

# Snowmass Community Planning Meeting

## Snowmass Timeline

Young-Kee Kim

University of Chicago

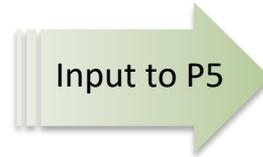
Chair, Division of Particles and Fields (DPF), American Physical Society

October 5, 2020

On behalf of the Snowmass Organization Team

# U.S. Strategic Planning Process for Particle Physics

~year-long process  
 Community-Wide **Science** Study  
 (a.k.a. “Snowmass”)



~year-long process  
 Particle Physics

**Project Prioritization Panel (“P5”)**  
 Formulate a 10-year execution plan  
 (20 year vision) within funding constraints  
 Subpanel of High Energy Physics Advisory  
 Panel for DOE/NSF funding agencies

Define the most important questions for the field  
 Identify promising opportunities to address them  
 Organized by DPF w/ APS DAP, DGRAV, DNP, DPB



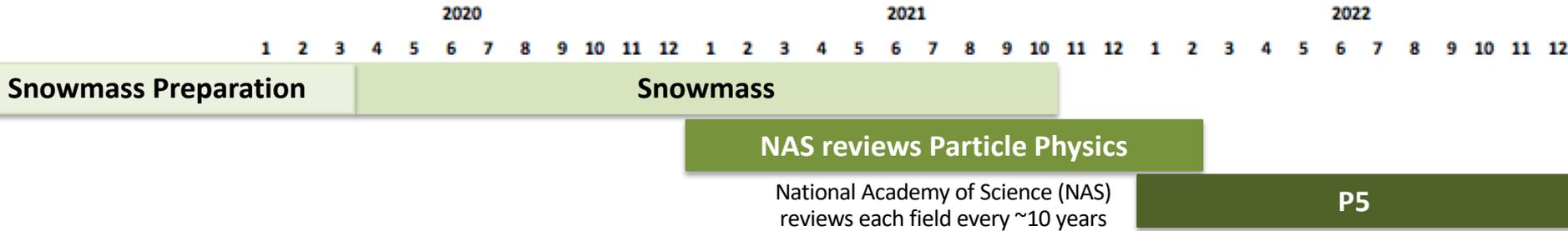
Particle Physics is global:

Snowmass process involves the international community and strategies/plans from other regions

Particle Physics is not isolated:

Snowmass process involves communities and their strategies/plans from related fields  
 (Accelerator, Nuclear, Astro, Gravitational, AMO, ...)

# U.S. Strategic Planning Process for Particle Physics



DPF: Past Chair  
Prisca Cushman



Chair  
Young-Ke Kim



Chair Elect  
Tao Han



Vice Chair  
Joel Butler



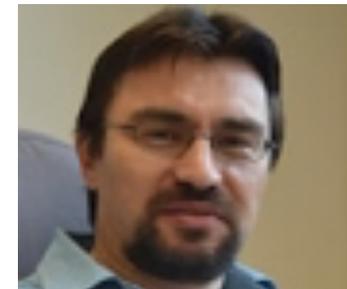
DPB (Accelerator)  
Sergei Nagaitsev



DAP (Astro)  
Glennys Farrar



DGRAV (Gravitational)  
Gabriela Gonzales



DNP (Nuclear)  
Yury Kolomensky

# Snowmass Advisory Group

- DPF Executive Committee

- Chair: Young-Kee Kim
- Chair-Elect: Tao Han
- Vice Chair: Joel Butler
- Past Chair: Prisca Cushman

## Steering Group

- Secretary/Treasurer: Mirjam Cvetič
- Councilor: Elizabeth Simmons
- Member-at-Large: Rick Van Kooten
- Member-at-Large: Elizabeth Worcester
- Member-at-Large: Natalia Toro
- Member-at-Large: Andre de Gouvea
- Member-at-Large: Mary Bishai
- Member-at-Large: Lauren Tompkins
- Early Career Member-at-Large: Sara Simon

