to pursue the DUSEL CO₂ project, the researchers propose to build columns taller than the Empire State Building packed with layers of sand and clay and filled with brine or other fluids, models of the geological structures being considered for carbon storage. (More details on this research in future DUSEL Newsletter issues.)

To read more: <http://www.symmetrymagazine.org/cms/>

SDPB.org:

July 5: "Deep Science" aired on SD Public Television – a 30-minute video hosted by South Dakota Governor Michael Rounds

July 9: Sanford Lab featured on South Dakota Public Radio's "Innovation" and "Science Café" – Hosted by Cara Hetland

Rapid City Journal, July 10: "Visitors strike gold at Neutrino Days"

June 17: *BHSU researchers earn competitive grants for DUSEL and aquaculture research (BHSU Communications)*

David J. Bergmann of BHSU received an award from South Dakota's Competitive Research Grant Program to study "Metagenomic Analysis of Drainage and Service Water in the Deep Underground Science and Engineering Laboratory (DUSEL) at the Homestake Mine." Other investigators include Cynthia Anderson (BHSU), Garth Spellman (BHSU), and Sookie Bang (SDSMT). Their research will sample and sequence DNA from the entire microbial community in drainage and service water at DUSEL. Researchers will search for novel genes encoding lignocellulases (used for production of biofuels), enzymes for hydrocarbon catabolism and metal ion reduction (used in biological treatment of aquifers contaminated by hydrocarbons or heavy metals), and enzymes for antibiotic synthesis.

<http://www.duselwatch.com/> - Wendy Pitlick
June 22: *Lab re-allocates Sanford dollars from education fund to facility outfitting*

www.sanfordlab.org/ - Check out "Twitter updates" in lower left hand column

SANFORD UNDERGROUND LABORATORY AT HOMESTAKE

Construction Updates



Figure 4: *Facilities Tech Oren Loken in the newly remodeled top floor of Ross Dry*

The Ross Dry Remodel at Sanford Lab in Lead is nearly finished. The above-pictured space will hold office cubicles. Engineering and other personnel will move from cramped quarters to this spacious new area. Oren Loken and his contractor father Alan helped to manage, working with DOC workers and other contractors on the project.

On July 9, installation was completed on a deep-water pump to the 7800 feet level.



Figure 5: *Rick Tinnell of CAI Construction (secured by a fall protection harness) observes Bobcat delivery*

The former Homestake electrical shop on the 4850 Level is gradually being transformed into a space for the Majorana experiment cavern. During the week of July 12, a 7000-pound Bobcat skid-steer loader was brought in to move the 2000-pound bags of shotcrete for the C-Tech crew who will apply it to the new cavern.

Every aspect of the construction process has been conducted with an eye to expertise as well as safety. The team included infrastructure techs, hoist operators, engineers, supervisors, and facilities techs. In addition, the process of lowering the Bobcat involved hours of planning and designing, welding, installing, and also preparing the shaft at the surface and underground to allow for proper clearance to insert and remove the equipment.

Fourth of July Parade

Sanford Lab exhibited its presence at the Fourth of July parade in Deadwood. DUSEL Contracts Coordinator and Administrative Staff Supervisor Laurie Gehner handed out Neutrino Day flyers alongside a parade float simulating a dark-matter detector. An eight-foot plastic cylinder containing disco-ball WIMPs was illuminated by a flashing strobe and framed by 5000-foot shafts. The construction, topped by a headframe and a hoist room, was accompanied by science-fiction movie music. The float ride attached to the back of a pick-up truck culminated in a safety-certified launch of two WIMP "rockets."



Figure 6: Laurie Gehner hands out Neutrino Day flyers at Fourth of July Parade



Figure 8: Construction Safety Specialist Woody Hover explains the Dräger breathing apparatus. Left: Safety Officer Tom Regan; Health and Safety Manager Brendan Matthew



Figure 7: Posing with the Sanford Lab float: Warren Matthews, Tom Regan, John Scheetz, Jennifer Regan, Laurie Gehner, and Bill Harlan

EDUCATION AND OUTREACH



Neutrino Weekend 2010 took place over the weekend of July 9-11. The kick-off started Friday night with a standing-room-only crowd of 65 at downtown Lead's Stampmill Restaurant. SD Public Broadcasting's "Science Café" aired the event, hosted by Cara Hetland. Physicists Jaret Heise and Kara Keeter gave presentations on deep science research at Sanford Lab.

The next morning, about 550 people showed up for the free science festival at Sanford Lab's Yates Dry and Yates Shaft hoist rooms. Lecturers at that event included Dr. Kara Keeter (BHSU), Tom Durkin (SDSMT), and Dr. Jaret Heise and John Scheetz from Sanford Lab. Other activities included hands-on science events, exhibits, walking tours, videos, and Q&A time with the scientists.

