

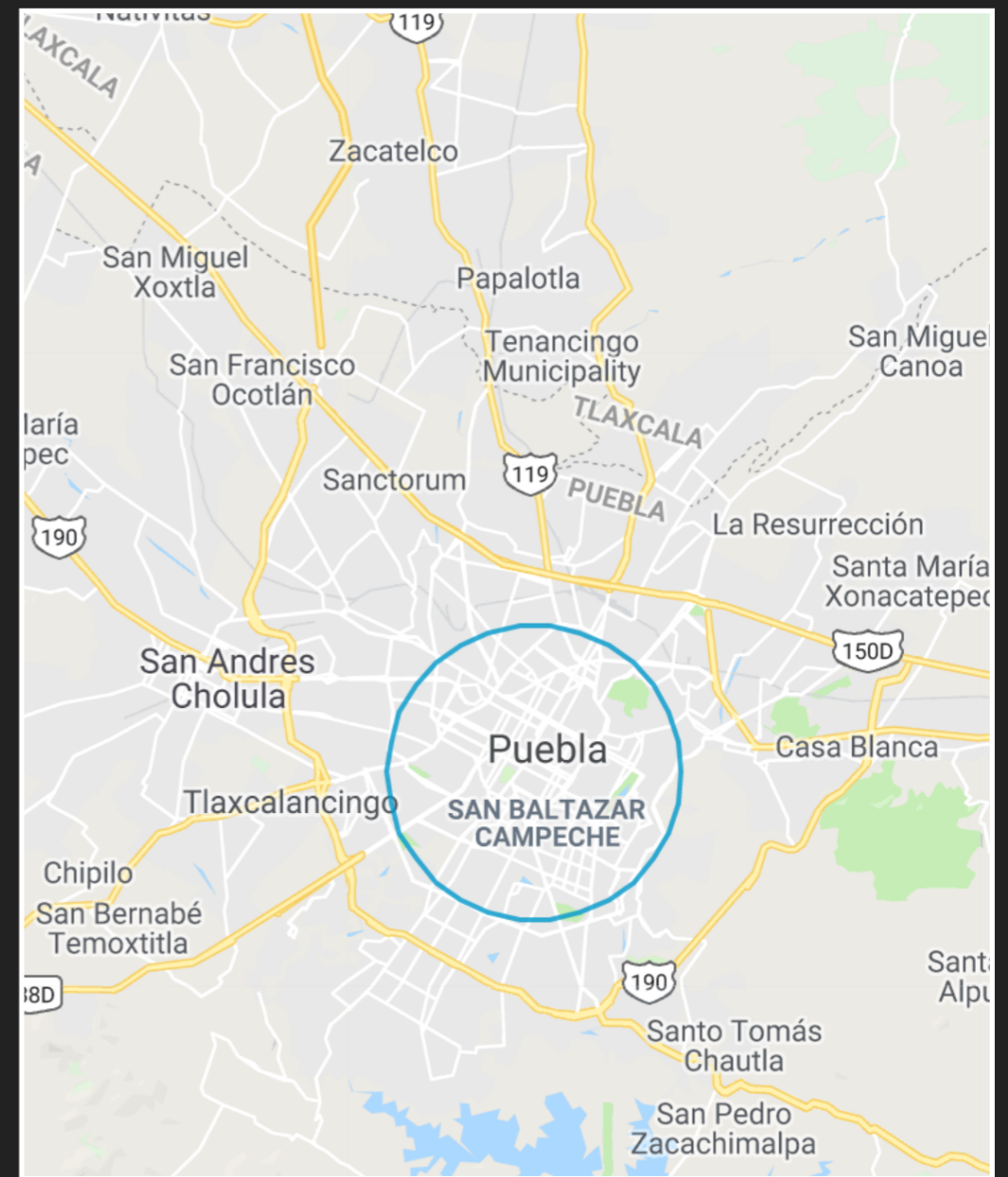
OUTREACH PLENARY

CLARA NELLIST

GEORG-AUGUST-UNIVERSITÄT GÖTTINGEN

LHCP2019, PUEBLA, MEXICO

21.05.2019



howlargeistheLHC.com



GEORG-AUGUST-UNIVERSITÄT
GÖTTINGEN

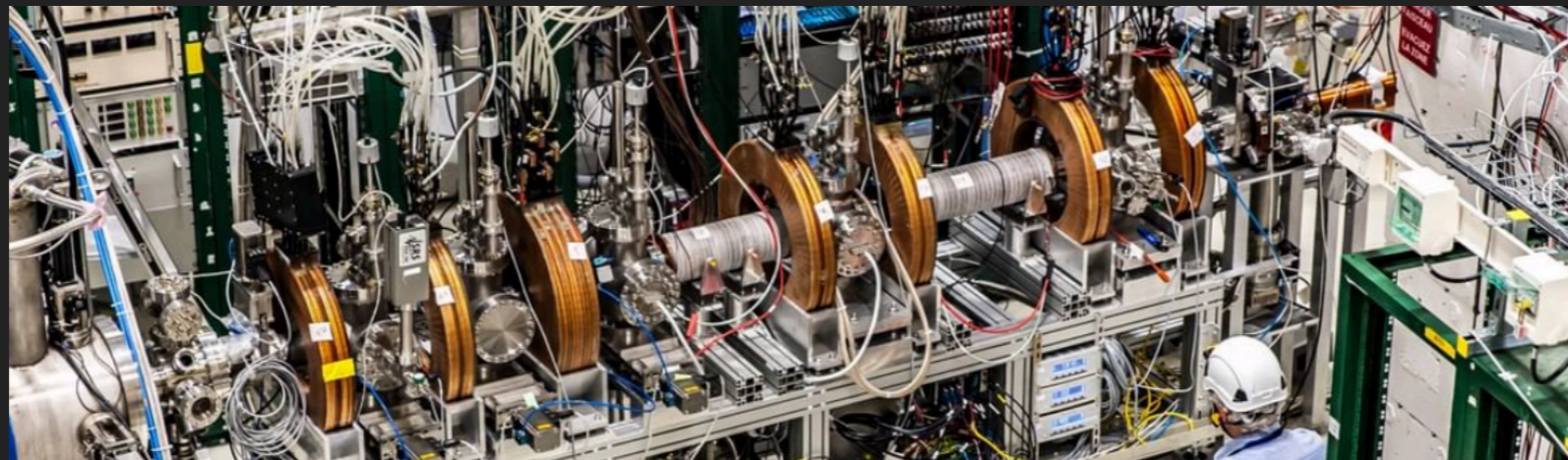
OVERVIEW



GEORG-AUGUST-UNIVERSITÄT
GÖTTINGEN

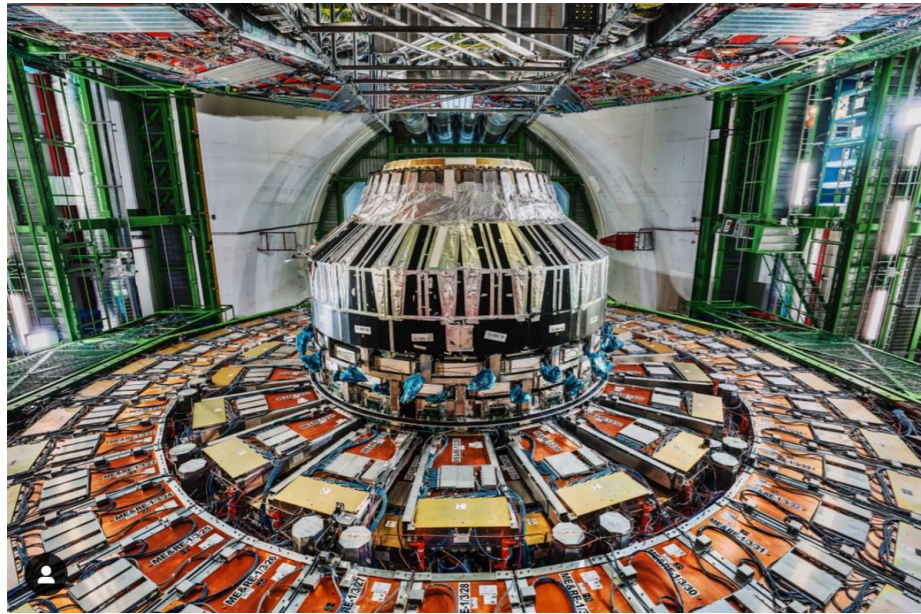
OUTREACH

- ▶ **What we do well.**
- ▶ **Opportunities to expand.**



This talk could cover over an hour, so what I mention here is not an exhaustive list, but a personal selection.

LHC OUTREACH



- ▶ CERN has a well-established history of outreach, communication and education.
- ▶ Each major LHC experiment has an outreach team.
- ▶ Outreach teams coordinate:
 - ▶ Visits, press, online communication (website, social media), events...
- ▶ Many projects also run by individual teams or members of the collaboration.

