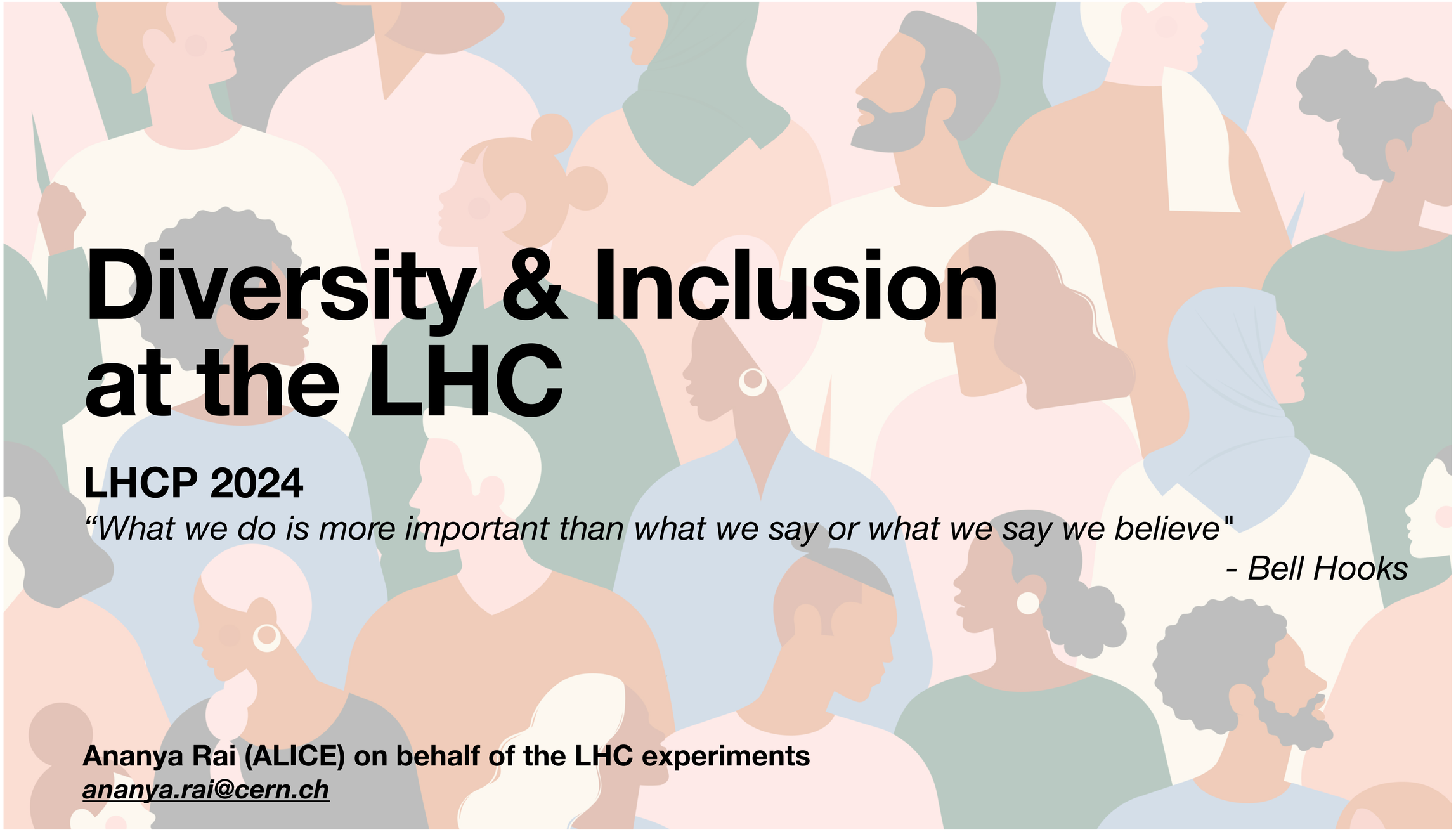


Diversity & Inclusion at the LHC

LHCP 2024

“What we do is more important than what we say or what we say we believe"

- Bell Hooks

Ananya Rai (ALICE) on behalf of the LHC experiments

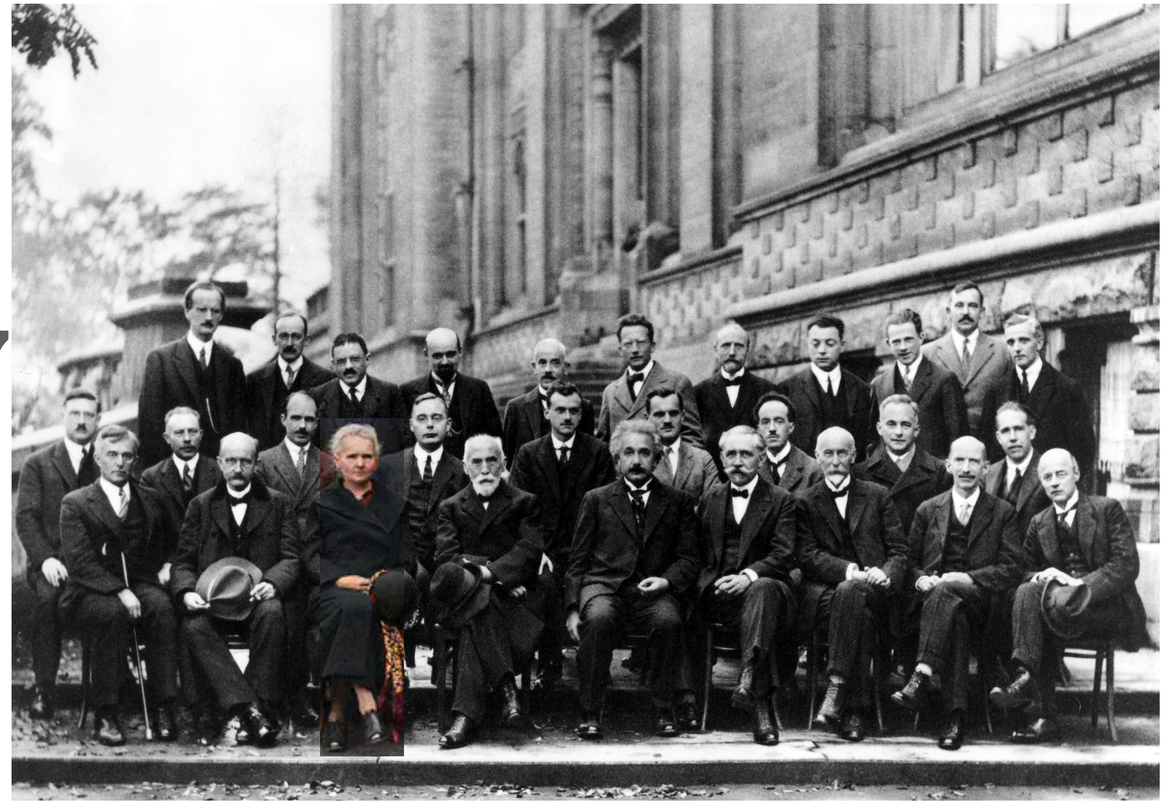
ananya.rai@cern.ch

Diversity

What and why?

Diversity solely based on physical aspects such as gender: 3%

1927



2024

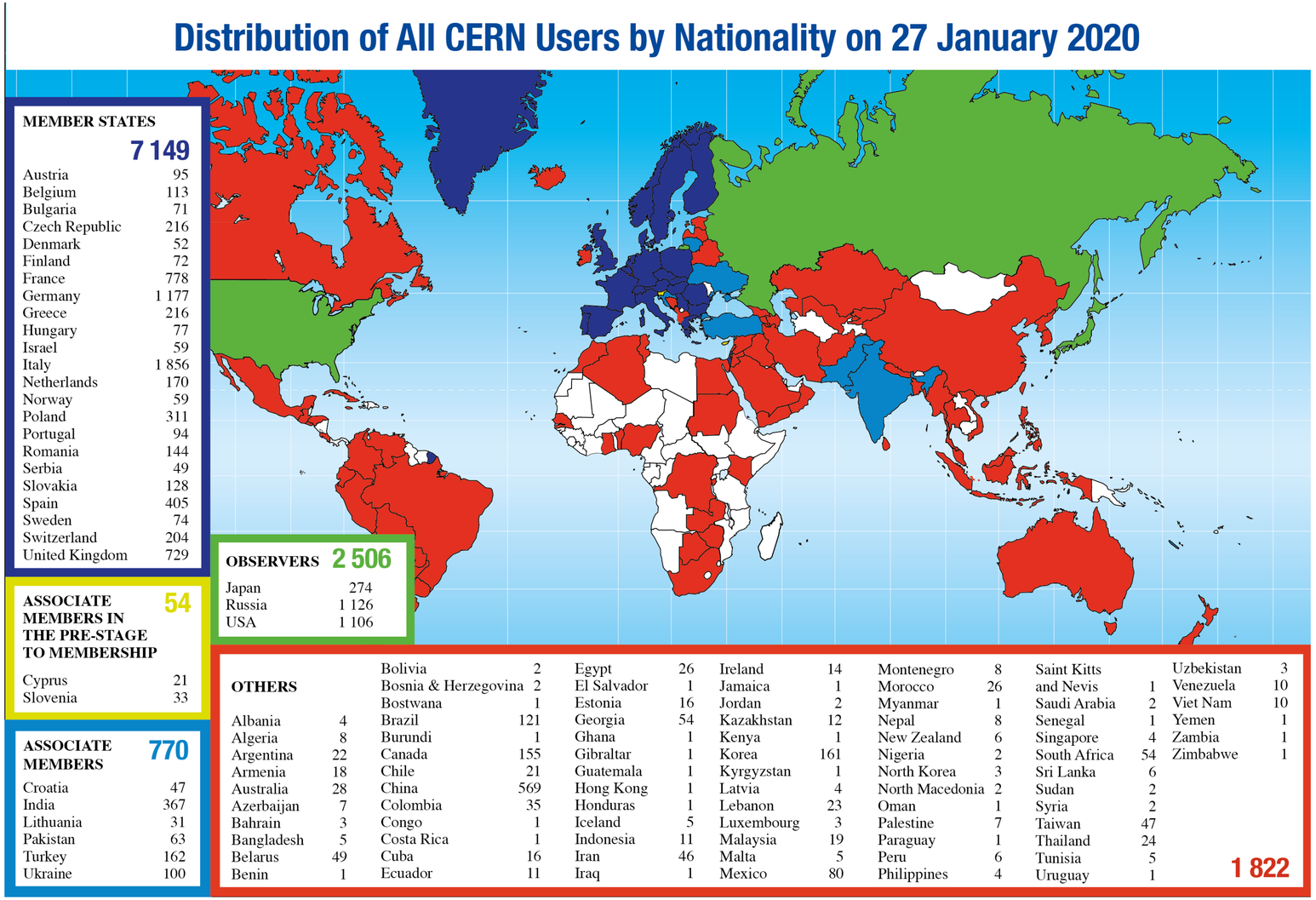
Diversity

What and why?

