**CEF Online Workshop**

**Friday, October 29, 2021**

**Short Summary provided below. Please, see individual presentations for detailed information, contacts and ways to get involved.**

1. **CEF Introduction (Kétévi A. Assamagan)**

In-person CEF workshop is scheduled on May 24-26, 2022 at University of California Irvine. Workshop will be hosted by Prof. Mu-Chun Chen, co-convener of the CEF D&I Topical Group. More information to come regarding registration, in-person vs. remote attendance etc. Request for workshop funding is pending with Steering Committee.

1. **Feedback from the Steering Committee (Priscilla Cushman)**

* Selected Strategic Goals summarized by the Snowmass 2013 report
  + Invest in the training of physicists to develop the most creative minds to generate new ideas in theory and experiment that advance science and benefit the broader society.
  + Establish a nationally coordinated communication, education and outreach effort, supported by a dedicated team, to convey the excitement and value of our field to others.
* There is a well-trodden path from Snowmass Report > P5 > Projects, but Community Engagement is not a project.
* Consider a special APS report (beyond the Snowmass Final Report) with specific action items.
* Explore how new HEP Public Engagement initiatives fit within the broader mission of APS. Create sustainable programs via collaboration.
* The work of Community Engagement is crucial to sustaining the rest of our plans. We need new physicists, new ideas, better training, a broad range of opportunities and a general populace that thinks we are worth funding.

1. **CEF7 — Environmental and Societal Impacts (Veronique Boisvert, Ken Bloom, Mike Headley)**

<https://snowmass21.org/community/impacts>

* The newest topical group in all of Snowmass launched by CEF leaders in summer 2021.
* “Examine the ways in which the US HEP program affects the environment and communities in which we do our work, and develop recommendations to improve our relationships in those areas.”
* Planned Contributed Papers:
  + “Impacts of Particle Physics laboratories on local communities” (ed: Mike Headley). Workshop to discuss this on 15th November.
  + “Carbon emissions from large future energy frontier projects” (eds: Véronique Boisvert, Ken Bloom). Workshop to discuss this on 9th November.
  + “AI and HEP: the Roles of Scientists in the ethical use of algorithms” (ed: Brian Nord, with Comp03). Team already in place.
* Join us. We are currently a bit longer on plans than people — it is not too late to get involved and have a significant impact in this area. With all due respect to the rest of Snowmass, topics in TG7 are literally matters of life and death. The recommendations we make can have an impact on how we can carry out the science that we love in a just and sustainable way.

1. **CEF6 — Government Engagement and Public Policy (Rob Fine, Louise Suter)**

<https://snowmass21.org/community/policy>

* This group covers all aspects of communication with
  + elected representatives at the federal, state and local level
  + officials at funding agencies, DOE, NSF
  + professional staff members who oversee particle physics-related budgets, such as staff members in the Office of Management and Budget, Office of Science and Technology Policy and related state organizations
* Since Snowmass 2013, community efforts in this area have been mostly through the annual DC advocacy trip, led by Fermilab, SLAC, and US LHC users groups, with input from DPF.
* We are focused on the future of these efforts:

● Are our current efforts working well?

● Are we efficient and effective at PP&GE (and how do we measure these)?

● Does our community have enough PP&GE tools/support?

● Is there enough PP&GE inreach?

● What areas need improving or expanding?

● What do we not currently do which we should be implemented?

* Current working groups:
  + Congressional advocacy for HEP funding
  + Congressional advocacy for HEP impactful issues
  + Non-congressional government engagement
  + HEP advocacy training and inreach
* All groups need more people and resources. Especially people to perform research and to lead the writing of contributed papers.
* How you can get involved?

● Join working group meetings/help draft white paper outlines. Time-scale: Now until early next year. Higher-level input, more influence on the direction our efforts will take. Please contact us if our current meeting time is inaccessible to you

● Volunteer for self-contained research task. Time-scale: Now until Mar/Apr 2022. Small- and medium-sized tasks available (with many more to come!). Good contribution to make asynchronously. Please contact us if you’re interested!

