



Division of Particles & Fields



Diversity, Equity, and Inclusion at Snowmass 2021

Overview of 12 Contributed Papers and Reports within DEI Group of the APS HEPA Strategy and Planning Exercise

On behalf of CEF-DEI Group Co-Convenors:

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Prioritization Process for US HEPA

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- 19-day prioritization workshop in Snowmass, CO, USA
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- European Strategy for Particle Physics — Since 2012
- Latin American Strategy Forum for Research and Innovation — Since 2019
- African Strategy for Fundamental and Applied Physics — Since 2020

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Snowmass 2021(22) → >1000 contributors around the globe, >500 CPs

- Timeline extended by COVID — see scientific program ([link](#))
- In-person summer study conference: July 17-27, 2022 in Seattle, WA, USA
- New: Community Engagement Frontier

Frontiers of Snowmass 2021(22)

Energy Frontier
(EF)

Instrumentation Frontier
(IF)

Theory Frontier
(TF)

Community Frontier
(CEF)

Neutrino Frontier
(NF)

Cosmic Frontier
(CF)

Computational Frontier
(CompF)

Accelerator Science
and Technology
(AF)

Underground Facilities
and Infrastructure
(UF)

Rare Processes
and Precision
(RF)

CEF3
Diversity
&
Inclusion

CEF2
Career Pipeline
&
Development

CEF1
Applications
&
Industry

CEF4
Physics Education

Community Engagement Frontier

CEF5
Public Education
&
Outreach

CEF6
Public Policy
&
Government Engagement

CEF7
Environmental
&
Societal Impacts

Added Summer 2021

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 - **Tools, policy, and expectations** to provide a safe environment for all
 - **Recognize+Address institutional barriers** in department, institutes, society
 - **Changes of perspective/priorities** at an individual and collective level

