



# **Summary of SURF's Long-term Vision Workshop 14-15 September 2021**

## **Suggestions for future workshops**

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# Long-Term Vision Round-Table Discussion

- Multidisciplinary study of long-term applications & uses of SURF
- Broad discussion and extend range of vision 20 to 30 years
- Open discussion available to the [public](#)
- We settled on a *Round-Table* format to facilitate discussion with the speakers and the audience
- Two partial days (to manage fatigue & time zones) using Zoom
- A useful avenue to obtain long-range planning information when preparing for Funding Agency planning processes, i.e. Snowmass HEP planning, Nuclear Physics LRP

# Guidance for the Round-Table

- Suggested questions to help *start* the discussions
  - Provide scientific overview, what are the big questions?
  - Provide a survey of techniques and approaches
  - Who is the community, funders, size of the community?
  - What is the broad vision for addressing these questions over the next 30 years, would it require other agencies, facilities, international collaboration?
  - Are there major branch-points in the research?
  - What does your vision of an ideal facility look like, including facilities, services, & resources?

# 14 September

Ed Blucher, University of Chicago - Neutrinos

Josh Klein, University of Pennsylvania - Neutrinos

Derek Elsworth, Penn. State - Geology/Geophysics

Paul Scovell, STFC - Boulby - Low Background Counting

Oliver Buchmueller, Imperial College London, Atom Interferometry

Laura Baudis, University of Zurich - Dark Matter

Steve Elliott, LANL - Neutrinoless Double-Beta Decay

Lindley Winslow - MIT, Neutrinos

# 15 September

Barbara Sherwood-Lollar, University of Toronto - Geomicrobiology

Michael Wiescher, Notre Dame - Nuclear Astrophysics

Ani Aprahamian, Notre Dame - Nuclear Astrophysics

Charles Fairhurst, University of Minn. - Geology, Geoengineering

Prisca Cushman, University of Minn. - Dark Matter

David Moore, Yale - Neutrinoless Double-Beta Decay

Maurice Garcia-Sciveres, LBNL - QIS (sensors)

Joe Formaggio, MIT - QIS (computing)

Matt Pyle, UC Berkeley - QIS (sensors)

Deb Wolf, SDSTA - Education and Outreach

<https://indico.sanfordlab.org/event/26/contributions/> slides & zoom recordings

# My Takeaways

- Continued strong demand for underground space, access & support
- New and emergent fields needing access to the underground
  - Atom Interferometry
  - QIS and QC
  - Societal Needs (e.g. CO<sub>2</sub> sequestration)
- Interest in DUNE's 4<sup>th</sup> cavity for next generation DM, neutrinoless double-beta decay and other neutrinos experiments
- Continued significant needs for *traditional* users – Neutrinos, Dark Matter, Biology, & Geophysics
- **Effective format to introduce other fields** to underground research
- Valuable to repeat this every couple to every 5 years, schedule the next one after the P5 and NP LRP outcomes are known ~ 2 years

# My Takeaways Following Snowmass

- Prominent Recommendation in 2013 was for the US to host a 3<sup>rd</sup> Generation Dark Matter Experiment. The interpretation of this is a 50 to 100 tonne noble liquid detector to probe the remaining  $\sim 10$  GeV WIMP parameter space.
  - This requires a significant fraction of a 100m long x 20m wide lab space with full experimental support (power, heat removal, access, safety, ...)
  - $\therefore$  either use of the LBNE module of opportunity or a new laboratory module will be needed in the US
- Announcement of SDSTA's efforts to fund this module in sequence/concert with DUNE construction and provide beneficial occupancy by the end of this decade was well-received at Snowmass. Support of this was a major recommendation from UF
- Making SURF a DOE Users Facility was advocated to the HEP community with strong support from the U/G Conveners

# My Takeaways, Following Snowmass

Once initial funding and/or plans are in place – hold a workshop focused on the new 4850 module(s). This would be an excellent method to advertise them to the underground community, solicit additional users and synergistic research, keep SURF in the spotlight of underground research, acquire experimental and outfitting requirements, and enlarge the community of users for this (these) new module(s).

Schedule this in 2023 or as soon as funding looks promising. Begin working the participants sooner (a couple of months notice) so they can prepare their requirements, timelines, funding options, presentations etc.