WHY DO WE DO IT?

- ▶ Present research results to a wider audience.
- ▶ Improve **general interest** in particle physics.
- ▶ Reach potential **new colleagues** who are interested in pursuing a career in particle physics.
- ▶ Lobby **Governments** to support scientific endeavours.
- ▶ Because it's **fun and rewarding**.
 - ▶ A reminder that our research is cool!



Image: CERN

And many more reasons...

WHO ARE OUR AUDIENCES?

Students



Virtual visit from Latvia (Image CMS/CERN)

Children



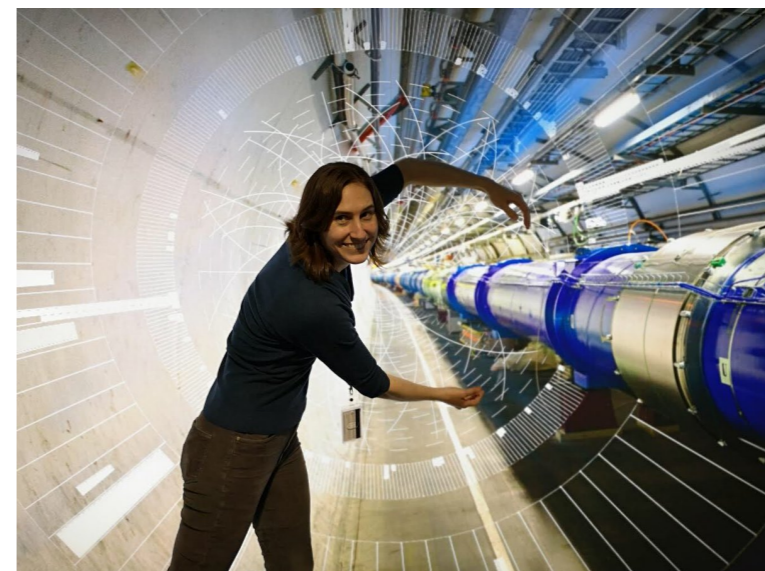
Build your own particle detector at the Nuit de la Science at UniGe. (Image: BYOPD)

Governments



Visit of Ana Brnabić, Prime Minister of the Republic of Serbia, with Mladen Šarčević, Minister of Education, Science and Technological Development (Image: CERN)

Media and social media influencers



Dr Katherine (Katie) Mack during her visit to CERN. (Image: Katie Mack)

Generally interested people



WOMAD2016 (Image: Connie Potter)