Diversity: the quality of being different.

But in the last 10 years, we have expanded our focus to

- Neurodiversity
- Gender identity
- Experiences of black, indigenous, people of color



Credit: CERN

Sounds great but why should we care?

Inclusion for better science

- **Inclusion:** making people feel that they belong.
- Anyone interested in physics should be able to do physics.
  But this is not our reality!
- Research shows that having a diverse group of problem solvers yields best results!

The Diversity–Innovation Paradox in Science

Bas Hofstra[a,1], Vivek V. Kulkarni[b], Sebastian Munoz-Najar Galvez[a], Bryan He[b], Dan Jurafsky[b,c], and Daniel A. McFarland[a,1]

[a]Graduate School of Education, Stanford University, Stanford, CA 94305; [b]Department of Computer Science, Stanford University, Stanford, CA 94305; and [c]Department of Linguistics, Stanford University, Stanford, CA 94305

19)

(14), and the sub-
. Our analyses use
ific disciplines, and
n them we are able
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her and why their

Groups of diverse problem solvers can outperform groups of high-ability problem solvers

Lu Hong[†‡§] and Scott E. Page[¶]

[†]Michigan Business School and [¶]Complex Systems, University of Michigan, Ann Arbor, MI 48109-1234; and [‡]Department of Finance, Loyola University, Chicago, IL 60611

ed for review May 25, 2004)

ally diverse groups outperform homoge-
lso been shown that functionally diverse
form the best individual agents, provided
p are nearly as good (1). These results still
ant question: Can a functionally diverse
s have less ability outperform a group of
ty who may themselves be diverse? The

The preeminence of ethnic diversity in scientific collaboration

Bedoor K. AlShebli, Talal Rahwan & Wei Lee Woon

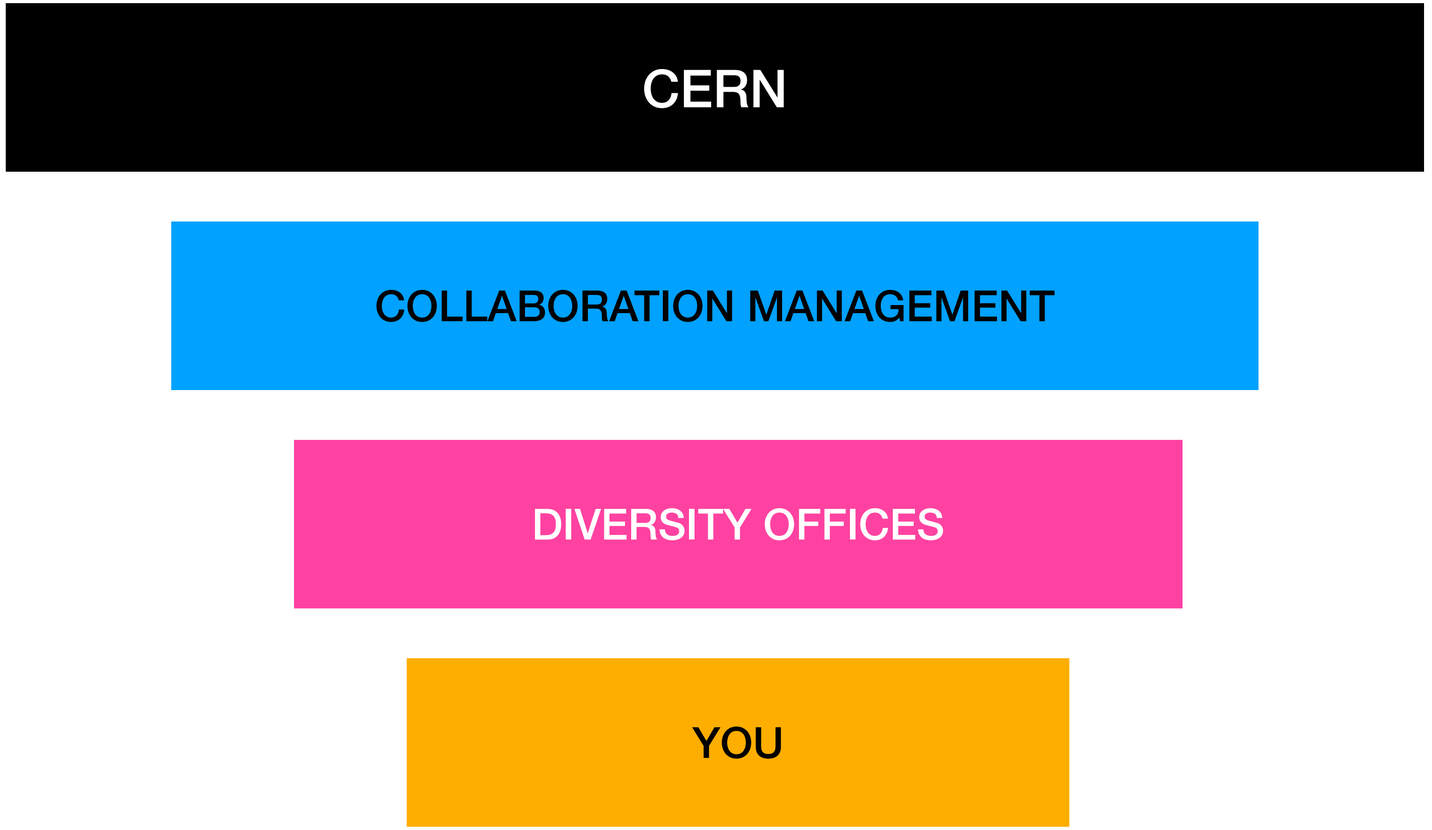
Nature Communications **9**, Article number: 5163 (2018) | Cite this article

Abstract

Inspired by the social and economic benefits of diversity, we analyze over 9 million papers and 6 million scientists to study the relationship between research impact and five classes of diversity: ethnicity, discipline, gender, affiliation, and academic age. Using randomized baseline models, we establish the presence of homophily in ethnicity, gender and affiliation. We then study the effect of diversity on scientific impact, as reflected in citations. Remarkably, of the classes considered, ethnic diversity had the strongest correlation with

Diversity & Inclusion at CERN

Tiered D&I efforts at CERN



CERN Diversity Initiatives

Ananya Rai, Yale

Diversity Initiatives at CERN

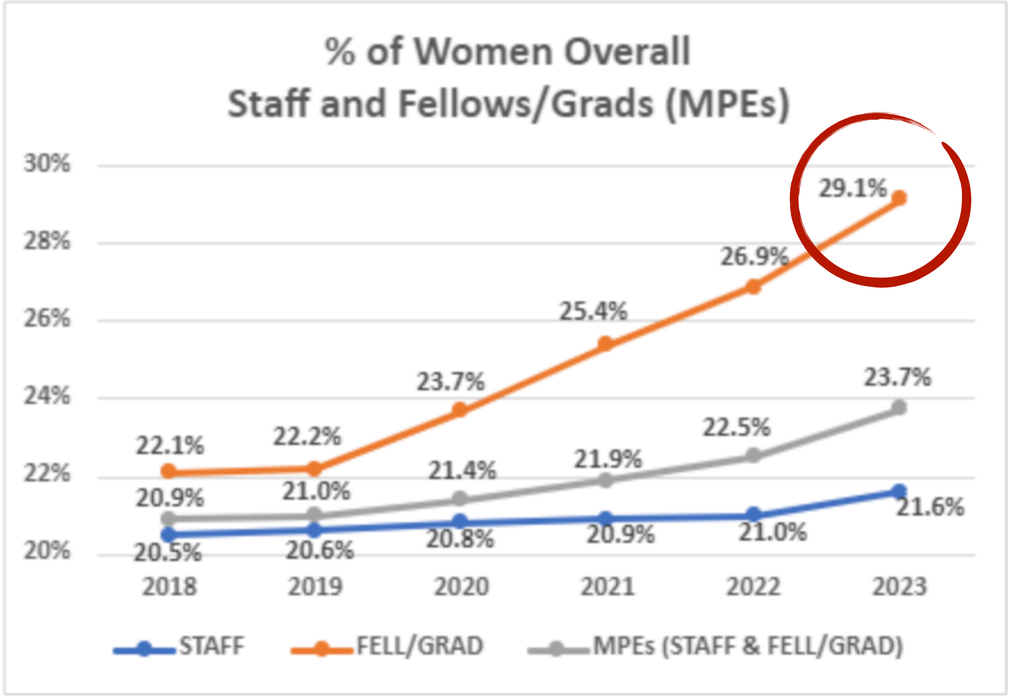
Past and present

- CERN **25 by 25**:
  1. Increase the percentage of women in the Employed Members of the Personnel from 21% (as of 31 December 2020) to 25% by the end of 2025.
  2. Diversify by nationality.

