ICHEP2018 SEOUL

XXXIX INTERNATIONAL CONFERENCE ON *high Energy* PHYSICS

JULY 4 - 11, 2018

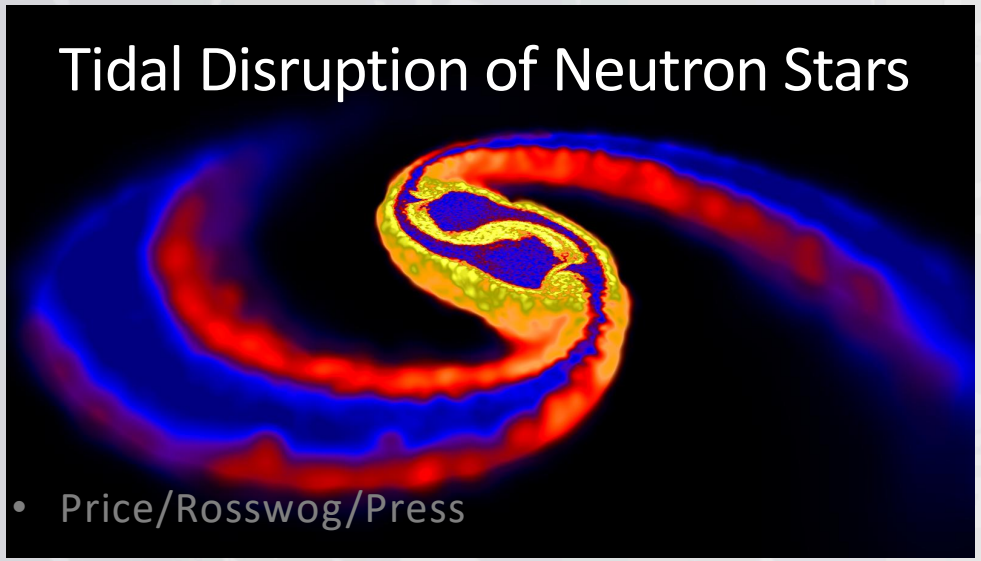
COEX, SEOUL

Diversity & Inclusion

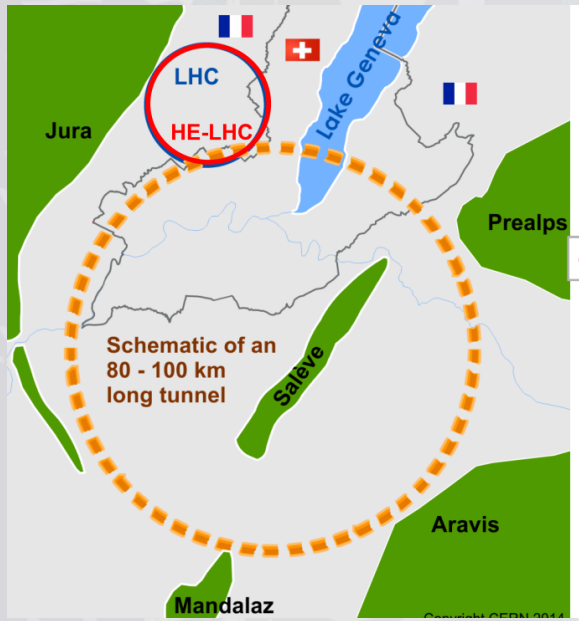
Sahal Yacoob

University of Cape Town

Tidal Disruption of Neutron Stars



- Price/Rosswog/Press

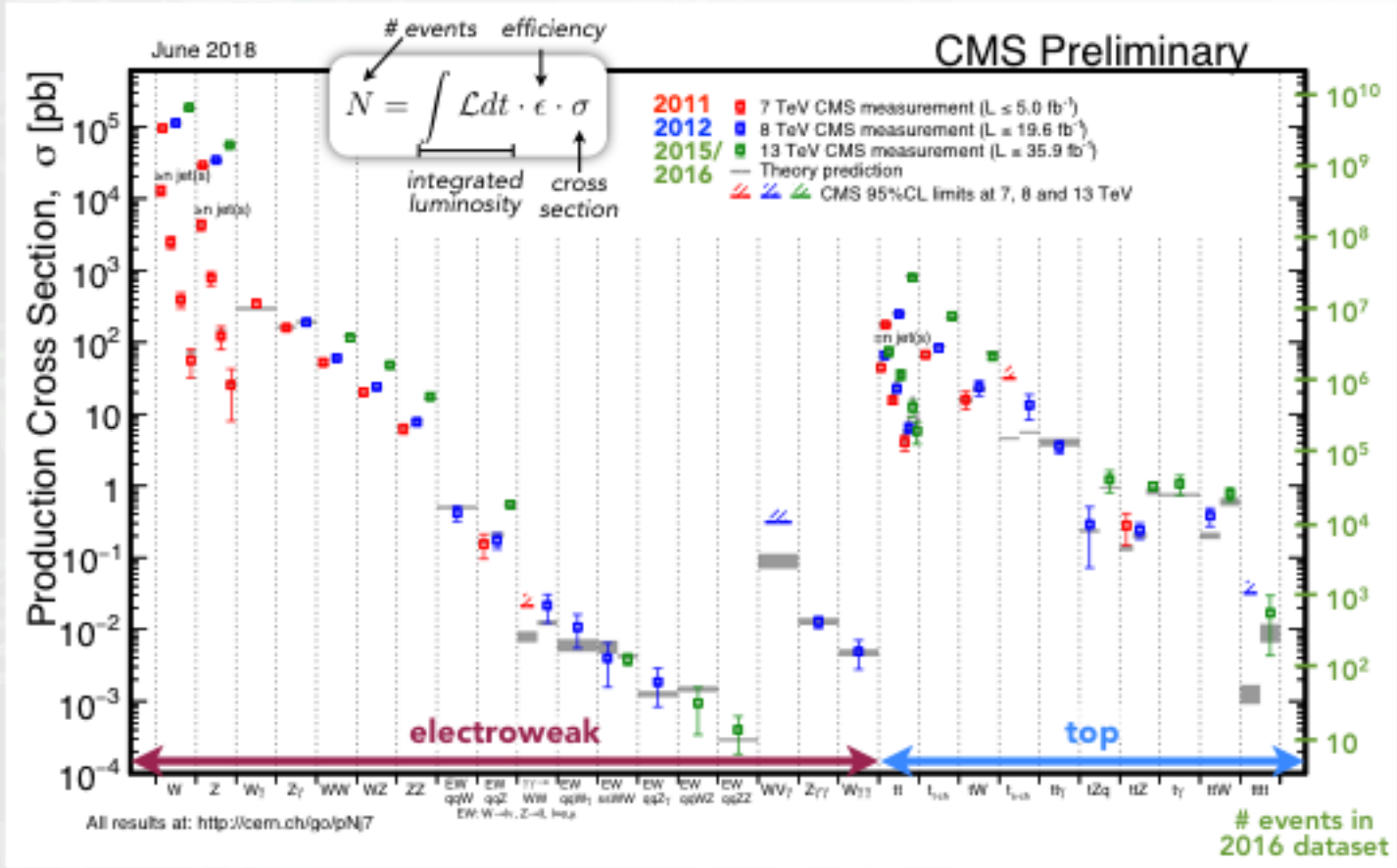


International FCC collaboration (CERN as host lab) to study:

- ***pp*-collider (*FCC-hh*)**
  → long-term goal, defining infrastructure requirements

~16 T ⇒ 100 TeV *pp* in 100 km

- **~100 km tunnel infrastructure** in Geneva area, site specific
- **e^+e^- collider (*FCC-ee*),** as potential first step
- **HE-LHC** with *FCC-hh* technology
- ***p-e* (*FCC-he*) option,** IP integration, e^- from ERL



This is also our world

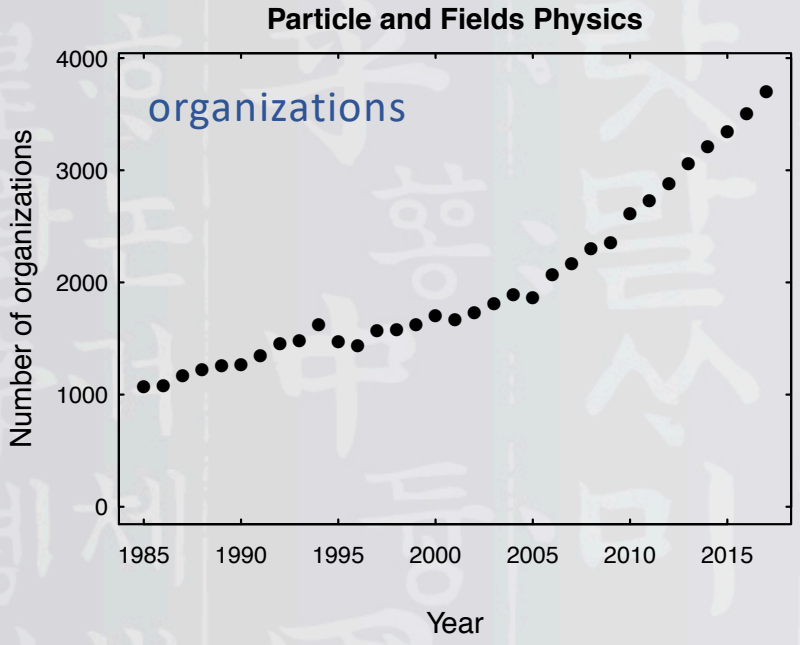
- **World Bank and WHO: Half the world lacks access to essential health services, 100 million still pushed into extreme poverty because of health expenses**
- **Fundamental to achieving universal health coverage is equity. All women and girls – rich or poor, urban or rural, educated or illiterate – must be able to access the health services equally. But, in low- and middle-income countries, the proportion of births attended by skilled health personnel differs by up to 80 percentage points between the richest and poorest women. The presence of skilled health personnel during childbirth is a key to preventing maternal and newborn deaths.**