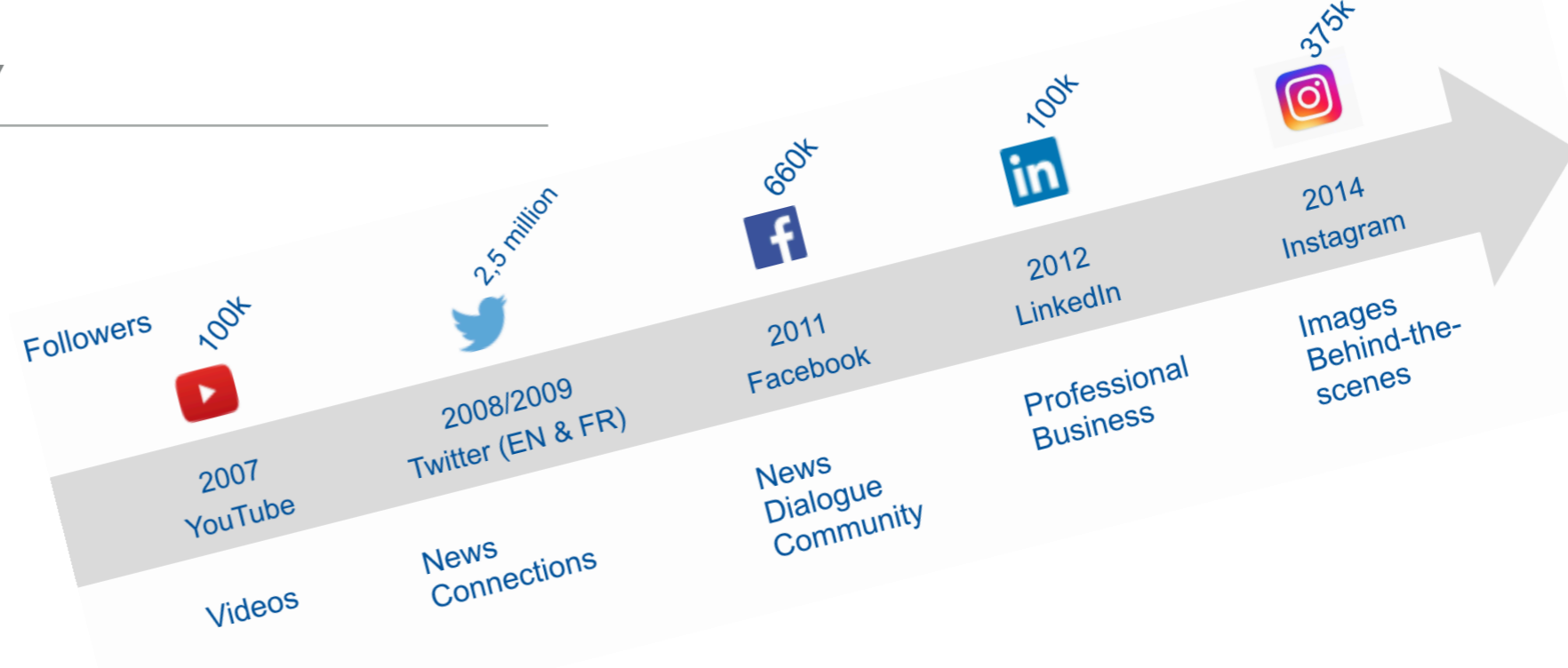
Clara Nellist

And many more... everyone! 5

**If you can't bring
people to the science,
let's bring the science
to them!**

SOCIAL MEDIA

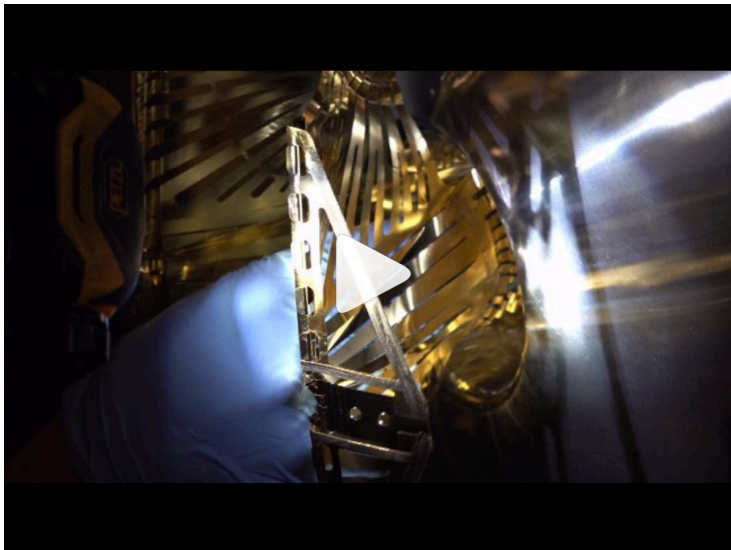
- ▶ Social media has allowed direct communication with various people interested in CERN and research at the LHC.
- ▶ Allows for a two-way conversation with audiences:
 - ▶ AMAs, polls and questions on Instagram stories, comments from audience during facebook lives.
- ▶ Requires constant evaluation of the effectiveness of communication.
 - ▶ The social media landscape is frequently evolving.
 - ▶ For example; changing the aspect ratio of videos.



CERN on Social media (Image: CERN)



SOCIAL MEDIA - THE SCIENCE AND THE SCIENTISTS



lhcbexperiment • Following
LHCb Experiment at CERN

lhcbexperiment • Week 19 of our series of episodes on the preparations for the LHCb Upgrade.

This week, the team focused on the very delicate dismantling of the last beam-pipe section. Furthermore, physicists and technicians carried on their work of removing the Scintillating Pad Detector (SPD) and PreShower (PS) cables and the installation of a platform on top of RICH II.

