

# Diversity, Equity and Inclusion in physics—lessons learned from the Snowmass process

Kétévi A. Assamagan



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@BrookhavenLab

# Snowmass Community Engagement

Activities in Snowmass 2021 were organized into 10 frontiers, one of which was Community Engagement (CEF)

CEF was further subdivided into 7 topical groups, namely

- Application and Industry
- Career pipeline and development
- **Diversity, Equity and Inclusion**
- Physics Education
- Public Education and Outreach
- Public Policy and Government Engagement
- Environmental and Societal Impacts

Each topical group had 2-4 co-conveners

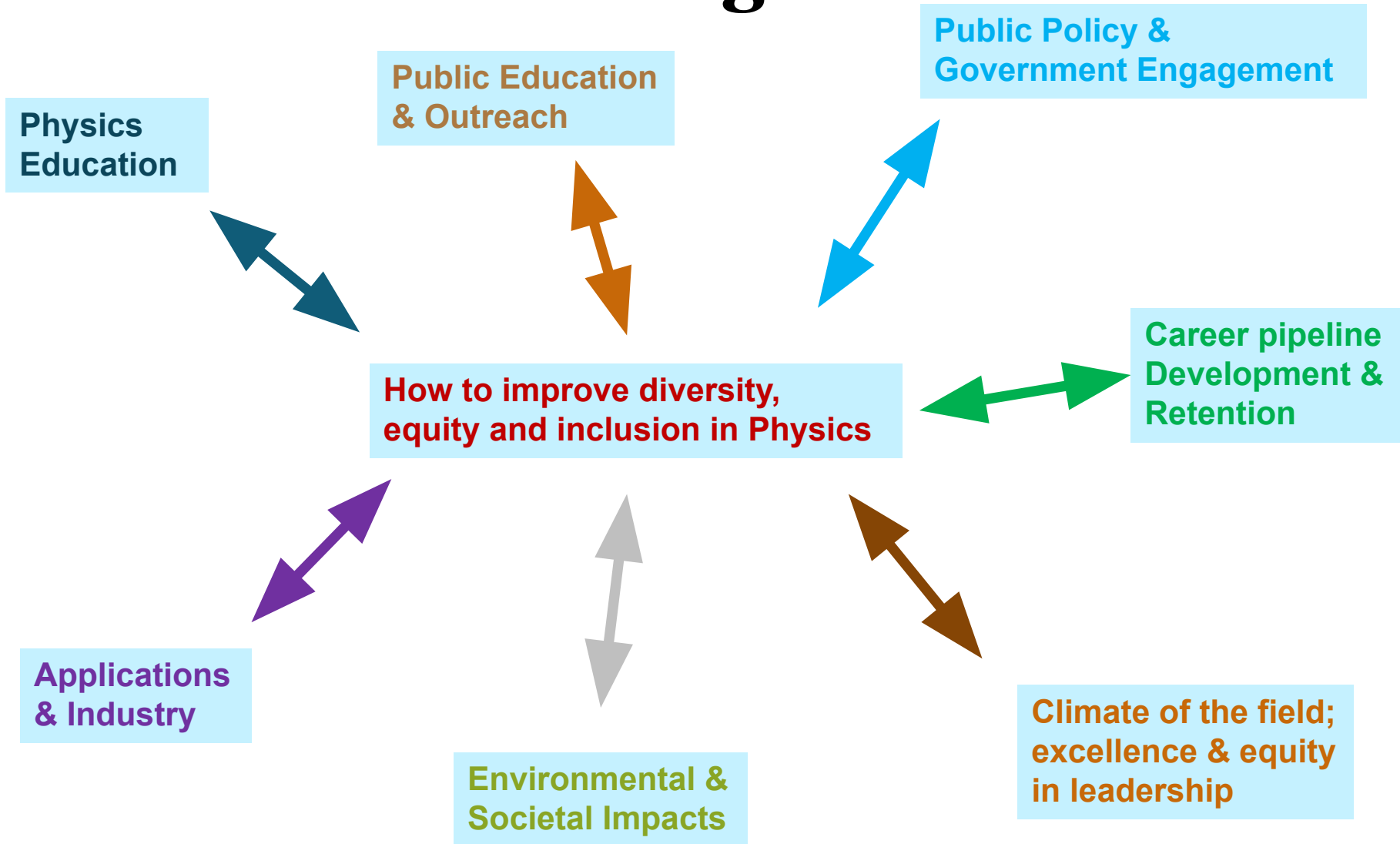
The conveners of CEF were Kétévi A. Assamagan (BNL) and Breese Quinn (University of Mississippi)

