

## Dear Homestake Collaboration,

Welcome to the January 2012 monthly newsletter for Homestake SURF 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 SURF, employment opportunities, and other highlights relevant to our shared goal.

### Important Dates

**January 26-27: MAJORANA DEMONSTRATOR Readiness Review – Lead, South Dakota**

**February 15-17: EHSOC Meeting – Lead, South Dakota**

**February 27-March 2: APS Meeting – Boston, MA**

## SURF: SUPPLEMENT ARTICLES

Over the next few months, a series of SURF Newsletter Supplement articles will explore some of the science basic to the Sanford Underground Research Facility, e.g., the LUX and MAJORANA DEMONSTRATOR experiments to be housed at the Davis Campus 4850 Level. The first installment, "The Construction of a Low-Background Underground Laboratory at the 4850 Level" will be available on [www.dusel.org](http://www.dusel.org) soon! Figure 1 shows an advance example.



*Figure 1: Laboratory outfitting taking place on the Davis campus 4850 Level*

## DURA NEWS

*DURA Election:* The DURA election was held in December.



**Kate Scholberg** has been elected to the DURA Executive Committee. She is the Anne T. and Robert M. Bass Associate Professor of Physics at Duke University. She received a B.Sc. in Physics from McGill University in 1989, and then attended Caltech, receiving an M.S. in 1991, and a Ph.D. in 1997 for thesis research on the MACRO experiment at Gran Sasso Laboratory, Italy. As a research associate at Boston University, she joined the Super-Kamiokande collaboration. She was Assistant Professor at MIT from 2000-04 before moving to Duke University. A recipient of DOE Outstanding Junior Investigator and NSF CAREER awards, she is a member of the Super-Kamiokande, T2K, LBNE, and HALO collaborations. She currently serves on the LBNE collaboration Executive Committee and coordinates the SuperNova Early Warning System, an international network of supernova neutrino detectors. She has also been a member of the Dark Matter Science Advisory Group (2006-07), the SNOLAB Experiment Advisory Committee (2004-08), HEPAP (2007-10), and currently the APS Division of Particles and Fields Executive Committee (2010-12) as well as many other committees. Congratulations to Kate Scholberg!

**Derek Elsworth and Hank Sobel** will be rotating off the DURA Executive committee. Steve Elliott thanked Elsworth and Sobel for their long service to the committee and its predecessors. Their leadership and efforts in support of developing underground science in the United States is greatly appreciated by the scientific community.

*DURA name:* DURA membership also voted on a name change for the organization. The new name will now be the Deep Underground Research Association (DURA).



## SURF IN THE NEWS

*Physicsworld.com: What lies ahead for 2012?  
Three new maps shine light on dark matter*

*Rapid City Journal: Sanford funding comes through as budget battles end (Kevin Woster)*

*The Journal's top 10 stories of 2011 – (#9)  
12 in 12: Meet the Journal's 12 to watch in 2012 –  
(Kevin Woster - Future is bright for old Homestake Gold Mine)*

*Newell area year in review: March 2011 (Colleen Brunner - Davis-Bahcall scholar news)*

*Black Hills Pioneer (Wendy Pitlick): \$185K state grant to benefit BHSU research*

For twitter updates see: [www.sanfordlab.org](http://www.sanfordlab.org)

**Reports Available:** The National Research Council report – “An Assessment of the Deep Underground Science and Engineering Laboratory”:

[http://www.nap.edu/catalog.php?record\\_id=13204](http://www.nap.edu/catalog.php?record_id=13204)

Marx-Reichanadter Committee report to DOE:  
[http://science.energy.gov/~media/np/pdf/Review\\_of\\_Underground\\_Science\\_Report\\_Final.pdf](http://science.energy.gov/~media/np/pdf/Review_of_Underground_Science_Report_Final.pdf)

## SANFORD UNDERGROUND LABORATORY NEWS

### Dewatering Levels



Figure 2: Progress of dewatering at Sanford Lab

The Figure 2 graphic above indicates the dewatering progress made at Sanford Lab. As of January 17, the water level was at 5873 feet, its lowest point ever. The high water mark, in August 2008, was at 4350 feet underground.

### Davis Campus - Update

During the last week of December, while many were on holiday break, construction continued on the 4850 Level of the Davis Campus. *Ainsworth Benning Construction* crews and subcontractors shifted their four-day, 40-hour workweek from Monday through Thursday to Tuesday through Friday.

In the Davis Cavern, assembly continued of the stainless steel water tank that will hold the LUX dark-matter detector (shown in Figure 3). The tank will have a 71,600-gallon capacity.



Figure 3: The LUX water tank awaits one more row of stainless steel plates before being welded together

Fabricators welded together four of the five rows of curved steel plates used to construct the tank. Project Engineer Rick Labahn expects the tank to be fully assembled some time in January. Additional large structural steel beams, which will support the second floor of the LUX experiment, were placed into position.