- Editor and Communication

- Editor – Michael Peskin
- Communication – Bob Bernstein

- Representatives from Related Divisions

- DPB (accelerator): Sergei Nagaitsev
- DNP (nuclear): Yury Kolomensky
- DAP (astro): Glennys Farrar
- DGRAV (gravitational): Gabriela Gonzales

- Representatives from the Int. Community

- Africa / Middle East
  - Azwinndini Muronga, Nelson Mandela Metropolitan Univ, South Africa
- Asia / Pacific
  - Atsuko Ichikawa, Kyoto University, Japan
  - Xinchou Lou, IHEP, China
- Canada
  - Heather Logan, Carleton University, Canada
- Europe
  - Val Gibson, Cavendish Laboratory, UK
  - Berrie Giebels, CNRS, France
- Latin America
  - Claudio Dib, Universidad Tecnica Federico Santa Maria, Chile

Special thanks to

Steering group meets weekly; Advisory group meets once every 4 weeks;

All Frontier conveners + Advisory group + CPM/CSS LOC co-chairs meet once every 4 weeks

Monitoring the progress to make sure that all is moving forward smoothly to achieve the goals of the planning exercise

# Frontiers and Topical Groups

30 Frontier conveners + ~250 Topical Group conveners + >40 inter-frontier liaisons + ~25 early career liaisons

10 Frontiers	80 Topical Groups
Energy Frontier	Higgs Boson properties and couplings, Higgs Boson as a portal to new physics, Precision Phys. & constraining new phys., Precision QCD, Hadron Colliders, Heavy Ions, Model specific explorations, More general explorations, Dark Matter
Frontiers in Neutrino Physics	Neutrino Oscillations, Sterile Neutrinos, Beyond Standard Model Neutrino Properties, Neutrino Cross Sections, Nuclear Safeguards and Neutrino Physics, Neutrino Detectors, Neutrino Sources, Neutrino Detectors
Frontiers in Rare Processes & Precision Measurements	Weak Decays of b and c quarks, Flavor Physics, Precision Measurements, Small Experiments. Baryon and Lepton Number Violation, Neutrinoless Double Beta Decay, Low Energies, Hadron spectroscopy
Cosmic Frontier	Dark Matter: Cosmic Rays, Dark Energy & Cosmic Acceleration: The Dark Universe, Dark Energy & Cosmic Acceleration: The Dark Universe
Theory Frontier	Black holes, Effective field theory techniques for quantum gravity, Quantum field theory, Cosmology, Quantum gravity, Quantum field theory, Cosmology, Quantum gravity
Accelerator Frontier	Physics and Accelerator Technology, Multi-TeV Colliders, Accelerator Technology, Accelerator Technology, Accelerator Technology, Accelerator Technology
Instrumentation Frontier	Calorimetry, Tracking, Trigger and DAQ, Micro Pattern Gas Detectors, Accelerator Technology, Accelerator Technology, Accelerator Technology, Accelerator Technology
Computational Frontier	Experimental and Theoretical Calculations and Simulation, Machine Learning, Storage and Processing, Accelerator Technology, Accelerator Technology, Accelerator Technology, Accelerator Technology
Underground Facilities and Infrastructure Frontier	Underground Facilities for Neutrinos, Underground Facilities for Cosmic Frontier, Underground Detectors
Community Engagement Frontier	Applications & Industry, Career Pipeline & Development, Diversity & Inclusion, Physics Education, Public Education & Outreach, Public Policy & Government Engagement

**30 Frontier conveners, ~250 Topical Group conveners, >40 Inter-Frontier Liaisons, ~25 Early Career Liaisons: Thank you, community, for your nominations!!**

**Significant efforts being made:**

- 30 Frontier conveners (since January 2020)
- TG conveners (since April 2020)
- Early Careers (since June 2020)

**Energy Frontier**



Meenakshi Narain  
(Brown U)



Laura Reina  
(FSU)



Alessandro Tricoli  
(BNL)

**Accelerator Frontier**



Steve Gourlay  
(LBNL)



Tor Raubenheimer  
(SLAC)



Vladimir

**Frontiers in Neutrinos**



Patrick Huber  
(Virginia Tech)



Kate Scholberg  
(Duke U.)