Kétévi was also appointed to the DPF Ethics Advisory Committee where he contributed to the development of the DPF code of conduct and core principle guidelines—this became more relevant considering the large community participation in Snowmass. Kétévi also served on the code of conduct response subcommittee to address violations

# Snowmass Community Engagement

- CEF received over 100 Letters of Interest (LOI)
- In addition, we organized regular meetings, town hall discussions, expert-panel discussions, workshops and surveys to collect further inputs from the community
- All the above were condensed into 35 contributed (white) papers developed within CEF
  - Details on the CEF white papers are available here, <https://snowmass21.org/submissions/cef>
- Furthermore, each topical group prepared a report of their activities
- Finally, at the frontier level, we also prepared a frontier report
- The white papers, topical group reports, and frontier report contain recommendations to address the issues studied within the scope of CEF.

# DEI is cross-cutting...



# CEF: Community Engagement Frontier

[Frontier Report](#)

[arXiv:2203.07328](#)

**CEF01: Applications & Industry**

**CEF02: Career pipeline & Development**

**CEF03: Diversity Equity & Inclusion**

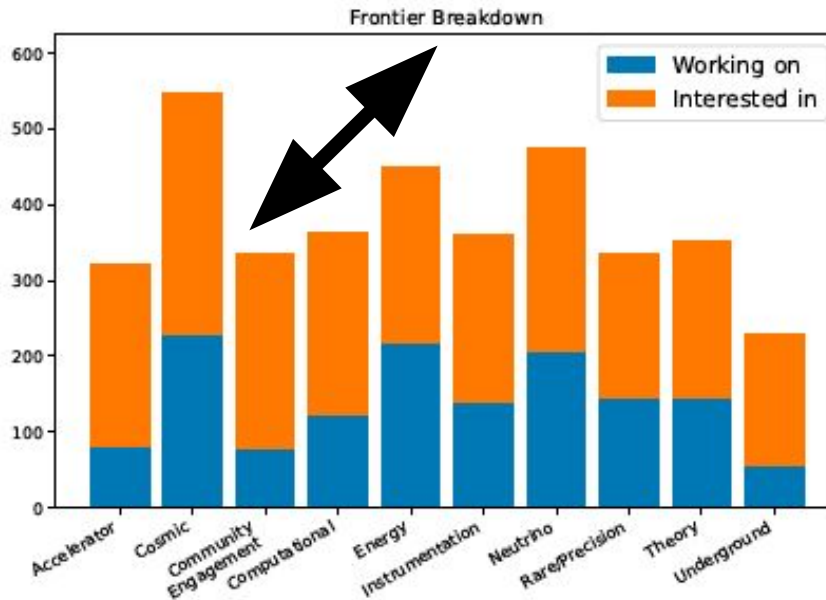
CEF Contributed Papers

**CEF07: Environmental & Societal Impacts**

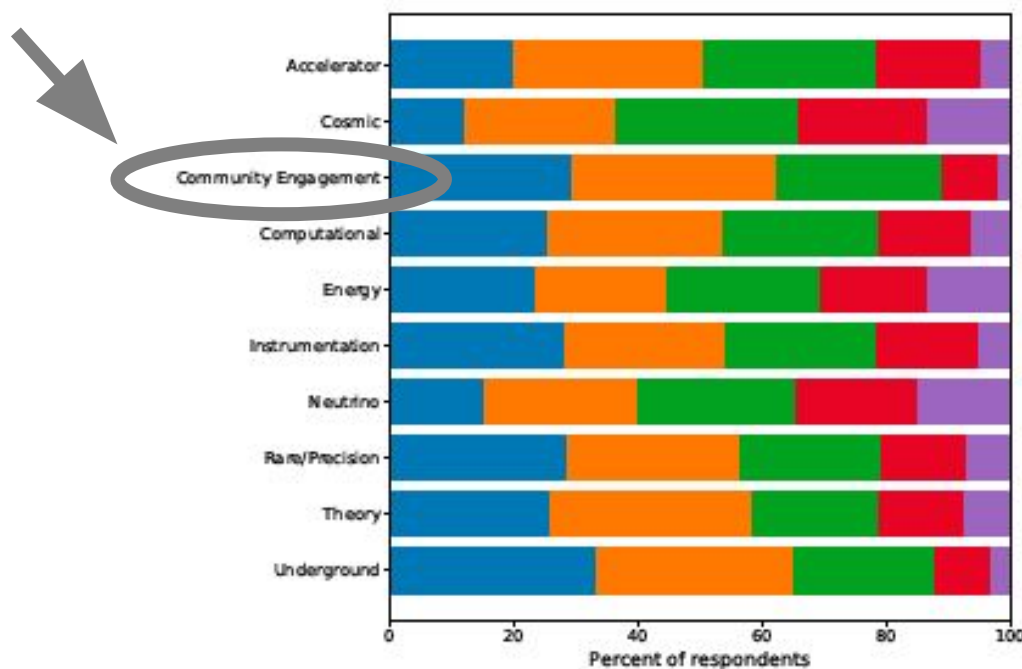
**CEF06: Public Policy & Government Engagement**

**CEF05: Public Education & Outreach**

**CEF04: Physics Education**

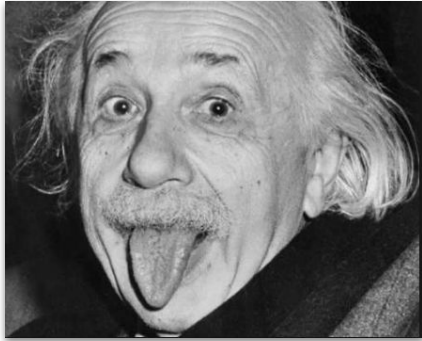


# How informed folks felt about future direction in CEF



Hopefully, the body of work done in CEF will offer clarity & direction

[arXiv:2203.07328](https://arxiv.org/abs/2203.07328)



What does a physicist look like?

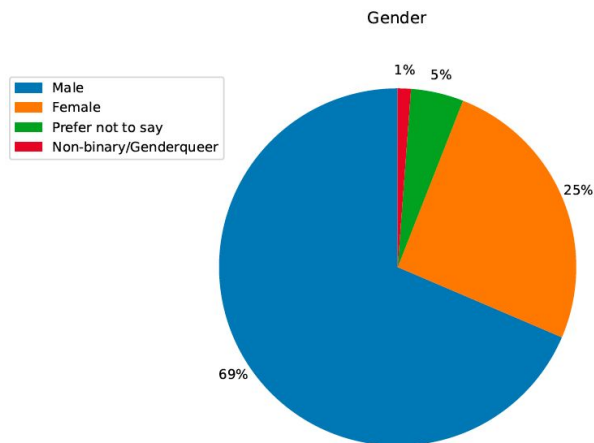


Draw me physicists  
Perception counts

”When we are talking about diversity, it is not a box to check. It is a reality that should be deeply felt and held and valued by all of us.” *Ava Marie DuVernay*

**Efforts are being made, although there is still a significant lack of diversity in our field, e.g. in 2019, 88 NP-supported students received their Ph.D.’s. Only 5% were Black or Hispanic, nearly a factor of 7 below representation in the US population**

# CSS participants

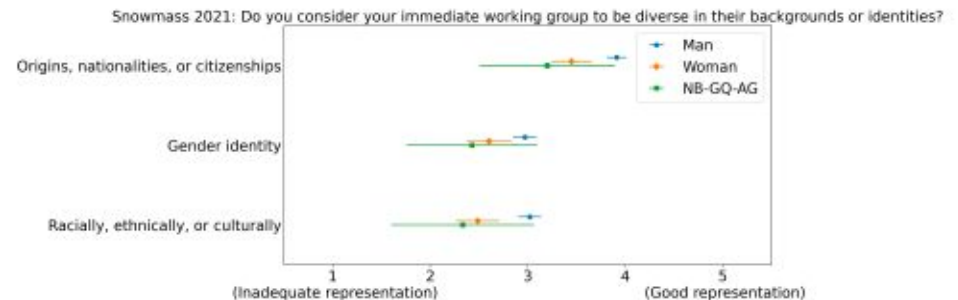


Why is that an issue?