In the Transition Area, painters began a several-month project of prepping and painting the walls. The first step was to apply block filler to fill in holes in the block walls. Following this, they apply a layer of primer, and then the paint. In some areas, they apply several coats of paint. Wood is attached to the wall, and electrical power panels are mounted over the wood, as illustrated in Figure 4.



Figure 4: In the Transition Area, Muth Electric electrician attaches a wood panel to a painted wall

Masons are constructing block walls in the chiller cutout (as in Figure 5). This area will house a transformer and a generator, as well as the chiller.



Figure 5: Block wall in the chiller cutout on the 4850 Level

This year, five large air-handling units were delivered to the Sanford Lab site, in 20 pieces, shrink-wrapped in bright blue plastic (see Figure 6). Two 50-ton chiller plants were also delivered. These will be needed to provide a constant, reliable flow of cool, clean air at the 4850 Level.

Project Engineer Rick Labahn reported that Sanford Lab crews would start to move the air handlers to the Yates Shaft later in January. Harlan Olson, a foreman for *Tessier's Inc.*, the mechanical subcontractor for Ainsworth Benning, believed that some of the units would need to be further disassembled to facilitate being transported underground.

*Tessier's* continued to install ductwork in the mechanical room of the Transition Area, where three of the air handlers will be located. The other two will go into the chiller cutout.



Figure 6: Harlan Olson inspects parts of five air handlers in the Yates Shaft yard

### New Yates Shaft Cage

In mid-December, the new Yates Shaft conveyance was installed to provide better access to the 4850 Level at the Davis Campus (see Figures 7-8). This project, in progress for over a year, has involved Sanford Lab facilities technicians, shaft technicians,

hoist operators, and the Lab's Environment, Health, and Safety Department. Procedures were put in place to remove the old work deck remaining from the Homestake mine days and install the new service cage.



Figure 7: New service cage ready for installation. The old work deck is still in the shaft.



Figure 8: The new cage is in the shaft. On top of the cage: Jeff Essink, Andy Sekora, and Rick Tinnell. Kevin Ehnes is in the lift (far right).

The cage, built by *OJ Industries*, has a capacity of 10,000 pounds. Its design is similar to the old cage's except that the interior is nine feet tall. The Yates conveyance still needs a few additions before it will be ready to transport people underground. Some of these include the safety "rope dogging" system, consisting of additional wire ropes and clamps which will automatically grip the dog ropes to stop the cage safely.

A crew from *Heavy Constructors Inc.* arrived on site during the week of December 19 to start installation of a new tower in the Yates headframe. The tower will support the dog ropes to be anchored in two large concrete footings inside the headframe. Sanford Lab technicians will install the ropes later.

Concrete and steel for the rope-dog system arrived in mid-January. The footings for the tower have been poured for the most part, with some concrete work remaining (see Figure 9 below). The tower will be erected in February. The expected completion date is March 2012.



*Figure 9: Project Safety Officer Steve Sandman of Heavy Constructors Inc. oversees the concrete pour for the south footing of the rope-dog tower*

## Safety at Sanford Lab

A three-tiered safety system is in place in the underground pump rooms at the 1250, 2450, 3650, and 5000 Levels of Sanford Lab. Since all of the pump rooms have only one way in and out, Sanford Lab Operations and the Environment, Health and Safety (EHS) Departments put procedures in place to maximize safety. Some of these include:

- Administrative controls limit the number of personnel in the pump rooms to two, except in special, pre-approved cases.
- Engineering controls require keeping the Ross Shaft conveyance near the pump-room level while personnel are working.
- Personal protective equipment and other supplies are stored in “resource areas” near the pump rooms.
- The EHS team is developing plans for refuge chambers near the pump rooms.

## EDUCATION AND OUTREACH

The Education Department continues to make good use of the videoconferencing equipment donated by LifeSize™ to reach beyond South Dakota and the region.

On January 18, Deputy Director of Education and Outreach Peggy Norris gave a talk on cosmic rays and Sanford Underground Laboratory to members of the Paulding County, GA school district, who were attending a workshop at Georgia Tech.

The videoconference equipment was then moved underground in order to have a live broadcast from the 4100 Level to the Deep Underground Research Association (DURA) Meeting, which took place on January 19 at Fermilab. Bill Harlan and Matt Kapust organized this event. Professor Herb Wang and his graduate student JoAnn Gage (University of

Wisconsin) and Steve Gabriel (Spearfish High School) spoke from the site of their experiment as part of the BioGeoEngineering presentation by William Roggenthen (Geological Engineering Professor, South Dakota School of Mines and Technology) at the meeting. The talk was also broadcast to the science class at Spearfish High, in South Dakota.

