



Greetings from DPF and Snowmass Meeting Overview

Joel Butler, Fermilab
Chairperson, Division of Particles and Fields,
Presented at the Snowmass Community Summer Study
Seattle, Washington
July 17, 2022



Outline



- Welcome and goals of the workshop
- Organization and goals of the Snowmass Community Planning Exercise 2021
- Organization of the Snowmass Community Summer Study (CSS) Meeting, July 17-26, Seattle, Washington
- Timeline for the report, a.k.a. the "Snowmass Book",
- Impact of COVID on our plans and on this meeting
- Summary and Outlook

Resources



- Some Resources for Snowmass 2021:
 - Link to conference homepage for Community Summer Study: <http://seattlesnowmass2021.net/>
 - Link to CSS agenda
 - CSS SLACK
 - Link to Snowmass 2021 portal twiki: <https://snowmass21.org/>
 - Link to Contributed papers: <https://snowmass21.org/submissions/>
 - Snowmass Early Career 2021: <https://snowmass21.org/start/young>
- Historical overview – Snowmass 2013/P5 2014
 - “How to Snowmass (article by C. Quigg)”: https://indico.fnal.gov/event/45207/attachments/133652/164937/How_to_Snowmass-final-links.pdf
 - Snowmass 2013 Book: <https://tinyurl.com/ypfd679z>
 - Link to material and report of P5, 2014: <http://usparticlephysics.org/p5/>

Goal of Snowmass 2021



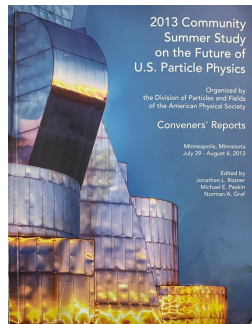
- This Snowmass Community Planning exercise is organized by the Division of Particles and Fields (DPF) of the American Physical Society (APS) as a ~ year-long “Science” study
- **Goal: To identify the most important questions in HEP and the tools and infrastructure required to address them**
 - To achieve a broader and deeper understanding of the science in our field and its connection to other research areas.
 - To engage junior scientists and foster our community development
 - **To reach a compelling, shared scientific vision** for the field moving forward for the US in alignment with its international partners
 - **Provide input to the “Particle Physics Project Prioritization Panel” (P5) process**, expected to begin its work in the late fall of 2022 and produce a report in the spring of 2023.

This Community Summer Study and Workshop is the final large meeting of this exercise and is the ***primary*** place where cross-frontier input is received. **Your charge is to achieve the goal!**

Snowmass 2013/P5 2014



- In 2013, Snowmass provided input to the High Energy Physics Advisory Panel's (HEPAP) subpanel, the Particle Physics Project Prioritization Panel, a.k.a. P5
 - Using Snowmass's scientific input and budget scenarios provided by US DOE, P5 developed and presented to DOE, via HEPAP, a 10-year execution plan, with priorities and recommendations, for the field in the US, with an eye also towards the ten years following that
- P5 has a broad mandate but tends to focus on large projects and facilities



"P5" Drivers



- **From P5 report:** "Snowmass, the yearlong community-wide study, preceded the formation of our new P5. A vast number of scientific opportunities were investigated, discussed, and summarized in Snowmass reports. **We distilled those essential inputs into five intertwined science Drivers for the field:**
 - Use the **Higgs boson** as a new tool for discovery
 - Pursue the physics associated with **neutrino mass**
 - Identify the new physics of **dark matter**
 - Understand cosmic acceleration: **dark energy and inflation**
 - Explore the unknown: **new particles, interactions, and physical principles**"

Please look at pages 1 and 2 of the Snowmass 2013 Report

Snowmass 2013 had a direct impact on the outcome of P5



- The main recommendations (LHC/HL-LHC, neutrinos) are the ones everyone remembers and were part of the vision of Snowmass, but there were 29 recommendations in all, leading to a strong, diverse program that will be discussed in talks later in this session.