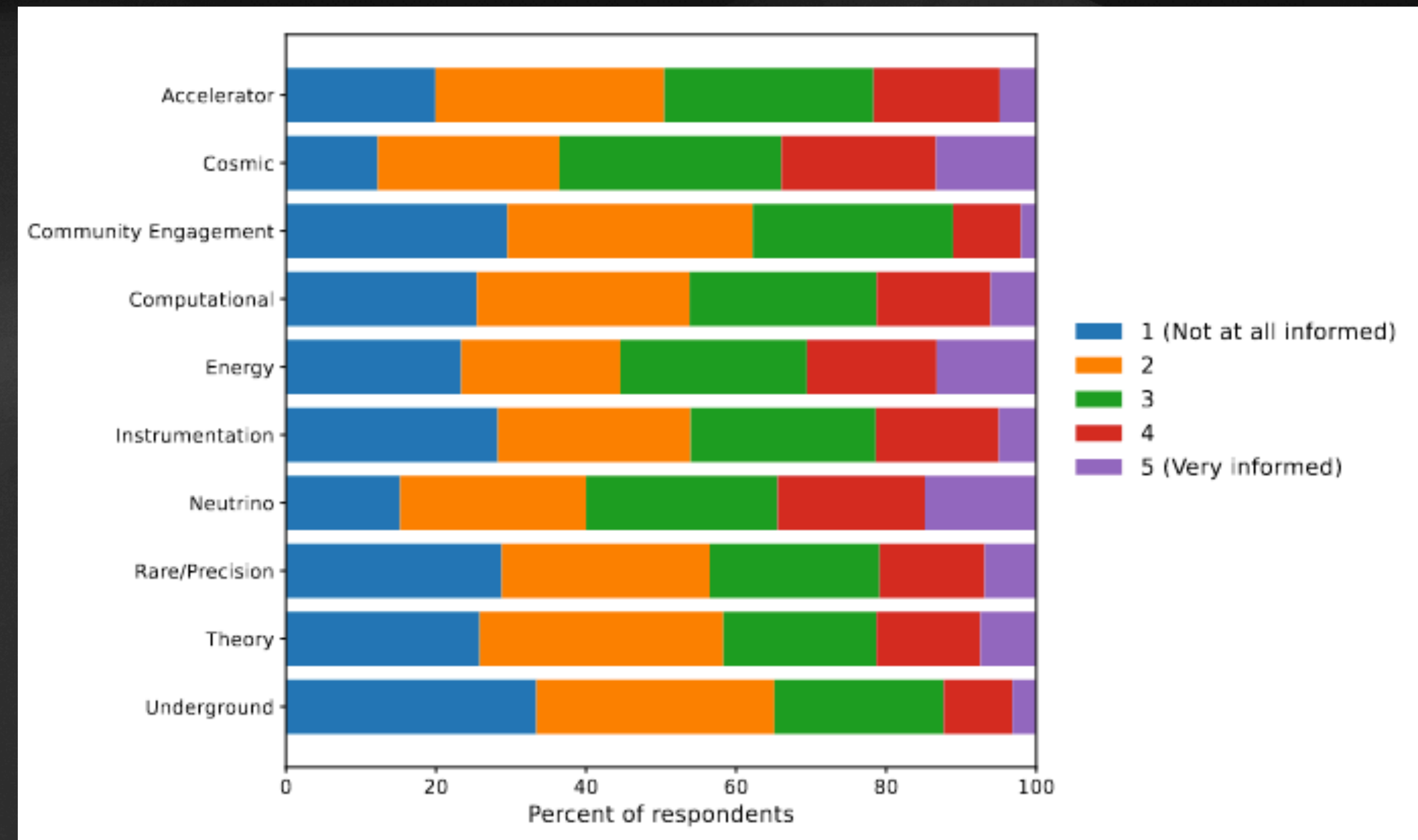
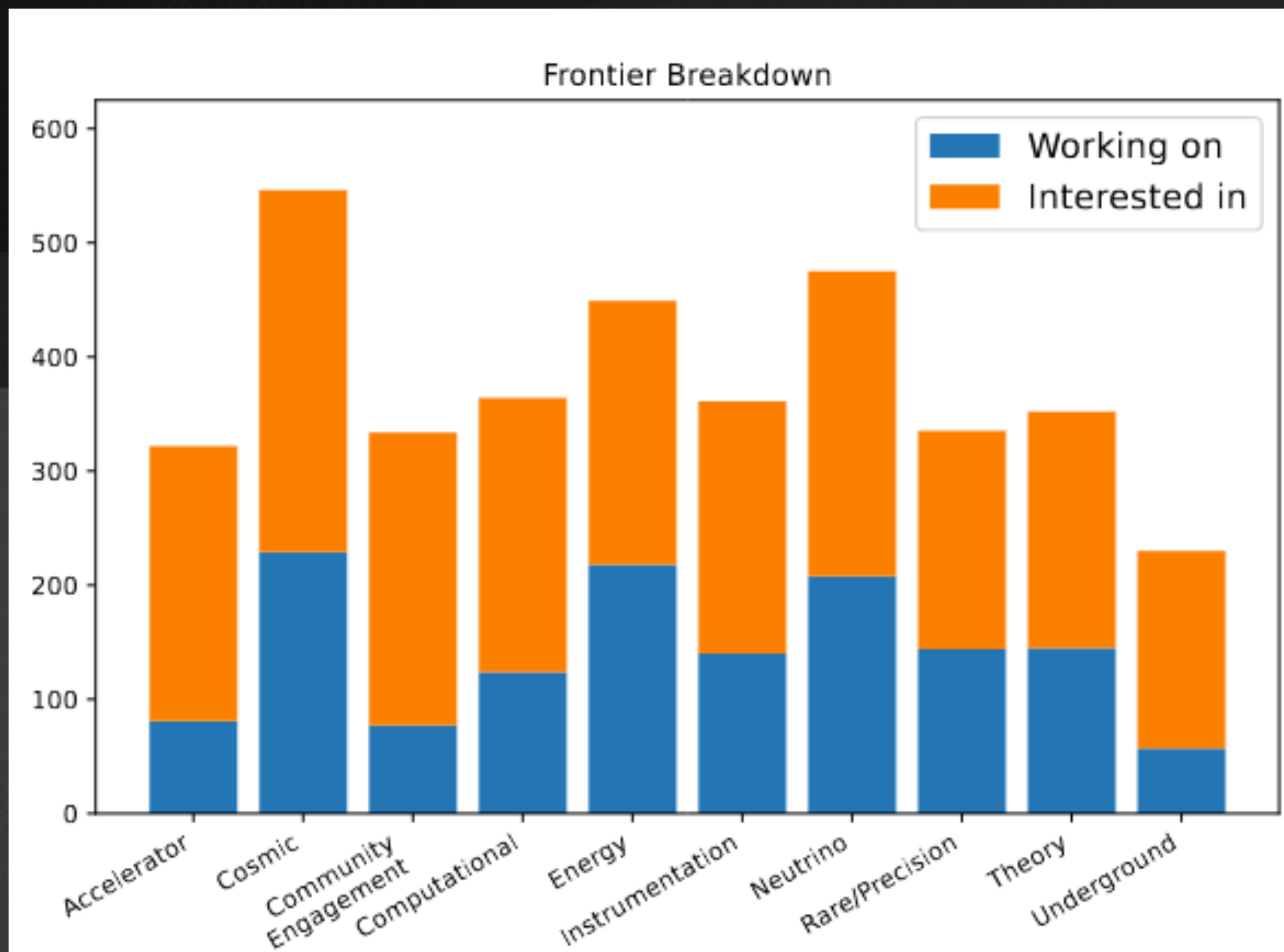
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 - See Snowmass Survey and Climate of the Field Contributed (White) Papers
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 - **Changes of perspective/priorities** at an individual and collective level
- What can we do about it?
 - Past: **Validate** colleagues' experiences, personal and inherited
 - Present: Listen, support/champion, and **be humble**
 - Future: **Actively Prioritize** DEI skills and deficiencies

