



SAC and Snowmass

Brendan Kiburg

Apr 30, 2020

Muon Department Meeting

Scientist Advisory Council (SAC) and Snowmass

Meets weekly with the directorate

Charge: “to engage in open discussion on topics of interest for both short- and long-term plans for the laboratory’s research program”

SAC’s Snowmass Goals

1. Help communicate Snowmass opportunities to our scientific staff
2. With the help of our working group leaders, coordinate the scientific input to the Snowmass Process
3. Facilitate (host) the Snowmass kickoff meeting
 - a. Community Planning Meeting (CPM) scheduled for November 4th-6th 2020
 - b. Scientific program organized by Snowmass Conveners
 - c. Planning for a non-zero fraction of virtual attendees (10-100%)
 - d. Plan will be guided by lab, DOE, state of Illinois policy and CDC guidance

Communicate Snowmass Opportunities

Snowmass Webpage: <https://snowmass21.org/>

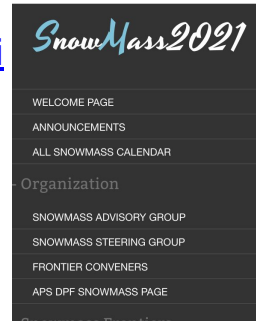
Frontier Conveners: <https://snowmass21.org/start/conveners>

April 18th Townhall slides: <https://indico.fnal.gov/event/23601/> (contains topical conveners)

Additional Townhalls proposed prior to November

Letters of Interest: <https://snowmass21.org/loi>

- 2 Pagers Due August 31, 2020
- Informs the CPM Content
- White Papers Due July 31, 2021



Letters of Interest

The purpose of letters of interest is to allow Snowmass conveners to see what proposals are coming and to encourage the community to begin studying them. Letters of Interest should give brief descriptions of the proposal and cite the relevant papers to study. These letters will help conveners to prepare the Snowmass Planning Meeting that will take place on November 4-6, 2020 at Fermilab.

The letters should be up to 2 pages not including bibliography and should be uploaded by authors **"HERE"** between April 1, 2020 and August 31, 2020. An index of submitted letters can be viewed **"HERE"**. The letters will be stored permanently in the Fermilab archive Doc.db shortly after August 31, 2020.

Authors of the letters are encouraged to make a full writeup for their work and submit it to the Snowmass proceedings according to the instructions **"HERE"**.

Snowmass Young forming a representative group

- Soliciting nominations (any early career members).
- Opportunity to drive process, replace some missed networking opportunities
- Nominations open until May 11. Form available [here](#)

Coordinate Scientific Input

Goals:

- Are we missing anything critical?
- Are we making coordinated contributions?
- Do people lack the non-scientific resources they need to contribute to Snowmass? Good time to ask department heads for specific resources

Coordination

- Worked with Working Group Leaders to identify plans for Snowmass White Papers
- Encourage you to get involved with one of these topics (reach out to Chris Polly and Ron Ray for precision, or me for any other category)
- Encourage you to add new topics to the list
- All-Scientist Meeting Friday May 29th (pm)

Intended White Papers (Snapshot)

1	Frontier	Topic	Contact Author Identified	1	Frontier	Topic	Contact Author Identified	Resource Needs Indicated	Author Scope
2	Cosmic	Axion Dark Matter	YES	27	Detectors	power over fiber technology (POF)	YES	9 months technician time (split between mechanical, electrical, cryo), 3 months at PAB with some technical support	
3	Cosmic	AI/Cosmology	YES						
4	Cosmic	Joint Cosmology Analysis of Late-Time Cosmic Structure Formation Probes	YES						
5	Cosmic	21 cm Cosmology opportunities in next decade	YES						
6	Cosmic	Astrophysical Probes of Dark Matter	YES						
7	Cosmic	Dark Matter Direct Detection							
8	Cosmic	Cosmic Microwave Background							
9	Cosmic	Dark Energy							
10	Cosmic	Galactic Center Excess	YES						
11	Neutrino	Tau Neutrino Appearance in Accelerator-Based Neutrino Beams							
12	Neutrino	Using the DUNE Opportunity Module as a Neutrinoless Double Beta Decay Platform		37	Precision+Rare Processes	SBND 8 GeV proton beam dump			
13	Neutrino	An H2+D2 Detector in the LBNF Neutrino Beam		38	Precision+Rare Processes	DarkQuest, 120 GeV proton beam dump spectrometer			
14	Neutrino / Precision+Rare Processes	Searches for new light weakly interacting particles using proton beam dumps at FNAL		39	Precision+Rare Processes	M ³ , muon missing momentum			
15	Energy	Dark Matter Searches		40	Precision+Rare Processes	Redtop	YES	1 Mech Eng, 0.03 to 0.10 FTE-years ; AD studies 2x 0.4 FTE-years	Fermilab + Community
16	Energy	VBS in dibosons - Precise Exploration of SM	YES	41	Precision+Rare Processes	Mu2e-II / CLFV			Fermilab + Community
17	Energy	VBS in dibosons - Study of longitudinal Polarization		42	Precision+Rare Processes	Precision muons / lepton Universality	YES		Fermilab + Community
18	Energy	Precision Higgs		43	Accelerator Science	Targetry	YES		
19	Energy	Higgs cubic and quartic couplings	YES	44	Accelerator Science	Cavities		clarification needed on scientist time	
20	Energy	Strong SUSY/BSM for pp machines							
21	Energy	Higgsino in SUSY	YES						
22	Energy	Energy/Accelerator Interface		45	Accelerator Science	Magnets		clarification needed on scientist time	-
23	Computing	Computing Challenges for HEP	YES	46	Accelerator Science	Cryogenics		clarification needed on scientist time	
24	Detectors	Quantum dot based scintillating sensors for low-mass tracking	YES						
25	Detectors	Capturing ultra-cold neutrons with CCDs	YES						
26	Detectors	4D tracker R&D	YES	47	TBD	EDI Challenges and solutions in HEP			Fermilab + Community
				48	TBD	Ethics of AI development by scientists			Fermilab + Community