I do not believe that all these projects would have been included without our strong communities developing excellent proposals and explaining them to their colleagues outside their community.

Organization of Snowmass 2021 in Ten "Frontiers" -I



Accelerator



Steve Gourlay
(LBNL)



Tor Raubenheimer
(SLAC)



Vladimir Shiltsev
(FNAL)

Cosmic



Aaron Chou
(Fermilab)



Marcelle Soares-Santos
(U.Michigan)



Tim Tait
(UC Irvine)

Community Engagement



Kétévi Assamagan
(BNL)

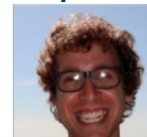


Breese Quinn
(Mississippi)

Computing



Steven Gottlieb
(Indiana U.)



Ben Nachman
(LBNL)



Daniel Elvira
(FNAL)

Energy



Meenakshi Narain
(Brown U)

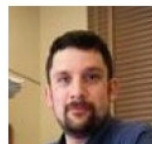


Laura Reina
(FSU)



Alessandro Tricoli
(BNL)

Instrumentation



Phil Barbeau
(Duke)



Petra Merkel
(FNAL)



Jinlong Zhang
(ANL)

Organization of Snowmass 2021 in Ten "Frontiers" - II



Neutrino



Patrick Huber
Virginia Tech



Kate Scholberg
Duke University



Elizabeth Worcester
BNL



Marina Artuso
(Syracuse U.)



Alexey Petrov
(Wayne State U.)



Bob Bernstein
(FNAL)

Rare Processes & Precision Measurements

Theory



Nathaniel Craig
(UCSB)



Csaba Csaki
(Cornell)



Aida El-Khadra
(UIUC)

Underground Facilities and Infrastructure



Laura Baudis (U. Zurich)



Jeter Hall (SNOLAB)



Kevin Lesko (LBNL)



John Orrell (PNNL)

All frontiers have topical subgroups, 80 in all (details on Twiki)

Accelerator:	7	Instrumentation:	10
Cosmic:	7	Neutrino:	10
Community Engagement:	7	Rare Processes:	7
Computing:	7	Theory:	11
Energy:	10	Underground:	6

More than 1500 people participated in the Snowmass process!

Snowmass Early Career (SEC)



- Early Career physicists have been formally represented at Snowmass since at least 2001 and gained even more formal recognition in 2013 and now in 2021/22
- Key activities planned for this Snowmass:
 - **Snowmass Coordination:** Coordinate with the Snowmass frontiers and help get EC members involved in the process
 - **In-reach:** Professional development and building cohesion within the early career community
 - **Diversity, Equity, and Inclusion (DEI):** Initiatives to make all HEP, in all aspects, more representative, welcoming, inclusive, and equitable.
 - **Survey:** Collect data on the early career membership
 - **Long-Term Organization:** There is interest in defining an early career organization to continue after Snowmass

