

International Benchmarking Panel

The International Benchmarking Panel is a HEPAP Subpanel charged by the Department of Energy and the National Science Foundation to "develop a report providing further input on possible P5 implementation strategies, particularly in the unique international context of particle physics".

Mei Bai (SLAC), Marcela Carena (FNAL), Scott Dodelson (CMU), Dan Dwyer (LBL), Tova Holmes (UTK), Andy Lankford (UCI), Wim Leemans (DESY), Reina Maruyama (Yale), Sekazi Mtingwa (NRC), Tsuyoshi Nakaya (Kyoto), Brian Nord (FNAL), Ian Shipsey (Oxford), Stefan Soldner-Rembold (Manchester), Lindley Winslow (MIT), Bonnie Fleming (FNAL/UChicago, Co-Chair), Patricia McBride (FNAL, Co-chair), JoAnne Hewett (HEPAP Chair, ex-officio)

Particle Physics is Global

- The regions can together address the full breadth of the field's most urgent scientific questions each hosting unique world-class facilities at home and partnering in high-priority facilities hosted elsewhere.
 - Hosting world-class facilities and joining partnerships in facilities hosted elsewhere are both essential components of a continued global vision.

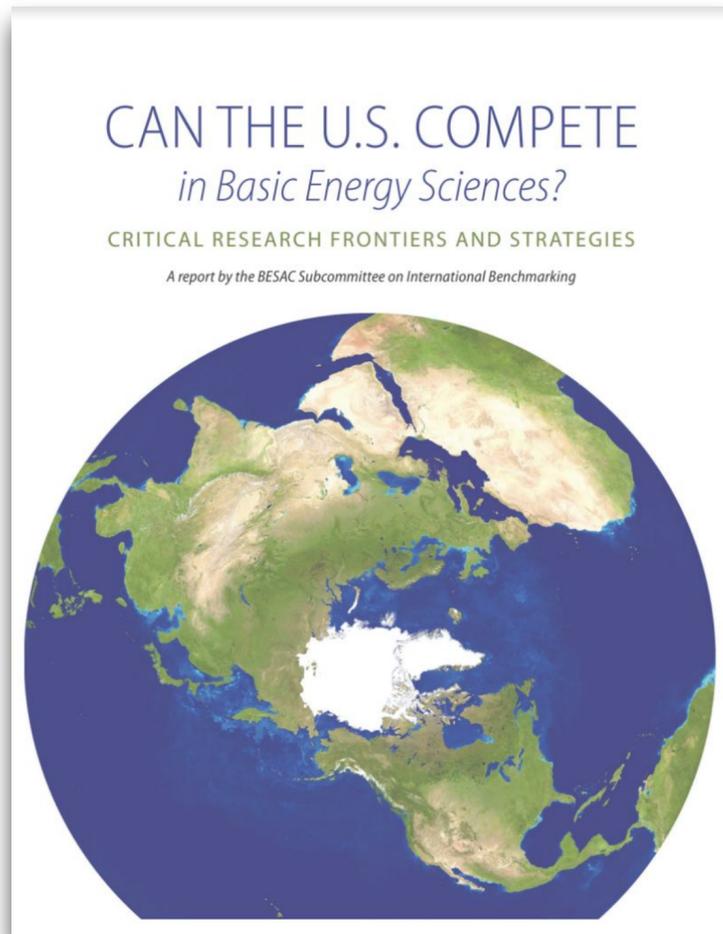


Working together to achieve scientific goals is our modus operandi

Our international collaborations inspire, made up of myriad individuals with diverse interests working together to achieve scientific goals

CMS has ~4300 scientists (including 800 PhD students), engineers and technicians from 41 countries and 190 institutes

From Ian Shipsey



The charge to HEPAP was motivated by the recent BES report on International Benchmarking

“In particular, basic scientific research, which is driven by the desire to understand fundamental principles, often leads to unexpected discoveries. These in turn provide the basis for innovation and technical developments: indeed, many of today’s most important technologies originated in U.S. basic research from decades past. Without continued investment in basic science today, future discoveries and technological innovation will languish.”

From the report by the BESAC Subcommittee on International Benchmarking

The flavor of the BESAC report leans more towards global competition.