Elizabeth Worcester  
(BNL)

**Instrumentation Frontier**



Steven Gottlieb  
(Indiana U.)



Ben Nachman  
(LBNL)



Jinlong Zhang  
(ANL)

**Frontiers in Rare Processes & Precision Meas.s**



Marina Artuso  
(Syracuse U.)



Alex



Oliver Gutsche  
(FNAL)

**Cosmic Frontier**



Marcella Soares-Santos  
(U.Michigan)



Tim Tait  
(UC Irvine)

**Underground Facilities and Infrastructure Frontier**



Laura Baudis  
(U. Zurich)



Jeter Hall  
(SNOLAB)



Kevin Lesko  
(LBNL)



John Orrell  
(PNNL)

**Theory Frontier**



Nathaniel Craig  
(UCSB)



Csaba Csaki  
(Cornell)



Aida El-Khadra  
(UIUC)

**Community Engagement Frontier**



Kétévi Assamagan  
(BNL)

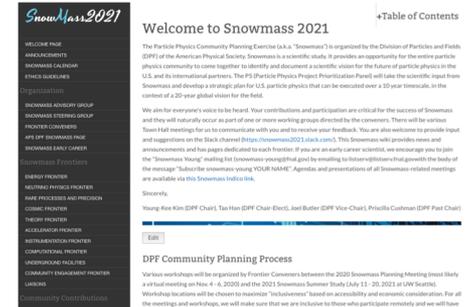


Breese Quinn  
(Mississippi)

**This Thursday's CPM Plenary Sessions Summary from Each Frontier**  
**Key questions, outcomes of CPM breakout sessions, and future plans between now and CSS**