Recommendations in each CP, Topical Group and Frontier reports

Snowmass Community Survey

[arXiv:2203.07328 \[hep-ex\]](https://arxiv.org/abs/2203.07328)



In Search of Excellence and Equity in Physics

[arXiv:2203.10393 \[physics.soc-ph\]](https://arxiv.org/abs/2203.10393)

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- Reality: intentional and unconscious biases prevent diversification

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- URMs draw new relations between ideas and concepts, but their novel contributions are discounted and less likely to earn them academic positions
- Cross-departmental research, analyzing ~1.2M US PhDs between 1977-2015

The Diversity-Innovation
Paradox in Science
Hofstra et al

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Inequity and injustice costs human and financial capital

- Private sector recognizes job stress costs \$300B/120k excess deaths per year,
- When will academia catch up with reality?

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Dying for a Paycheck (Book)
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EXTENSIVE resources and research cited in CP → We need to reprioritize and do better

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Climate of the Field

[arXiv:2204.03713 \[physics.soc-ph\]](#)

Issues Addressed:

- What formal policies exist in our field?
- What is the effectiveness of current policies?
- What can be done to improve policy effectiveness?

Systems of Oppression Thrive Today in HEPA

- MANY reports on varying scopes/scales
- Code of Conduct helps, but culture needs change

Information Sharing for Community Education

- Anecdotes and Experiences
- Develop professional relationships w/ DEI and social science experts (and compensate!)

Snowmass2021 CEF03 Climate of the Field	
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Identifying and Addressing Mechanisms of Oppression in HEPA

HOW TO READ THE SNOWMASS WHITE PAPERS

on

Power Dynamics in Physics

Informal Socialization in Physics Training

and

Policing and Gatekeeping in STEM

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EXECUTIVE SUMMARY

The purpose of this white paper is to describe how unfair power dynamics related to various aspects of identity—race, gender identity, gender expression, sexual orientation, and ability status—operate in physics settings and offer concrete steps that one can take to make our discipline more equitable and just.

Power Plays

Given the nature and history of racism, all white people have been socialized to hold a number of racist beliefs yet spend a considerable amount of time attempting to distance themselves from this fact. The result is racial harm done unto BIPOC people on a daily basis; their accounts of this harm are routinely dismissed because of the sincere belief that intention matters more than impact, and that “nice” people cannot be racist.

Comfortable with Oppression. Yet how nice can a person really be if they are comfortable with oppression? The evidence of oppression in all forms is abundant, yet white people remain surprised every time an account of racism or racial violence is brought to their attention. There are incentives to not knowing the true extent of oppression in the United States, and remaining comfortable, blissfully ignorant, is just one example.

Attempts to Stand Straight in a Crooked Room. Intersectionality methodology guides our understanding of the experiences of BIPOC women and allows us to see the different oppressions that they must navigate despite our society’s tendency to obscure it.

Recommendations

This paper concludes with several recommendations for ways that readers might apply the topics addressed herein. The first—to observe and learn about power dynamics and movement-building—will require you to see new dynamics with new eyes, even in contexts you previously believed were quite familiar. Equally challenging is the suggestion to examine your own values, and whether/how they align with those around you.

Finally, we offer a number of ideas how readers might use their power to disrupt oppressive structures, and re-imagine a new landscape. To make true and lasting change, both existing tools, and new tools/skills must be brought to bear. The challenge must also be met with a sense of urgency and a commitment to our future selves. Snowmass 2031 will arrive whether we make improvements or not. The question is, “How will we spend the intervening years?”

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Socialization and Personal Agency

The common conceptualization of mentoring is too broad to truly improve the experience and increase the success of novice scientists. Protégés will benefit much more if they take time to reflect and identify their needs before selecting a group of mentors, rather than relying solely on one person for support. This self-reflection also allows novice scientists to better understand what they are looking for, and perhaps also what to avoid so that they have the best experience possible.