- CERN **Code of Conduct**

- CERN offices

Credit: CERN D&I



LGBTQ+ CERN

Supporting Neurodiversity at CERN

Diversity & Inclusion office

Women In Technology

Disability Network

Diversity & Inclusion Initiatives at Experiments

The diversity of diversity initiatives at the LHC

Ananya Rai, Yale

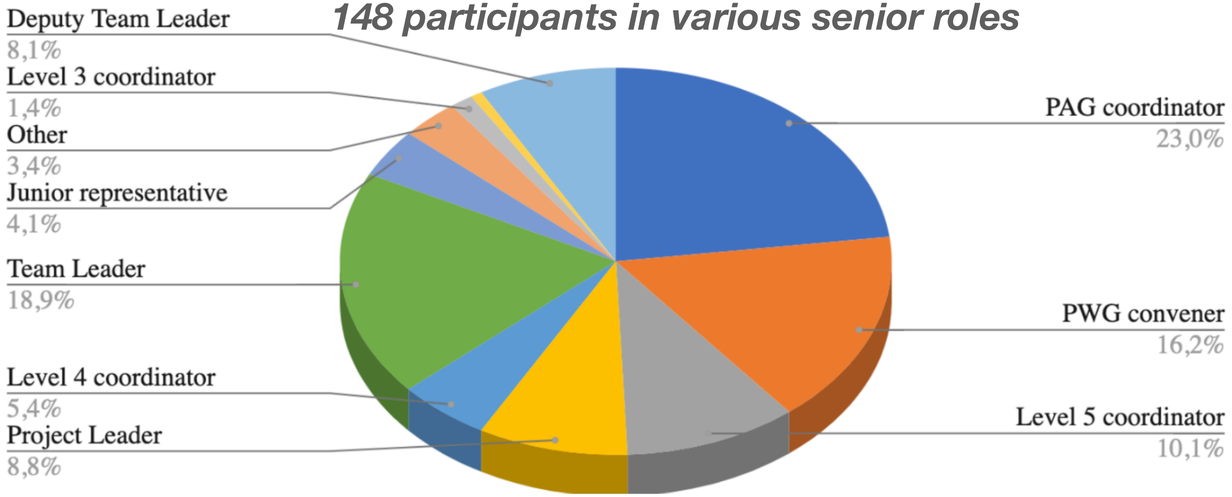
Initiatives at ALICE

ALICE Diversity Office: Past & Present

- ALICE juniors representatives **have a vote in collaboration board & management board** (2013-).
- Training for management roles to promote inclusivity at ALICE (offered yearly), **funded by ALICE** (2020-).

"Inclusive Workspaces"

Statistics from ALICE Inclusive Workspaces Workshop (2020-23)
148 participants in various senior roles



- Focus is on **well-being**.
- Initiative to **improve cross-cultural communication** within the collaboration via a new workshop. (First run during ALICE week in March, 2024)

"Collaborating in Culturally Diverse Teams"

Initiatives at ATLAS

Past and present

- Use of **pronouns** in the ATLAS GLANCE database (2024).

- **Outreach** is essential to communicate our scientific endeavors to the general public & to create a more diverse scientific community.

- ***Educational material***: books, fact sheets etc. for all levels, in **various languages**.

**All LHC experiments have active outreach efforts*

Initiatives at CMS

CMS Diversity & Inclusion Office: Past and present

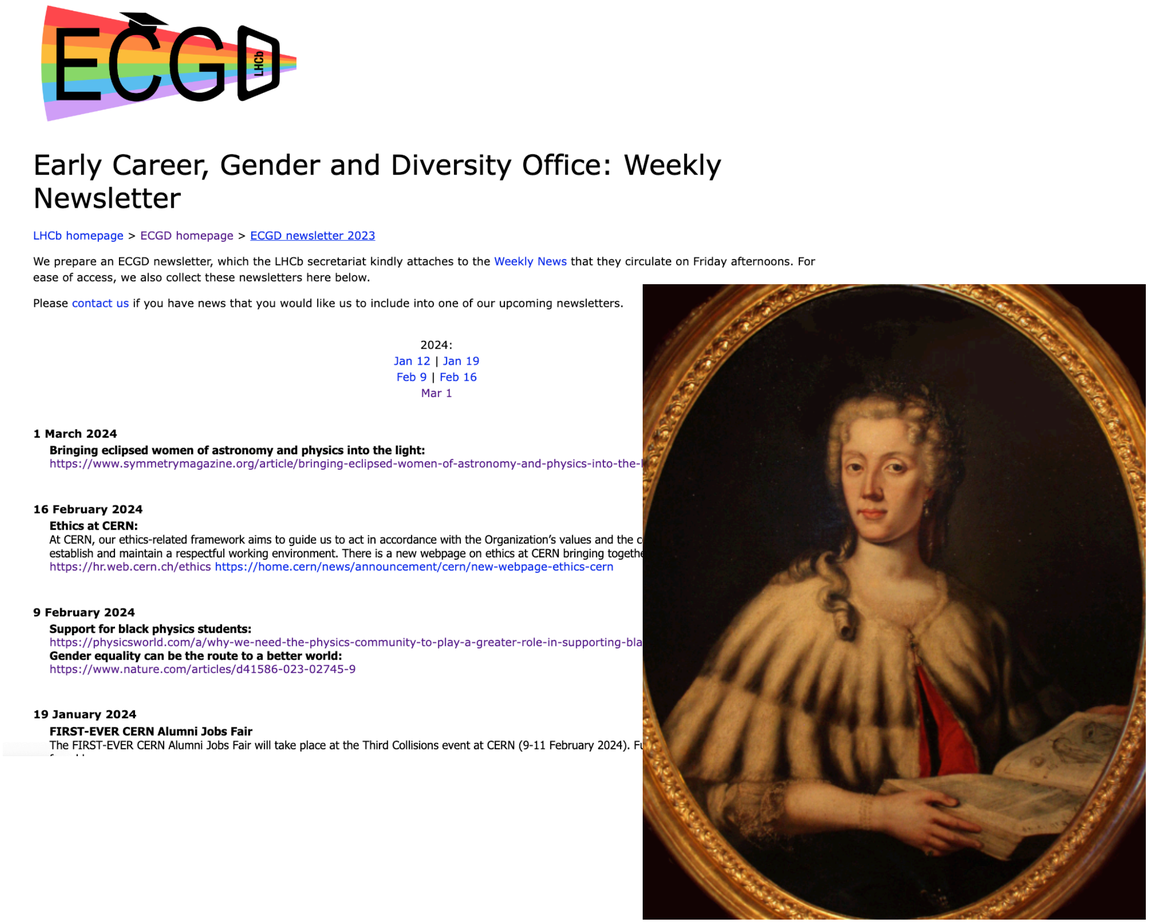
- ***Handbook*** available online.
- ***Task Force on Diversity & Inclusion*** (2020) to make recommendations for appointing a more diverse management body.
- ***Color palette for color blindness*** (2024): Enforcing a CMS style that ensures plots are **accessible** to people with color blindness.

Initiatives at LHCb

Early Career, Gender & Diversity Office: Past and present

- Focus on ***early career scientists*** *(2012-)*
  retention of underrepresented minorities is positively influenced by **dedicated mentorship** early in their careers.

- ***Laura Bassi Group*** *(2019-)*
  Focus on underrepresentation in HEP.
  Informal network — crucial as this allows minorities to have safe spaces to share experiences.



