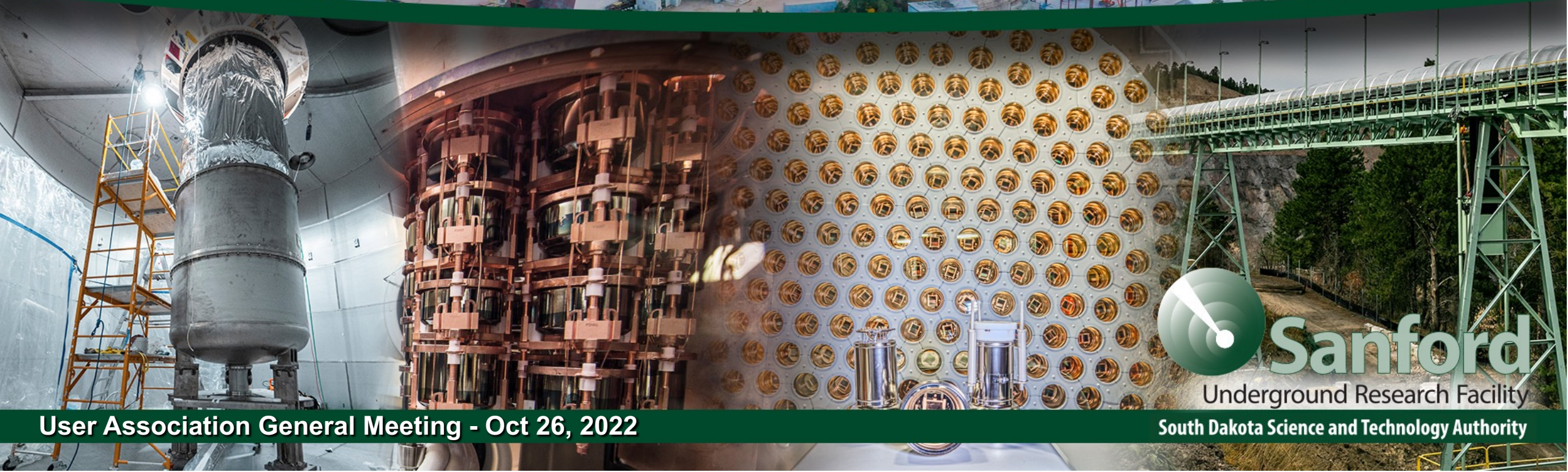


Institute for Underground Science at SURF Overview and Future Plans

Mike Headley
SURF Lab Director
mheadley@sanfordlab.org



Sanford

Underground Research Facility

South Dakota Science and Technology Authority

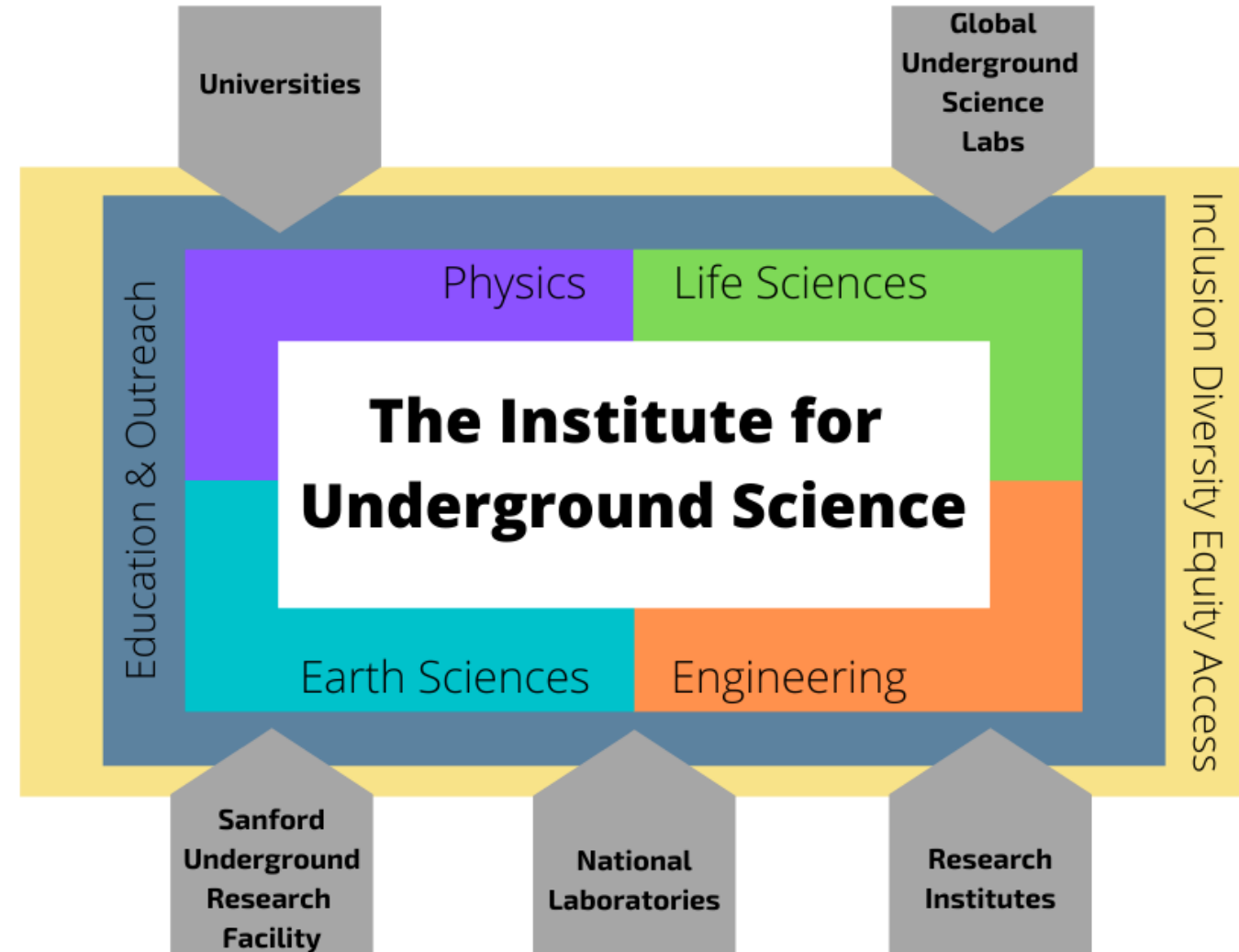
User Association General Meeting - Oct 26, 2022