Energy Frontier



Meenakshi Narain (Brown U)



Laura Reina (FSU)



Alessandro Tricoli (BNL)

Topical Group		Topical Group co-Conveners			
EF01	EW Physics	Higgs Boson properties and couplings	Sally Dawson (BNL)	Andrey Korytov (U Florida)	Caterina Vernieri (SLAC)
EF02		Higgs Boson as a portal to new physics	Patrick Meade (Stony Brook)	Isobel Ojalvo (Princeton)	
EF03		Heavy flavor and top quark physics	Reinhard Schwienhorst (MSU)	Doreen Wackerroth (Buffalo)	
EF04		EW Precision Phys. & constraining new phys.	Alberto Belloni (Maryland)	Ayres Freitas (Pittsburgh)	Junping Tian (Tokyo)
EF05	QCD and Strong Interactions	Precision QCD	Michael Beigel (BNL)	Stefan Hoeche (FNAL)	Michael Schmitt (NW)
EF06		Hadronic structure and forward QCD	Huey-Wen Lin (MSU)	Pavel Nadolsky (SMU)	Christophe Royon (Kansas)
EF07		Heavy Ions	Yen-Jie Lee (MIT)	Swagato Mukherjee (BNL)	
EF08	BSM	Model specific explorations	Jim Hirschauer (FNAL)	Elliott Lipeles (UPenn)	Nausheen Shah (Wayne State)
EF09		More general explorations	Tulika Bose (UW-Madison)	Zhen Liu (Maryland)	Simone Griso (LBL)
EF10		Dark Matter at colliders	Caterina Doglioni (Lund)	LianTao Wang (Chicago)	

Neutrino Physics Frontier



Patrick Huber (Virginia Tech)



Kate Scholberg (Duke University)



Elizabeth Worcester (BNL)

Topical Group		Topical Group co-Conveners			
NF01	Neutrino Oscillations	Peter Denton	Megan Friend	Mark Messier	Hiro Tanaka
NF02	Sterile Neutrinos	Georgia Karagiorgi	Bryce Littlejohn	Pedro Machado	Alex Sousa
NF03	Beyond the SM	Pilar Coloma	Lisa Koerner	Ian Shoemaker	Jae Yu
NF04	vs from Natural Sources	Yusuke Koshio	Gabriel Orebi Gann	Erin O'Sullivan	Irene Tamborra
NF05	Neutrino Properties	Carlo Giunti	Ben Jones	Lisa Kaufman	Diana Parno
NF06	Neutrino Cross Sections	Jonathan Asaadi	Baha Balantekin	Kendall Mahn	Jason Newby
NF07	Nuclear Safeguards and Other Applications	Nathaniel Bowden	Jon Link	Wei Wang	
NF08	Theory of Neutrino Physics	André de Gouvêa	Irina Mocioiu	Saori Pastore	Louis Strigari
NF09	Artificial Neutrino Sources	Laura Fields	Alysia Marino	Pedro Ochoa	Josh Spitz
NF10	Neutrino Detectors	Josh Klein	Ana Machado	Dave Schmitz	Raimund Strauss

Rare Processes & Precision Meas Frontier



Marina Artuso (Syracuse U.)



Alexey Petrov (Wayne State U.)