Organization of this meeting - I



Snowmass 2021

	Sunday, July 17 Day 1	Monday, July 18 Day 2	Tuesday, July 19 Day 3	Wednesday, July 20 Day 4	Thursday, July 21 Day 5	Friday, July 22 Day 6	Saturday, July 23 Day 7	Sunday, July 24 Day 8	Monday, July 25 Day 9	Tuesday, July 26 Day 10	Wednesday, July 27
07:30 - 08:00 AM	Registration										
08:00 - 08:30 AM											
08:30 - 09:00 AM											
09:00 - 09:30 AM											
09:30 - 10:00 AM	Introductory Plenary										
10:00 - 10:30 AM											
10:30 - 11:00 AM											
11:00 - 11:30 AM											
11:30 - 12:00 PM											
12:00 - 12:30 PM											
12:30 - 01:00 PM	Lunch	Lunch, Poster & Exhibit	Lunch, Poster & Exhibit, and FOA/DOE General Meeting	Lunch, Poster & Exhibit and NSF General Meeting	Lunch, DOE Prgm Managers 1) Energy, 2) Theory	Lunch, DOE Prgm Managers 1) Energy, 2) Theory	Lunch and Communicating HEP to the public and the gov't	Lunch and Communicating HEP to the public and the gov't	Lunch and Communicating HEP to the public and the gov't	Lunch and Communicating HEP to the public and the gov't	Lunch and Communicating HEP to the public and the gov't
01:00 - 01:30 PM											
01:30 - 02:00 PM											
02:00 - 02:30 PM	Introductory Plenary	Parallel 1: AIML Parallel 2: Underground Science	Parallel 1: Career and Training the Next Generations	Parallel 1: Neutrino; Parallel 2: Rare processes	Colloquium on Rare Processes and Precision Measurements	Colloquium on Underground Physics	Colloquium on Energy Frontier	Colloquium on Energy Frontier	Colloquium on Energy Frontier	Colloquium on Energy Frontier	Colloquium on Energy Frontier
02:30 - 03:00 PM											
03:00 - 03:30 PM											
03:30 - 04:00 PM											
04:00 - 04:30 PM	Coffee	Parallel 1: The next accelerators; Parallel 2: LQCD	Parallel 1: Neutrino; Parallel 2: Cosmic Colliders	Colloquium on Instrumentation	Colloquium on new Accelerators and R&D	Colloquium on Theory	Colloquium on Computing	Colloquium on Computing	Colloquium on Computing	Colloquium on Computing	Colloquium on Computing
04:30 - 05:00 PM											
05:00 - 05:30 PM											
05:30 - 06:00 PM	If										
06:00 - 06:30 PM											
06:30 - 07:00 PM											
07:00 - 07:30 PM											
07:30 - 08:00 PM											
08:00 - 08:30 PM											
08:30 - 09:00 PM											
09:00 - 09:30 PM											
09:30 - 10:00 PM											
10:00 - 10:30 PM											

Organization of this meeting - II



- Day 1: charge to the Frontiers and to Snowmass, perspectives from funding agencies
- Day 2-8:
 - Morning – Many frontier parallel sessions
 - Afternoon – Plenary sessions of three hours duration, mostly important presentations by frontiers explaining their key conclusions to the other frontiers. **Get out of your lane and learn what others are doing!**
 - In some cases, a three-hour slot has two sessions running simultaneously
 - Afternoon Sessions of General interest
 - Sessions on selected cross-cutting topics of general interest to several frontiers or the whole community
 - Meetings during lunch period (no food consumed at meeting – COVID safety) with funding agencies and additional general topics
- Day 9-10:
 - Perspectives of important national and international leaders and organizations
 - Conference summaries via several panels and a summary talk, all aimed at producing clear, concise input to P5 and the basis for a consensus after P5 concludes

Questions in Plenary Sessions



- Often, a panel discussion or Q&A period will be placed after a series of talks in a session. The session will have a google doc for entering questions before, during, or even after the session. No questions will be taken at the end of the individual talks but will be reserved for the speakers until the end of the session.
 - No questions will be taken from ZOOM chat.
- Sessions will have two moderators who will work together to provide balanced opportunities for in-person and remote attendees to ask questions and to follow up on the answers.
- The remote/online moderator will choose questions entered through the googledocs or by online attendees using the 'raise hand' feature of ZOOM. Priority will go to questions entered via "raise hands".
- People attending in-person can raise their **actual** hands! When they are recognized by the in-person moderator, one of two "runners" will bring hand-held microphones to them so they can ask their questions.
- Questions that could not be answered because of the lack of time can be answered by the speakers after the meeting.
- For this Day 1 meeting, we are not going to answer questions in real time for the first two segments. Please put your questions in the google doc and the speakers will answer them after the session. For the talks starting at 4:30 pm, there will be a discussion period after the last talk where we will use the procedure described above to select questions.