# Snowmass Process

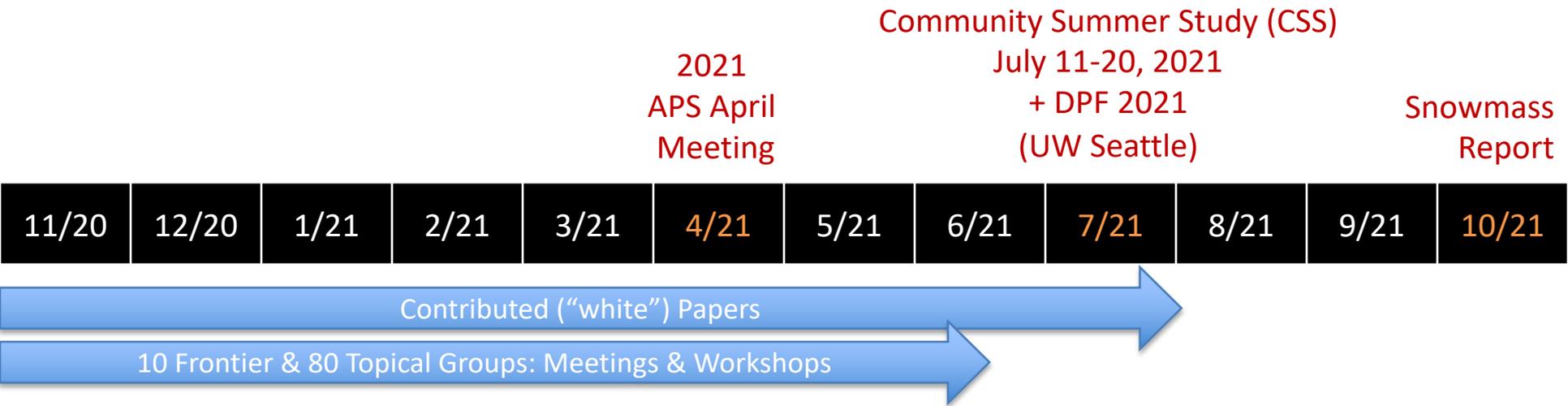
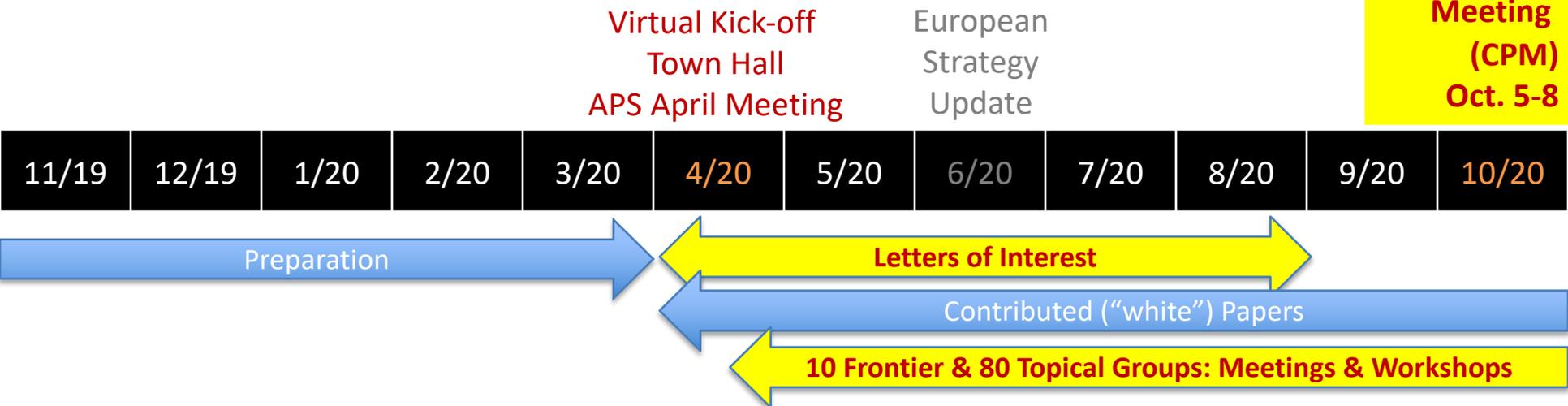
- Wiki (<https://snowmass21.org/>) – one-stop shop
  - Structure, Frontier/TG activities, Calendars, News, Community Input, Slack channels, ...



- Snowmass Early Career
  - Early career members actively engaging in the Snowmass 2021 process
  - This group will build a long-term particle-physics early career community that persists after the Snowmass process.
- Ethics
  - Dynamic exchange of ideas across a large swath of the community in a variety of formats (slack channels, meetings, workshops). All community members should feel safe and supported in engaging in all exchanges.
  - DPF Ethics Task Force formed in April 2020 ([DPF Core Principles and Community Guidelines](#)), CP&CG Response Team for CPM formed
  - Establishment of DPF Ethics Committee (November 2020)