”Achieving gender equality is about disrupting the status quo, not just negotiating it”  
Phumzile Mlambo-Ngcuka

# Men in HEP don't believe...

[arXiv:2203.07328](https://arxiv.org/abs/2203.07328)



There is far more under-representation than could be expected from meritocracy

[arXiv:2203.11523v2](https://arxiv.org/abs/2203.11523v2),

[arXiv:2203.11513v2](https://arxiv.org/abs/2203.11513v2)

[arXiv:2203.11518v2](https://arxiv.org/abs/2203.11518v2),

[rXiv:2203.11508v2](https://arxiv.org/abs/2203.11508v2)

[arXiv:2203.10393v1](https://arxiv.org/abs/2203.10393v1).

Why is that an issue?

## The Diversity-Innovation Paradox in Science



# Building a Culture of Equitable Access and Success for Marginalized Members in Today's Physics Community

<https://arxiv.org/pdf/2206.01849.pdf>

“DEIA in physics is a broad topic. Here, we focus on the experiences of marginalized communities and outline ways different stakeholders can build a culture of equitable access for the success of marginalized individuals. Specifically, we identify urgent needs in the following areas:

- (1) We need to acquire a better understanding of the status quo, both quantitatively and qualitatively, to assess the effectiveness of existing programs and to develop best practices;
- (2) We need to develop effective and inclusive ways to engage marginalized communities;
- (3) We need to create infrastructure to better support members of marginalized communities, on an academic, financial and personal level;
- (4) We need to create an environment conducive to equitable access and success by establishing community expectations, fostering inclusion in social interactions, and holding individuals and institutions accountable; and
- (5) We need to establish a mechanism to monitor progress in the area of DEIA, including the implementation of recommendations”

# DEI is not reverse discrimination

- It is an effort to transform institutions to ensure full participation
- Large and rich institutes to stop hoarding resources
- Move away from rewarding privilege
- Move towards cultivating potential and increasing mobility for all
- Build partnerships and enable systemic approaches to increasing educational access and success for all

We don't recommend strategies that "offer a narrow, at-the-margins response to exclusion, which deflects attention from more central problems with the current system and invites zero-sum reactions to [DEI] efforts" *Susan P. Sturm*