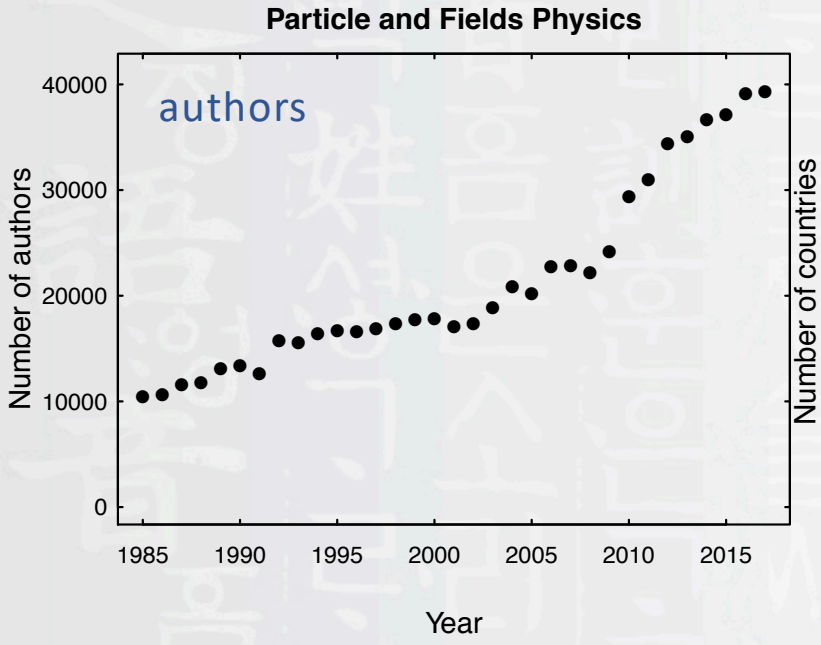
So … What's this all about then ?

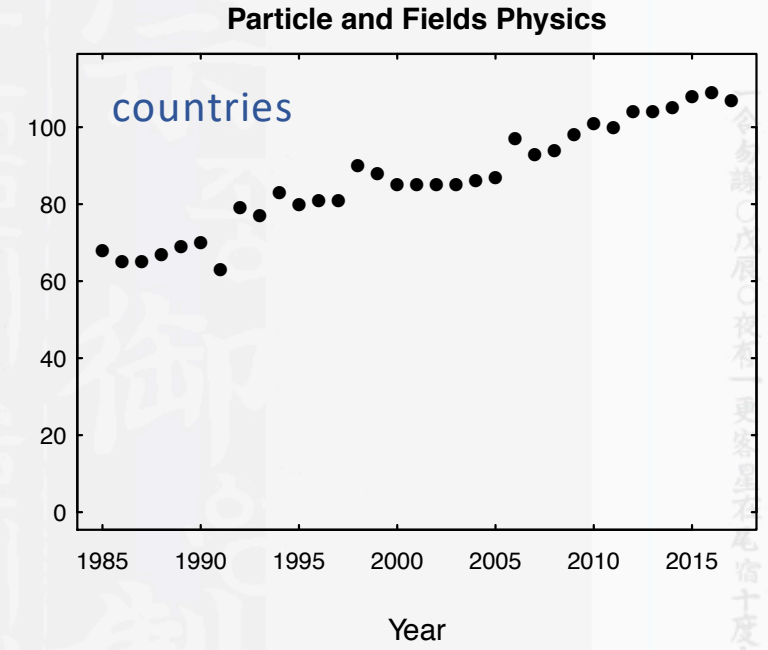
- Diversity:
  Measure of Variety
  (How many types of each identity)
- Inclusion:
  Behaving in a way that encourages diversity

How active are we ?

Maria Grazia Pia

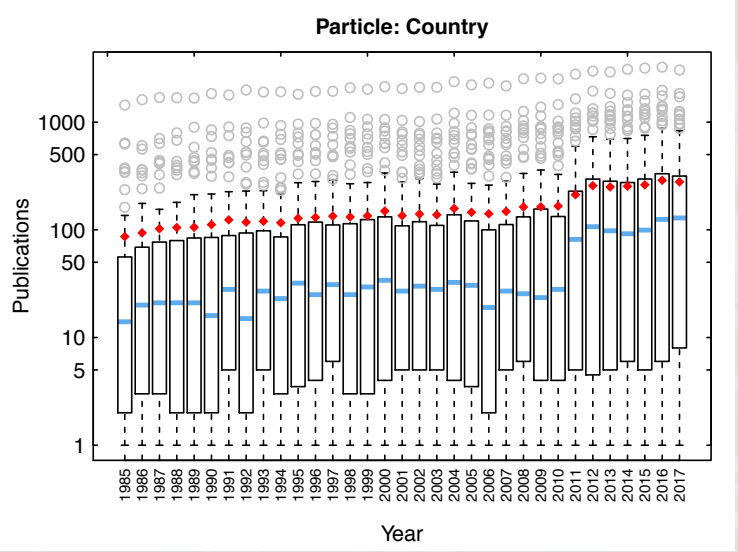


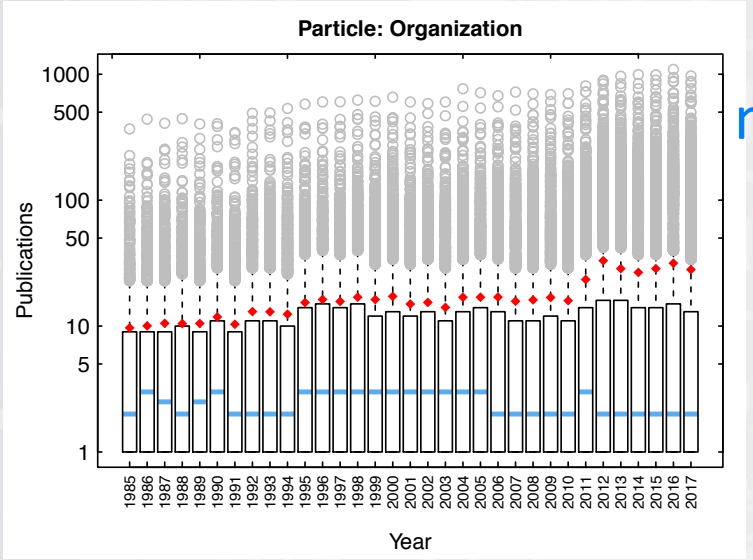




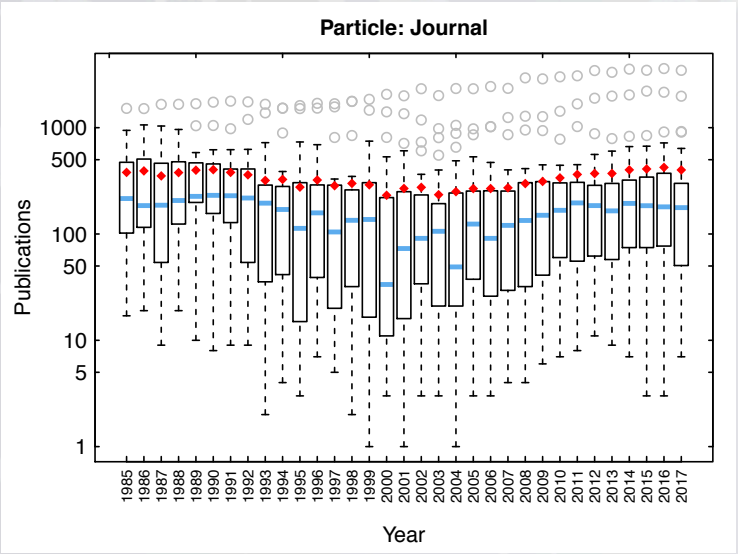
General increase of the number of publications, of journals, of participating countries, organizations and authors

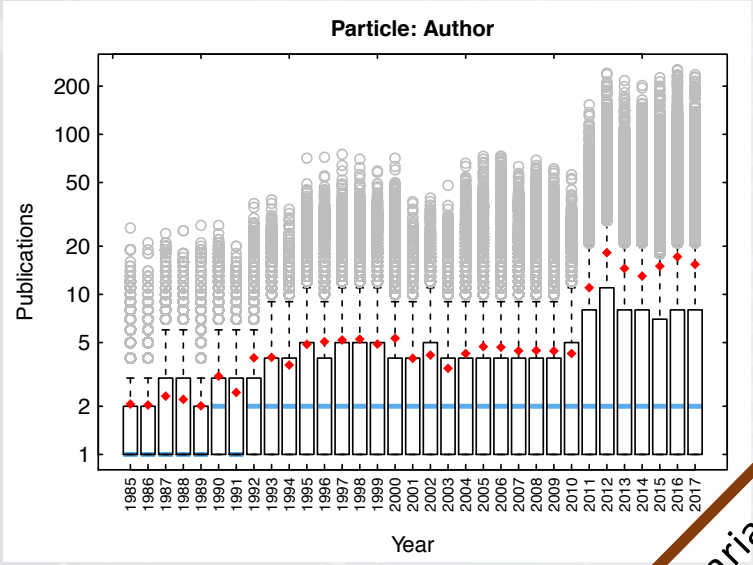
Who is publishing ?