# Snowmass Timeline

**Community Planning Meeting (CPM) Oct. 5-8**

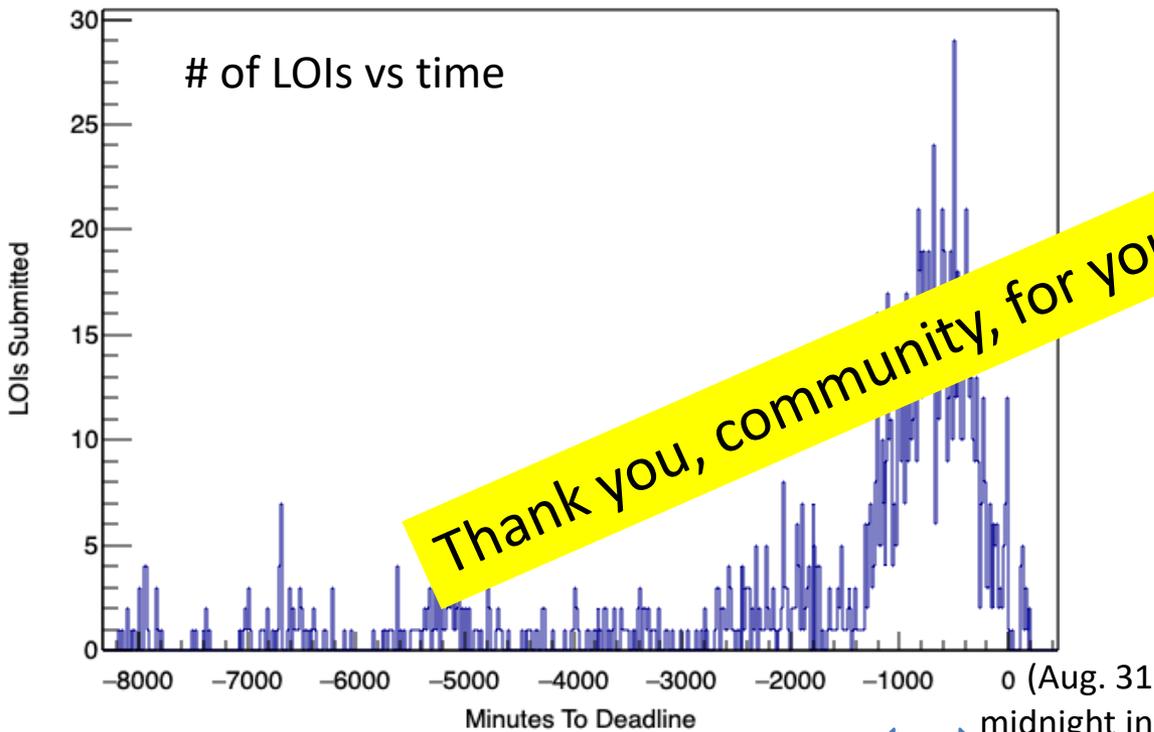


# Letters of Interests

1,574 in total: submitted before August 31, 2020

Many LOIs – multiple frontiers

Frontier + TG conveners: tireless efforts to prepare the CPM using this information (Sept.)

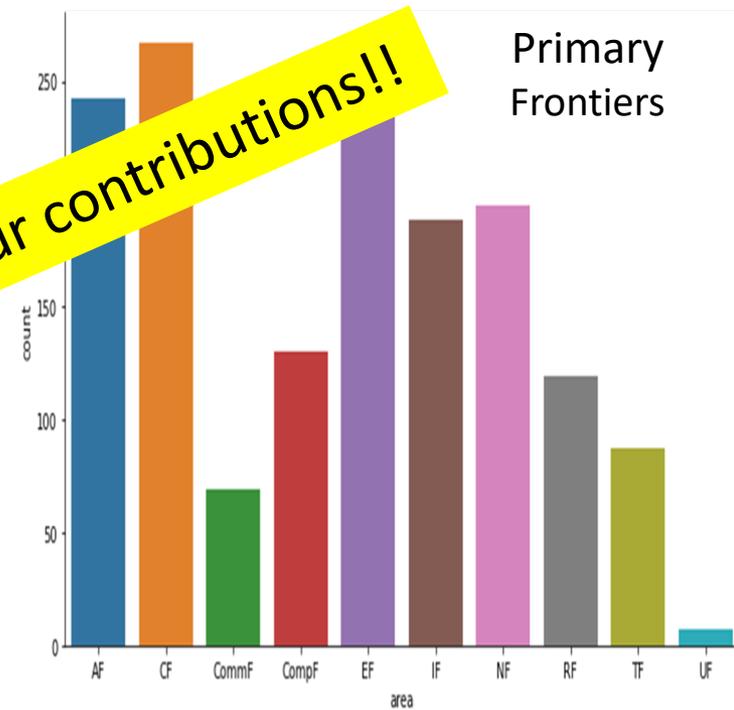


(Credit: Sam Hedges)