Pitfalls and Potholes

Far too often, novice BIPOC scientists do not find a support network that is strong enough to counter the racism and isolation they face. There are little to no structures in place to prevent this—finding the right network is up to chance, and those who are not lucky often leave physics or STEM entirely. On the other hand, sometimes BIPOC women will find that they are being embraced by their physics community but for all the wrong reasons, and for only a fleeting time. The transition from pet to threat takes a toll both emotionally and professionally, and often leads to a difficult choice between career progression in a toxic environment, or starting over someplace safe.

Lessons Learned

Race matters in all settings, and claims of objectivity in physics are more of a dream than reality. Established physicists, particularly those in positions of power related to hiring and admissions, must understand how race functions in meritocracy, so that they may make more equitable decisions. The work continues as new hires and new students enter an institution and confront its culture. While a toxic culture and racism cannot be resolved overnight, faculty can begin to communicate nonverbal signs of value to their students and mentees immediately.

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The purpose of this white paper is to lay out the impacts of policing and gatekeeping in STEM, illustrated with lived experiences of scientists of color who are achieving despite the daunting challenges they face.

Policing

People around the world were impacted by the extrajudicial murders of Ahmaud Arbery, Breonna Taylor, and George Floyd. The effect on black people, including black scientists, was profound. In this paper, we described direct experiences black scientists have had with policing, as well as the trauma black scientists experience each time a murder like this is reported. This suffering is compounded when colleagues and peers seem oblivious and unaffected, leaving black scientists further isolated in an already unwelcoming environment.

Gatekeeping

In practice, gatekeeping comprises a set of behaviors, practices, and traditions, backed up by individual and organizational power to guard the boundaries of the discipline. Unfortunately, many people who bear the brunt of systemic oppression, receive multiple messages that they do NOT belong. For some, these accumulate to push them firmly outside of the boundaries, and they leave.

Even when gatekeeping fails to achieve its ultimate goal, smaller encounters exact time and emotional labor from the targets of oppression, reducing the time and energy they have available for their scientific work. Further, biases that impact how scientists efforts are judged have led to exclusions from opportunities and funding, which lead to further losses.

Comfort and Safety

We invite readers to wrestle with the difference between feeling unsafe and actually being unsafe. Using the experiences of real people, we describe productive enactments of this tension, and reveal the benefits of accepting this struggle as ongoing and endless.

Take-Aways

The paper concludes with an account of how even a well-intentioned, self-described social activist can cause harm, contrasted against someone working daily to create an inclusive environment for everyone to work and learn.

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Attempts to Stand Straight in a Crooked Room. Intersectionality methodology guides our understanding of the experiences of BIPOC women and allows us to see the different oppressions that they must navigate despite our society’s tendency to obscure it.

Recommendations
This paper concludes with several recommendations for ways that readers might apply the topics addressed herein. The first—to observe and learn about power dynamics and movement-building—will require you to see new dynamics with new eyes, even in contexts you previously believed were quite familiar. Equally challenging is the suggestion to examine your own values, and whether/how they align with those around you.

Finally, we offer a number of ideas how readers might use their power to disrupt oppressive structures, and re-imagine a new landscape. To make true and lasting change, both existing tools, and new tools/skills must be brought to bear. The challenge must also be met with a sense of urgency and a commitment to our future selves. Snowmass 2031 will arrive whether we make improvements or not. The question is, “How will we spend the intervening years?”

EXECUTIVE SUMMARY
This paper addresses issues related to the process of informal socialization into physics, particularly for senior graduate students and postdoctoral scholars. Many physicists’ careers are built on the relationships they have and develop during these critical years.

Socialization and Personal Agency
The common conceptualization of mentoring is too broad to truly improve the experience and increase the success of novice scientists. Protégés will benefit much more if they take time to reflect and identify their needs before selecting a group of mentors, rather than relying solely on one person for support. This self-reflection also allows novice scientists to better understand what they are looking for, and perhaps also what to avoid so that they have the best experience possible.

Pitfalls and Potholes
Far too often, novice BIPOC scientists do not find a support network that is strong enough to counter the racism and isolation they face. There are little to no structures in place to prevent this—finding the right network is up to chance, and those who are not lucky often leave physics or STEM entirely. On the other hand, sometimes BIPOC women will find that they are being embraced by their physics community but for all the wrong reasons, and for only a fleeting time. The transition from pet to threat takes a toll both emotionally and professionally, and often leads to a difficult choice between career progression in a toxic environment, or starting over someplace safe.

Lessons Learned
Race matters in all settings, and claims of objectivity in physics are more of a dream than reality. Established physicists, particularly those in positions of power related to hiring and admissions, must understand how race functions in meritocracy, so that they may make more equitable decisions. The work continues as new hires and new students enter an institution and confront its culture. While a toxic culture and racism cannot be resolved overnight, faculty can begin to communicate nonverbal signs of value to their students and mentees immediately.