mean
median





Contradiction:
low and approximately constant **median**,
outliers extending up to very large number of publications

Food for thought:
scientific and sociological implications

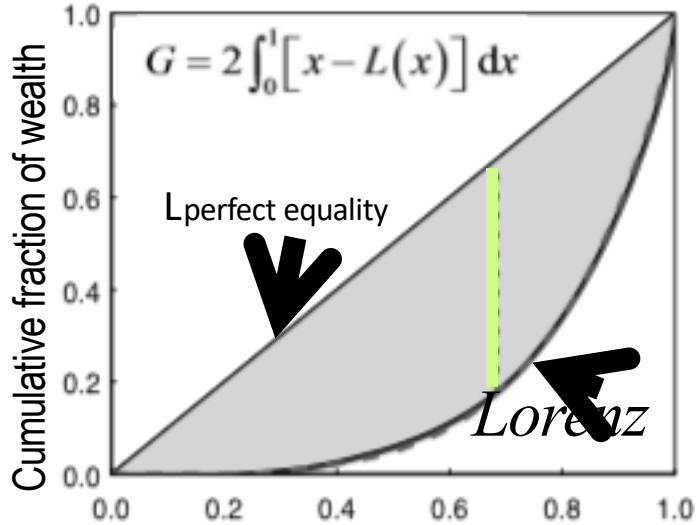
Maria Grazia Pia

How Equal are we ?

Gini index

C. Gini, Variabilità e mutabilità : contributo allo studio delle distribuzioni e delle relazioni statistiche, 1912

Most common measure of inequality

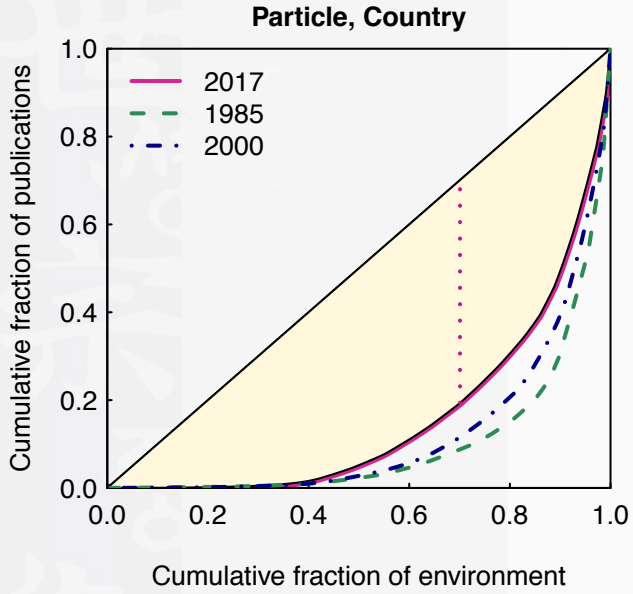


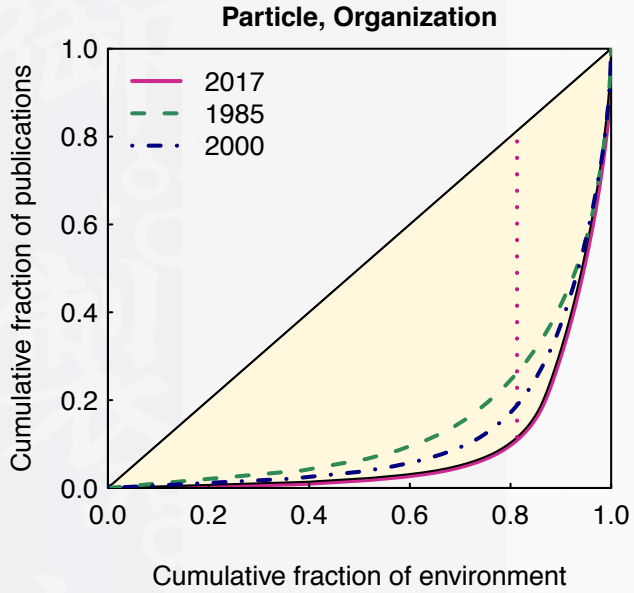
"The x richest people in the world are worth more than the poorest y%"

$0 \le G \le 1$

0 → 1

more unequal society



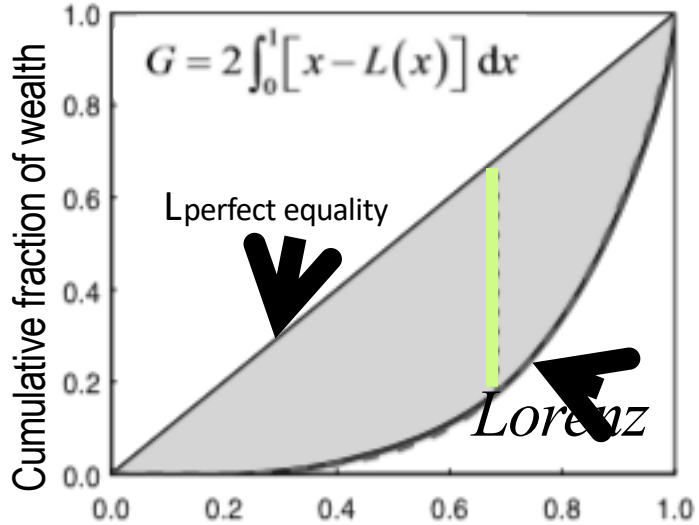


Equality

Gini index

C. Gini, Variabilità e mutabilità : contributo allo studio delle distribuzioni e delle relazioni statistiche, 1912

Most common measure of inequality

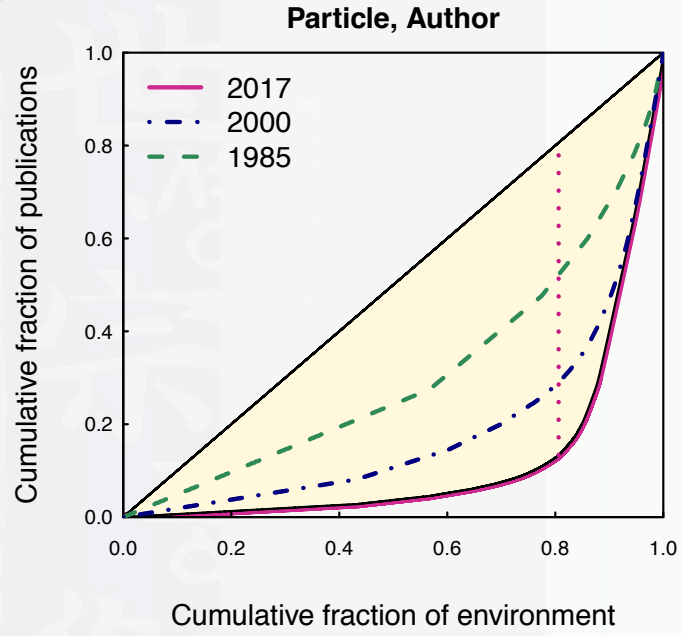


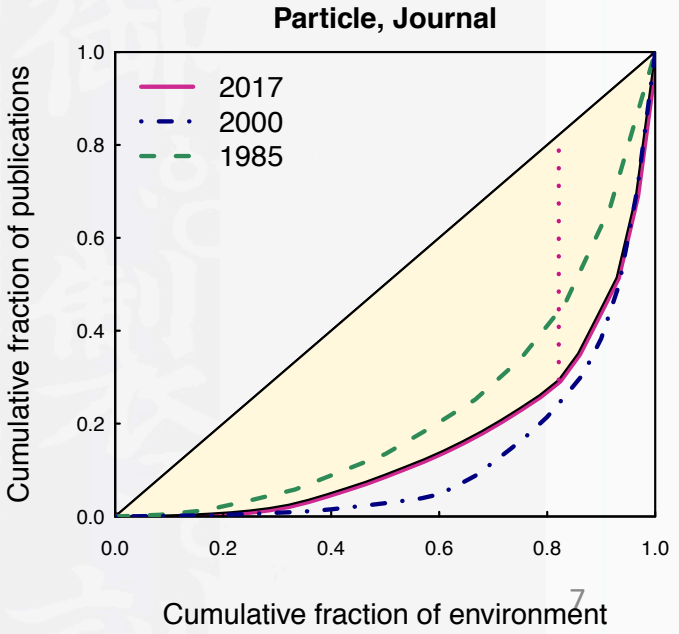
"The x richest people in the world are worth more than the poorest y%"