Institute Development Process

- STEM Institute Study (December 2019): study of related global institutes.
- SURF Institute Program Study (December 2020): Interviewed SURF users and leaders in various fields related to UG science to identify community needs.
- Working Group defined Institute scope (April – June 2021):
 - Ms. Elizabeth Freer, dialogue LLC
 - Mr. Mike Headley, SDSTA
 - Dr. Jaret Heise, SDSTA
 - Dr. Barbara Szczerbinska, Texas A&M Univ – Corpus Christi
 - Dr. Bob Wilson, Colorado State University
 - Ms. Deb Wolf, SDSTA
- Completed Institute development study in December 2021.
- Kick-off planning currently underway.

Institute Vision

- Establish the world-leading center for underground science collaboration and intellectual community.
- Provide leadership in long-term science community planning.
- Engage with the global community for vision and leadership in a range of disciplines.
- Serve as the “hub” for information on global underground science.
- Foster close collaboration and integration with the science and outreach programs.
- Establish world leadership in K-12 and public E&O programs.



Building Intellectual Community

- Intellectual community is an intangible asset and its success at the Institute will require careful and intentional consideration.
- The Institute's culture must be intentionally structured from the start to include diverse voices and amplify not just the voices of renowned scientists.
- Foster and develop the intellectual community for those participating in:
 - Institute programs;
 - Researchers actively working on experiments at SURF; and
 - The broader underground science community.
- A critical level of activities and robust plan for programs are required to foster an intellectual community.
- Intellectual community must be supported through the architectural program and design of the facility.

Science Program Goals

- The goal for the Institute's science program is to establish a scientific community for underground science, which includes:
 - Providing resources to promote long-term community planning (planning for future experiments and connecting underground science communities);
 - Establishing professional development avenues for early-career scientists and those from historically under-represented groups;
 - Ensuring diversity of representation when planning for and connecting underground science communities.
- The Institute's international science advisory committee will recommend the long-term strategic vision for the Institute science program goals (10+ year vision).
- The Institute staff scientists will develop and build programs on a 2-to-5-year planning cycle to address the research goals. The planning process will also be flexible enough to be responsive to new science developments.

Science Interaction Model

- Interactions amongst fall into three general categories:
 - **Meetings:** Conferences, workshops and topical meetings as well as experiment-related meetings and workshops;
 - **Visiting Scientist Program:** Brings a range of scientists to the Institute via a scientist-in-residence program, fellowships, schools;
 - **Synergies:** Leverage meetings and visiting scientists to foster communication within and between disciplines.
- The Institute will also maintain access to cohesive collection of publications and presentations on the scientific fields working at the Institute.
- The Institute will build a virtual community to connect researchers not only to the Institute, but also across the broader community including a resource-rich website to support the science interaction model.

