

# Tour of Underground Facilities and Science: Today and Tomorrow

**Jeter Hall (SNOLAB/Laurentian)**

# Conduct @ Snowmass Community Summer Study

By participating in this workshop, you are consenting to abide by the DPF Core Principles & Community Guidelines (see <https://snowmass21.org/cpcg/start>).

## Respect and support community members.

- Use privileged status to empower & amplify voices that are being excluded.

## Communicate with *empathy*.

- Try to understand others' ideas and perspectives before addressing them.

## Commit to *constructive dialogue*.

- Criticize ideas, not people. Provide reasoned arguments that improve conversation.

## Take initiative.

- Intervene when you see behavior that violates community standards.

Violations of community guidelines can be reported to the Ethics Advisory Committee's Code-of-Conduct Response Team via email ([snowmass-code@u.washington.edu](mailto:snowmass-code@u.washington.edu)) or Slack ([#code-of-conduct](#)) message, over Zoom, or in person.

- The CRT will treat all reporters respectfully and all complaints seriously.
- » Behavior requiring an **immediate response** should also be reported to the session chair, Slack moderator, or similar authority.

You are encouraged to invoke the CP&CG as needed to promote and maintain a welcoming, professional, and safe environment for all workshop participants!





# Underground Facilities & Infrastructure (UF)

- Frontier Objectives & Goals
  - Determine science programs performing research in underground facilities
  - Collect information on existing underground facilities & infrastructure (supply)
  - Collect current/future needs for science in underground facilities (demand)
  - Compare demand to supply (gap analysis)
  - Analyze to generate a recommendation for an integrated strategy for underground facilities & infrastructure



# Tour of Underground Facilities will Highlight the Capabilities for the Exciting Science Opportunities Over the Next Decade

- Jaret Heise – Science Director at the Sanford Underground Facility
  - Science and facilities at SURF, the US flagship facility for underground science
- Clarence Virtue – Interim Executive Director at SNOLAB
  - Tour of the international facilities





# Closing Remarks and Underground Facilities During the Community Summer Study



# Underground Facilities & Infrastructure *Co-Conveners & Topical Conveners*

## UF Co-Conveners



Laura Baudis (U. Zurich)



Jeter Hall (SNOLAB)



Kevin Lesko (LBNL)



John Orrell (PNNL)

Group	Topic	Conveners		Liaisons
UF1	Underground Facilities for Neutrinos	Tim Bolton (KSU)	Patrick Decowski (Nikhef & U Amsterdam)	<u>Neutrinos</u> Albert de Roeck (CERN)
		Danielle Speller (Johns Hopkins)		<u>Astronomical v</u> Gabriel Orebi Gann (Berkeley)
UF2	Underground Facilities for Cosmic Frontier	Scott Hertel (UMass Amherst)	Kaixuan Ni (UCSD)	<u>Particle DM</u> Hugh Lippincott (UCSB)
		Emilija Pantic (UC Davis)		Jodi Cooley (SNOLAB)
				<u>Instrumentation</u> Eric Dahl (Northwestern)
UF4	Supporting Capabilities	Richard Schnee (SDSMT)	Alvine Kamaha (UCLA)	
		Brianna Mount (BHSU)		
UF5*	Synergistic Research	Daniel Robertson (Notre Dame)		<i>Many external contributors</i>
UF6	Integrated Strategy for Underground Facilities and Infrastructure	Laura Baudis (U. Zurich)	Jeter Hall (SNOLAB)	
		Kevin Lesko (LBNL)	John Orrell (PNNL)	

\* UF3 – Underground Detectors – was absorbed into UF5

# UF Topical sessions at Snowmass in Seattle

Day	Date	Time	Title	Room
Sunday	July 17			
Monday	July 18			
Tuesday	July 19	08:00-10:00	UF2: Underground Facilities for Cosmic Frontier	307 (HUB)
Wednesday	July 20	10:00-12:00	UF5: Synergistic Underground Science & Facilities	111 (JHN)
Thursday	July 21			
Friday	July 22	10:00-12:00	UF1: Underground Facilities for Neutrinos	242 (MGH)
Saturday	July 23	10:00-12:00	UF4: Supporting Capabilities for Underground Research	022 (JHN)
Sunday	July 24	10:00-12:00	UF6: Underground Facilities Gaps & Needs	242 (MGH)
Monday	July 25			
Tuesday	July 26			

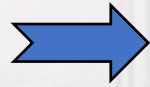


# Cross-Frontier sessions with UF

Day	Date	Time	Title	Room
Sunday	July 17			
Monday	July 18			
Tuesday	July 19	10:00-12:00	UF-NF-RF: Neutrinoless double beta decay	241 (MGH)
Wednesday	July 20	08:00-10:00	UF-IF: Quantum Science & Technology (QST) Instrumentation & Underground Facilities	111 (JHN)
Thursday	July 21	08:00-10:00	UF-NF: Long Baseline Neutrinos & Underground Facilities	231 (MGH)
Friday	July 22	<del>10:00-12:00</del>	<del>UF-IF: Instrumentation &amp; Underground Facilities</del>	<del>022 (JHN)</del>
Saturday	July 23			
Sunday	July 24			
Monday	July 25			
Tuesday	July 26			

# UF Colloquia

- Monday, July 18<sup>th</sup>  
14:00-15:30  
Pacific



## Afternoon Plenary: A Tour of Underground Facilities & Science: Today and Tomorrow

📍 130 (Kane Hall)

Convener: Jeter Hall (SNOLAB)

2:00 PM	<b>Introduction and overview of UF</b> Speaker: Jeter Hall (SNOLAB)	🕒 5m
2:05 PM	<b>SURF</b> Speaker: Jaret Heise (Sanford Underground Research Facility)	🕒 30m
2:35 PM	<b>International Underground Laboratories</b> Speaker: Clarence Virtue (Laurentian University)	🕒 40m
3:15 PM	<b>Outline of UF activities at Snowmass</b> Speaker: Jeter Hall (SNOLAB)	🕒 15m

- Friday, July 22<sup>nd</sup>  
14:00-15:30  
Pacific



## Afternoon Plenary: Advancing Research at Underground Facilities (UF)

📍 250 (HUB)

Conveners: Laura Baudis (University of Zurich), Jeter Hall (SNOLAB), Kevin Lesko (LBNL), John Orrell (Pacific Northwest National Laboratory)

2:00 PM	<b>Underground needs for Neutrino &amp; Cosmic Frontier science</b> Speaker: Scott Hertel (UMass Amherst)	🕒 22m
2:22 PM	<b>Supporting infrastructure and synergistic research</b> Speaker: Alvine Kamaha (UCLA)	🕒 22m
2:44 PM	<b>A strategy for underground facilities and research</b> Speaker: John Orrell (Pacific Northwest National Laboratory)	🕒 22m
3:06 PM	<b>Questions and discussion</b>	🕒 24m



# UF Reports

- Reports are still in draft format
- UF Reports draw from other Frontiers:
  - Facility needs must consistently reflect science needs in other Frontier reports
  - Facility and infrastructure content from other Frontiers can find a home in UF!
- Previews and draft conclusions are available in UF sessions this week



# Summary

- Underground Facilities & Infrastructure Frontier (UF) supports the execution of science from other Frontiers, notably:
  - Neutrino Frontier
  - Cosmic Frontier
  - Rare Processes and Precision Frontier
- Snowmass in Seattle is key to UF for:
  - Establishing consistency with requirements stemming for other Frontiers
  - Outlining and communicating UF report structures
  - Drafting recommendations *in context*
- Join us to help catalyze the future for science underground!



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