$0 \le G \le 1$

0 → 1

more unequal society

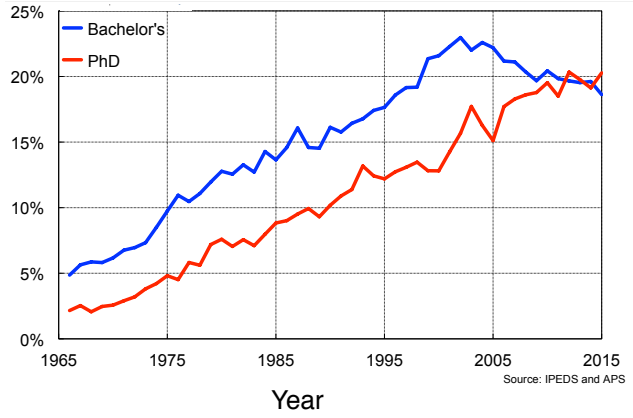




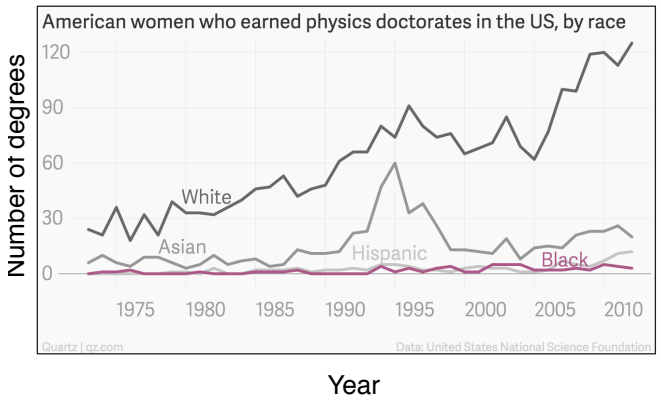
Participation of women

- Physics continues to be the least diverse of the sciences
  - Initiatives to increase the participation of women in physics has yielded positive results
- The increase of women in physics is mostly attributed degrees earned by white women

Percentage of women in physics

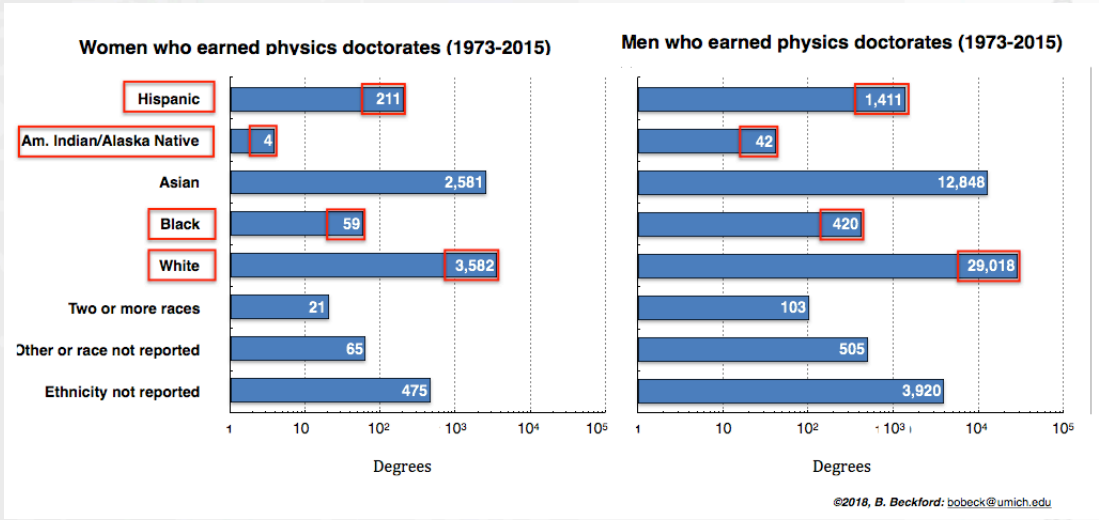


PhD degrees earned by women in physics by race



URM's in the USA

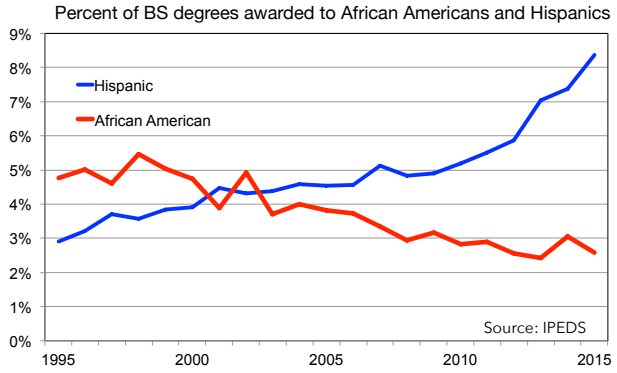
African American comprise approximately 13 % of the U.S. populations

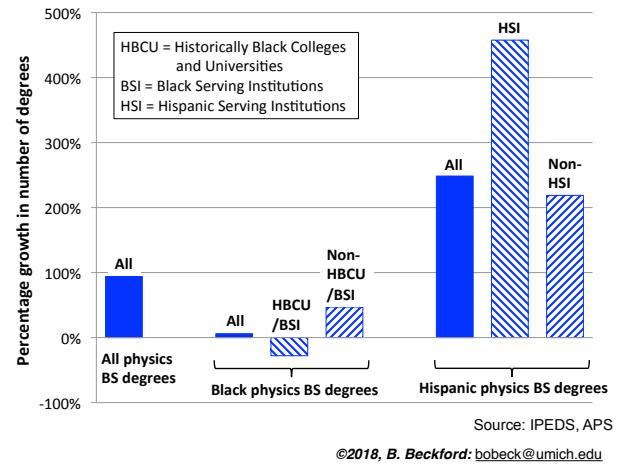


Brian Beckford

TEAM-UP

- Number of physics BS earned continues to increase
- 130 % increase since 1999 low
- African Americans are 15% of college students, and there was ~10% increase in overall BS (2003-2013)
- Percentage of physics African Americans BS continues to be low (2-4%)
- Physics and astronomy is not benefitting from growth in African American degrees





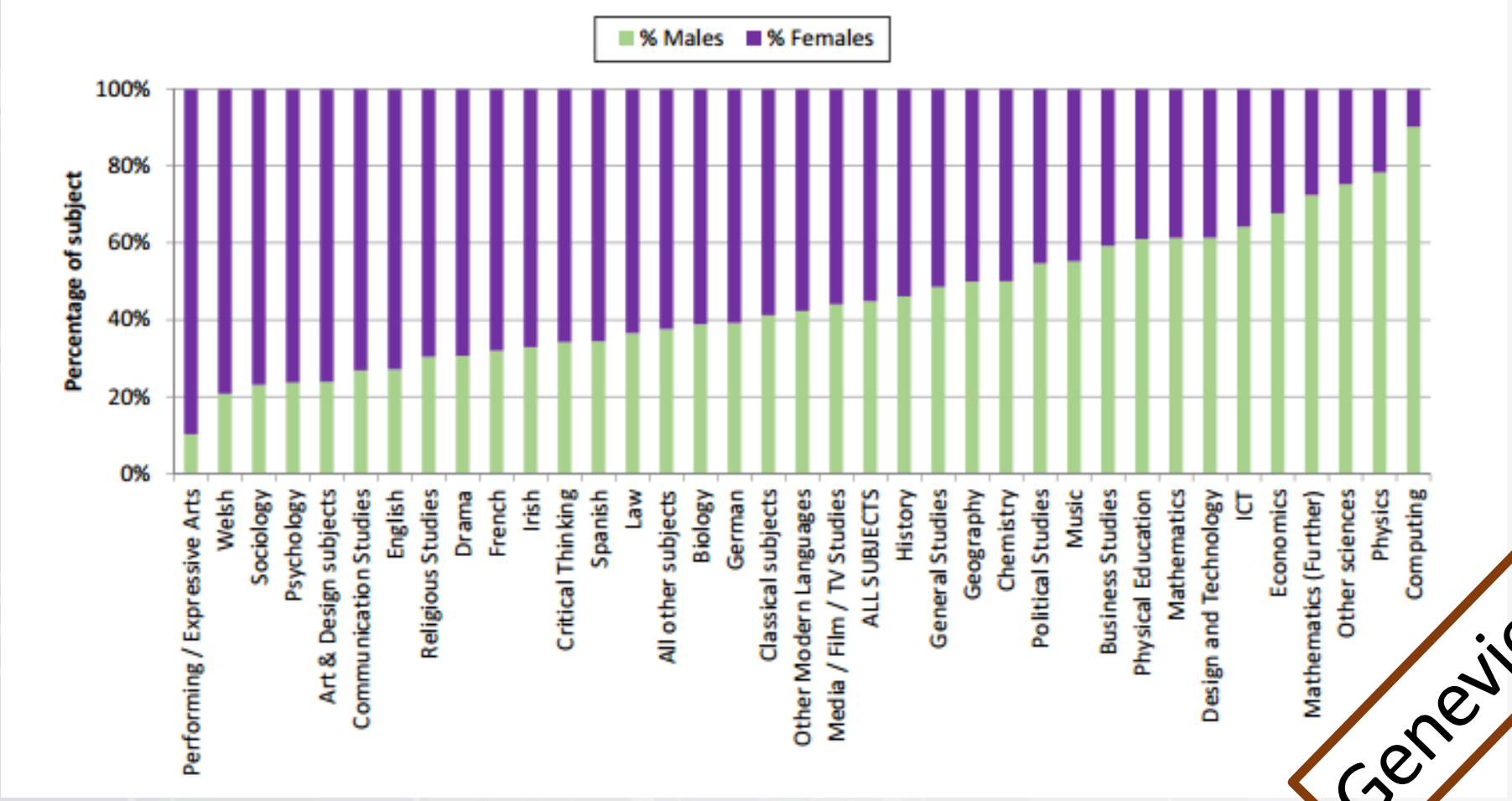
Formed fall 2077 to examine and assess the reasons for the persistent underrepresentation of African Americans in physics and astronomy (BS level)