20 hours

midnight in Hawaii



(Credit: Gordon Watts)

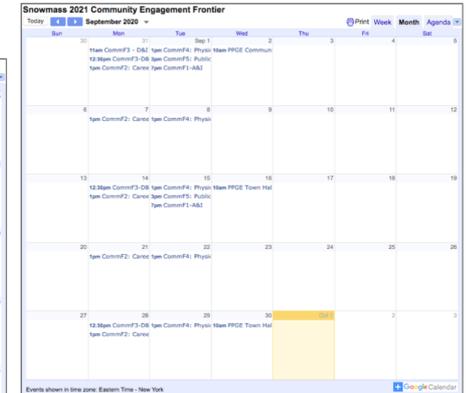
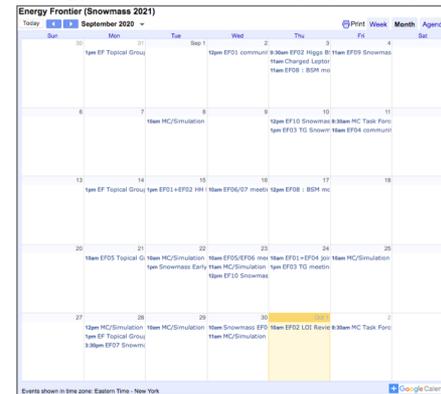
Thank you, community, for your contributions!!

# Community Planning Meeting (CPM): Goals

Community Engagement Frontier Calendar (Sept 2020)

- April 2020 – Now (CPM)
  - Each Frontier and Topical Group: meetings and various workshops since Spring 2020

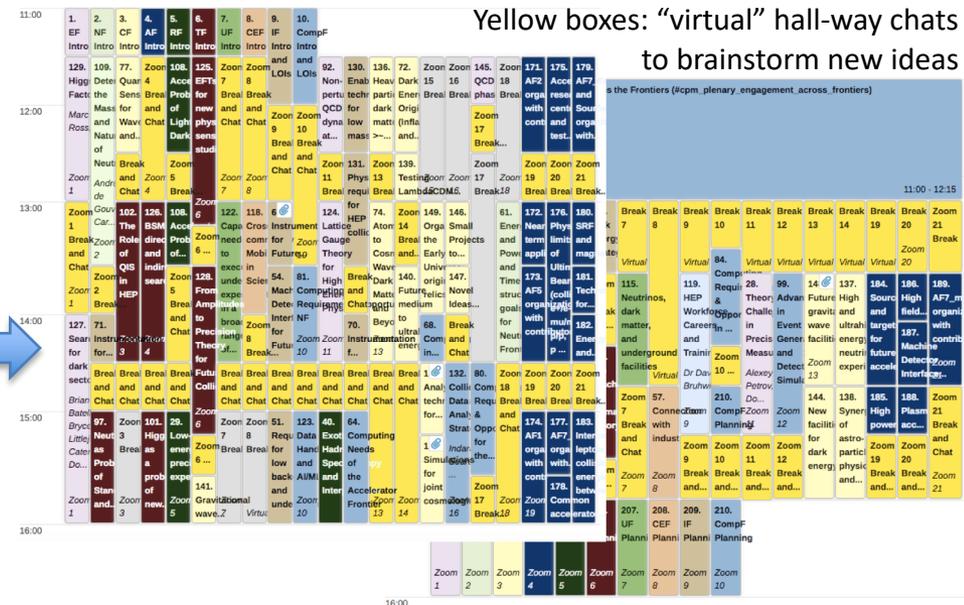
Energy Frontier Calendar (Sept 2020)



- CPM's goals
  - Develop plans and steps to take between October 2020 and the Snowmass Community Study in July 2021, leading to a final report in October 2021.