Our charge incorporates the inherent international nature of the science that we do

Charge to the International
Benchmarking (IB) subpanel of
HEPAP



U.S. Department of Energy
and the
National Science Foundation



Dr. JoAnne Hewett
Chair, High Energy Physics Advisory Panel
Theory Group, MS 81
SLAC National Accelerator Laboratory
2575 Sand Hill Road
Menlo Park, California 94403

Dear Dr. Hewett:

We are grateful to the High Energy Physics Advisory Panel (HEPAP) for their many contributions to the development of the 2014 Particle Physics Project Prioritization Panel (“P5”) Report, which successfully laid out a compelling research program that employed world-leading facilities and exciting new capabilities. HEPAP’s 2019 review of P5 implementation demonstrated that many of the report’s recommendations are being realized and the community is making excellent progress on the P5 science drivers. As we approach again a community-led “Snowmass” process to consider the most exciting particle physics opportunities for the coming decades, we think it is timely to consider more closely the unique international context of particle physics, and how we can best position the U.S. program and its researchers for success in this evolving landscape.

A core tenet of the P5 Report is that particle physics is fundamentally a global enterprise. The close connections of U.S.-based researchers to major international facilities, as well as the many international scientists conducting their research in the U.S., speak to how the enterprise of particle physics is tightly interwoven across multiple borders and time zones. Today, the international particle physics community is larger and more diverse than ever before, expanding opportunities for collaboration and partnership.

Looking to the future, we want to ensure that the U.S. continues to be a leader in particle physics internationally and remains one of the best places to conduct research, as well as preserving its ability to collaborate effectively at leading facilities hosted elsewhere. We want to be the best partner we can be for the international scientific community.

To that end, we must develop and maintain world-leading capabilities in key technologies, especially particle accelerators and detectors, as well as high performance computing; and also provide compelling, inclusive, and equitable opportunities for all those who want to explore the secrets of the universe at their most fundamental level.

Therefore, the Department of Energy and the National Science Foundation request that HEPAP develop a report providing further input on possible P5 implementation strategies, particularly in the unique international context of particle physics noted above. Specifically, we ask HEPAP to address the following questions:

J. Stephen Binkley
Acting Director
Office of Science
U.S. Department of Energy

Sean L. Jones
Assistant Director
Directorate for Mathematical and
Physical Sciences
National Science Foundation

“it is timely to consider more closely the **unique international context of particle physics**, and how we can best position the U.S. program and its researchers for success in this evolving landscape”

“ensure that the U.S. **continues to be a leader in particle physics internationally** and remains one of the best places to conduct research, as well as **preserving its ability to collaborate effectively at leading facilities hosted elsewhere**. We want to be the best partner we can be for the international scientific community”

“**develop and maintain world-leading capabilities** in key technologies, especially particle accelerators and detectors, as well as high performance computing; and also provide compelling, inclusive, and equitable opportunities for all those who want to explore the secrets of the universe at their most fundamental level”

Charge questions

U.S. as a Partner of Choice

- How can the U.S. particle physics program maintain critical international cooperation in an increasingly competitive environment for both talent and resources? In areas where the U.S. is leading, how can we sustain our roles and attract the best international partners? In other areas, how can the U.S. build and maintain its reputation as a “partner of choice”? In general, are there barriers that can hinder our ability to form effective and enduring international partnerships?

Report Charge questions:

Leadership roles

- Identify key areas where the U.S. currently has, or could aspire to, leadership roles in High Energy Physics (HEP) via its unique or world-leading capabilities (i.e., advanced scientific facilities and tools), or leading scientific and technical resources, including highly trained personnel and supporting infrastructure. This may include emerging areas or opportunities that offer significant promise for leadership. To preserve and foster U.S. leadership roles within reasonable resource constraints, are there particular technical areas or capabilities that could be emphasized? Are there other technical resources and capabilities that could be leveraged in to achieve these goals, possibly through collaborations within and beyond the HEP community?

Report Charge questions:

Recruit and train the best talent

- How can programs and facilities be structured to attract and retain talented people? What are the barriers to successfully advancing careers of scientific and technical personnel in particle physics and related fields, and how can U.S. funding agencies address those barriers? A complete answer to these questions must address how we can ensure that we are recruiting, training, mentoring, and retaining the best talent from all over the world, including among traditionally underrepresented groups within the U.S.

Benchmarking is used to measure performance using a specific indicator (cost per unit of measure, productivity per unit of measure, cycle time of x per unit of measure or defects per unit of measure) resulting in a **metric of performance that is then compared to others.**

Wikipedia



How does this panel fit into the US planning process?