● Volunteer to help flesh out the outlines to prose. Time-scale: Jan-Mar 2022. Lower-level input, less influence on the direction of the overall effort. Well-defined tasks with well-defined timeline.

1. **CEF5 — Public Education and Outreach (Sarah Demers, Kathryn Jepsen, Don Lincoln, Azwinndini Muronga)**

<https://snowmass21.org/community/outreach>

* Engagement Survey Results (received approx. 280 responses).
* Topical Meetings held:

• Coordination of collaborations using cosmic ray physics in public engagement, from smart phones to distributed detector arrays

• In-depth dive into Art-Science collaborations ( residencies, sculpture, music, dance; discussion of best-practices for partnerships)

• APS President Jim Gates discussed his work in education with the group

• We plan additional interactions with APS and funding agencies via invitations to discussion in meetings

• We have been through a strategic planning workshop, led by Kathryn, to help focus us on our goals and identify strategies to realize them

* Contributed paper: Structural changes for public engagement with particle physics and particle physics communication. Outline:

• Introduction/Motivation

• Within Particle Physics Community (Research Groups, Experimental Collaborations, Conferences)

• Within Institutions (Colleges/Universities - Department/School/Division, College/University Leadership; National Labs - Communications & Education Offices, Lab Leadership; Government - Office of Science and Technology Policy (OSTP), Congress; Funding Agencies – DOE, NSF, Foundations; Professional Societies -

AAAS, APS, DPF)

* We have an outline and initial rough text for our “Structural Changes” contributed paper. What are we missing?
* We have interests in additional contributed papers (modes of public engagement, best practices for reaching people from groups that are under-represented in physics).

1. **CEF4 — Physics Education (Randal Ruchti, Sudhir Malik, Sijbrand de Jong**

<https://snowmass21.org/community/education>

* List of Contributed Papers:

1. Career/Education

Meeting the Challenges and the Opportunities - Educational Preparation and Training for Particle Physics and Related Research and Technical Careers.

Interested in discussion of Masters Degrees as a means of expanding career options in high energy physics and other scientific and technical domains and broadening participation. Focus area: existing masters programs and their motivation, what works, what communities are served, career impact and new ideas.

1. General Education – K/12 and Up

Rethinking Science and Mathematics in Secondary Education - Bridging of K/12 Education and Research Science.

1. Particle Physics Specific Education

Restructuring the Particle Physics Curriculum in Higher Education to meet Twenty-first Century Challenges.

Survey and Forum. Main topic: What are the missing elements in current particle physics curriculums and how to improve it in the next decade?

1. Global Software Issues and HEP

Recasting Software and Computing Education to Drive Experimental and Theoretical Advances in Particle Physics.

Interested in discussion of interconnections and models of collaboration of between high energy physics and experts in Data Science. Focus areas: existing programs and their motivation, what works, what communities are served, career impacts, sustainability of programs.

1. Public Engagement and International Connections

Particle Physics Education Without Boundaries. Review of International Engagement (Programs/Collaborations e.g. QuarkNet IPPOG, CERN REU, RET; Focus on value for U.S. high school students, undergraduates, teachers)

Need examples from the community:

* + - Do you know of additional REU/RET programs that offer international experiences?
    - Do you know of other similar teacher and student programs?

We want to include these if we can. Please share this information!

1. **CEF3 — Diversity and Inclusion (Mu-Chun Chen, Carla Bonifazi, Johan Bonilla, Cindy Lin, Kétévi A. Assamagan)**