Laura Bassi*: Italian physicist &*
first woman to have a doctorate in science

Statistics
Backing up facts with numbers

Ananya Rai, Yale

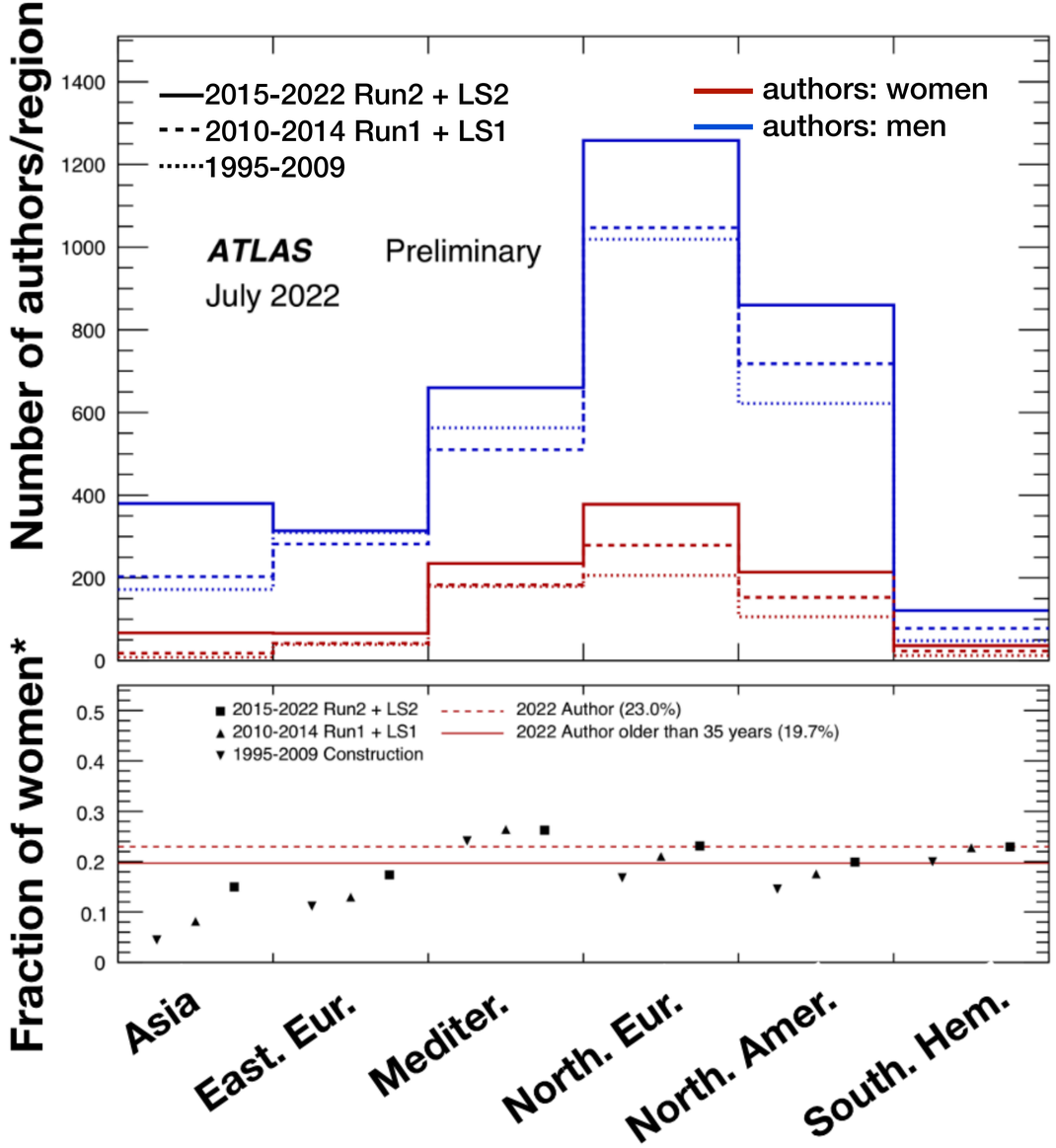
Informing the collaboration

Studying age, gender & regionality

2022 Author (23.0%)
2022 Author older than 35 years (19.7%)

2015-2022 Run2 + LS2
2010-2014 Run1 + LS1
1995-2009 Construction

- Statistics illustrate the impact of intersectional identities on diversity in physics.
- Trends show that the fraction of women* is growing overall (but at different rates).
- Fraction of women* authors decreases with age - retention of women* in science/ improving trends for younger generation?



*Women refers to heteronormative gender binary as in CERN database.

**All LHC experiments perform similar analyses.

Diversity Initiatives at the Management Level

What can the management do?

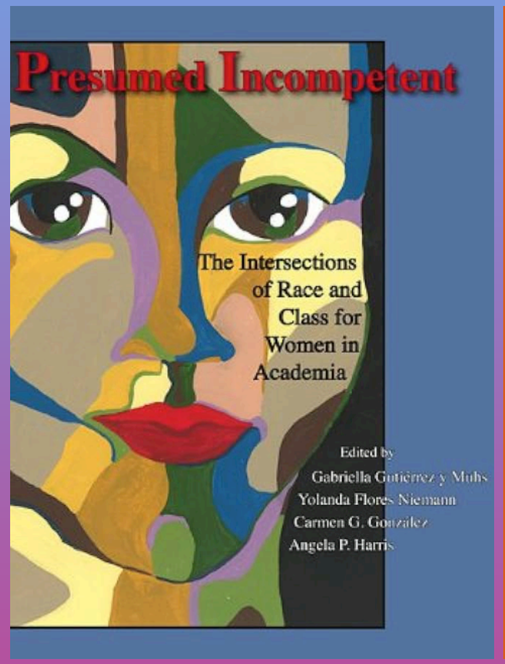
Supporting the collaboration

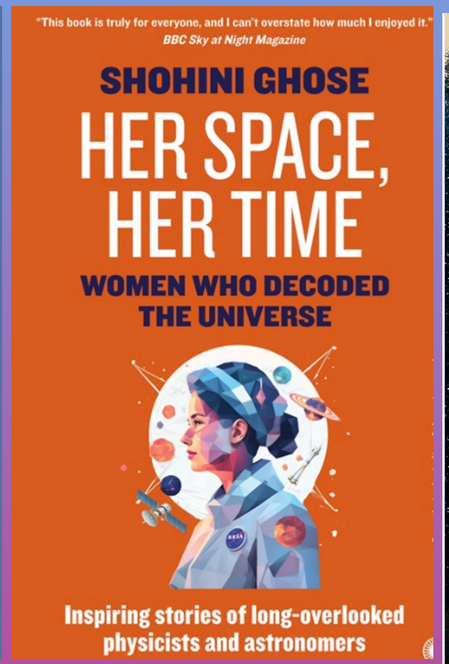
- **Support** diversity initiatives within your collaborations.

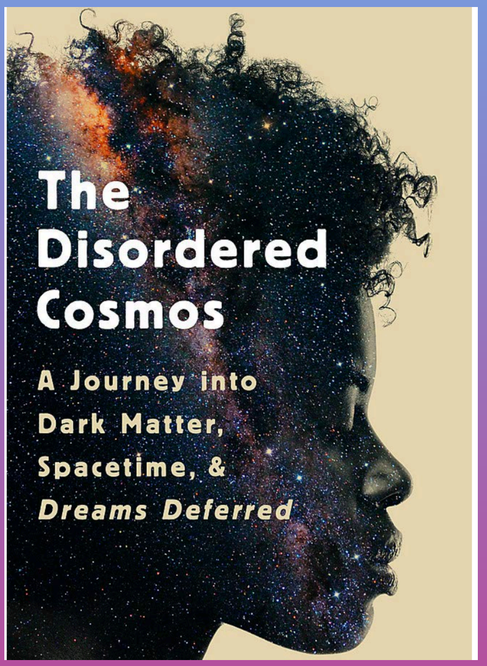
- Consider the diversity of your collaboration when planning collaboration meetings/ conferences
  - do all members feel **safe**?
  - is there **childcare**? *(shoutout to LHCP for having childcare!)*
  - is it accessible to people with **disabilities**?
  - **visas** can take time. Consider giving your collaborators enough notice
  - consider **allocating funds** to people from countries with limited scientific funding for travel *(shoutout to LHCP for early career grants!)*

- Take **active** interest in diversity issues within the collaboration. Consider cross-experiment collaboration to tackle diversity issues.

Is this enough?







What can YOU do?

Answer: A LOT!

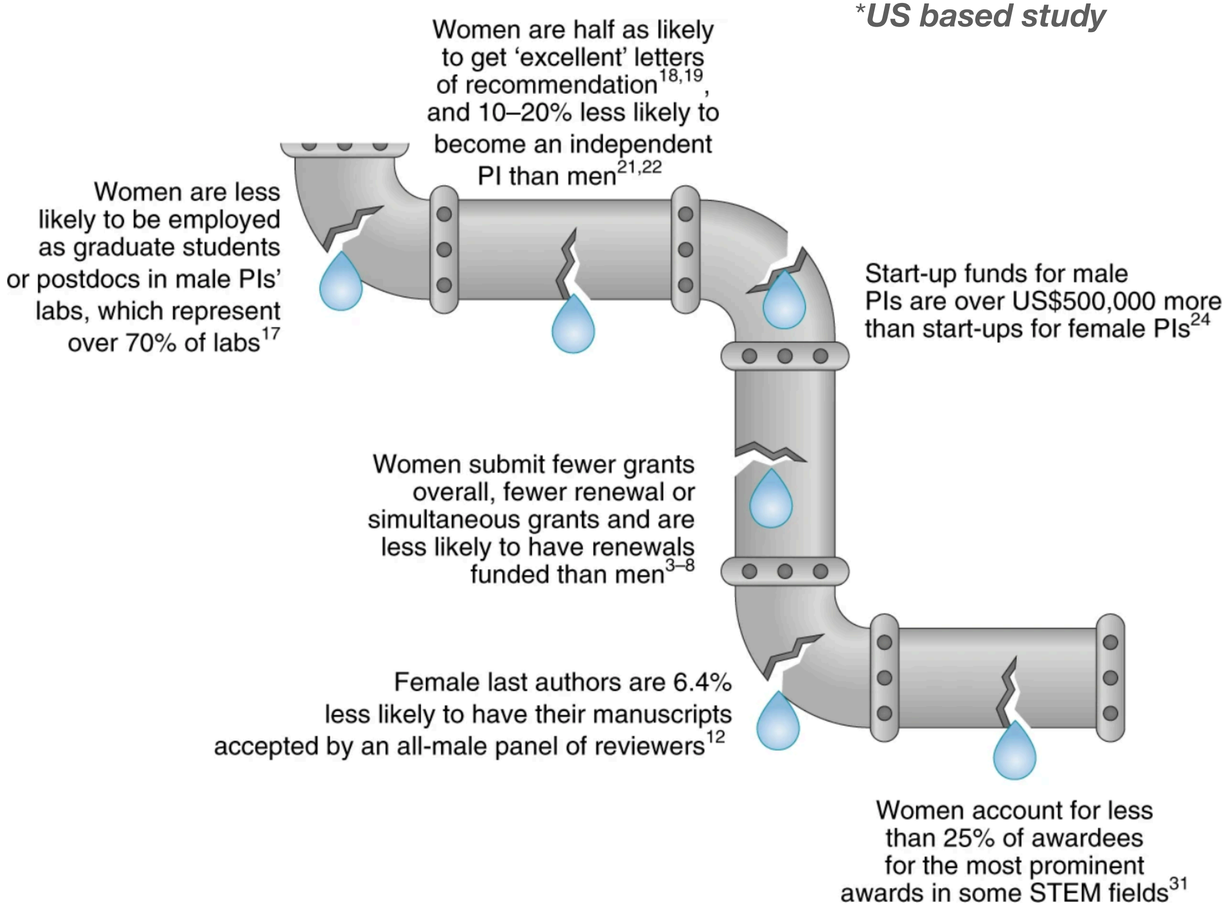
- Underrepresented groups **ALONE** cannot fix the problem of underrepresentation alone — "*water cannot fix a leaky pipe*"
- It is highly likely that you are or know someone who knows someone who knows someone who has been affected by D&I issues.
- **Educate yourself** about D&I and the experiences of minority groups.

minorities

Fig. 1: The leaky pipeline of ~~women~~ in STEM.