Science Program Summary

Science Program Elements	# of Events Annually	Participants / Event & Year	Timeframe	Annual Subtotals
Conferences	5	100-300/event 700 / year	3-7 days As scheduled	71 Events ———— 2620 people engaged
Workshops & Topical Meetings	16	20-50 / event 370 / year	1-3 weeks Quarterly	
Experiment Mtgs & Workshops	10	50-300 / event 1000 / year	1-2 weeks As Scheduled	
Seminars & Colloquia	40	10-15 / event 450 / year	2-4 hours Weekly	
Scientists in Residence	--	20-40 / year	6-24 months	6 Events ————
Fellowships (Fall & Spring)	2	20 / year	4-6 months	160 people engaged
Science School (Summer)	2	30 / year	1-4 weeks	
Semester Courses (Fall / Spring)	2	60 / year	12 weeks	

Education & Outreach Overview

- While SURF will continue to serve as an inspiration for the Education and Outreach (E&O) program, the E&O program will move under the umbrella of the Institute.
- Artist-In-Residence (AiR) program will transition to the Institute. The AiR serves as a connector between the science happening at SURF and the Institute and the public's understanding and appreciation of that work.
- To ensure effective connections between research and the public, the E&O team will offer trainings in best-practices for communicating their research to the general public.
- The Institute will also jointly bring together science education researchers, faculty, and practitioners, to positively impact how science is taught, learned, and experienced by students and the general public.
- The existing K-12 student education opportunities will continue and expand to serve a broader audience at national and international scales.

E&O Program Model

- E&O team direct interactions with K-12 students falls into three general categories: Curriculum Resource Support, Classroom Presentations, and Field Trips.
- Institute will also provide training opportunities for educators:
 - Regional, state, and national science education conferences;
 - Education workshops and topical meetings;
 - Continuing education opportunities;
 - Graduate Education Summer School;
 - Critical Topics in Science Education.
- General Public Outreach, including teaching science communication skills.
- Additional student interactions (K-16):
 - Robotics program;
 - Davis-Bahcall Scholars;
 - Internships, Shadowing, and Mentoring;
 - STEAM Programs.

Education Program Summary

Education Program Elements (beyond direct student experiences)	Annual Events	Participants / Event & Year	Timeframe	Annual Subtotals
Conferences Workshops and Topical Meetings	8	30-200 /event 530 / year	3-5 days June, Fall, Winter, Spring	14 Events —— 720 People
Continuing Education Opportunities	6	20 / event 120 / year	3 days Summer	
Graduate Education Summer School	1	20 / year	10 weeks Summer	
Critical Topics in Science Education	2	25 / event 50 / year	1 week Spring & Fall	
Science Educator Fellow		2 / year	8 - 12 months	45 Events ——
Public Outreach Events	12	100 / event 1200 / year	1.5 hours Monthly	
IDEA & STEM Topical Meetings	3	350 /year	1-5 days	
Students (K-16): (Robotics, Interns, STEAM, etc.)	30	10-100 /event 890 / year	1 day to 5 weeks Monthly & Summer	2440 People

Facilities

- Recommend the Institute be located at or immediately adjacent to SURF, close to where the science is happening at SURF to further facilitate genuine interactions and build intellectual community.
- Facilities will include the following key components:
 - Auditorium to seat up to 300 people and 11 formal presentation spaces;
 - Working spaces for up to 300 researchers, educators, and program participants;
 - 6 designated spaces for spontaneous or informal discussions;
 - Centralized free and quality coffee;
 - A cafe to seat at least 100 people, plus outdoor seating;
 - State-of-the-art audiovisual infrastructure in all conference areas;
 - Onsite guest house style housing to accommodate 100 people.

Next Steps

- Planning underway to kick off the Institute in 2023. Report due to SDSTA and SURF Foundation Boards of Directors on Dec 15, 2022.
- Institute branding and social media presence will be established.
- Discussions are underway with Dr. Barbara Szczerbinska to plan and host a 4-6 week CETUP theoretical physics workshop in summer 2023.
- “Science talks for scientists” will begin in March 2023 to help build intellectual community. (zoom format to increase reach)
- Discussions underway with other labs and universities on science programming partnerships.
- Current K-12 E&O efforts, Sanford Lab Homestake Visitor Center, and SURF AiR program will transition under the Institute’s branding.
- Focused, national-level fundraising effort for Institute will begin in 2023.
- SLHVC, SURF, and Elevate Rapid City facilities will provide initial space for programs.