EXECUTIVE SUMMARY
The purpose of this white paper is to lay out the impacts of policing and gatekeeping in STEM, illustrated with lived experiences of scientists of color who are achieving despite the daunting challenges they face.

Policing
People around the world were impacted by the extrajudicial murders of Ahmaud Arbery, Breonna Taylor, and George Floyd. The effect on black people, including black scientists, was profound. In this paper, we described direct experiences black scientists have had with policing, as well as the trauma black scientists experience each time a murder like this is reported. This suffering is compounded when colleagues and peers seem oblivious and unaffected, leaving black scientists further isolated in an already unwelcoming environment.

Gatekeeping
In practice, gatekeeping comprises a set of behaviors, practices, and traditions, backed up by individual and organizational power to guard the boundaries of the discipline. Unfortunately, many people who bear the brunt of systemic oppression, receive multiple messages that they do NOT belong. For some, these accumulate to push them firmly outside of the boundaries, and they leave.

Even when gatekeeping fails to achieve its ultimate goal, smaller encounters exact time and emotional labor from the targets of oppression, reducing the time and energy they have available for their scientific work. Further, biases that impact how scientists efforts are judged have led to exclusions from opportunities and funding, which lead to further losses.

Comfort and Safety
We invite readers to wrestle with the difference between feeling unsafe and actually being unsafe. Using the experiences of real people, we describe productive enactments of this tension, and reveal the benefits of accepting this struggle as ongoing and endless.

Take-Aways
The paper concludes with an account of how even a well-intentioned, self-described social activist can cause harm, contrasted against someone working daily to create an inclusive environment for everyone to work and learn.

Marginalized Communities in HEPA

arXiv:2206.01849 [physics.soc-ph]

5 Major Areas Needing to be Addressed:

- **Acquire a better understanding of the status quo**, both quantitatively and qualitatively, to assess the effectiveness of existing programs and to develop best practices
- Develop effective and inclusive ways to **engage marginalized communities**
- **Create infrastructure** to better support members of marginalized communities, on an academic, financial and personal level
- **Create an environment conducive to equitable access and success** by establishing community expectations, fostering inclusion in social interactions, and holding individuals and institutions accountable
- **Establish a mechanism to monitor progress in the area of DEIA**, including the implementation of the recommendations enumerated in this paper and others during the Snowmass 2021 process.

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General Recommendations

- 1) Improve experiences of members of marginalized communities, engage these communities, collect feedback, assess the effectiveness of existing programs, and develop best practices
- 2) Sustain engagement with marginalized communities, and train members of the particle physics community for productive engagement
- 3) Create infrastructure to improve academic, financial, and personal support for members of marginalized communities
- 4) Create environment conducive to success and the retention of members of marginalized communities, establish community expectations, foster inclusion, and ensure individual and institutional adherence
- 5) Establish a mechanism to monitor progress in the area of DEIA, including the implementation of recommendations from the Snowmass 2021 process.

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Accessibility in HEP: Lessons from the Snowmass Process

[arXiv:2203.08748 \[physics.ed-ph\]](https://arxiv.org/abs/2203.08748)

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- Shows **majority** of respondents reporting experiencing financial, caretaker responsibilities, mental health, physical, auditory, and visual barriers of varying degrees for either themselves (5%) and/or others around them (50%)

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- Lack of planning can make accessible meetings prohibitively expensive
- Leads to issues failing to be addressed, burden falls on affected individuals

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Recommendations for Financial, Family, Mental Health, Physical and Auditory Disabilities

- Conferences should strongly consider making their entrance fees sliding-scale or waivable for under-resourced and early-career scientists. Also provide and advertise travels grants early.
- **Accessible practices can help many more people than individuals with disabilities**

Lifestyle and Personal Wellness

[arXiv:2203.08748 \[physics.ed-ph\]](https://arxiv.org/abs/2203.08748)



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Premise:

- Highly competitive environment of physics introduces **unsustainable** levels of stress, often **forcing a choice between a basic human need and work**



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Observations:

- Physics culture creates self-selective culture and demographic of **sterile individualism**
- Failure to fit into the status-quo academic model is **wrongfully attributed to individuals' 'incompatibility'** with physics culture
- Needs of the individual are often suppressed for the sake of products
- Evaluation metrics often fail to incorporate life changes/obligations
- **Resource-starved perspective** characteristic of early-career experiences exacerbate inequity and drive away scientists of underrepresented backgrounds
- COVID introduced unprecedented stress and stratifies disparities of URM

Strategies in Education, Outreach, and Inclusion to Enhance the US Workforce in Accelerator Science and Engineering