## From Diversity to Mobility and Full Participation

# Some DEI-related papers

- **"Lifestyle and personal wellness in particle physics research activities"**, [arXiv:2203.08631](https://arxiv.org/abs/2203.08631) [[physics.soc-ph](https://arxiv.org/archive/physics)] (pdf).
- **Climate of the Field: Snowmass 2021"**, [arXiv:2204.03713](https://arxiv.org/abs/2204.03713) [[physics.soc-ph](https://arxiv.org/archive/physics)]
- **"Accessibility in High Energy Physics: Lessons from the Snowmass Process"**, [arXiv:2203.08748](https://arxiv.org/abs/2203.08748) [[physics.ed-ph](https://arxiv.org/archive/physics)] (pdf).
- **"Why should the U.S. care about high energy physics in Africa and Latin America?"**, [arXiv:2203.10060](https://arxiv.org/abs/2203.10060) [[physics.soc-ph](https://arxiv.org/archive/physics)] (pdf).
- **"Policing and Gatekeeping in STEM"**, [arXiv:2203.11508](https://arxiv.org/abs/2203.11508) [[physics.soc-ph](https://arxiv.org/archive/physics)] (pdf).
- **"Power Dynamics in Physics"**, [arXiv:2203.11513](https://arxiv.org/abs/2203.11513) [[physics.soc-ph](https://arxiv.org/archive/physics)] (pdf).
- **"Informal Socialization in Physics Training"**, [arXiv:2203.11518](https://arxiv.org/abs/2203.11518) [[physics.soc-ph](https://arxiv.org/archive/physics)] (pdf).
- **"How to Read the Snowmass White Papers on Power Dynamics in Physics, Informal Socialization in Physics Training, and Policing and Gatekeeping in STEM"**, [arXiv:2203.11523](https://arxiv.org/abs/2203.11523) [[physics.soc-ph](https://arxiv.org/archive/physics)] (pdf).
- **"Building a Culture of Equitable Access and Success for Marginalized Members in Today's Particle Physics Community"**, [arXiv:2206.01849](https://arxiv.org/abs/2206.01849) [[physics.soc-ph](https://arxiv.org/archive/physics)] (pdf)
- **"The need for structural changes to create impactful public engagement in US particle physics"**, [arXiv:2203.08916](https://arxiv.org/abs/2203.08916) [[physics.soc-ph](https://arxiv.org/archive/physics)] (pdf).
- **"The Necessity of International Particle Physics Opportunities for American Education"**, [arXiv:2203.09336](https://arxiv.org/abs/2203.09336) [[physics.ed-ph](https://arxiv.org/archive/physics)] (pdf)
- **"Enhancing HEP research in predominantly undergraduate institutions and community colleges"**, [arXiv:2203.11662](https://arxiv.org/abs/2203.11662) [[physics.ed-ph](https://arxiv.org/archive/physics)]
- **"Facilitating Non-HEP Career Transition"**, [arXiv:2203.11665](https://arxiv.org/abs/2203.11665) [[physics.ed-ph](https://arxiv.org/archive/physics)]
- **"Broadening the scope of Education, Career and Open Science in HEP"**, [arXiv:2203.08809](https://arxiv.org/abs/2203.08809) [[physics.ed-ph](https://arxiv.org/archive/physics)]
- **"Snowmass 2021 Community Survey Report"**, [arXiv:2203.07328](https://arxiv.org/abs/2203.07328) [[hep-ex](https://arxiv.org/archive/hep)] (pdf)
- **"Particle Physics Outreach at Non-traditional Venues"**, [arXiv:2203.09585](https://arxiv.org/abs/2203.09585) [[physics.ed-ph](https://arxiv.org/archive/physics)] (pdf)

# The 11 canons of Community Engagement

**Report of the 2021 U.S. Community Study on the  
Future of Particle Physics (Snowmass 2021)  
Summary Chapter**  
**<https://arxiv.org/abs/2301.06581>**

**Community Engagement Frontier**  
**<https://arxiv.org/abs/2211.13210>**

**Diversity, Equity and Inclusion topical group report**  
**<https://arxiv.org/pdf/2209.12377.pdf>**

# (1) Climate of the field

## The climate of the field needs more work:

- The HEP community should improve strategic planning procedures, science workplace norms and culture, ethics and code of conduct guidelines and procedures to encourage adherence to and address violations thereof, and ultimately create an inclusive climate that ensures diversity and equity.
- Achieving these objectives will necessitate partnership with scholars, professionals, and other experts in several disciplines, including but not limited to anti-racism, critical race theory, and social science.
- Improving the climate also consists of implementing practices and programs for participation in HEP by non-R1 institutions.
- Many institutions have been making efforts in these areas; what is lacking is a coherent approach where best practices are shared and encouraged. The HEP community should create the framework where a coherent approach towards improving the climate can flourish.

## **(2) Work-life balance**

Research institutes and universities should do more to maintain the highest standard in work-life balance and mental health of staff. Proper training of staff should be developed to integrate productive work habits that encourage a balance between professional expectations and private affairs, and good mental health.

# **(3) Accessibility**

Funding agencies, laboratories, universities, professional societies and event organizers should do more to make events accessible to all community members, including those with disabilities. Planning for events should include, from the very beginning, effective coverage for accessibility.