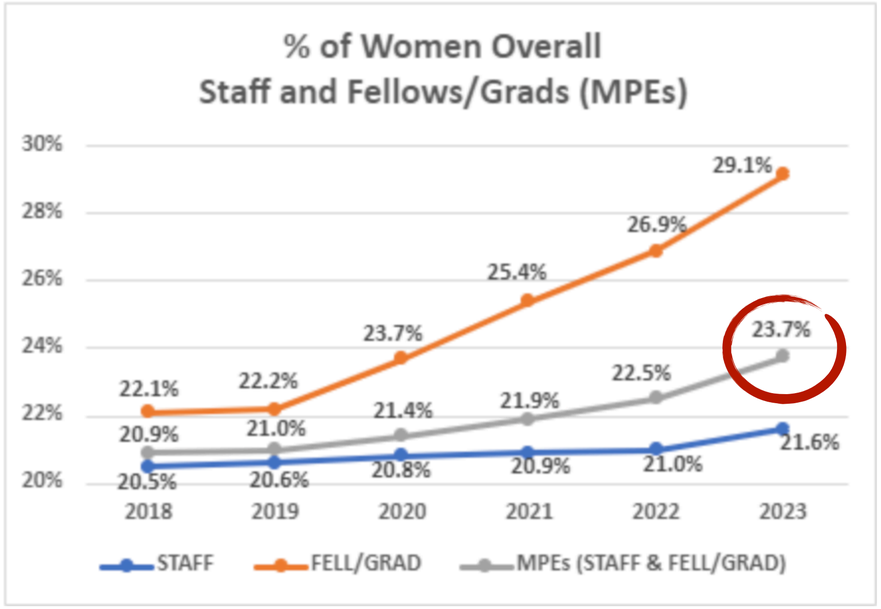
From: How the entire scientific community can confront gender bias in the workplace

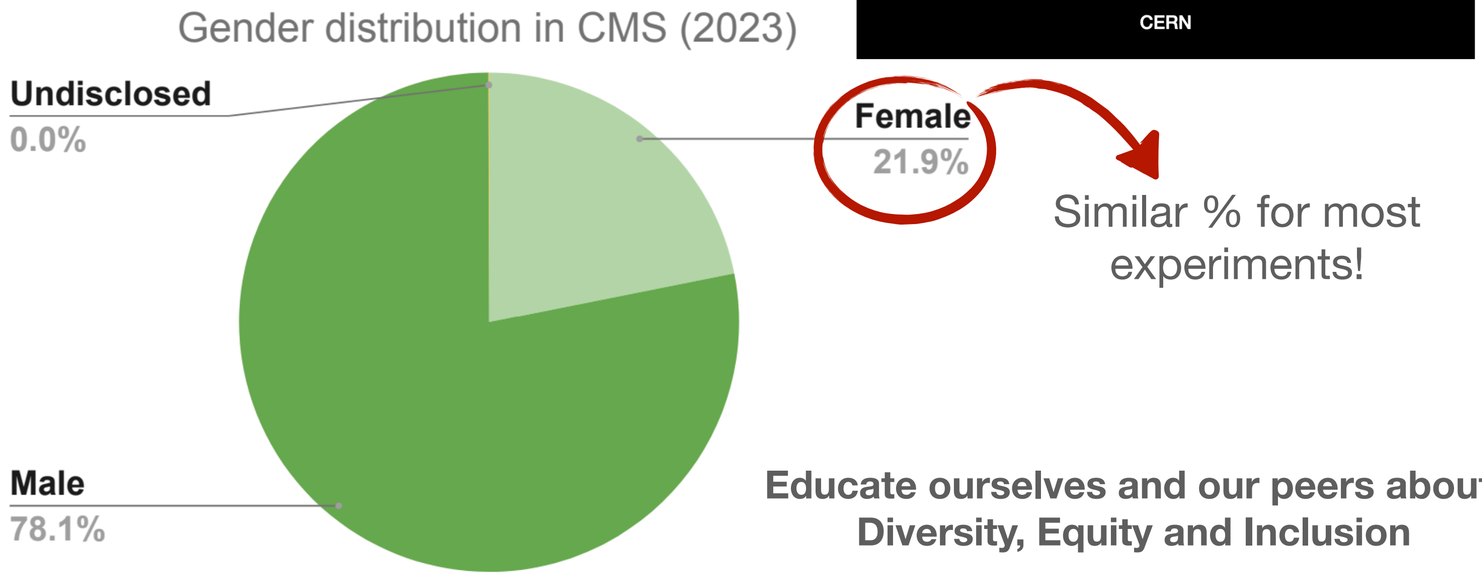
**US based study*



Looking to the future

Where can we improve? (very limited thoughts)





Similar % for most experiments!

Didn't discuss EQUITY:

- visas take time. Give your collaborators time to plan (***inclusion***)
- consider allocating funds to people from countries with limited scientific funding for travel (***equity***)

Educate ourselves and our peers about Diversity, Equity and Inclusion

Move away from using heteronormative gender in databases

Make colorblind-friendly plotting styles the norm

Make EQUITY a priority

We are making progress but we can do a lot more!