- Long term goal:
  - *Through broad community based efforts we aim to bring the percentage of African American physics & astronomy BS to parity with their overall graduation rate*
  - *(4%—>9%)*
- Produce a report that will include (~fall 2019)
  - *Findings from our study*
  - *Institutional case studies featuring innovative programs and student narrative*

TEAM-UP

- Achieved via:
  - Consulting prior research
  - Surveys (students and departments)
  - Site Visits
- You can help:
  - Distribute survey to African American students
    - https://www.aip.org/diversity-initiatives/teamup-survey
  - Share information with Task Force on innovative programs that have increased African Americans undergraduate participation
  - Share your ideas for solving this problem

Difference between male and female A-level subject choices - UK



Genevieve Guinot

CERN Teacher Program: aim and assumptions

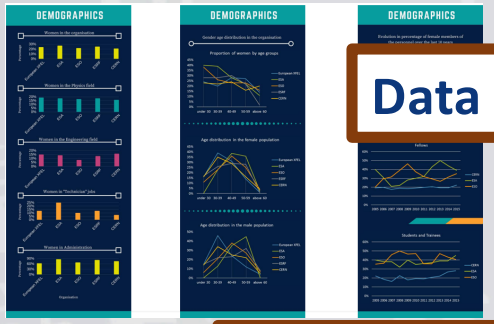
- **Encourage** school kids and in particular girls to take up science subjects
- Contribute to **the reduction of the gender gap in the field** by
  - Raising awareness on gender equality in STEM / in physics
  - Helping teachers re-think their teaching methods
  - Learning from each other
  - Disseminating tools for an inclusive classroom

- Assuming that teachers are not trained to teach to a **diverse audience**
- Using the **amplification power** of the Teachers community

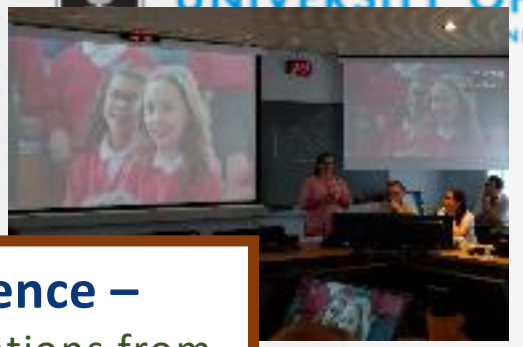
ICHEP2018 SEOUL XXXIX INTERNATIONAL CONFERENCE ON high Energy PHYSICS
JULY 4 - 11, 2018 COEX, SEOUL

UNIVERSITY OF CAPE TOWN
IYUNIVERSITEIT VAN KAAPSTAD

Objective 1 : to equip teachers with tools to understand the issue of gender balance / gender equality in their science classroom, through:



Data – STEM, Physics, CERN



Sharing experience – Teachers' observations from their classroom

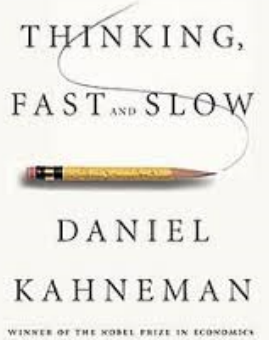
Introduction of concepts – Application to the classroom

GENERA

Information on initiatives – local and global

OECD PISA study on gender equality in education.

Input from research and practices – meet experts / explore research papers



Interviews with female scientists at CERN

Content developed in collaboration Dr Isabelle Collet - Senior lecturer in Education and Associate Researcher at the Institute of Gender Studies - University of Geneva

ICHEP2018 SEOUL XXXIX INTERNATIONAL CONFERENCE ON high Energy PHYSICS JULY 4 - 11, 2018 COEX, SEOUL

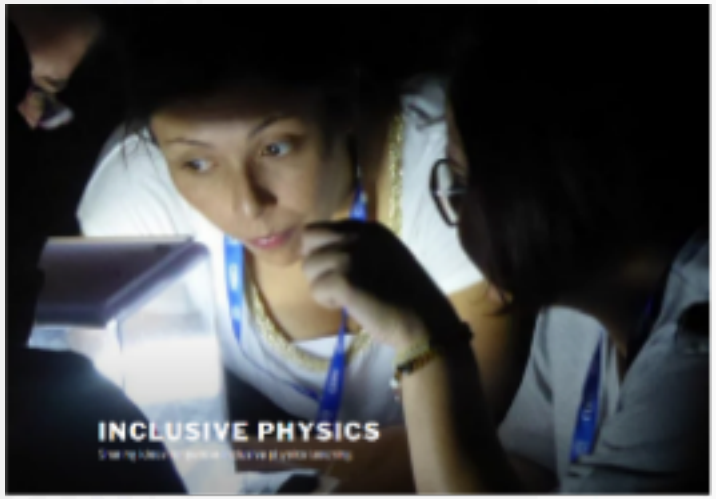
How?

UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

Objective 2 : to establish concrete and realistic actions teachers will be able to implement in their classroom

Examples of actions implemented by previous participants:

- Open activities – science fair to teach the scientific method (BE)
- "Buddy system" for higher grades (UK)
- Introduction of reflection time and open enquiry activities (UK)
- Implementation of an alternative way to prepare students for evaluation (ZA)
- Workshop for teachers (CO)



Objective 3 : to disseminate the lessons learnt and tools developed

⇨ **Output of 2016 work group : a leaflet with country-specific approaches, learnings from the interviews and advice on how to support a gender inclusive environment in the physics classroom**

⇨ **Output of 2017 work group : a collaborative website**
http://www.inclusivephysics.org/tips-for-gender-inclusive-teaching/
⇨

What teachers take home…

- **Reflection time:** studies have shown that giving students the opportunity to reflect on the learning process and outcome (e.g. a learning journal), increases the pleasure of learning for both genders significantly.
- **Collaboration, rather than competition:** by nurturing an environment that is based on collaboration (e.g. through group work) rather than competition, girls' interest in the subject can be sparked. Research has shown that girls are less engaged if the learning environment is competitive.
- **Avoiding stereotypes:** we all have biases and as a teacher it is especially crucial to be aware of the remarks and examples being used to avoid common stereotypes, e.g. girls being generally better suited for social sciences and languages.
- **Open enquiry activities:** opportunities for debates, e.g. on the ethical implications of science for society, allows the students to experience science in alternative ways.
- **Avoid painting science pink :** adapting classroom examples to a stereotypical image of girls does not work to get more girls into science.
- **Role models:** pointing out positive female role models in science and engineering and at all career levels can counteract the stereotypical image of a mature male scientist.

ICHEP2018 SEOUL XXXIX INTERNATIONAL CONFERENCE ON high Energy PHYSICS JULY 4 - 11, 2018 COEX, SEOUL

UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

Inclusion at LHCb

Simon Akar

ECGD Office's mandate

We note that the report addresses both concerns related to gender and diversity, in particular the specific difficulties encountered by women physicists, but also the challenges that all physicists face in the early stages of their career (typically while a student, or in a first or second postdoc position). In the below, therefore, we speak of Early Career, Gender and Diversity (ECGD).

1. We shall appoint two ECGD Officers, one man and one woman, with the following mandate:
   i. **to advise the management on ECGD matters**;
   ii. **to be available for listening to and advising colleagues**, in a **confidential manner**, who feel that they are the **victims of harassment**, **discrimination**, or **other inappropriate behaviour**;
   iii. **to collate regular statistics** and other relevant information related to gender and, where appropriate, other ECGD matters, **so that the collaboration's progress in this area can be monitored** (see 3.);
   iv. to assist the management in **scheduling regular open meetings where ECGD matters can be discussed** (see 4.).