1,075 views
APRIL 26

Add a comment... Post

CERN • Following
@CERN

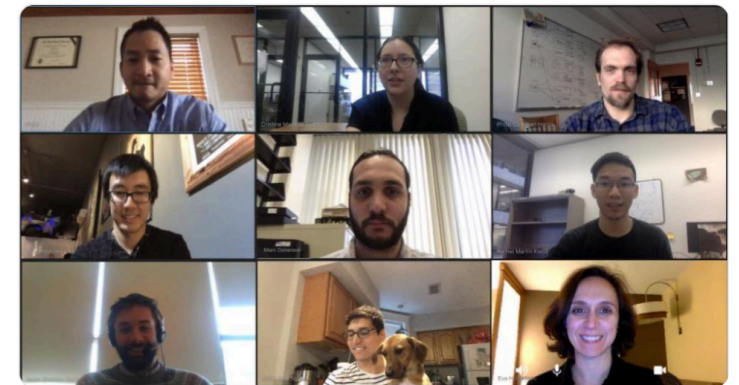
Our #PhotoOfTheWeek shows work being done on the @CMSExperiment's Resistive Plate Chambers (RPC).

Find out more: cms.cern/news/resistive...

alice_experiment • Following

CMS Experiment CERN • Following
@CMSExperiment

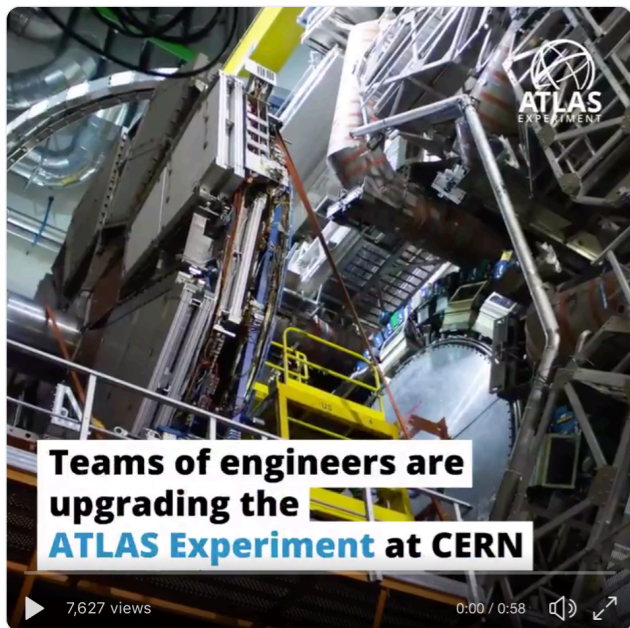
CMS results involve a lot of remote collaboration. The #scientists who worked on the tools to select the jets necessary for the result below (and other similar signatures) met regularly via #videoconferencing. Read more about searching for light bosons: cms.cern/news/casting-l...



2:41 PM - 10 Apr 2019

ATLAS Experiment • Following
@ATLASexperiment

With the #LHC shutdown for 2 years, what's going on at the ATLAS Experiment? Check in with the teams at work underground to upgrade and maintain the ATLAS detector



5:12 PM - 17 Apr 2019

Clara Nellist

ALICE
TOMORROW
Nov 13, 4pm (CET)

FB LIVE from the ALICE experiment Control Room

alice_experiment • Following

alice_experiment • Last week, on 9 November at 9:19pm CET, ALICE and the other experiments at the LHC recorded their first collisions of lead nuclei since 2015. Collisions of lead nuclei will allow ALICE's physicists to study specific phenomena such as quark-gluon plasma, a state of matter that prevailed during the very first moments of the Universe, when the temperature was so high that quarks and gluons were not confined by the strong force into protons and neutrons.

Tomorrow at 4pm CET, we'll be live on the CERN Facebook page from the ALICE experiment run control center to tell you everything about this LHC

Liked by cmsexperiment and 169 others
NOVEMBER 12, 2018

Add a comment... Post

- ▶ The human side is also important.
- ▶ Sometimes have to remind audiences that scientists are people too.



EDUCATION



(Image: Julien Marius Ordan / CERN)



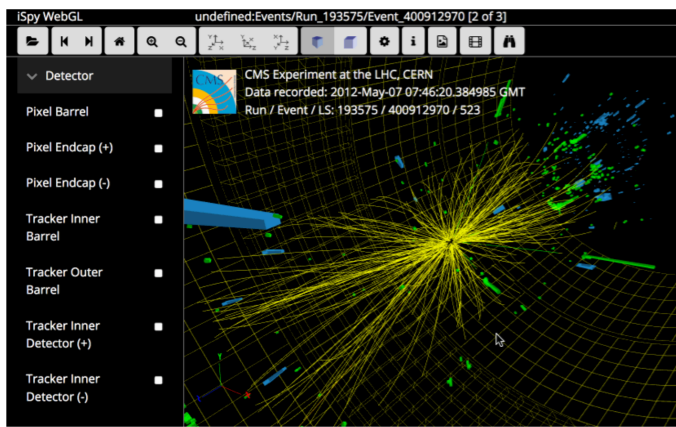
(Image:ATLAS)