[arXiv:2203.08919 \[physics.acc-ph\]](https://arxiv.org/abs/2203.08919)

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- Improvements concerning education, public outreach, and inclusion in Accelerator Science and Engineering will enhance the workforce
- Early-career scientists and engineers are the future of scientific workforce, to ensure quality science we must provide the training they need

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Example Mechanisms to Educate/Train: US Particle Accelerator School

- Two 2-week sessions winter/summer, ~300-350 participants, 20-26 courses
- COVID forced virtual education programs, highlighted **need to evolve techniques**
- Recommends prioritization of trainees' **communication/learning methods**, e.g. increased social media presence
- Highlights need for **active recruiting for URM**

Particle Physics in Africa and Latin America

[arXiv:2203.10060](https://arxiv.org/abs/2203.10060) [physics.soc-ph]

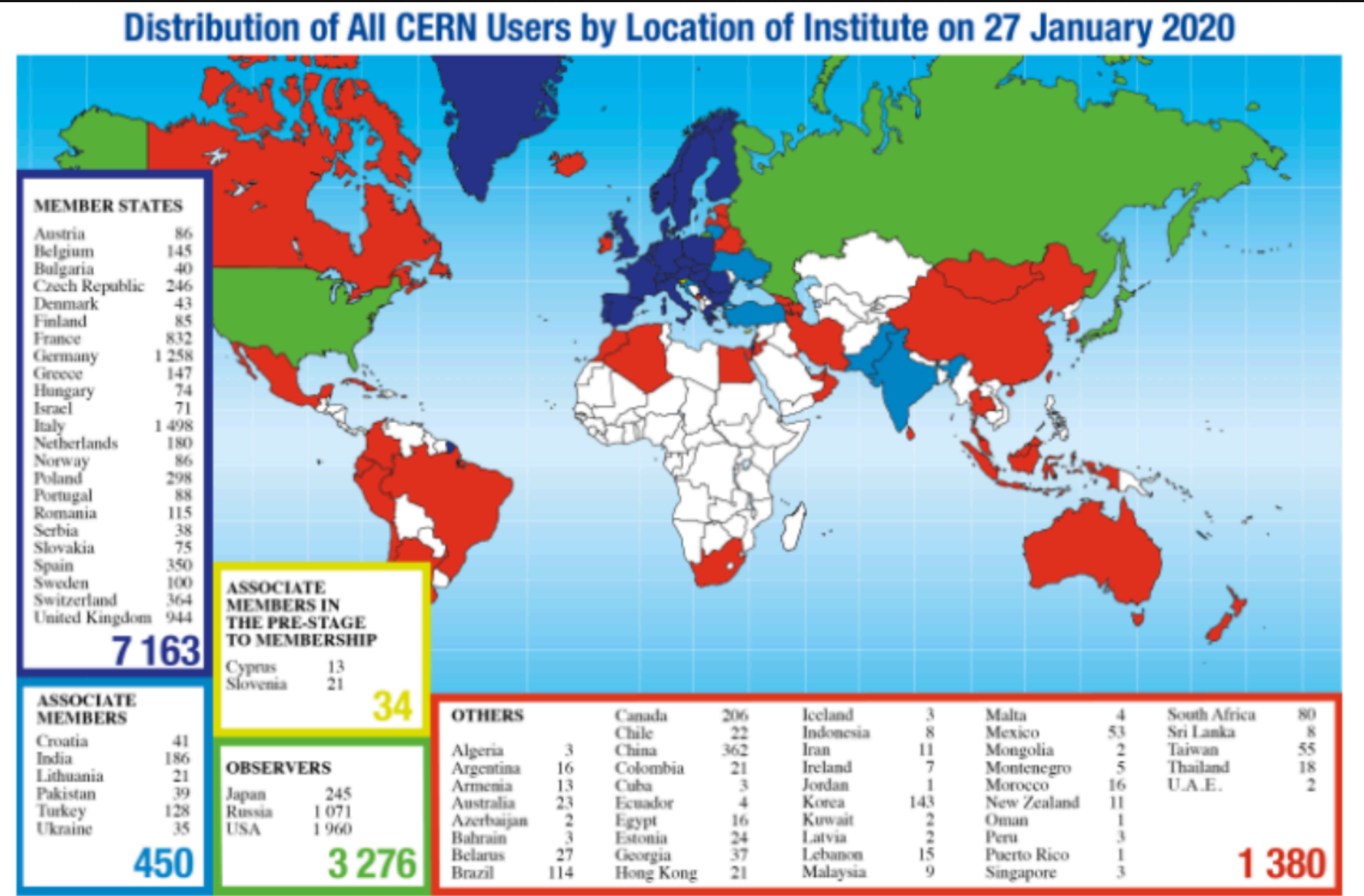


Figure 1: Distribution of CERN [10] users by location of their institutes. Users are not necessarily originating from the country of the university or laboratory they are affiliated with. Less than 5% of CERN users are associated with a developing nation.