ECGD in practice

- **Avoid alienating people with preaching, moralising, regulating**
  - **Work with (not against) our collaborators, the vast, vast majority of whom have an extremely positive attitude, to improve working conditions for all**
  - **Not a "police force"**
- **Activities related to mandate**
  - **Organize regular meetings within the collaboration**
  - **Monitor gender/diversity balance in the collaboration, as a function of age (leadership positions, talks, …)**
  - **Support newcomers to LHCb**
  - **Confidential listening & advice**
  - **Advice to management as needed**

Inclusion at LHCb

Practical steps

- **Being an international collaboration, LHCb** reflects the international community, and as such **cannot completely isolate from biases / prejudices inherent in our society**
- … but we can **reduce obstacles and sources of inequality within the collaboration**
  - **Explicit discrimination** (usually easy to spot)
    - Sexist comments and jokes
    - Different treatment of male and female students
  - **Implicit discrimination** (less obvious to spot)
    - "Male"-dominated work environment
    - Structures that disfavour women getting senior positions

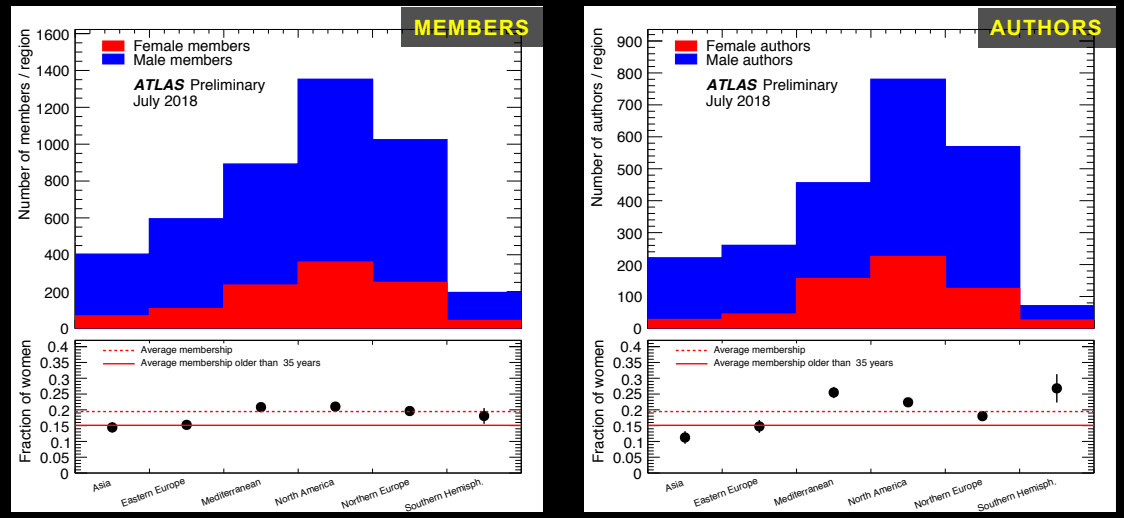
Practical steps

- Identifying problems is **important but not sufficient!**
- **Recognise our (LHCb's) limitations**
  - Collaboration does not control hiring/recruitment/retention
  - Nor demographics of incoming population
  - Nor policies of member institutions, countries (for parental leave etc)
- **Important rôle for ECGD**
  - **Raise awareness**
  - **Propose "good practice" to alleviate ill effects of implicit discrimination**
    - If a WG convenor (or similar) takes **parental leave** (or similar), they are guaranteed to be able to **return and resume their mandate**
    - If **offered a talk** by SB, people are **free to decline** without giving a reason, and are not penalised
    - **Systematically indicate gender balance** when showing nominations or membership for SB, EB,WG convenors, …

Diversity of ATLAS

Luis Roberto Flores Castillo

Gender vs Region



Fraction of women: 12 to 23%
Lowest: Asia; highest: Mediterranean, North America, Northern Europe
Larger amongst younger members in all regions

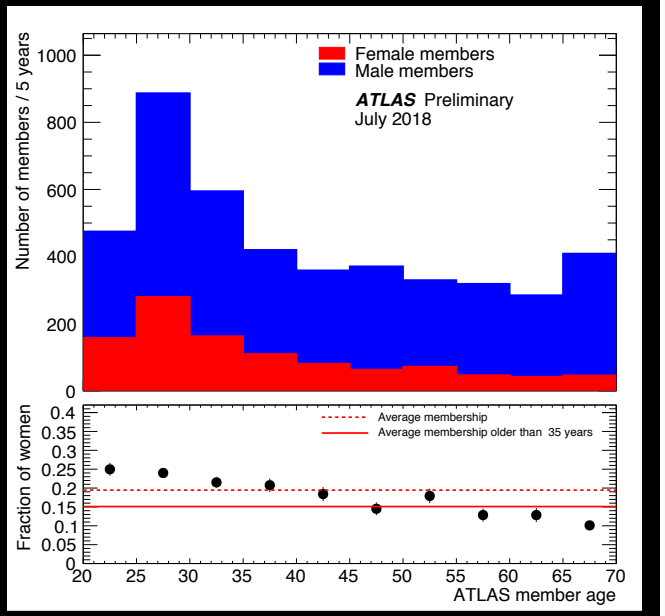
Age of ATLAS members

Members' ages span over seven decades

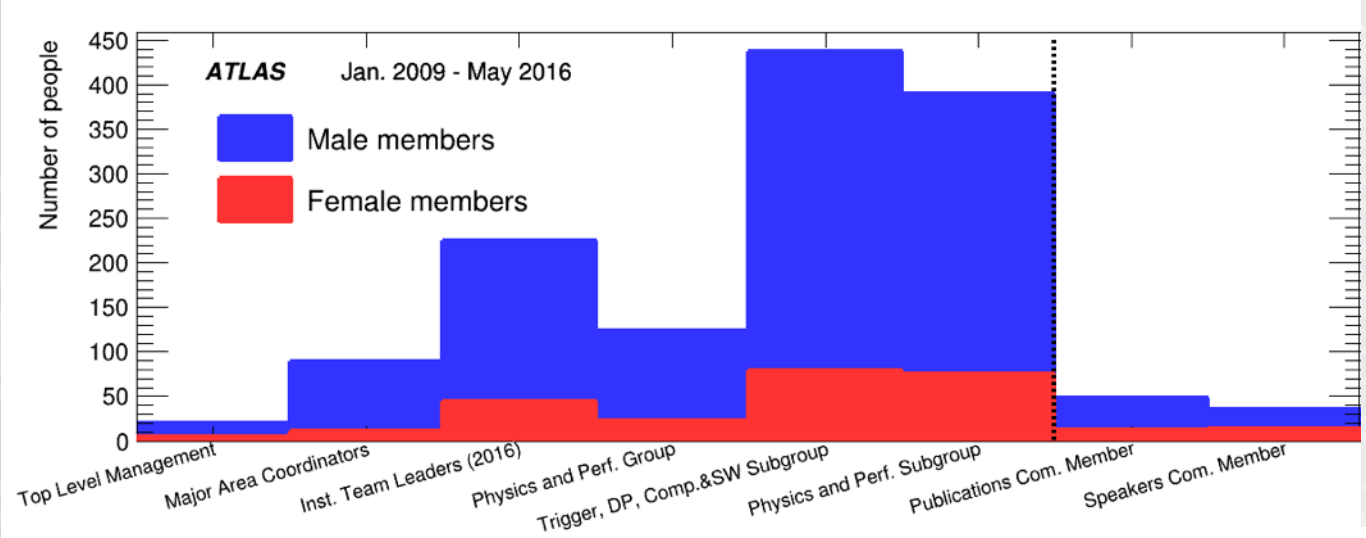
~ half (2,483) < 35 yo

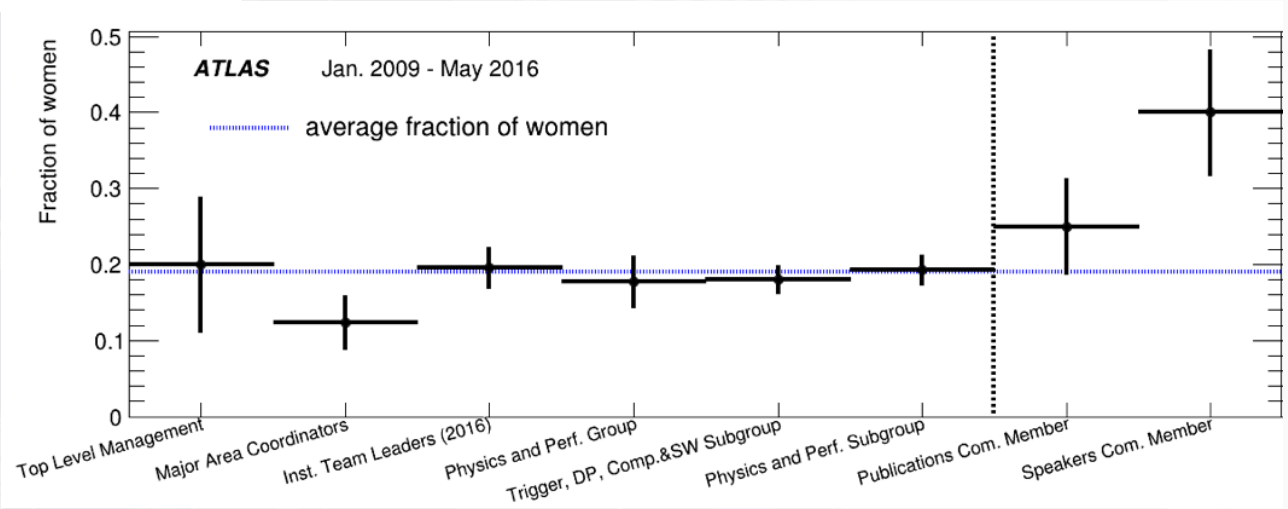
Fraction of women vs age:

- Largest: age < 25 (~ 25%)
- For age ≥ 65, it falls to ~ 10%
- Age ≤ 35: 23±1 (%)
- Age ≥ 35: 15±1 (%)