Impact of COVID and other “disturbances”



- This edition of Snowmass was planned to run from the summer of 2020 to a final get-together in July of 2021 at the University of Washington
- By early 2021, it became clear that COVID would have a major impact on our ability to carry out the necessary work because
 - Lack of face-to-face meetings reduced efficiency
 - Heavy burdens fell on our young physicists, who do many of the studies
 - Especially young physicists with children, who now had care for them all day and school them at home
- In consultation with DOE, which agreed to delay P5 by one year, to 2022/23, we decided to take a ~7month pause/slowdown with the expectation that conditions would improve because of vaccines and mitigation measures
 - The meeting at University of Washington was delayed until July of 2022
- The pause/slowdown began in January of 2021
- By September we restarted and there was a “Snowmass Day” on September 24, 2021, to review the plans for completing the work by the July meeting
- Vaccination and mitigation enables us to have this hybrid meeting with a large face-to-face component in comparative safety if we work at it
- Other distressing events in national and international affairs contributed to the emotional stress of this period

COVID at this meeting



- The infection rate is increasing again
- **Respect all UW and Snowmass rules and guidelines!**
 - **Masking when in close quarters is crucial**
- There are a variety of strategies to limit the time we spend in close proximity to others, such as participating remotely in meetings that are very crowded, either from your dorm or hotel room or from outdoors, using the strong UW wireless network.
 - You can even rejoin the meeting in-person for the Q&A
- One important part of the in-person component is to meet in small groups and private conversations with colleagues
 - Continue to use distancing and masking to reduce risk

We honor and appreciate the hard work and resilience shown by the community to work through the COVID pandemic period.

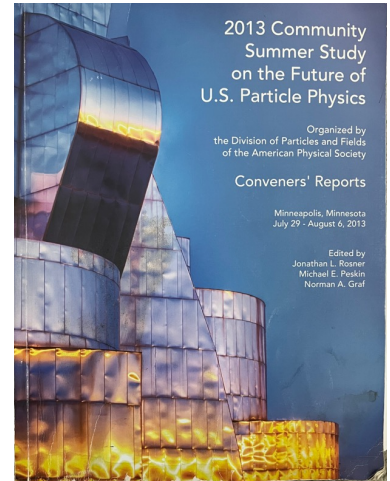
Timeline for Snowmass Book



Snowmass Timelines



- **March 15: Contributed papers (a.k.a. White Papers)**
- **May 31: Preliminary Topical Group Reports**
- **June 30: Preliminary Frontier Reports**
- **July 17 – 26: Converge on reports for all the frontiers and produce executive summaries representing the views of their communities and providing the basic input needed for P5**
- **September: draft Executive Summary and Report Summary**
- **October- November: Snowmass Book finalized and ready for submission**



- Cover from Snowmass 2013 report, ~ 350 pages
- The new report will be ~500 pages
- All Contributed Papers will remain part of the permanent record of Snowmass

Summary and Outlook



- This Seattle meeting is a hybrid meeting with a large in-person, >700, presence and a large remote participation, ~500.
- Despite all the challenges, an amazing amount of outstanding work is being done and, as we begin this July meeting, we have the basic input to the Snowmass Book and P5 in hand
 - I am in awe of the commitment of this community, which succeeded in the face of such great challenges
- We plan to give P5 a thorough picture of the most important physics opportunities, and the capabilities needed to achieve them
 - As we begin to summarize this work, discussions and debate are beginning to intensify, as they should!
- We hope and expect that we will emerge from this 2022/2023 Snowmass/P5 with a program that will enable us to do great physics and will have the same or a higher level of community support than we achieved in 2013/2014!