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Global Science...or is it...

- Geographic diversity falls along economic lines
- Must remove systemic barriers to provide space for inclusion
- ‘Trickle down’ opportunities are not as effective as we hope.

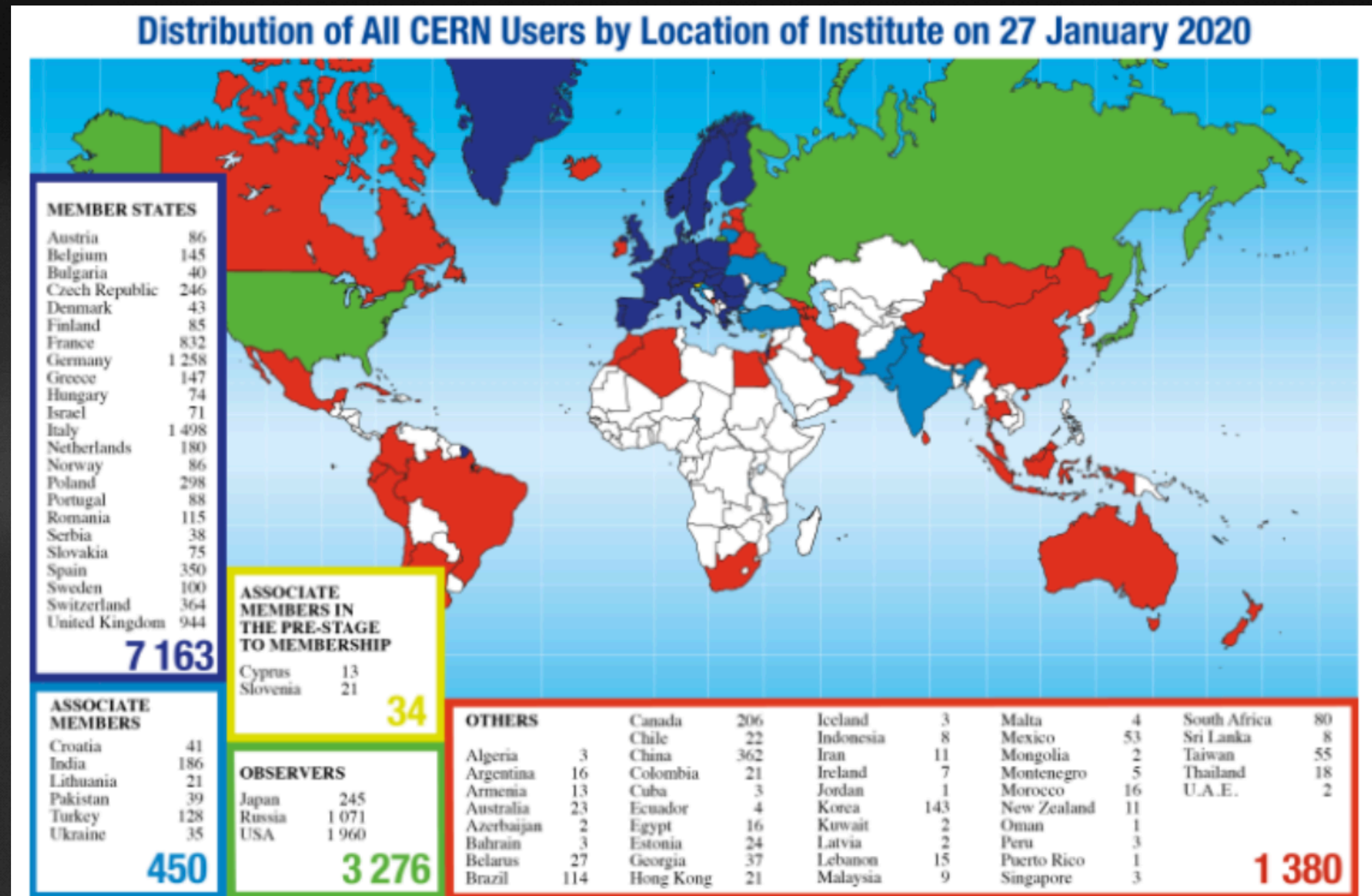


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Case Study: Costa Rica @ LHCb

- Which comes first, research program or research staff/faculty?
- Imperative to provide support and entrance mechanism to develop physics programs