Bob Bernstein (FNAL)

Topical Group		Topical Group co-Conveners	
RF01	Weak Decays of b and c	Angelo di Canto	Stefan Meinel
RF02	Strange and Light Quarks	Emilie Passemar	Evgueni Goudovski
RF03	Fundamental Physics and Small Experiments	Tom Blum	Peter Winter
RF04	Baryon and Lepton Number Violation	Pavel Filievez Perez	
RF05	Charged Lepton Flavor Violation	Sacha Davidson	Bertrand Echenard
RF06	Dark Sector at Low Energies	Stefania Gori	Mike Williams

Cosmic Frontier



Aaron Chou (Fermilab)



Marcelle Soares-Santos (Brandeis)



Tim Tait (UC Irvine)

Topical Group		Topical Group co-Conveners			
CF01	Particle DM	Jodi Cooley (SMU)	Tongyan Lin (UCSD)	Hugh Lippincott (UCSB)	Tracy Slatyer (MIT)
CF02	Wavelike DM	Joerg Jaeckel (Heidelberg)	Gray Rybka (UW)	Lindley Winslow (MIT)	
CF03	DM Astro Probes	Alex Drlica-Wagner (FNAL)	Chanda Prescod-Weinstein (NH)	Haibo Yu (Riverside)	
CF04	DE & CA The Modern Universe	Jeff Newman (Pittsburgh)	Masao Sako (Penn)	Anze Slosar (BNL)	Finalizing
CF05	DE & CA Cosmic Dawn & Before	Clarence Chang (ANL)	Deirdre Shoemaker (Georgia Tech.)	Finalizing	
CF06	Dark Energy complementarity	David Schlegel (LBNL)	Finalizing	Finalizing	
CF07	Cosmic Probes	Luis Anchordoqui (CUNY)	B.S. Sathyaprakash (Penn State)	Kirsten Tollefson (MSU)	Finalizing

Theory Frontier



Nathaniel Craig (UCSB)



Csaba Csaki (Cornell)



Aida El-Khadra (UIUC)

Topical Group		Topical Group co-Conveners			
TF01	String theory, quantum gravity, black holes	Daniel Harlow	Shamit Kachru	Juan Maldacena	
TF02	Effective field theory techniques	Patrick Draper	Ira Rothstein		
TF03	CFT and formal QFT	David Poland	Leonardo Rastelli		
TF04	Scattering amplitudes	Zvi Bern	Jaroslav Trnka		
TF05	Lattice gauge theory	Zohreh Davoudi	Taku Izubuchi	Ethan Neil	
TF06	Theory techniques for precision physics	Radja Boughezal	Zoltan Ligeti	#3	
TF07	Collider phenomenology	Fabio Maltoni	Shufang Su	Jesse Thaler	
TF08	BSM model building	Patrick Fox	Hitoshi Murayama		
TF09	Astro-particle physics and cosmology	Dan Green	Joshua Ruderman	Ben Safdi	Jessie Shelton
TF10	Quantum information science	Simon Catterall	Roni Harnik	Veronika Hubeny	

Accelerator Frontier



Steve Gourlay (LBNL)



Tor Raubenheimer (SLAC)



Vladimir Shiltsev (FNAL)

Topical Group		Topical Group co-Conveners		
AF01	Beam Phys & Accel. Education	Z. Huang (Stanford)	M. Bei (GSI)	S. Lund (MSU)
AF02	Accelerators for Neutrinos	J. Galambos (ORNL)	B. Zwaska (FNAL)	G. Arduini (CERN)
AF03	Accelerators for EW/Higgs	M. Ross (SLAC)	Q. Qin (IHEP, Beijing)	
AF04	Multi-TeV Colliders	M. Palmer (BNL)	A. Valishev (FNAL)	N. Pastrone (INFN, Torino)
AF05	Accelerators for PBC and Rare Processes	E. Prebys (UC Davis)	M. Lamont (CERN)	
AF06	Advanced Accelerator Concepts	C. Geddes (LBNL)	M. Hogan (SLAC)	P. Musumeci (UCLA)
AF07	Accelerator Technology R&D			
	Sub-group RF	E. Nanny (SLAC)	S. Posen (FNAL)	H. Weise (DESY)
	Sub-Group Magnets	G. Sabbi (LBNL)	S. Zlobin (FNAL)	S. Izquierdo Bermudez (CERN)
	Sub-Group Targets/Sources	C. Barbier (ORNL)	Y. Sun (ANL)	F. Pellemoine (FNAL)

Instrumentation Frontier



Phil Barbeau (Duke)



Petra Merkel (FNAL)