- CPM Plenary Sessions
  - Exciting Physics
  - Plans from other regions and related fields
  - Messages from funding agencies
  - Voices of the community

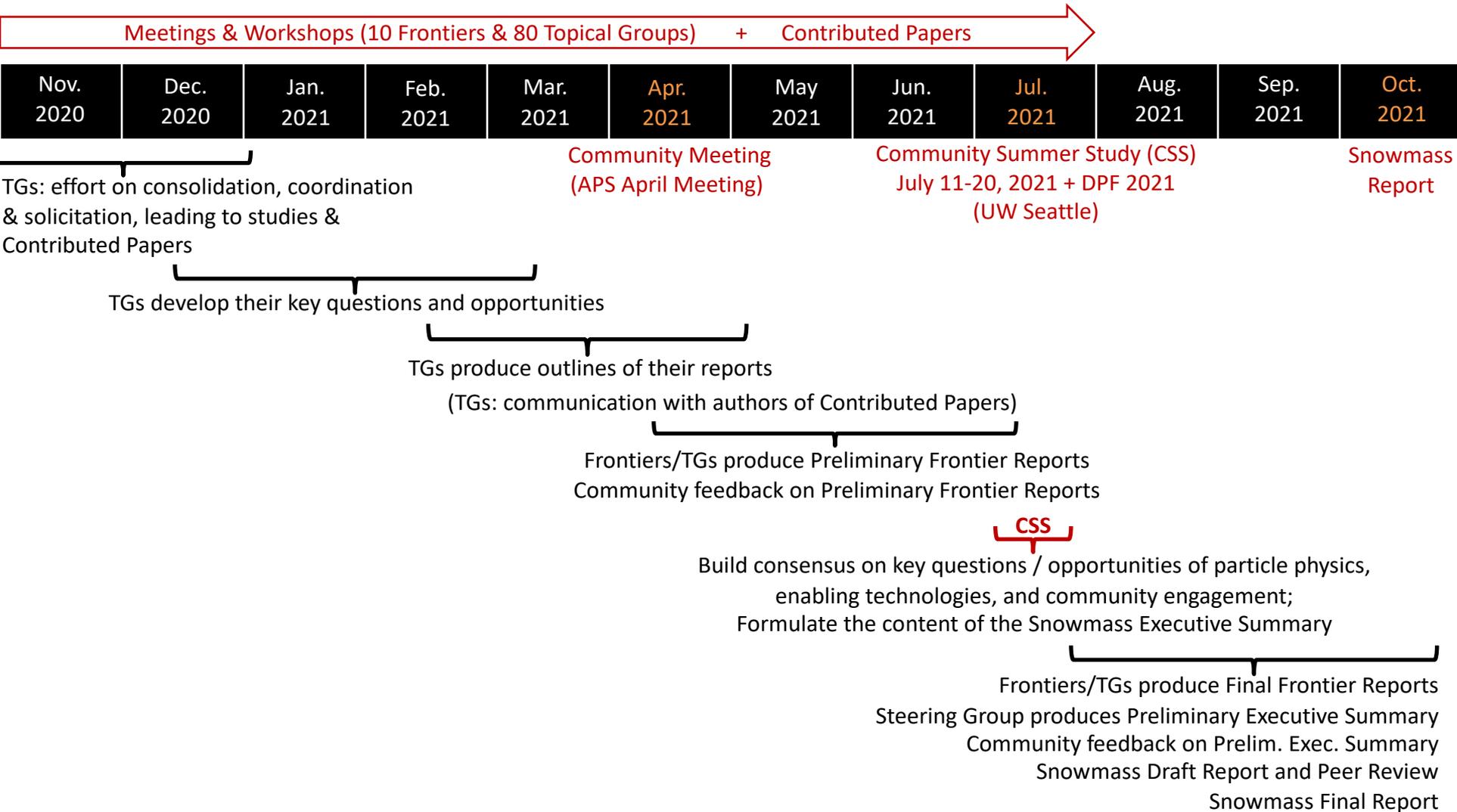
Yellow boxes: "virtual" hall-way chats to brainstorm new ideas