Neutrino weekend concluded with the Science-and-the-Arts festival held at the Lead Arts Council on Main Street. About 30 people attended a lecture presented by artist Dick Termes.

About 40 volunteers participated from Sanford Lab's staff, as well as BHSU, the Lead Chamber of Commerce and others.

Early Education Activities

K-12 Education: On June 25, 120 freshmen from the South Dakota GEAR-UP program toured the Waste Water Treatment Plant (WWTP). The students also had a geology talk at the Open Cut, given by Tom Trancynger and Tessa Jones, and also visited the Homestake Mining Museum in downtown Lead. Connie Giroux organized the activities, and the help of all the WWTP team is highly appreciated.



Figure 9: GEAR-UP students at the Waste Water Treatment Plant

Dr. Kara Keeter, Assistant Professor of Physics at Black Hills State University hosted a Quarknet workshop for six teachers from June 21 to July 2. Bob Peterson from the Fermilab Quarknet office led the teachers in constructing two detectors that will become part of the national Quarknet cosmic ray network hosted by Fermilab.

Undergraduate Activities

The 2010 Davis-Bahcall Scholars visited Sanford Lab from June 28 to July 2. Many thanks to everyone who lectured to the students: Drew Alton (Augustana College), Mike Dragowsky (Case Western), Kara Keeter (BHSU), Zbigniew Hladysz (SDSMT), Dongming Mei (USD), Bill Roggenthen (SDSMT), Herb Wang (Wisconsin), Jim Whitlock (Sanford Lab), and Bai Xinhua (SDSMT). Thanks also to Cynthia Anderson for a tour of the CCBR Genomics Facility at BHSU, and to Larry Stettler for taking the students on a geology field trip. The students toured CERN and Gran Sasso in Europe, and are now studying at Princeton for three weeks.

The 2010 Homestake-Fermilab Summer Scholars are currently at Fermilab for two weeks of lectures, tours and laboratories. They returned to Sanford Lab on July 23 and will remain through July 29. Since the Yates Dry Education Center is now under construction, the students will be meeting at the Smart Center at the Lead Opera House.



Figure 10: Bryce Frentz, Andrew Gaspar, and Karin Hanson work on a nuclear lab during Davis-Bahcall week

ENVIRONMENT, HEALTH & SAFETY

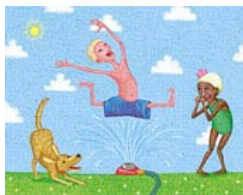


Pet Summer Safety

Never leave your pet alone in a car
Provide plenty of water and shade for pets left outdoors

Dogs can get sunburned too – use a natural sunblock on Fido's nose and ears

Keep cats and rabbits inside on hot days



New Safety pages on Sanford Lab website:
www.sanfordlab.org - Use the left hand menu to open individual pages

NEW STAFF



Bob Grusczyński started with the DUSEL project in May as an Analyst for the Project Controls Team. He is located in the Berkeley DUSEL Project Management Office and will provide support for the DUSEL Project Management team as they prepare for the Preliminary Design Review. The DUSEL Project is looking forward to having Bob and his 20 plus years of Project Management experience and expertise contributing to a successful PDR. Bob came to DUSEL from NEON, National Ecological Observatory Network, another NSF project where he assisted with the completion of a successful Final Design Review and approval of \$422 Million MREFC award to begin construction.

Bob currently commutes from Dallas, where he and his wonderful wife Sandie spend the majority of free time with their four wonderful children, a Black Lab, a Beagle, and two Chihuahuas. Bob is looking forward to being a part of science history in the making.



Dr. Warren Matthews has joined DUSEL to serve as the Cyber-infrastructure Chief Engineer. He will be located in Lead. Warren grew up in England and has a PhD in particle physics from research conducted at the OPAL experiment at CERN. He has over 12 years of experience in supporting large networking and

monitoring systems in support of science. He served as a network specialist at Stanford Linear Accelerator Center (SLAC) Computing Services, and as a research scientist in the Office of Information Technology at the Georgia Institute of Technology. Most recently he was Research Support Co-ordinator at JANET, the UK's research network. Cyberinfrastructure is a term used by the NSF to define Information Technology (IT) in support of science research. Warren will be leading planning, design, and construction of IT related capabilities for DUSEL with DUSEL facilities design contractors and also working with IT staff to define how current IT capabilities will evolve for DUSEL.

Warren is married to Mindy. Their children are Kathryn (11), Ricky (8), and Jake (5). Warren's family (shown in picture) is looking forward to exploring the Black Hills.