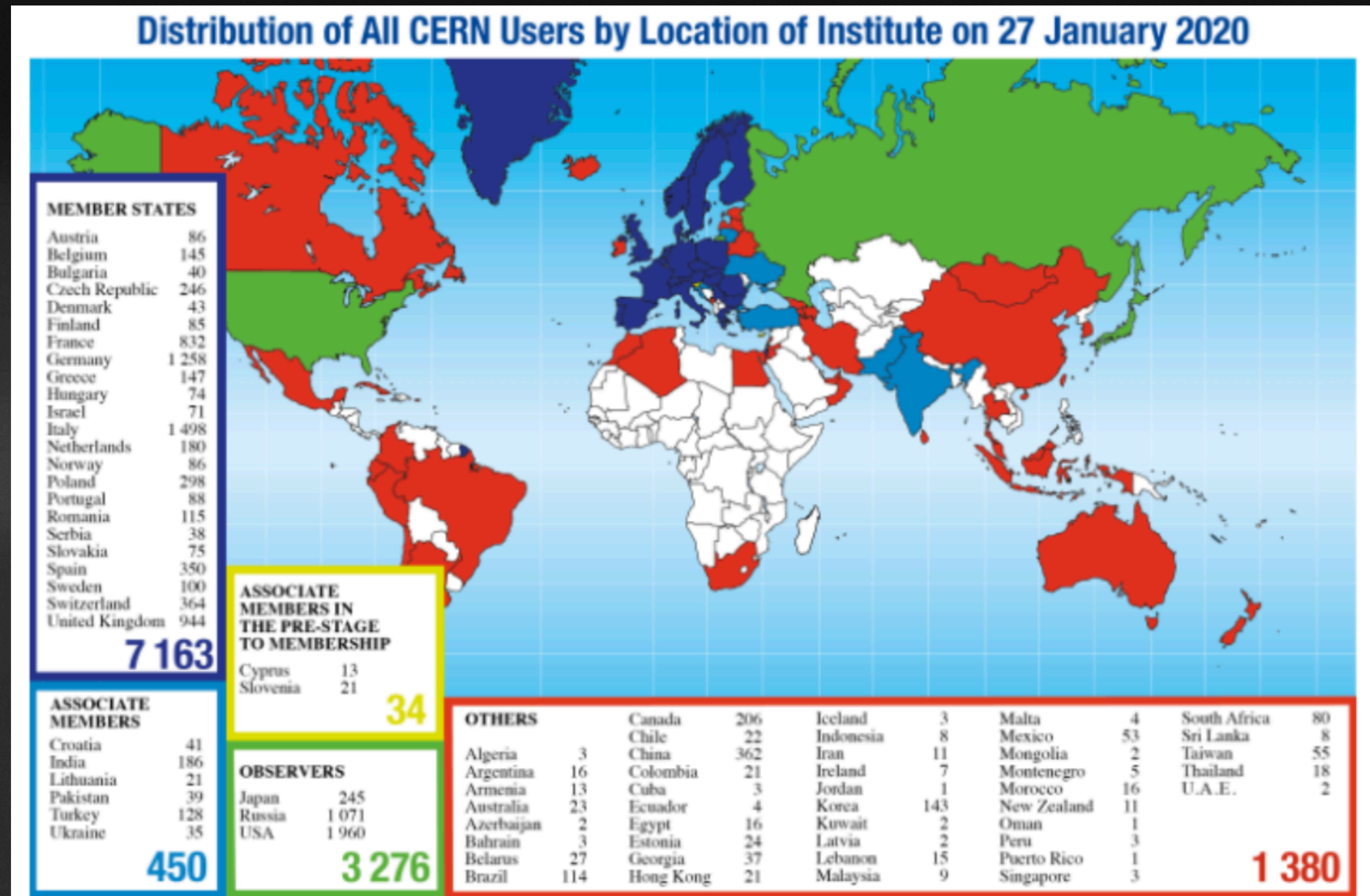


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Common Recommendations

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To the HEPA Community and Funding Agencies

- HEPA communities must employ the use of **robust strategic planning procedures**, including a full re-envisioning of science workplace norms and culture.
- HEPA communities must implement new modes of **community organizing and decision-making** that promote agency and leadership from all stakeholders within the scientific community.
- HEPA communities must **engage in partnerships** with scholars, professionals, and other experts in several disciplines, including but not limited to anti-racism, critical race theory, and social science.

Vision for Tomorrow

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Now what?

- We now have literature, reports, and community-driven calls for action
- First step to building allyship is exposure

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Where is 'the bar' today, and where should we be next year/decade

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Evolution of DEI efforts: education/exposure -> self-reflection -> sustainable action

Thank You!