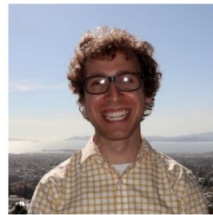
Jinlong Zhang (ANL)

Topical Group		Topical Group co-Conveners		
IF01	Quantum Sensors	Thomas Cecil (ANL), Kent Irwin (SLAC), Reina Maruyama (Yale), Matt Pyle (Berkeley)		
IF02	Photon Detectors	Juan Estrada (FNAL)	Mayly Sanchez (ISU)	Abigail Vieregg (Chicago)
IF03	Solid State Detectors&Tracking	Tony Affolder (UCSC)	Artur Apresyan (FNAL)	Lucie Linssen (CERN)
IF04	Trigger and DAQ	Darin Acosta (Florida)	Wes Ketchum (FNAL)	Stephanie Majewski (Oregon)
IF05	Micro Pattern Gas Detectors	Thomas Schwarz (Michigan)	Maxim Titov (SACLAY)	Sven Vahsen (Hawaii)
IF06	Calorimetry	Andy White (UTA)	Minfang Yeh (BNL)	Rachel Yohay (FSU)
IF07	Electronics/ASICS	Gabriella Carini (BNL)	Mitch Newcomer (UPenn)	John Parsons (Columbia)
IF08	Noble Elements	Eric Dahl (Northwestern)	Roxanne Guenette (Harvard)	Jen Raaf (FNAL)
IF09	Cross Cutting and System Integration	Jim Fast (PNNL)	Maurice Garcia-Sciveres (LBL)	Ian Shipsey (Oxford)

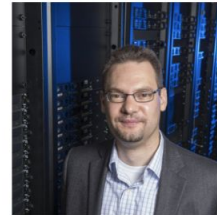
Computational Frontier



Steven Gottlieb (Indiana U)



Ben Nachman (LBNL)



Oliver Gutsche (FNAL)

Topical Group		Topical Group co-Conveners		
CompF01	Experimental Algorithm Parallelization	Guiseppe Cerati (FNAL)	Katrin Heitmann (ANL)	Walter Hopkins (ANL)
CompF02	Theoretical Calculations and Simulation	Peter Boyle (BNL)	Daniel Elvira (FNAL)	Ji Qiang (LBNL)
CompF03	Machine Learning	Phiala Shanahan (MIT)	Kazu Terao (SLAC)	Daniel Whiteson (Irvine)
CompF04	Storage and processing resource access (Facility and Infrastructure R&D)	Wahid Bhimji (NERSC)	Rob Gardner (U Chicago)	Frank Würthwein (UCSD)
CompF05	End user analysis	Gavin Davies (U.Mississippi)	Peter Onyisi (U Texas at Austin)	Amy Roberts (UC Denver)
CompF06	Quantum computing	Travis Humble (ORNL)	Gabriel Perdue (FNAL)	Martin Savage (U Washington)
CompF07	Reinterpretation and long-term preservation of data and code	Kyle Cramner (NYU)	Mike Hildreth (U Notre Dame)	Matias Carrasco Kind (Illinois/ NCSA)

Underground Facilities and Infrastructure



Jeter Hall (SNOLAB)



Kevin Lesko (LBNL)



John Orrell (PNNL)

Topical Group		Topical Group co-Conveners
UF01	Underground Facilities for Neutrinos	TBD
UF02	Underground Facilities for Cosmic Frontier	TBD
UF03	Underground Detectors	TBD
UF04	Supporting Capabilities	TBD
UF05	Synergistic Research	TBD
UF06	An Integrated Strategy for Underground Facilities and Infrastructure	TBD

Community Involvement Frontier



Kétévi A. Assamagan (BNL)



Breese Quinn (Mississippi)

Topical Group		Topical Group co-Conveners			
Comm01	Applications & Industry	Farah Fahim (FNAL)	TBD	Koji Yoshimura (Okayama)	
Comm02	Career Pipeline & Development	Sudhir Malik (UPRM)	Yangyang Chen (Cornell)	Amr El Zant (BUE)	
Comm03	Diversity & Inclusion	Mu-Chun Chen (UCI)	Sam Meehan (CERN)	Carla Bonifazi (UFRJ)	
Comm04	Physics Education	Randy Ruchti (Notre Dame)	Frossie Economou (LSST)	Sijbrand de Jong (Radboud)	
Comm05	Public Education & Outreach	Sarah Demers (Yale)	Kathryn Jepsen (SLAC)	Don Lincoln (FNAL/Notre Dame)	A. Muronga (Nelson Mandela)
Comm06	Public Policy and Government Engagement	Rob Fine (Rochester)	Louise Suter (FNAL)	Brajesh Choudhary (Delhi)	