YOU

DIVERSITY OFFICES

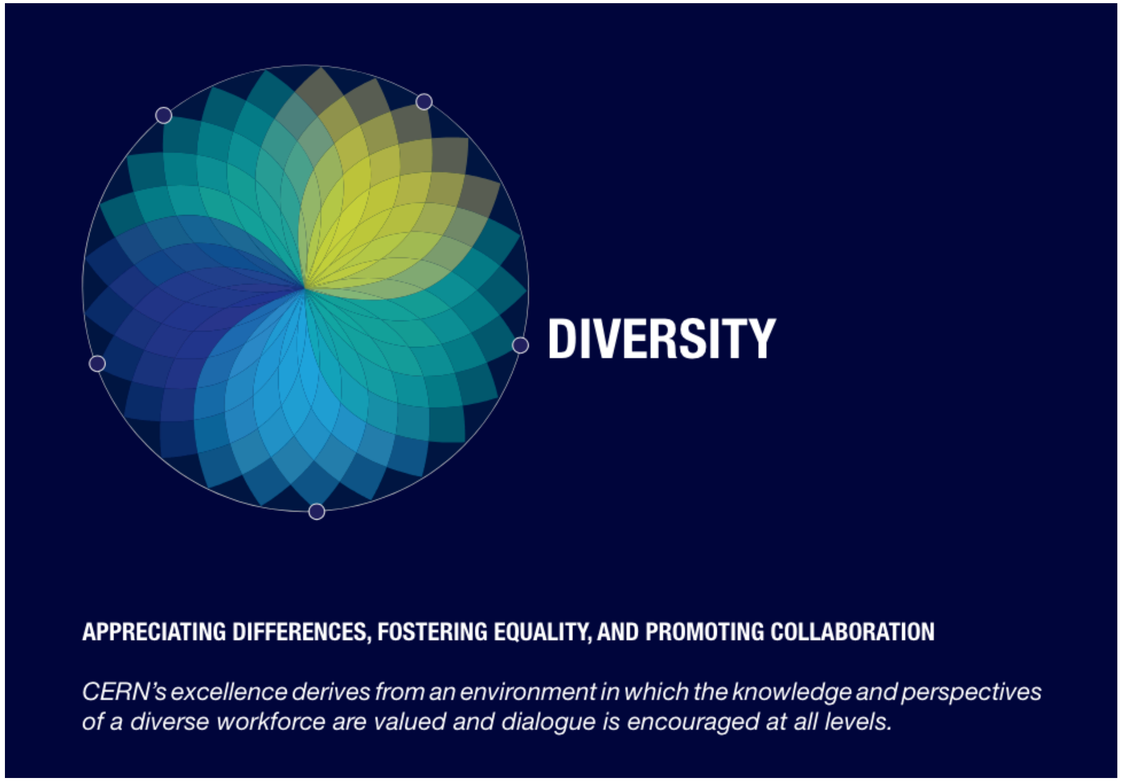
COLLABORATION MANAGEMENT

CERN

Backup

CERN Code of Conduct

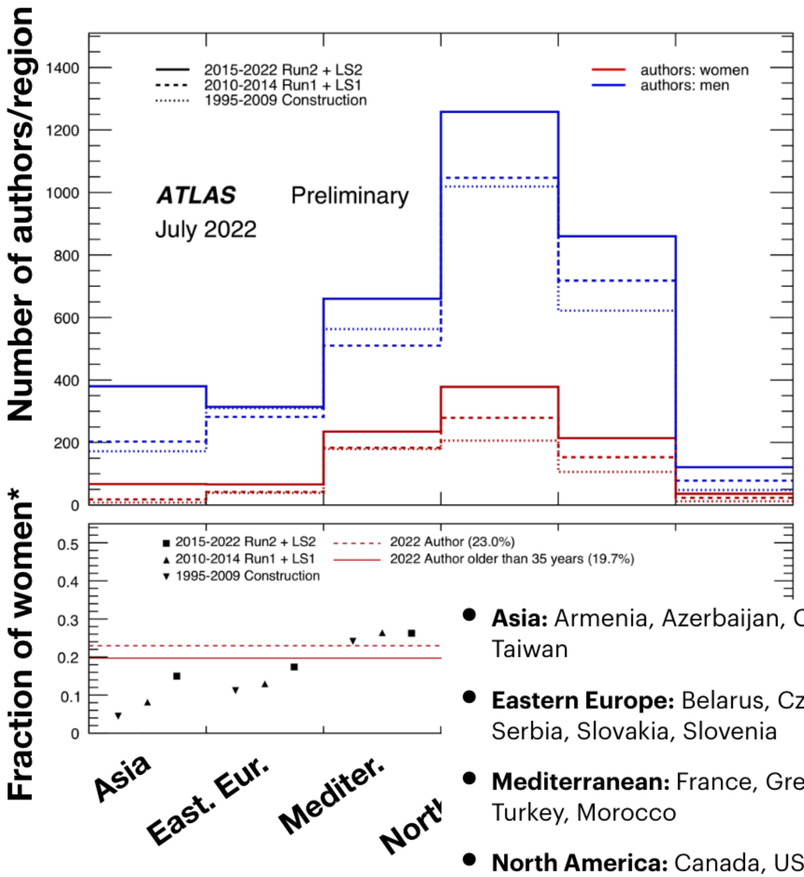
Guidelines for all CERN users



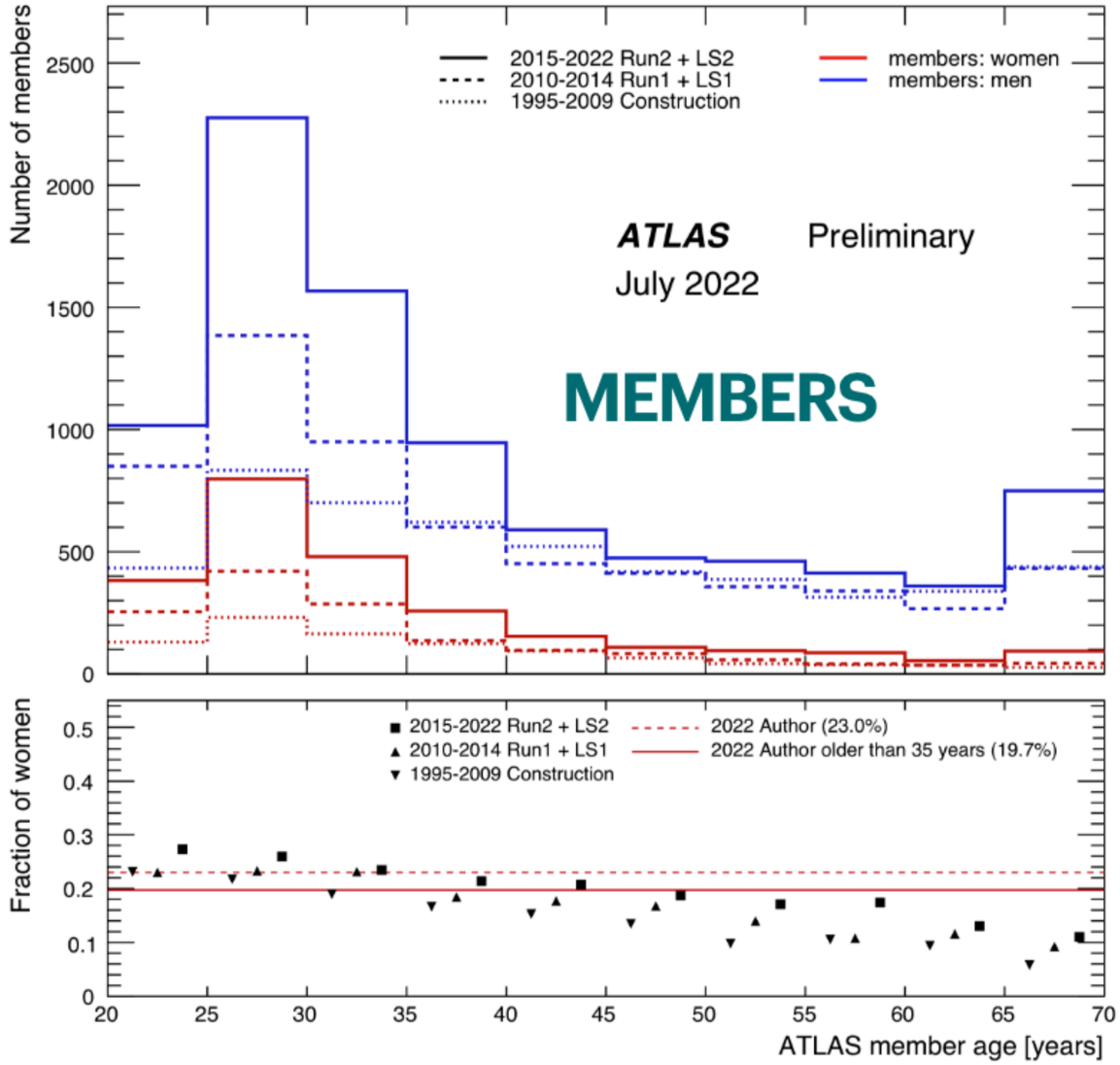
AS CERN CONTRIBUTORS, WE:

- Respect and value differences.
- Promote inclusiveness in the workplace in terms of both personal characteristics and professional abilities.
- Demonstrate team spirit and invest in team building.
- Treat others with tact, courtesy and respect.
- Abstain from and actively discourage discrimination in all forms.
- Avoid offending others by exercising restraint, and are aware that statements or actions not intended to be offensive to another person may be perceived as such.
- Refrain from unpleasant or disparaging remarks or actions, in particular on the basis of sex, age, religion, beliefs, nationality, culture, ethnicity, race, sexual orientation, status at CERN, disability, or family situation.

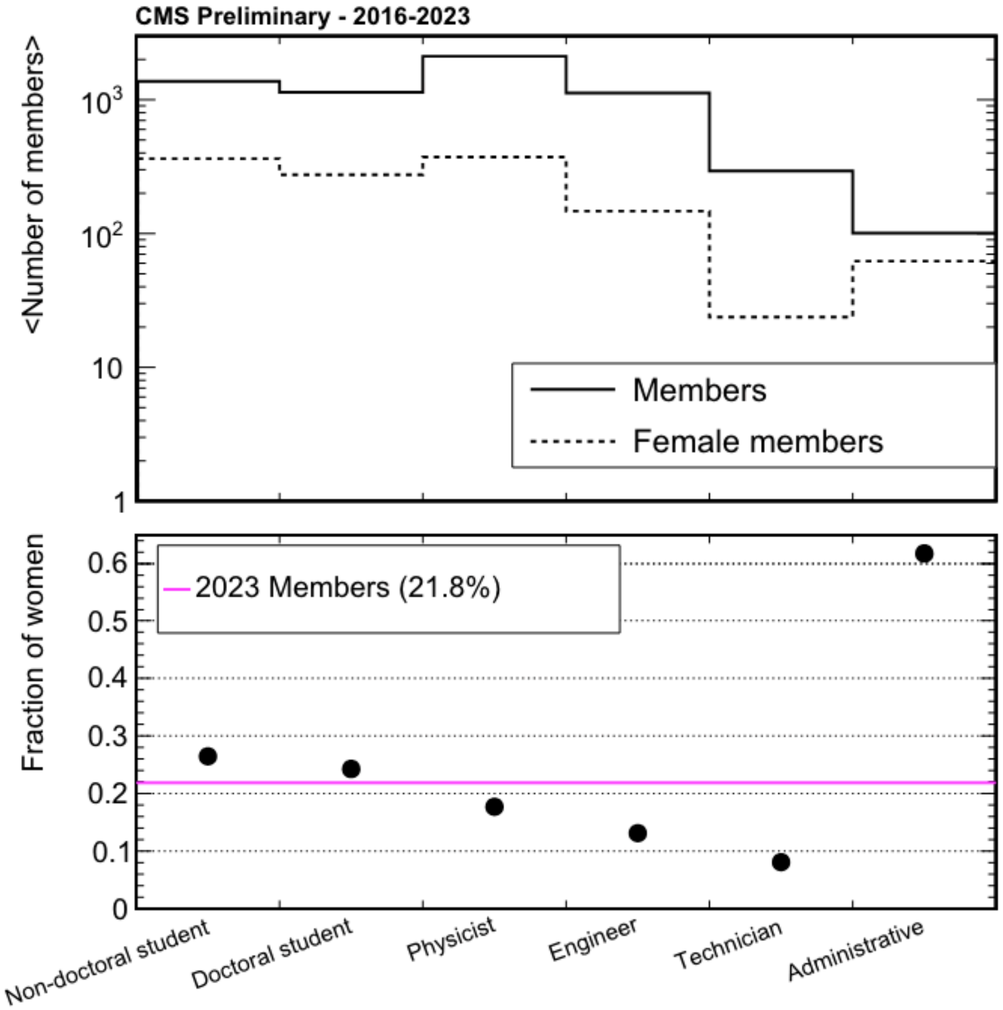
Info on statistics (ATLAS 2022)