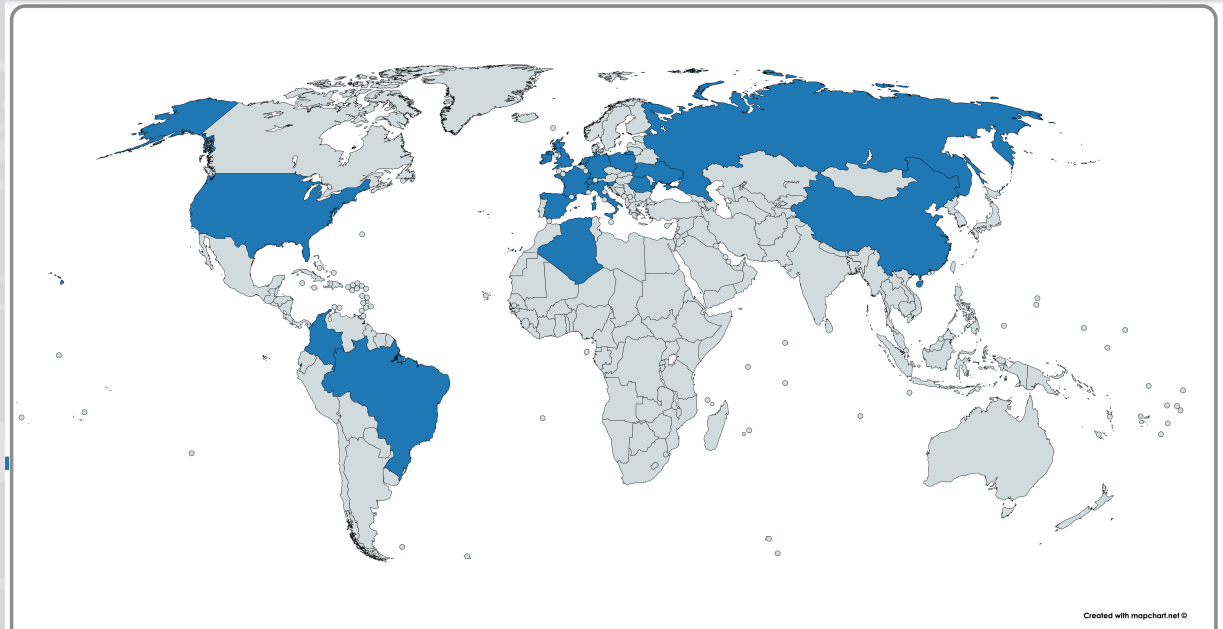
Diversity of leadership positions (ATLAS)





Who works at LHCb and ATLAS ?

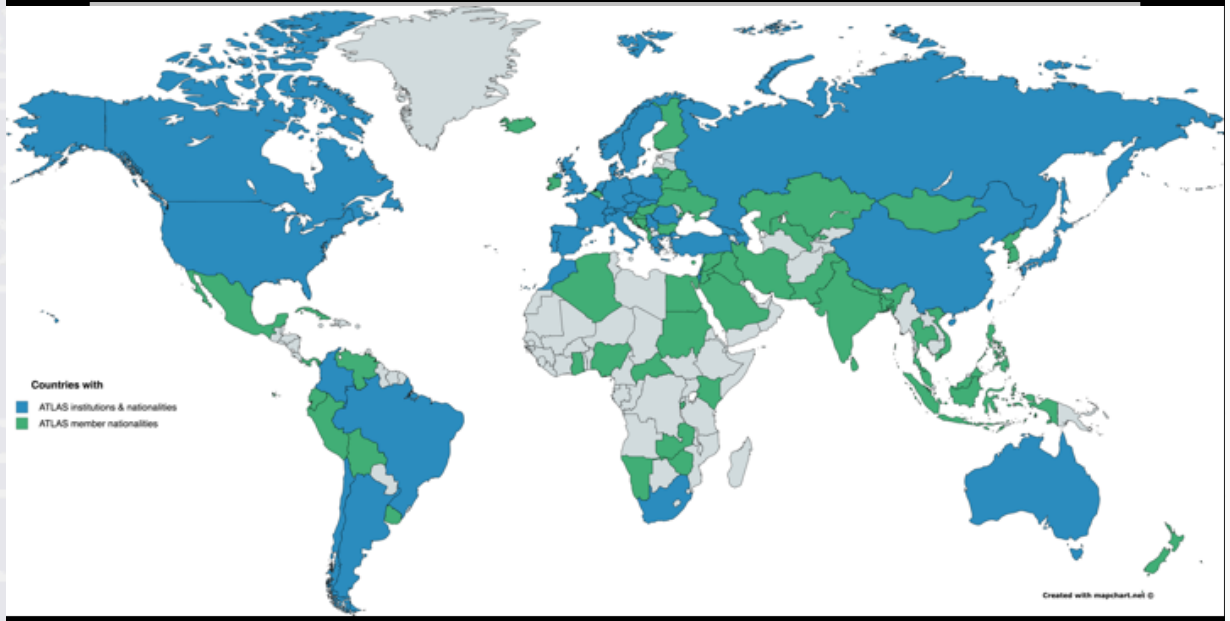
Setting the scene



~1260 members from 79 institutes in 18 countries
(as of June 2018)

Simon Akar ICHEP 18' - ECGD @ LHCb 3

Region



38 countries with member institutions; green: at least one ATLAS member

10 Regional, Age and Gender Demographics in the ATLAS Collaboration July 7, 2018 ATLAS EXPERIMENT

Physics Diversity and Inclusion in Africa

Africa has a diverse range of challenges:

Some countries need to deal with internal exclusionary legacies: e.g. Apartheid SA had regulations that restricted the majority African population from studying mathematical sciences.

Youth in Africa constitute 19% of the global youth population in 2015. In Africa 60% of the population is below 25 yrs. Population is about 1.2 billion

Azwinndini Muronga

SKA and opportunities for collaborations

Major research stations located outside the club: change in global engagements

SKA - The largest radio astronomy observatory to be (co-) hosted by South Africa (70%) and Australia (30%) : meaning that two Global/Geographical South nations will be at the heart of managing and driving the project; and this will add a new dynamic to the nature and culture of global collaboration – also fostering inclusion

Africa and in particular Southern Africa has geographic advantage in astronomy research (besides point of human origins)

In Africa the diversity challenge is both local and global.

Multi-messenger astronomy

Successful Interventions

African Conference on Fundamental Physics and Applications

THE BIENNIAL AFRICAN CONFERENCE ON FUNDAMENTAL PHYSICS AND APPLICATIONS

- **International Organizing Committee (IOC)**
  - The IOC is the main organizer of the school
- **Local Organizing Committee (LOC)**
  - Local committee in the host country
- **International Advisory Committee (IAC)**
  - Advises on various aspects of the organization including fund raising

Azwinndini Muronga

WiPiSA Lunch Conversations

"Fixing" the work culture

Implementing policies to help the Organization move away from normative views on

⇨ Families

⇨ Career commitment

⇨ Two main areas of work

- ❑ Inclusive family definition and family friendly policies
- ❑ Work-like balance policies

in a context of international mobility

Genevieve Guinot

Area of work – Inclusive definition of family

- *The old "ideal" family : married man and house wife, with children, living under the same roof*
  - ⇨ Registered partnerships are recognised irrespective of the country of recognition; same rights as marriage
    - residence permit in Switzerland and France
    - work permit in Switzerland, under certain conditions
    - various family benefits for employees (financial and social)
    - partner's children recognised as family member by the Organization
  - ⇨ Equal treatment for installation irrespective of spouse/registered partner moving to CERN area
  - ⇨ Support to dual career /measures to ease social integration
  - ⇨ « Paternity leave » becomes gender neutral

Area of work – Work-life balance

- *The "old" ideal worker: sacrificing life to work*.

⇨ Increased flexibility for new parents:
- guaranteed access to parental leave if a min. of 2 months' notice period is given.
- guaranteed access to part-time work (min. 80%; max. 6 months).

⇨ Increased flexibility of leave scheme, in particular for caring responsibilities or for learning opportunities.

⇨ Increased flexibility in the teleworking programme.

Concluding remarks – from Genevieve

"If we ask employees for their views on a policy, …, what influences them is not the existence of an elegant policy, but the way it was applied to them by their boss." --Pr. John Purcell, University of Bath, UK

⇨Change is not linear, need to

- guide managers in the application of policies
- constant shuttling between policies and their application

The Port Hackathon

Daniel Dobos

diversity and inclusion can accelerate showing the value and impact of fundamental HEP research

The Usual Approach

- Invite Society to our comfort zone
- Explain our needs and solutions
- Connect it to benefits of society

The Port Approach

- Leave our comfort zone to other domains
- Bring our methods to societies needs
- Connect it to our world without need to explain it

THE PorT

:: Better Body Bag ::