**Thanks to everyone in HEP and associated disciplines,
in the US and other nations, who are helping us to
produce a great result!**

**Thank you for your attention and
for joining us in Seattle or remotely!**

Backup Slides

DPF Oversight and Coordination



- Snowmass includes all aspects of high energy physics and takes an interdisciplinary and international approach
 - **Snowmass Steering Group [meets weekly]**
 - DPF Chair line + representatives of four closely associated APS Divisions: Astrophysics, Nuclear Physics, Gravitational Physics, Physics of Beams
 - **Snowmass Advisory Group [meets monthly]**
 - DPF Executive Committee + representatives of major regional and international organizations
 - **Snowmass All-Conveners Group [meets monthly]**
 - DPF chair line, 30 frontier conveners, the UW chair and deputy chairs of the CSS
 - **Community Summer Study (CSS) Program Committee**
 - One convener chosen by each frontier, Steering Committee, Early Career scientist representatives, UW chairs of CSS
 - **CSS Local Organizing Committee**

10 Frontiers	80 Topical Groups
Energy	Higgs Boson properties and couplings, Higgs Boson as a portal to new physics, Heavy flavor and top quark physics, EW Precision Phys. & constraining new phys., Precision QCD, Hadronic structure and forward QCD, Heavy Ions, Model specific explorations, More general explorations, Dark Matter at colliders
Neutrino Physics	Neutrino Oscillations, Sterile Neutrinos, Beyond the SM, Neutrinos from Natural Sources, Neutrino Properties, Neutrino Cross Sections, Nuclear Safeguards and Other Applications, Theory of Neutrino Physics, Artificial Neutrino Sources, Neutrino Detectors
Rare Processes	Weak Decays of b and c, Strange and Light Quarks, Fundamental Physics and Small Experiments. Baryon and Lepton Number Violation, Charged Lepton Flavor Violation, Dark Sector at Low Energies, Hadron spectroscopy
Cosmic	Dark Matter: Particle-like, Dark Matter: Wave-like, Dark Matter: Cosmic Probes, Dark Energy & Cosmic Acceleration: The Modern Universe, Dark Energy & Cosmic Acceleration: Cosmic Dawn & Before, Dark Energy & Cosmic Acceleration: Complementarity of Probes and New Facilities
Theory	String theory, quantum gravity, black holes, Effective field theory techniques, CFT and formal QFT, Scattering amplitudes, Lattice gauge theory, Theory techniques for precision physics, Collider phenomenology, BSM model building, Astro-particle physics and cosmology, Quantum information science, Theory of Neutrino Physics
Accelerator	Beam Physics and Accelerator Education, Accelerators for Neutrinos, Accelerators for Electroweak and Higgs Physics, Multi-TeV Colliders, Accelerators for Physics Beyond Colliders & Rare Processes, Advanced Accelerator Concepts, Accelerator Technology R&D: RF, Magnets, Targets/Sources
Instrumentation	Quantum Sensors, Photon Detectors, Solid State Detectors & Tracking, Trigger and DAQ, Micro Pattern Gas Detectors, Calorimetry, Electronics/ASICS, Noble Elements, Cross Cutting and System Integration, Radio Detection
Computational	Experimental Algorithm Parallelization, Theoretical Calculations and Simulation, Machine Learning, Storage and processing resource access (Facility and Infrastructure R&D), End user analysis
Underground Facilities	Underground Facilities for Neutrinos, Underground Facilities for Cosmic Frontier, Underground Detectors
Community Engagement	Applications & Industry, Career Pipeline & Development, Diversity & Inclusion, Physics Education, Public Education & Outreach, Public Policy & Government Engagement
Snowmass Early Career	Snowmass Early Career to represent early career members and promote

Snowmass 2021



- Why “Snowmass”?

- The name Snowmass is retained since it implies **an outlook or state-of-mind** as to how we pursue our science in US HEP:
 - Community driven and inclusive – all people and ideas are welcome
 - Global - Open to all, including physicists from all over the world, and takes into account the plans in all other regions
 - Interdisciplinary – reaches out to related fields

- Why 2021?

- It started in 2020, but because of the pandemic, it took two years so 2021 is the “average” of the years??