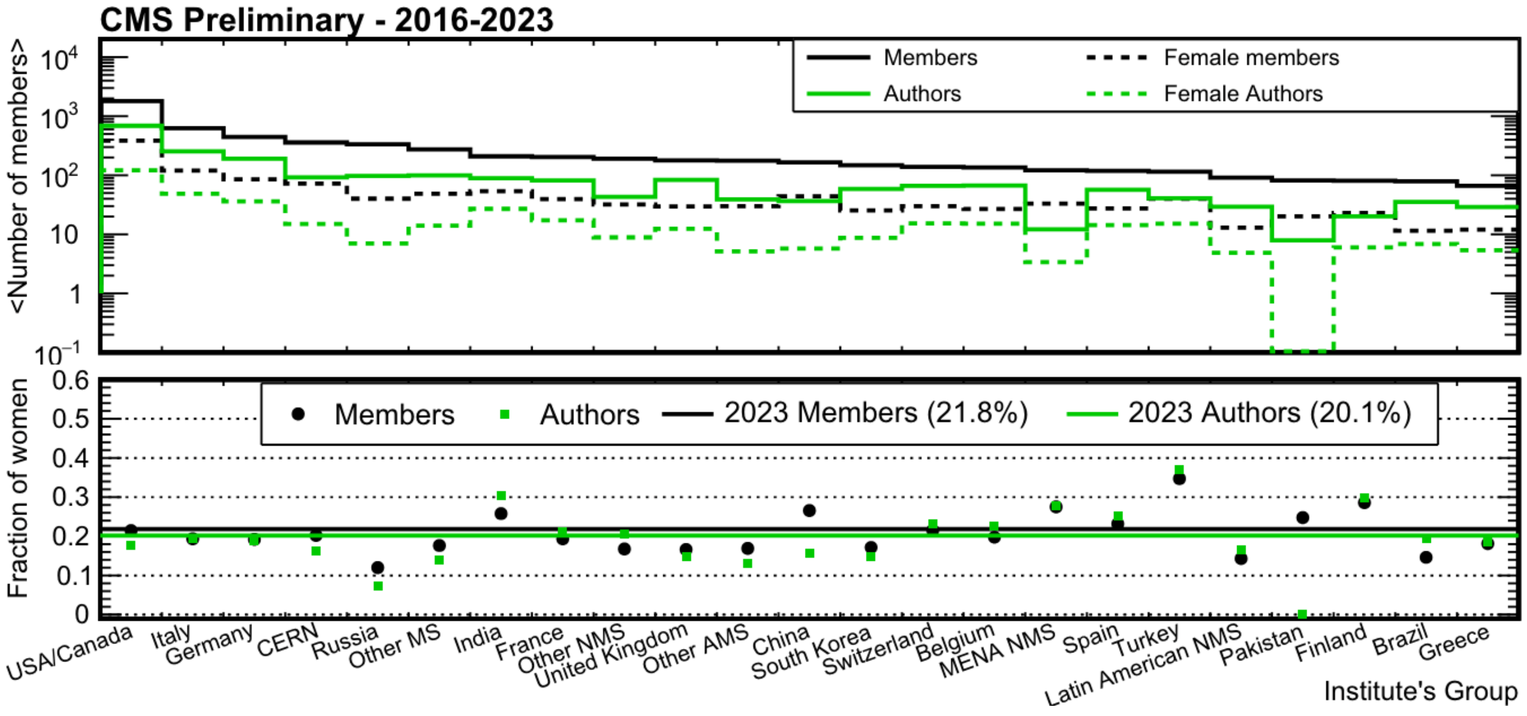


- **Asia:** Armenia, Azerbaijan, China, Georgia, Hong Kong, Japan, Taiwan
- **Eastern Europe:** Belarus, Czechia, Poland, Romania, Russia, Serbia, Slovakia, Slovenia
- **Mediterranean:** France, Greece, Israel, Italy, Portugal, Spain, Turkey, Morocco
- **North America:** Canada, USA
- **Northern Europe:** Austria, Denmark, Germany, the Netherlands, Norway, Sweden, Switzerland (including CERN), UK
- **Southern Hemisphere:** Argentina, Australia, Brazil, Chile, Colombia, South Africa



Info on statistics (CMS 2023)



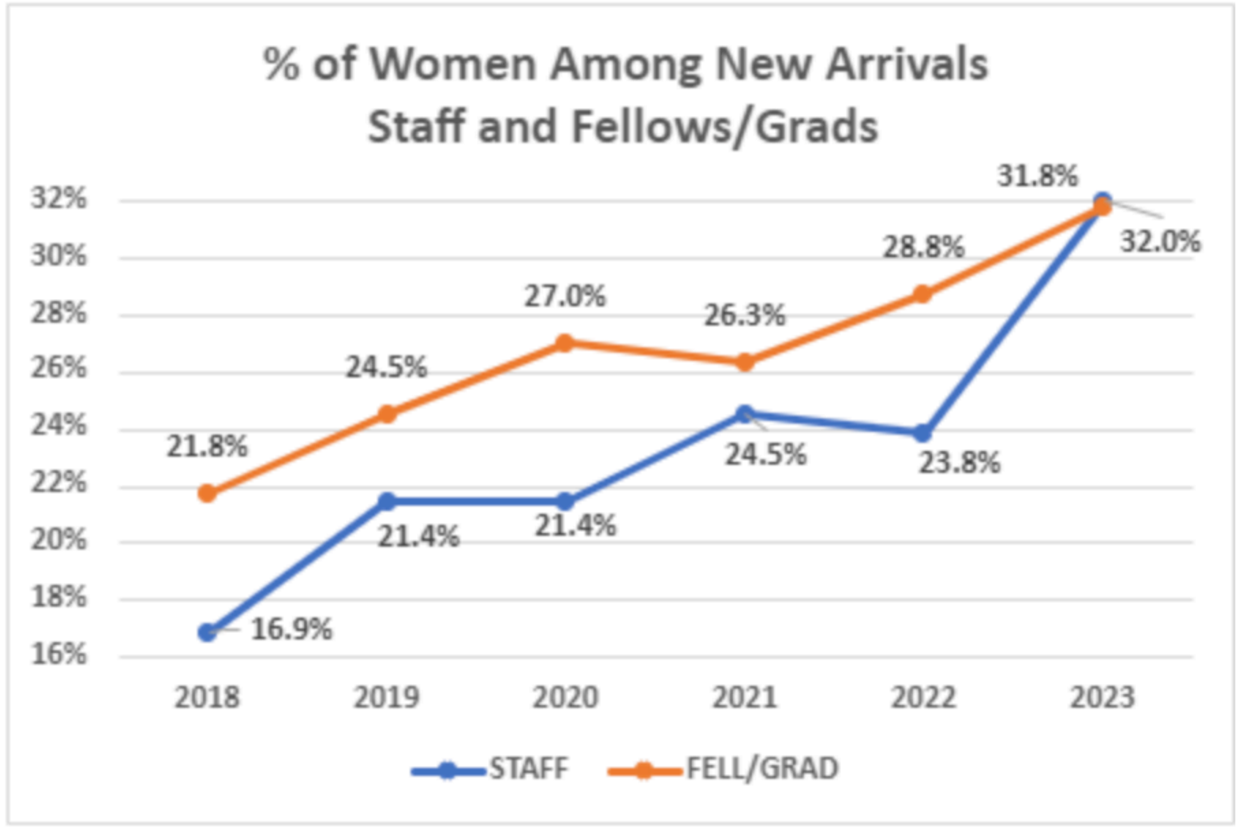


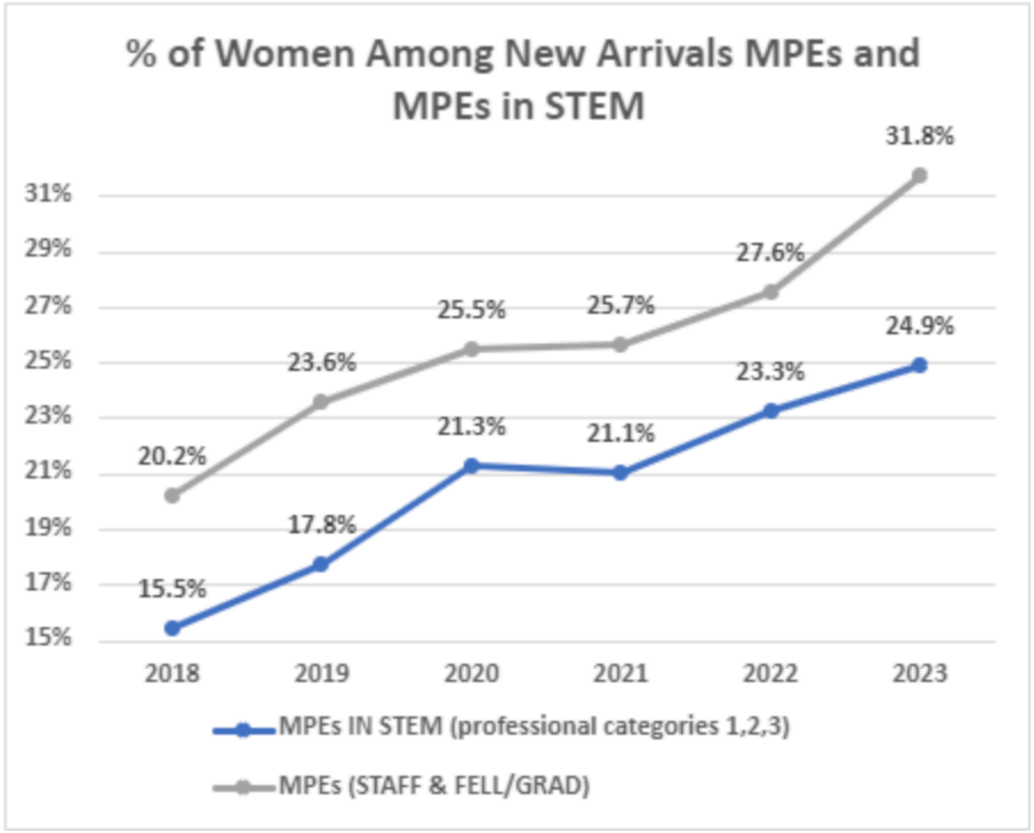
Decreasing # of members

CERN 25 by 25

Where we stand

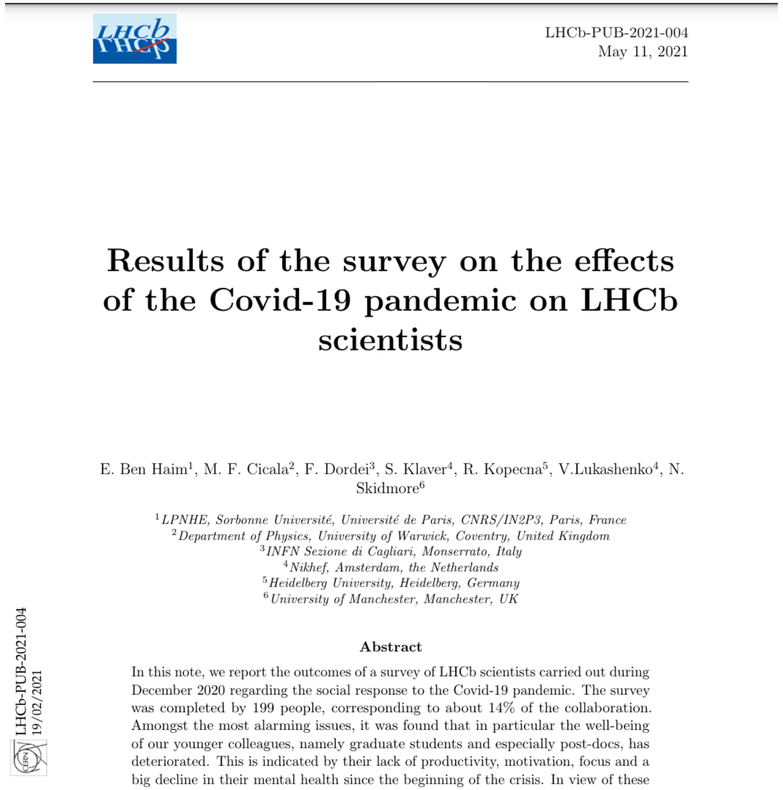
Link: https://diversity-and-inclusion.web.cern.ch/actions/25-25