Keeping semiconductor detector dry

&

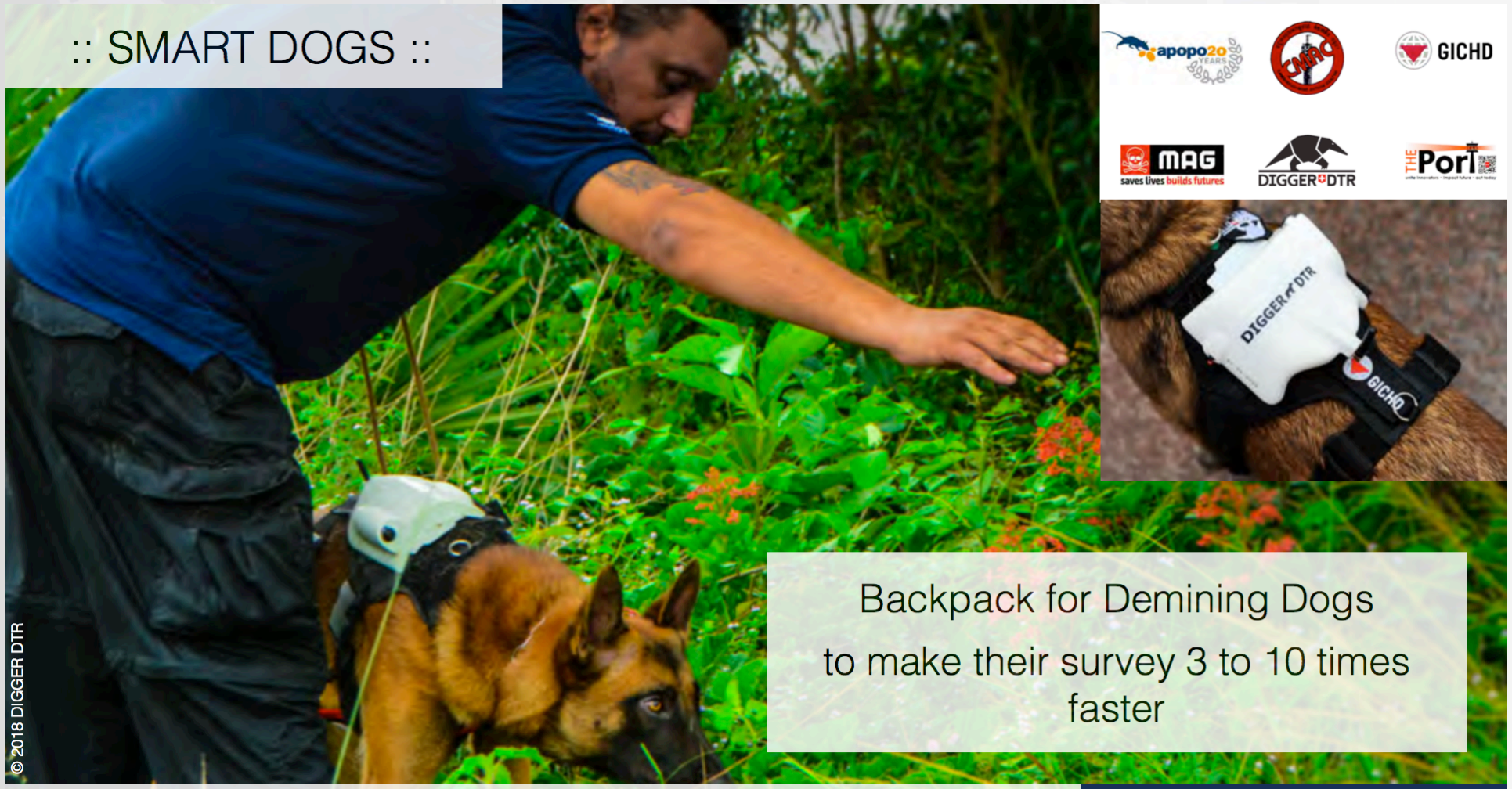
Allowing ICRC Forensic teams to longer visually identify dead bodies

have very similar needs

http://socialsolutionsresearch.com/

D. Dobos :: THE Port :: Using HEP Expertise for Social & Humanitarian Impact

:: SMART DOGS ::



Backpack for Demining Dogs

to make their survey 3 to 10 times faster

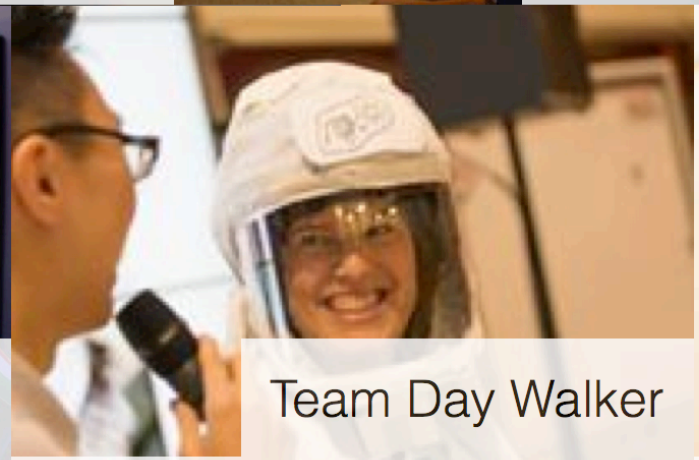
D. Dobos :: THE Port :: Using HEP Expertise for Social & Humanitarian Impact

:: Children with UV Hypersensitivity ::

John Ellis

Jorge Cham

Luca Parmitano



Team Day Walker

D. Dobos :: THE Port :: Using HEP Expertise for Social & Humanitarian Impact

Strategies -- modified from Brian Beckford!

- Broad community wide effort
- *Individuals from marginalized groups are always tasked with fixing everything while doing their science.*
- What can you do to help?
  - *Stop all harassment in STEM*
  - *Learn and be involved; don't only care when its convenient*
  - *Advocate*
  - *Mentor*
  - *Recruit more diverse people*
  - *Implement policies that support inclusion and equity*

ATLAS Regions

- assigned by home institution (not nationality, residence, whether based at CERN)
- ad-hoc definitions (by proximity & to have sufficiently large memberships to discern correlations):

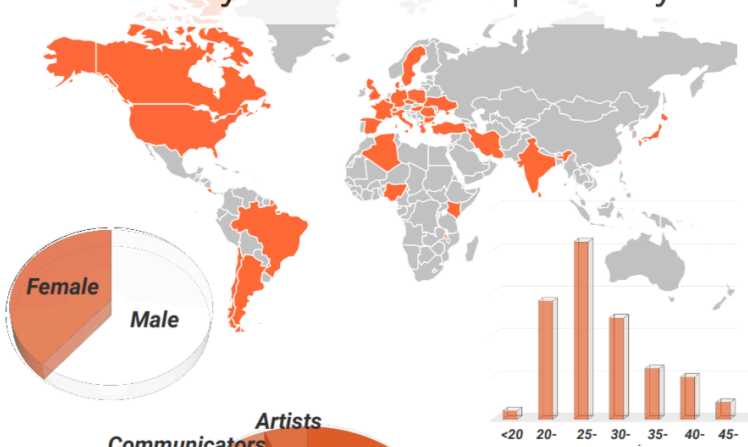
- Asia: Armenia, Azerbaijan, China, Georgia, Japan, Taiwan
- Eastern Europe:Belarus, Czech Republic, Poland, Romania, Russia (including JINR Dubna), Serbia, Slovakia, Slovenia
- Mediterranean: France, Greece, Israel, Italy, Portugal, Spain, Turkey, Morocco
- North America: Canada, USA
- Northern Europe: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

Tackling occupational stress

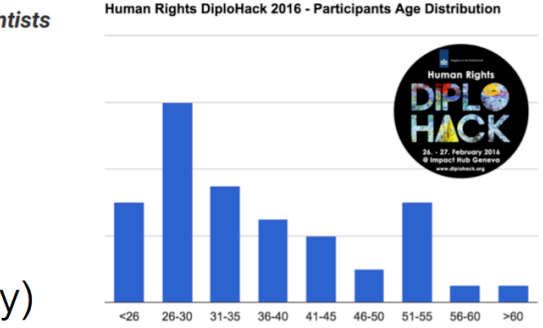
by Fabiola Gianotti

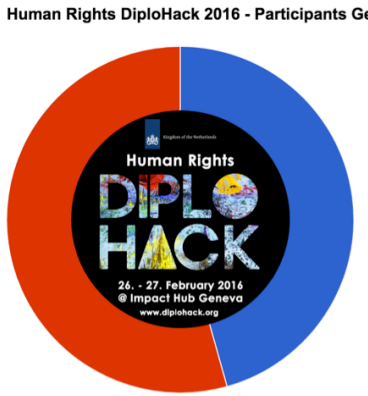
Surveys and studies dating back to the 1990s show that stress in the workplace is on the rise. This has serious consequences for the individuals concerned in terms of their physical and mental health, as well as for their general well-being and personal relationships. For that reason alone, it is incumbent on any responsible employer to address the issue head on. Occupational stress also has a negative impact on productivity due to deteriorating working relationships, reduced quantity and quality of output, and absences.

:: diversity & inter-disciplinarily ::



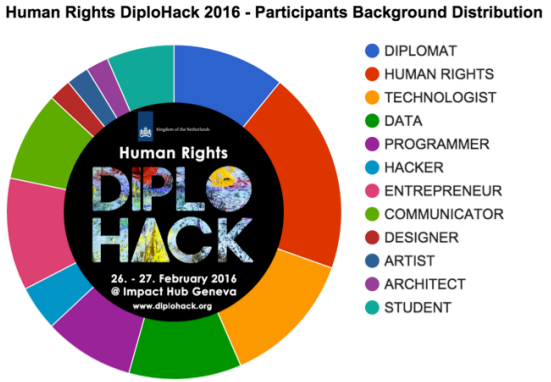
‘Landau’-like age distribution (peak ~30y)





~40-55% female participants

~1/3 human aid
~1/3 technology
~1/3 other backgrounds



D. Dobos :: THE Port :: Using HEP Expertise for Social & Humanitarian Impact