History: US HEP Community Planning Exercise, a.k.a. Snowmass



- Snowmass, the DPF-hosted Community Planning Exercises, started in 1982
 - The then DPF chair Charles Baltay said: “The 1982 DPF Summer Study was the first attempt in recent years to bring together physicists from the whole country to consider the future of our field from the point of view of the best overall national program. The DPF Executive Committee feels that this summer study was sufficiently useful in this last respect to hold similar summer studies at appropriate times in future years.”
 - The study lasted several months and culminated in a 3-week-long workshop in Snowmass, Colorado
- **Goal: To identify the most important questions in HEP and the tools and infrastructure required to address them**
 - To achieve a broader and deeper understanding of the science in our field
 - To engage junior scientists and foster our community development
 - To reach a compelling vision for the field moving forward
 - **Provide input to the “Particle Physics Project Prioritization Panel” (P5) process (starting in 2013)**
- In 2013, for reasons external to HEP, the meeting was held outside of Snowmass at the **University of Minnesota , Snowmass on the Mississippi**, and was shortened to ~10 days
 - The shorter meeting requires more discussion and consensus building to be done in advance

DPF Oversight and Coordination: Snowmass Steering Group



DPF:

Joel Butler (chair, Fermilab)

Sekhar Chivukula (chair-elect,
University of California,
San Diego)

Andre de Gouvea (vice chair,
Northwestern University)

Tao Han (past chair, University
of Pittsburgh)

Young-Kee Kim (recent chair,
University of Chicago)

Priscilla Cushman (recent chair,
University of Minnesota)

APS Divisions with strong cross-disciplinary links:

Particle Beams: Sergei Nagaitsev (FNAL)

Nuclear Physics: Yury Kolomensky (University
of California, Berkeley)

Astrophysics: Glennys Farrar (New York
University)

Gravitational Physics: Nicolas Yunes
(University of Illinois, Urbana-
Champaign)

The Steering Group Ensures a multi- and cross- disciplinary focus.
Each frontier also has a liaisons to all other associated frontiers

DPF Oversight and Coordination: Snowmass Advisory Group (2021)



- **Chair (Joel Butler)**
- **The Snowmass Steering group**
- **Additional DPF Executive Committee members:**
 - Secretary/Treasurer: Tulika Bose, University of Wisconsin
 - Councilor: Bob Bernstein, FNAL
 - Member-at-Large: Kendall Mahn
 - Member-at-Large: Heather Gray
 - Member-at-Large: Mary Raafat Mikhail Bishai, BNL
 - Member-at-Large: Lauren Tompkins, Stanford University
 - Member-at-Large: Mayly Sanchez, Iowa State University
 - Member-at-Large: Gordon Watts, University of Washington - Seattle
 - Early Career Member-at-Large: Julia Gonski, Columbia University
- **Representatives of the International Community**
 - Claudio Dib, Universidad Tecnica Federico Santa Maria, Chile
 - Val Gibson, Cavendish Laboratory, UK
 - Berrie Giebels, CNRS, France
 - Atsuko Ichikawa, Kyoto University, Japan
 - Heather Logan, Carleton University, Canada
 - Xinchou Lou, IHEP, China
 - Michelangelo Mangano, CERN
 - Azwinndini Muronga, Nelson Mandela University, South Africa
- **Editor**
 - Michael Peskin, SLAC National Laboratory
- **Communications Liaison**
 - Robert Bernstein, Fermilab
- **Technical Liaison**
 - Sergei Chekanov, Argonne National Laboratory

The Advisory Group ensures awareness of international plans and opportunities for collaboration

Did Snowmass 2013 have an impact on the P5 outcome?



- I would say yes!
- The main recommendations (LHC, neutrinos) may have been somewhat obvious even at the beginning of the process, but needed justification and incorporation into real budgets with timelines
- There were, however, 29 recommendations total, including
 - Maintain a program of projects of all scales, from the largest international projects to mid- and small-scale projects.
 - Increase the budget fraction invested in construction of projects to the 20%–25% range.
 - Provide the flexibility to support new ideas and developments
 - Select and perform in the short term a set of small-scale short-baseline experiments
 - Build DESI and complete LSST,
 - Proceed with G2 Dark Matter programs, support one or more G3 dark Matter Programs
 - Complete Mu2e and muon g-2

I do not believe that all these would have been included without our strong communities developing excellent proposals and explaining them to their colleagues outside their community.