- A subpanel of HEPAP
- Builds on the Strategic Plan for U.S. Particle Physics in the 2014 P5 report.
- Provides input to the new P5 panel, but is NOT P5 rather is “providing further input on possible P5 implementation strategies, particularly in the unique international context of particle physics”

Timescale for report: Deliver the report to HEPAP in Spring 2023

Building for Discovery

Strategic Plan for U.S. Particle Physics in the Global Context

Executive Summary



Report of the Particle Physics Project Prioritization Panel (P5)

May 2014

The Panel

The Panel Members

International

- Members' expertise span across areas relevant for the 2014 P5 Science Drivers
 - Mei Bai (SLAC), Marcela Carena (FNAL), Scott Dodelson (CMU), Dan Dwyer (LBL), Tova Holmes (UTK), Tsuyoshi Nakaya (Kyoto), Andy Lankford (UCI), Wim Leemans (DESY), Reina Maruyama (Yale), Sekazi Mtingwa (NRC), Brian Nord (FNAL), Ian Shipsey (Oxford), Stefan Soldner-Rembold (Manchester), Lindley Winslow (MIT)
- Co-Chairs: Patricia McBride (FNAL), Bonnie Fleming (FNAL/UChicago)
- Ex-officio: JoAnne Hewett (SLAC)

Panel Organization

- The work is shared among 4 sub-committees:
 - Big experiments (LHC, DUNE, Cosmic) (Chair: Andy Lankford)
 - Small experiments/Instrumentation/Quantum/AI/ML (Chair: Ian Shipsey)
 - Accelerator program (Chair: Mei Bai)
 - Workforce (Chair: Sekazi Mtingwa)
- Aspects of Theoretical Research, throughout sub-committees

Panel Activities

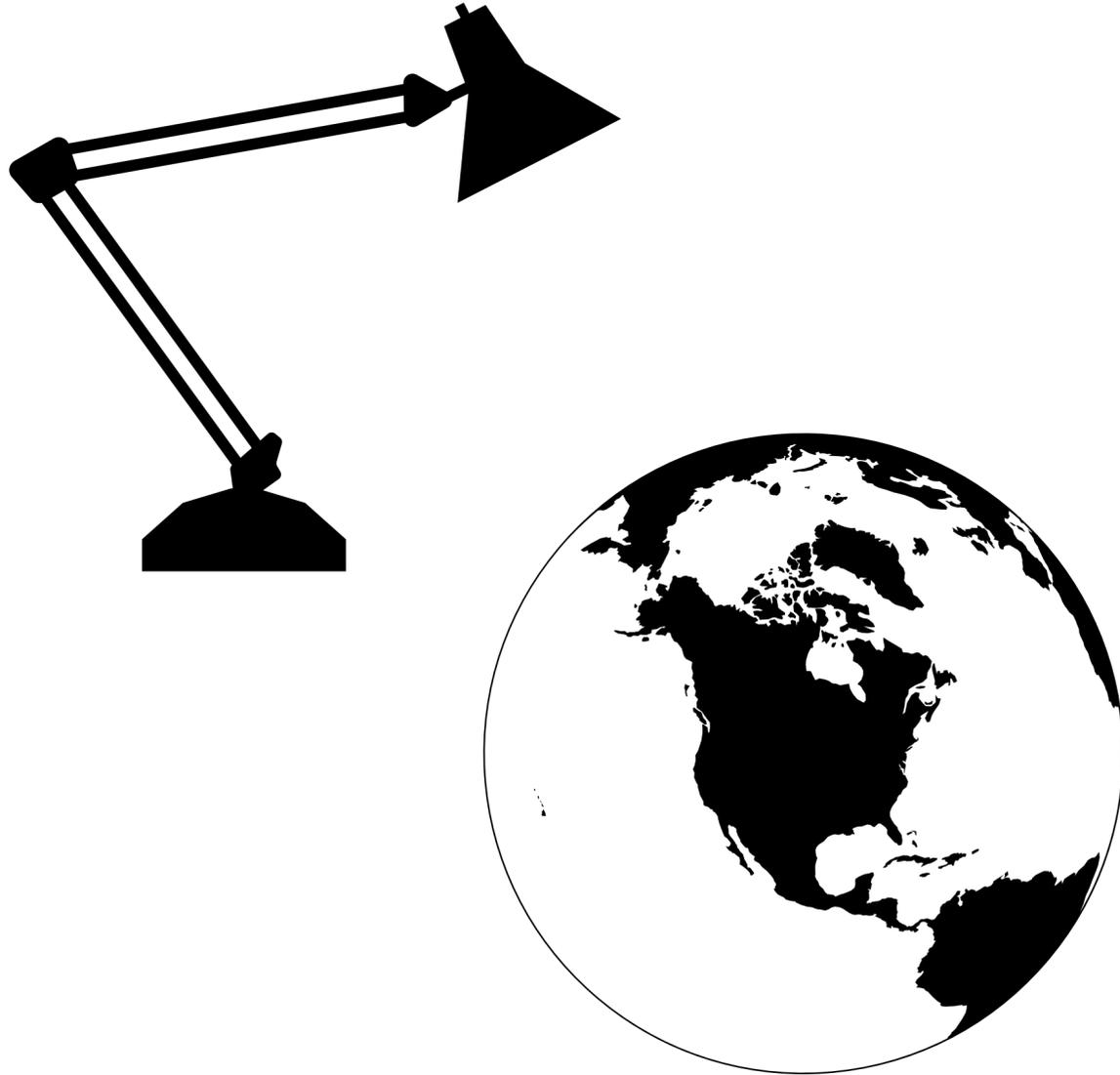
Data collection → bringing report together