# (4) Physics Education & Career Pipeline Development

- The lack of diversity in HEP has been linked to, not only the issue of climate, but also to the lack proper education and pipeline development. A diverse pool of candidates cannot be expected at the tertiary or higher levels of HEP engagement, in spite of best efforts and practices, if efforts were not made as far back as the K-12 and university undergraduate levels, to nurture the pipeline.
- It is therefore necessary for the HEP community to create effective programs to support pupils, teachers and students in their local communities, to develop and maintain interests in physics. Educational institutes should develop or expand programs to prepare students with the skills needed for HEP and related applications.
- Our field cannot absorb all the early career members that it produces; funding agencies, laboratories and universities should work together and create training, skills and career opportunities for transitions to, and success in, non-academic environments.



# (5) Technology Transfers

Technology transfers between HEP and industry are necessary for the socioeconomic impacts of HEP research and the integration of cutting-edge industrial developments to advance HEP goals.

- Funding agencies and laboratories should improve policies and programs to foster technology transfers and collaborative programs with industry on targeted technology development beneficial for HEP.
- Laboratories and universities should improve targeted partnerships on HEP projects.
- The HEP community should make efforts to maintain connections with networks of alumni to facilitate HEP–industry relations and HEP advocacy.

# (6) Public Policy & Government Engagement

- The HEP community should be proactive in providing resources to sustain and grow the annual HEP Congressional advocacy efforts.
- HEP groups should coordinate efforts by laboratories and universities in order to extend advocacy to the federal executive branch, state and local governments.
- Considering that HEP research draws international collaborations, HEP groups should improve concerted efforts toward international advocacy to facilitate the reach of HEP and, in particular, to support HEP communities of developing countries.
- HEP advocacy for non-HEP funding issues is highly encouraged and can be beneficial for HEP goals.

# (7) Physics Outreach

- Funding agencies, universities and research institutes should encourage staff to spend appropriate time on outreach, DEI and climate improvement efforts. Such time spent should be included favorably in staff evaluation, career progressions and grant evaluations.
- In designing outreach programs, it is important to understand the needs of the audience, include its members in the design of programming and pay attention to its interest – the HEP community should take a foundational approach to successful outreach by building lasting relationships with target communities. Successful outreach programs cannot be transactional with the target communities.

# (8) Environmental & Societal Impacts

- Laboratories, universities and research collaborations should work to improve environmental impacts of HEP activities, including the design, development and operation of HEP research facilities and detectors. Good community relations are important to integrate community needs and feedback in site selections, and subsequently, operation of HEP facilities.
- HEP communities should build synergistic collaborations with other communities to draw on a broader spectrum of funding sources for work on technologies that could benefit HEP.

# (9) Engagements with Emerging Countries

Engagement with emerging countries needs improvement for international diversity and pipeline development in HEP, and the global impact and visibility of HEP efforts.

- Universities, laboratories and HEP groups should improve and sustain international outreach, partnerships, schools, workshops, conferences, training, short-visits for research, and development of research consortia.
- Mechanisms should be developed to facilitate the participation of colleagues from developing countries.
- Large international research collaborations should improve efforts to facilitate the integration and participation of research groups from developing countries and support efforts to foster HEP in these countries.

# (10) Individual Participation in Community Engagement

- The aforementioned goals and suggestions for improvement will be beneficial to the individual HEP researchers in establishing a climate of inclusivity, diversity and equity that fosters scientific excellence.
- Furthermore, progress in these goals will improve the socioeconomic, societal and environmental impacts of HEP. In so doing, HEP as a whole will benefit from societal advocacy. It is therefore important for the HEP communities to encourage more participation in community engagement.
- In particular, during future Snowmass activities, the work of this frontier should not be relegated to a handful of community members.

# (11) Implementation & Progress Monitoring

How to implement the aforementioned goals and suggestions, and how to monitor progress, was hotly debated.

- It was generally agreed that, in its prioritization of projects, P5 could recommend, where relevant, implementation of the Community Engagement goals in project planning, development, maintenance and operation.
- Furthermore, the Division of Particles and Fields of the American Physical Society should establish a permanent Community Engagement Advocacy Committee. The charge of a such a committee would be to facilitate the community coordination of implementation, best-practice sharing, rewards, encouragements and progress monitoring and reporting.