Snowmass 2021/22



- **We must make strong physics cases for near-term, i.e., the HL-LHC, and far term, i.e., new colliders**
 - We have to clearly identify the physics advantages of each and how they differ or overlap
- We should acknowledge the current situation of project readiness and also the demands on funding of ongoing projects which affects timing of new projects
- **The next big decision will be based on what CERN learns about the technical feasibility, siting issues, and cost of the large tunnel and FCC-ee**
 - We need to prepare an R&D program that can support it but also can pursue the most promising directions if it cannot go forward
- We might anticipate a decision point ~ 4years from now, well before the “natural” time for the next P5
 - **We should put in place now what is needed to be ready for that**

Agenda for Day 1 - I



9:00 AM → 12:15 PM

Plenary: Snowmass Workshop Charge - I

Conveners: R. Sekhar Chivukula (UC San Diego), Tao Han (University of Pittsburgh)

9:00 AM

CSS Welcome and Meeting Logistics

Speaker: Gordon Watts (University of Washington)

9:15 AM

Welcome from the University of Washington

9:30 AM

DPF Greeting and Snowmass Organization Overview

Speaker: Joel Butler (Fermilab)

9:45 AM

Accelerator Frontier Workplan

Speaker: Steve Gourlay (LBNL)



AF Draft Executive S...



AF Snowmass Intro...

10:00 AM

Community Engagement Frontier Workplan

Speaker: Ketevi Adikle Assamagan (Brookhaven National Lab)



Community Engage...

10:15 AM

Coffee Break

10:45 AM

Computational Frontier Workplan

Speaker: Steven Gottlieb (Indiana Univ.)



CompF_CSS_workpl...

11:00 AM

Cosmic Frontier Workplan

Speaker: Tim Tait (UC Irvine)



CF Workplan.pdf

11:15 AM

Energy Frontier Workplan

Speaker: Alessandro Tricoli (BNL)

11:30 AM

Theory vision: the questions before us (Working

Speaker: Hitoshi Murayama (University of California, Berkeley)

Agenda for Day 1 - II



2:00 PM → 4:00 PM **Plenary: Snowmass Workshop Charge II**

2:00 PM **Instrumentation Frontier Workplan**

Speaker: Jinlong Zhang (ANL)

2:15 PM **Neutrino Frontier Workplan**

Speaker: Elizabeth Worcester (BNL)

2:30 PM **Early Career Viewpoint**

Speaker: Julia Gonski (Columbia University)

2:45 PM **Experimental Landscape (Working title, may change)**

Speaker: Andrew Lankford (UC Irvine)

3:15 PM **Rare Processes and Precision Measurements Frontier Workplan**

Speaker: Robert Bernstein (Fermilab)

 snowmassOpening...

3:30 PM **Theory Frontier Workplan**

Speaker: Shufang Su (University of Arizona)

 TF_Workplan.pdf

3:45 PM **Underground Facilities Frontier (UF) Workplan**

Speaker: John Orrell (Pacific Northwest National Laboratory)

 UF-Workplan-final.pdf

4:30 PM → 7:00 PM **Afternoon Plenary: Planning US HEP - past present future**

Convener: Joel Butler (Fermilab)

4:30 PM **Perspectives from Snowmass to P5 in 2013/2014**

Speaker: Steve Ritz (UCSC and SCIPP)

4:50 PM **Perspectives from NSF**

Speaker: James Shank (NSF)

 Snowmass_NSF_Pe...

5:15 PM **Perspectives from DOE**

Speaker: Harriet Kung (DOE)

5:40 PM **Perspectives from Fermilab**

Speaker: Lia Merminga (FNAL)

6:05 PM **Perspectives from HEPAP**

Speaker: JoAnne Hewett (SLAC)

6:30 PM **Questions/Comments**