- CPM Parallel Sessions
  - First opportunity to bring together the community across the field
  - Focus on inter-frontier discussions
  - Establish cross working group connections.
  - Identify gaps and areas to focus / to study
  - Brainstorm new ideas

# Preliminary Snowmass Timeline / Process

Starting point for discussion with the community during CPM



# Preliminary Snowmass Report Structure

Starting point for discussion with the community during CPM

Preliminary  
Report Structure:  
Adopting Snowmass 2013

## Executive Summary

(~50 pages)

Introduction

A few pages from each Frontier

## Frontier Report



**Intensity Frontier**

[Snowmass 2013](#)

Frontier Summary  
(20~50 pages)

Chapter 2: Intensity Frontier  
Conveners: J.L. Hewett and H. Weerts

[Working Group Summary \(arXiv:1401.6077\)](#)

Subgroup Reports:

Topical Group Reports  
(20~50 pages per TG)

- 12. [Neutrinos](#) [1310.4340](#)
- 13. [Baryon Number Violation](#) [1311.5285](#)
- 14. [Charged Leptons](#) [1311.5278](#)
- 15. [Quark Flavor Physics](#) [1311.1076](#)
- 16. [Nucleons, Nuclei, and Atoms](#) [1312.5416](#)
- 17. [New Light Weakly Coupled Particles](#) [1311.0029](#)

Contributed Papers as References

Contributed Papers:

*General:*

- |     |                            |  |
|-----|----------------------------|--|
| 001 | K. Lesko                   | Why the US Needs a Deep Domestic Research Facility: O    |
|     |                            | Education Benefits, Technology Advances, and Scientific  |
|     |                            | Physics  |
| 019 | S. Holmes, <i>et al.</i>   | Project X: A Flexible High Power Proton Facility         |
| 021 | S. Glashow                 | Particle Physics in the United States: A Personal View   |
| 024 | V. Shiltsev, <i>et al.</i> | Issues and R&D Required for the Intensity Frontier Accel |
| 055 | A. Kronfeld, <i>et al.</i> | Project X: Physics Opportunities                         |
| 056 | S. Holmes, <i>et al.</i>   | Project X: Accelerator Reference Design                  |

# Community Planning Meeting: Program Committee

- Steering Group
  - DPF: Young-Kee Kim (Chair), Tao Han (Chair-Elect), Joel Butler (Vice-Chair), Priscilla Cushman (Past Chair)
  - Glennys Farrar (DAP), Gabriela Gonzales (DGRAV), Yury Kolomensky (DNP), Sergei Nagaitsev (DPB)

- Frontier Representatives

- Frontier Conveners

Energy	Laura Reina	Florida State U.
Neutrinos	Patrick Huber	Virginia Tech.
Rare Processes and Precision Measurements	Marina Artuso	Syracuse U.
Cosmic	Aaron Chou	Fermilab
Theory	Aida El-Khadra	UIUC
Accelerator	Tor Raubenheimer	SLAC
Instrumentation	Jinlong Zhang	Argonne
Computational	Oliver Gutsche	Fermilab
Underground Facilities and Infrastructure	John Orrell	PNNL
Community Engagement	Breese Quinn	U. Mississippi

- 2 Early Careers

- Vishvas Pandey (postdoc), Joshua Barrow (graduate student)

- Co-chairs of CPM Local Organizing Committee

- Bo Jayatilaka, Brendan Kiburg

Special thanks to

All Frontier Conveners  
All Topical Group Conveners

# CPM Local Organizing Committee

Special special thanks go to



Bo Javatilaka  
Fermilab  
(Co-chairs of CPM Organizing Committee)



Brendan Kiburg  
Fermilab



Jonathan Asaadi  
UT, Arlington



Saptaparna  
Bhattacharya, NW



Zoltan Gece  
Fermilab



Erica Snider  
Fermilab



Tiziana Spina  
Fermilab



Yuanyuan Zhang  
Fermilab



Gordon Watts  
UW Seattle



Shih-Chieh Hsu  
UW Seattle

(Co-chairs of 2021 CSS)