For those on the Sanford Lab site, the Education and Outreach Department is launching a monthly brown bag lunch. Sessions will feature the science and engineering of Sanford Lab and SURF at a level suitable for everyone. The inaugural session will take place on Wednesday, February 1; its scheduled topic of Electromagnetism will be presented by Ben Saylor (Sanford Lab Director of Education and Outreach and BHSU Professor).

## ENVIRONMENT, HEALTH & SAFETY



### Winter Safety

- Drive carefully in rainy or snowy weather as the streets are slick and visibility may be low. Watch out for other cars and brake gently. If you live in a colder climate, keep an emergency kit in your vehicle.
- Stock up on canned or dried food, bottled water, batteries, candles, and extra blankets in case the power goes out.
- Pets can catch colds too! Dogs may need an extra coat, or boots to protect their paws when they go out. Cats should stay indoors, if possible.

If you are visiting South Dakota, contact (605) 722-0002 for road closure and weather information or check [Safe Travel USA](#).

### Safety pages on Sanford Lab website:

[www.sanfordlab.org](http://www.sanfordlab.org) - Use the left hand menu to open individual pages

## STAFF NEWS

**Brendan Matthew** will transition to a new role within the EH&S Department to address the issues of safety policy and procedure development and support for facility and science operations. As of January 7, **Josh Willhite** will serve temporarily as the acting Health and Safety Manager until a new EH&S Director has been hired and is on location in

Lead, South Dakota. Josh will remain in his role as Director of Engineering.

**Jason Van Beek** and **Tessa Jones** have moved on from Sanford Lab to pursue opportunities at Malin Space Science Systems with the latest Mars rover project. Jason and Tessa both joined the Science department as Researcher/Guides, working mainly with the Science and Engineering teams. Both made contributions to the Biology/Geology/Engineering (BGE) research groups, as well as many other contributions. Best wishes on this next phase of their careers!

## UPCOMING EVENTS AND ANNOUNCEMENTS

### Conferences and Workshops

**American Physical Society (APS) March meeting 2012** - February 27-March 2, 2012, Boston Convention Center, Boston, MA. Scientific sessions, Tutorials and workshops, and Exhibit Hall. For registration, abstract submission, and general info: <http://www.aps.org/meetings/march/>

**Black Hills State University Quarknet Center Masterclasses** - March 16 (with Cincinnati) and March 21 (with Argonne). The classes will analyze LHC (CERN) data from ATLAS. If you would like to attend and bring your students, contact Kara Keeter, [Kara.Keeter@bhsu.edu](mailto:Kara.Keeter@bhsu.edu).

**APS April meeting** – March 31-April 3, 2012. Hyatt Regency, Atlanta, GA. Held jointly with the Sherwood Fusion Theory Conference for Divisions of Astrophysics, Computational Physics, Nuclear Physics, Particles and Fields, Physics of Beams, and Plasma Physics. <http://www.aps.org/meetings/april/index.cfm>

**Underground Science Experiments & Research Seminars (USERS)** continue bi-weekly on Thursdays, 1:30-2:30 PM. Alternate sessions will be held at LBNL and UC Berkeley, 325 Old LeConte Hall. If you are interested in attending these seminars please subscribe to this email list for future announcements: <http://dusel.org/mailman/listinfo/ugsseminars>

## DURA Events

### DURA Annual Meeting on January 19-20, 2012

The annual meeting of the Deep Research Association (DURA) took place at Fermilab National Accelerator Laboratory on January 19-20, 2012. Approximately 50 people attended the meeting to hear presentations on LBNE by Jim Strait (FNAL, LBNE Project Manager) and FNAL by Pier Oddone (FNAL Director), reports from DURA from Steve Elliott (LANL) and Richard Gaitskell (Brown), and various aspects of Sanford Underground Lab from Kevin Lesko, Mike Headley, William Roggenthen, Duane Moser, Herb Wang, and Jaret Heise. Representatives from the DOE and NSF also reported. Other topics included: SNOlab Overview from Nigel Smith, Underground Laboratories from Alessandro Bettini of INFN and Padua University, and Underground Accelerators from Michael Wiescher (University of Notre Dame). On the final day, a roundtable on the Science Program at Lab Module 1 was held to discuss Dark Matter, Double Beta Decay, Low Background Counting, and other related issues. More than 70 people attended by videoconference, using a live video link. PDF slides of the meeting are available at:

<https://indico.fnal.gov/conferenceTimeTable.py?confId=5102-20120119>

Please send information regarding upcoming meetings of interest or presentations from DuRA members, as well as other related events to Steve Elliott ([elliotts@lanl.gov](mailto:elliotts@lanl.gov)), Duane Moser ([Duane.Moser@dri.edu](mailto:Duane.Moser@dri.edu)) or Joe Wang ([jswang@lbl.gov](mailto:jswang@lbl.gov)).