- The subcommittees are completing a “data collection” phase, seeking input across all areas
 - Interviewing many members of the community
 - Collecting demographics
 - Community and Snowmass takeaways

We have a place to submit feedback through our [website](#).

Demographics

What do we know?



- [AIP Statistics](#)
- [NSF/NSB](#)
- Large Collaborations
- Statistics from the labs
- Universities
- International

Snowmass Town Hall



Lots of great feedback!

- Build on what has already come out of Snowmass
- Consider where we can “Benchmark” with comparisons to other countries/regions
- Get input from Early Career members of the community
- Attract and retain talent across all areas - particularly acute in theory
- Streamline processes to enable international colleagues to collaborate in the US
- Vibrant R&D programs in the US - coordinate internationally?

Outlooks from Snowmass

- “Particle physics is global. The evolving international context remains essential.” *L. Merminga*
 - *Theme: Collaborate and Compete!*
- The panel is working to develop a description of the international (global) nature of our field and to articulate actionable recommendations.
- International collaboration is an integral part of our field. To be an attractive international partner, we need a strong vibrant program, sufficient resources and a talented workforce.
- Let’s continue the spirit of Snowmass and work together to build a global vision leading to clear pathways to the best science.

Status of the Panel's work

- Launch of Panel → Mid June 2022, several remote meetings
- Regular subcommittee meetings and cross subcommittee meetings
- Town Hall at Snowmass July 23rd
- In person Subcommittee Chairs meeting → November 4-6

Final In Person Workshop: January 13-16

→ **Finalize main Themes, Recommendations, Organization and writing of the report**

→ January-March: Complete report writing

→ Spring 2023 HEPAP meeting: Deliver report

International Benchmarking Panel

The International Benchmarking Panel is a HEPAP Subpanel charged by the Department of Energy and the National Science Foundation to "develop a report providing further input on possible P5 implementation strategies, particularly in the unique international context of particle physics". A link to the charge and the specific questions the Panel is to consider can be found [here](#). The Panel will provide a report to HEPAP in the fall.

The Panel is comprised of the following experts across HEP:

Mei Bai (SLAC), Marcela Carena (FNAL), Scott Dodelson (CMU), Dan Dwyer (LBL), Tova Holmes (UTK), Andy Lankford (UCI), Wim Leemans (DESY), Sekazi Mtingwa (NRC), Tsuyoshi Nakaya (Kyoto), Brian Nord (FNAL), Ian Shipsey (Oxford), Stefan Soldner-Rembold (Manchester), Lindley Winslow (MIT), Bonnie Fleming (Yale, Co-Chair), Patricia McBride (FNAL, Co-chair), JoAnne Hewett (HEPAP Chair, ex-officio)

We welcome community feedback! Please reach out to anyone on the Panel to express your thoughts and views on our charge.

<https://sites.google.com/yale.edu/internationalbenchmarkingpanel/home>