<https://snowmass21.org/community/diversity>

* Town Halls were held throughout 2020 and 2021 to support community. Also helped with identifying potential authors (beyond the original submitters), structure of the topics, content and resources for each topic. Need to document observations and suggestions from each Town Hall dedicated to demographics groups. Need person power to manage ‘study groups’.
* List of Contributed Papers:
  + Physics in Developing Nations (Lead: Kétévi A. Assamagan)
  + Accessibility (Lead: Cindy Lin, Johan Bonilla)
  + Climate of the Field (SECDEI-led: Erin Hansen, Erica Smith)
  + Lifestyle/Personal Wellness (Lead: Carla Bonifazi)
  + Marginalized Communities (Lead: Mu-Chun Chen)
  + Meta Snowmass Review (Lead TBD)
* Augmented REU LOI is included in several Contributed Papers. Target Problem: REUs good program, but suffers from same inequalities as general physics research. How can we ensure the program best supports the target demographics?
* All LOI authors have been contacted, many responded and intend to contribute to the CPs.
* Next steps: set up slack channels for each CP, organize CP meetings and start planning the writing process. Please contact us if you are interested to be part of the efforts!

1. **CEF2 — Career Pipeline and Development (Aneliya Karadzhinova-Ferrer, Julie Hogan, Sudhir Malik)**

<https://snowmass21.org/community/career>

* We are in HEP for the love of science, career in academics or use skills learnt to get a job outside HEP
* Career Pipelines and Development (CP&D), therefore, directly connects with almost every CEF TG and Frontier (especially Computational and Snowmass Young)
* Identify, encourage and promote skill developments of Physics graduates, Young researchers
  + Promote skill sets geared towards non-academic career
* Identify and promote careers and employment opportunities
  + HEP and non-HEP Career, Networking with Alumni, Funding strategies, Mentoring
* Encourage placements based on scientific majors and skills (Abilities ---> Skills ---> Career )
* Promote skill sets geared towards non-academic career
* Synergy with other Topical groups in CEF for vision for development of Career paths and Opportunities
* List of Contributed Papers:
  + CP1 - HEP research at non-R1
  + CP2 - Tackling Diversity and Inclusiveness in HEP
  + CP3 - Facilitating Non-HEP Career Transition

1. **CEF1 — Applications & Industry (Farah Fahim, Alex Murokh, Koji Yoshimura)**

<https://snowmass21.org/community/applications>

* List of Contributed Papers:
  + Engaging Scaleups (Lead: Ash Ravikumar, CERN)
  + Tech transfer from National Labs (Lead: Mauricio Suarez, Fermilab)
  + Application-driven engagement with universities leveraging synergies with other funding agencies (Lead: Jim Hoff, Fermilab, Seda Memik, Northwestern University)
    - Co-development with other applications (Extreme electronics in DARPA and DOE overlap, both HEP and industry applications e.g. Smart sensors)
    - University Groups (Especially suited for co-developments since they have direct access to all funding agencies; Involving university groups beyond Physics to be involved)
  + Big Industry engagement to benefit HEP: Microelectronics Support from large CAD companies (Lead: Shaorui Li)
    - Direct feedback from all CAD tool providers
    - Looking at a solution similar to DARPA toolbox
    - Low cost, volume licenses with support
    - Negotiate T&Cs with DOE
    - Contract directly with National Lab
    - University collaboration with NL should automatically be covered based on the NL contract
  + Nurturing the Industrial Accelerator Technology Base in the US (Lead: Alan Todd)
    - The purpose of this WP is to discuss the importance of having a world-class domestic industrial vendors base, capable of supporting the needs of the accelerator facilities, and necessary steps to support and develop such base in the US.
  + FLASH Radiation Therapy (Lead: Reihard Schulte)
    - The purpose of this WP is to discuss challenges and opportunities in the emerging field of FLASH radiation therapy (FLASH-RT).

1. **Summary and Conclusions (Kétévi A. Assamagan)**

* Contributed papers topics are defined, but are currently in various stages of development. Additional ideas/suggestions may be considered, provided suggestions/ideas are accompanied with additional person-power.
* More community participation is needed.
  + Contributions to flesh out targeted topics of limited scopes and durations
  + Please contact topical groups conveners or contributed paper leaders for details
* Big question
  + Do we risk dropping some contributed papers in case community participation does not improve?
  + Consider de-scoping, but make sure to record all un-covered topics under topical group reports and frontier reports.