## Nominations

**IUPAP Young Scientist Prize for the Commission of Particles and Fields (C11)** – The C11 is soliciting nominations for two 2012 Young Scientists Prizes. Candidates should have a maximum of 8 years research experience following the Ph.D. and not be a previous recipient. Send nomination materials to the C11 Commission Chair: Hiroaki Aihara, [IUPAP-YSP@hep.phys.s.u-tokyo.ac.jp](mailto:IUPAP-YSP@hep.phys.s.u-tokyo.ac.jp) by March 1, 2012.

[http://www.iupap.org/youngscientist/page\\_50920.html](http://www.iupap.org/youngscientist/page_50920.html)



**JOBS**

**Postdoctoral Fellow - Experimental Neutrino Physics, MAJORANA group, Lawrence Berkeley National Lab.** Neutrinoless double-beta decay search in the MAJORANA experiment and direct kinematic measurement of the neutrino mass scale in the KATRIN experiment. Dr. Alan Poon (AWPoon@lbl.gov).

<https://lbl.taleo.net/careersection/2/jobdetail.ftl?lang=en&job=73997>

**Physicist Postdoc Fellow - SNO+ Neutrino Experiment, Nuclear Science Division, Lawrence Berkeley National Lab.** SNO+ will search for the neutrinoless double-beta decay of <sup>150</sup>Nd. Job #74020. Prof. Gabriel Orebi Gann, GOREbiGann@lbl.gov.

<http://cjo.lbl.gov/positions.html?jobcode=abc&jobfield=10>

**Physicist Postdoctoral Fellow - Dark Matter Experiment, Lawrence Berkeley National Lab.** Working on the Large Underground Xenon (LUX) experiment. Deadline: 2/29/12. Amy Pagsolingan, AVPagsolingan@lbl.gov.

<https://academicjobsonline.org/ajo/jobs/1326>

**Postdoc position - Direct Dark Matter search, UC Davis.** LUX dark matter search experiment and development of techniques for ultra-sensitive radio-assay of materials. Bill Tuck, Dept. of Physics, One Shields Ave., UC Davis, Davis, CA 95616, tuck@physics.ucdavis.edu.

**Faculty position - University of Maryland-College Park, CMNS-College of Computer, Math & Natural Sciences:** Assistant Professor, Elementary Particle Theory (Job #116767).

[https://jobs.umd.edu/applicants/jsp/shared/search/SearchResults\\_css.jsp](https://jobs.umd.edu/applicants/jsp/shared/search/SearchResults_css.jsp)

**Postdoctoral Fellowship - Microbial ecology/geobiology at Desert Research Institute's Las Vegas campus.** Deep subsurface microbiology studies at Nevada National Security site and other sites, including Sanford Lab. Duane Moser, Chair, Postdoctoral Fellow-Microbial Ecology Search Committee (PH: 702-862-5534 or duane@moser@dri.edu. <https://dco.gl.ciw.edu/related-postdoctoral-fellow-opportunities>

**Postdoctoral position - Subatomic Physics Group, University of Michigan.** Completion of upgrades to a calorimeter for neutron flux measurement and cold-beam neutron lifetime measurement at NIST. Tim Chupp, chupp@umich.edu.

**Postdoctoral Fellows - Experimental AstroParticle Physics, Dept. of Physics, Queen's University.** SNOLAB research group positions with DEAP and PICASSO Dark Matter search experiments. Prof. Tony Noble, 99 University Ave., Queen's University, Kingston, ON, Canada, K7L-3N6, noble@queensu.ca.

**Newsletter Editor:** Melissa Barclay

**Contributors:** Kevin Lesko; Bill Harlan (Sanford Underground Lab News); Steve Elliott, Joe Wang (DURA News); Peggy Norris, Ben Saylor (Education and Outreach).

**Photo Credits:** Fig. 1: Rick Labahn; Figs. 2-9: Matt Kapust

**SURF CONTACT INFORMATION  
University of California at Berkeley**

Kevin T. Lesko: 510-642-0147

KTLesko@berkeley.edu

Melissa Barclay: 510-642-2244

mbarclay@berkeley.edu

<http://www.dusel.org/>

**SDSTA/Sanford Lab**

Ron Wheeler, Executive Director

Mandy Knight, 605-722-8650, x222

MKnight@sanfordlab.org

<http://www.sanfordlab.org/>

**South Dakota School of Mines and Technology**

William Roggenthen: 605-394-2460

William.Roggenthen@sdsmt.edu

**BERKELEY OFFICE  
(New Address as of Dec 2<sup>nd</sup>)**

**UC Berkeley**

**SURF Project Office**

**2150 Shattuck, 10<sup>th</sup> Floor**

**MC 1295**

**Berkeley, CA 94704**

**Fax: 510-642-6164 (temporary)**