UPCOMING EVENTS AND ANNOUNCEMENTS

First Annual DuRA Meeting

Dates: Thursday, September 2: 1-5 pm
Friday, September 3: 8:30 -5 pm
Location: Fermilab - Batavia, Illinois

This meeting will be of interest to the broader scientific, education and engineering communities involved in planning research and activities at DUSEL. It will be the first of what we expect will be many annual meetings organized by the newly formed DUSEL Research Association.

The meeting will feature:

1. Preliminary Design Synopsis: The Facility team will present a synopsis of the DUSEL Preliminary Design and plans and schedule for presenting the design to the NSF this year.

2. Science Integration in Preliminary Design: The Facility team will describe the generic experiments that have been integrated into the facility design.

3. Community-Facility Interaction: An open dialogue between the science community and the Facility team will be held to discuss aspects of the upcoming PDR and other DUSEL-related issues.

4. DUSEL Science: Representatives from the physics, earth science, and engineering communities will review the state-of-the-science and needs of their community, particularly with respect to DUSEL. The mission and purpose of DuRA will be presented and new members of the Executive Committee will be introduced. The newly formed DUSEL Program Advisory Committee will be also be described and introduced.

5. Agency Perspectives: Representatives from NSF and DOE will present their perspectives on DUSEL science program.

Calling on DUSEL Science groups in the Washington, DC area: The Inaugural USA Science & Engineering Festival, the country's first national science festival, will descend on the Washington, D.C. area in October 2010. The Festival promises to be the ultimate multi-cultural, multi-generational and multi-disciplinary celebration of science in the United States. The culmination of the Festival will be a two-day Expo in the nation's capital that will give over 500 science & engineering organizations from all over the United States the opportunity to present themselves with a hands-on, fun science activity to inspire the next generation of scientists and engineers.

For more information: usasciencefestival.org

DUSEL/Sanford Lab will have a tent at the Expo on the Mall on Saturday and Sunday, October 23-24. We will have several hands-on activities set up, and need some enthusiastic and energetic volunteers. If you live close to the DC area, please consider sending some of your postdocs and graduate students to volunteer for a few hours in the DUSEL tent, or even participating yourself. Contact Peggy (pnorris@sanfordlab.org) for more details.

Advances in Neutrino Technology 2010, Santa Fe, September 16-18: The Advances in Neutrino Technology series of workshops are unique in format and philosophy. The vision of the workshop is to have extended discussions of technical issues at a level one would normally find only in a collaboration meeting. In ANT workshops, we can share ideas across the boundaries of different experiments in order to advance our whole field and improve the quality and sensitivity of neutrino experiments in general. Not all ideas presented have to be "fully-baked" in all details. You will have the

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opportunity to hear what others are working on in addition to getting expert feedback on your own ideas in "real time".

For more information and to register, please visit the web site at: <http://www.physics.ucdavis.edu/ANT10>

This workshop is partially supported by the National Science Foundation and includes a number of awards to support local expenses for graduate students who wish to attend all three days. Please contact the conference organizers at: vmg@lanl.gov for an application.

Fourth Pontecorvo School - The IVth International Pontecorvo Neutrino Physics School," organized by JINR (Dubna) will be held September 26-October 6, 2010 in Alushta (Crimea, Ukraine). For more info: <http://pontecorvosch.jinr.ru/>



JOBS

Postdoctoral Research position in Microbial-Plant Interactions driving methane release. Will interact with University of Alabama, Florida International University and the Everglades LTER. For more information contact: Dr. Gregory Starr, Dept. of Biological Sciences, University of Alabama, (gstarr@ua.edu) or 205-348-0556.

Postdoctoral positions in the McKinsey group at Yale, Dept. of Physics. Research possibilities include development of LXe, LAr, and LNe as materials for particle detection, as well as their use in the LUX and MiniCLEAN dark matter experiments. Especially experienced candidates may be considered for a research scientist position. Send CV, statement of research interests, and list of publications to: Daphne Klemme, Dept. of Physics, Yale University, PO Box 208120, New Haven, CT 06520-8120 or daphne.klemme@yale.edu.

Postdoc Research position in neutrino physics, Physics Dept, Stanford. Contact Ms. Marcia Keating, Varian Physics, Stanford, CA 94305-4060; email: mkeating@stanford.edu.

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Photo Credits: Figs. 1-2: Dr. Patricia Sobecky; Figs. 3,4,8,9: Bill Harlan; Fig. 5: Mike Dropulich; Fig. 6: Jennifer Regan; Fig. 10: Peggy Norris.

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