Well-being Focus

LHCb & ALICE



LHCb-PUB-2021-004
May 11, 2021

Results of the survey on the effects of the Covid-19 pandemic on LHCb scientists

E. Ben Haim[1], M. F. Cicala[2], F. Dordei[3], S. Klaver[4], R. Kopecna[5], V.Lukashenko[4], N. Skidmore[6]

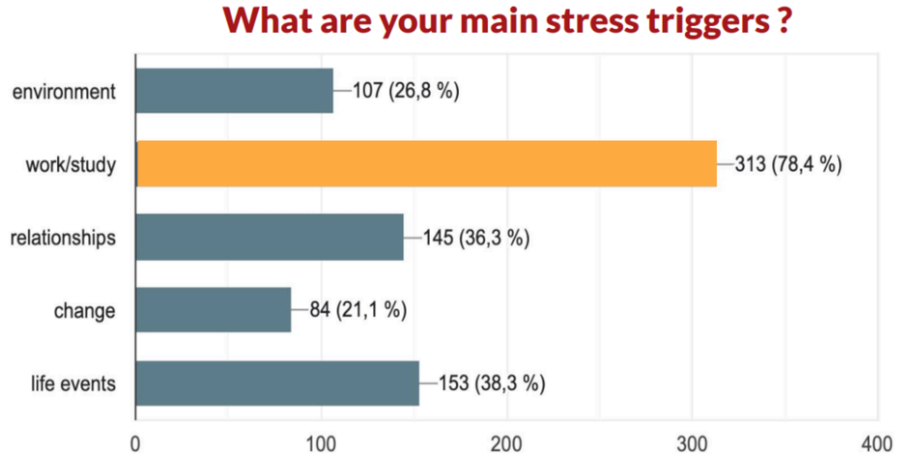
[1] *LPNHE, Sorbonne Université, Université de Paris, CNRS/IN2P3, Paris, France*
[2] *Department of Physics, University of Warwick, Coventry, United Kingdom*
[3] *INFN Sezione di Cagliari, Monserrato, Italy*
[4] *Nikhef, Amsterdam, the Netherlands*
[5] *Heidelberg University, Heidelberg, Germany*
[6] *University of Manchester, Manchester, UK*

Abstract

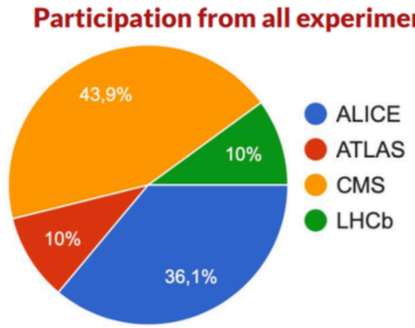
In this note, we report the outcomes of a survey of LHCb scientists carried out during December 2020 regarding the social response to the Covid-19 pandemic. The survey was completed by 199 people, corresponding to about 14% of the collaboration. Amongst the most alarming issues, it was found that in particular the well-being of our younger colleagues, namely graduate students and especially post-docs, has deteriorated. This is indicated by their lack of productivity, motivation, focus and a big decline in their mental health since the beginning of the crisis. In view of these worrying results, we provide a series of suggestions hoping that this report can help to increase the awareness about less debated effects of the Covid-19 pandemic, in particular on our younger colleagues.

LHCb-PUB-2021-004
19/02/2021

Link to paper



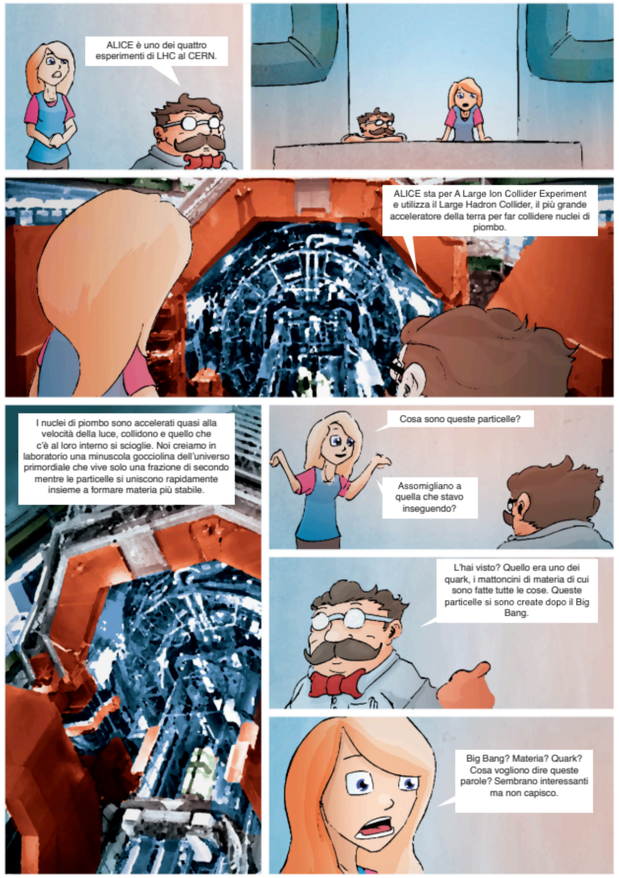
ALICE week (Oct'23) Junior's Talk



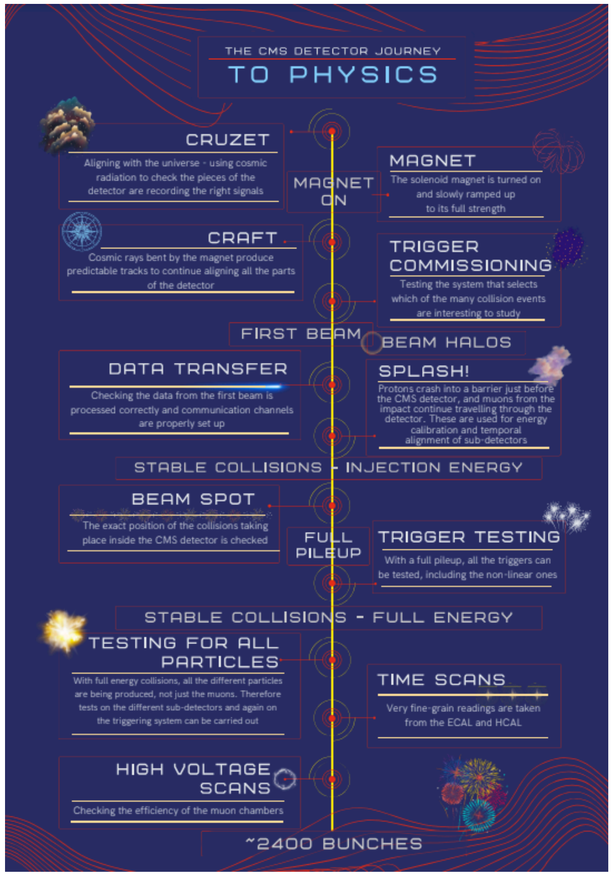
ALICE week (Oct'23) Junior's Talk

Education & Outreach

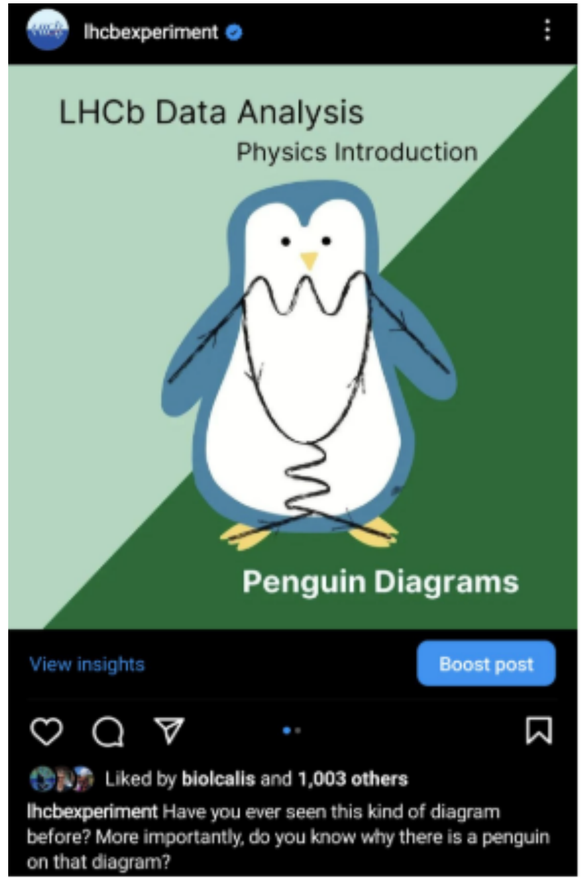
All experiments



ALICE brochure



CMS brochure



A little bit on Outreach

Past and present

- **Outreach** is essential to communicate our scientific endeavors to the general public & to create a more diverse scientific community.

- ***Virtual visits***: offering the world a glimpse into research conducted at ATLAS.

ATLAS Virtual Visits: Bringing the World To our Detector

- Outreach efforts are wide and varied!

- ***Educational material***: books, fact sheets etc. for all levels, in **various languages**.

**All LHC experiments have active outreach efforts*