- ▶ Working with teachers to provide **educational resources** for students is a vital part of outreach.
- ▶ Many different ways this takes place:
 - ▶ Talks in schools
 - ▶ International Masterclasses, organised in the IPPOG framework.
 - ▶ ATLAS colouring book
 - ▶ Virtual visits for students
 - ▶ S'COOL LAB

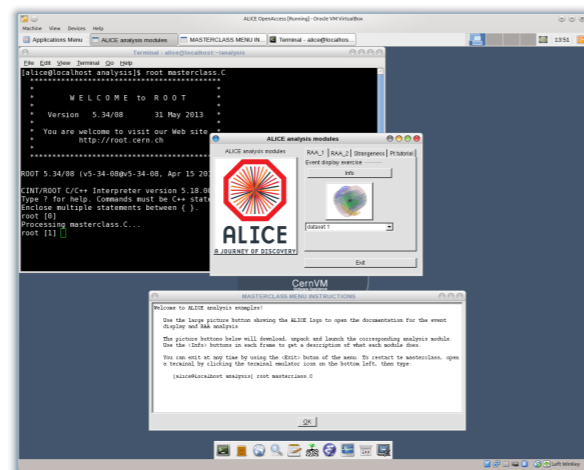
OPEN DATA AND CHALLENGES



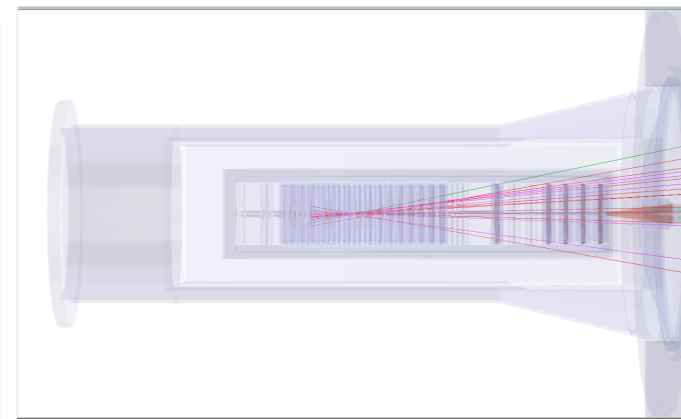
- ▶ Open data releases reflects CERN's commitment to open access.
- ▶ Increases access for places that don't have good access to universities.



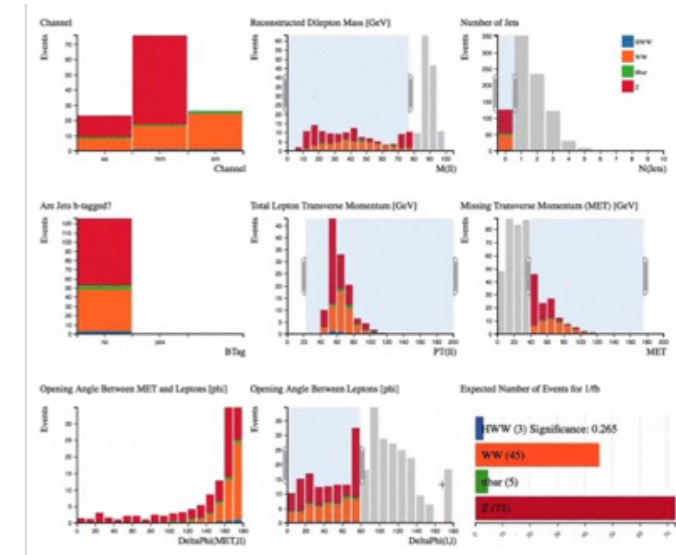
(Image: Tom McCauley and Achintya Rao CMS/CERN)



(Image Alice/CERN)



(Image LHCb/CERN)



(Image ATLAS/CERN)



- ▶ Machine learning challenges, such as TrackML, allow people interested in coding to apply their skills to data from LHC experiments.

Featured Prediction Competition

TrackML Particle Tracking Challenge

High Energy Physics particle tracking in CERN detectors

CERN · 653 teams · 9 months ago

\$25,000

Prize Money

FESTIVALS

- ▶ Festivals are a worldwide phenomena and organisers are looking for something a 'bit different' to attract audiences.



Live from
Jodrell Bank

Physics
pavilion at
WOMAD

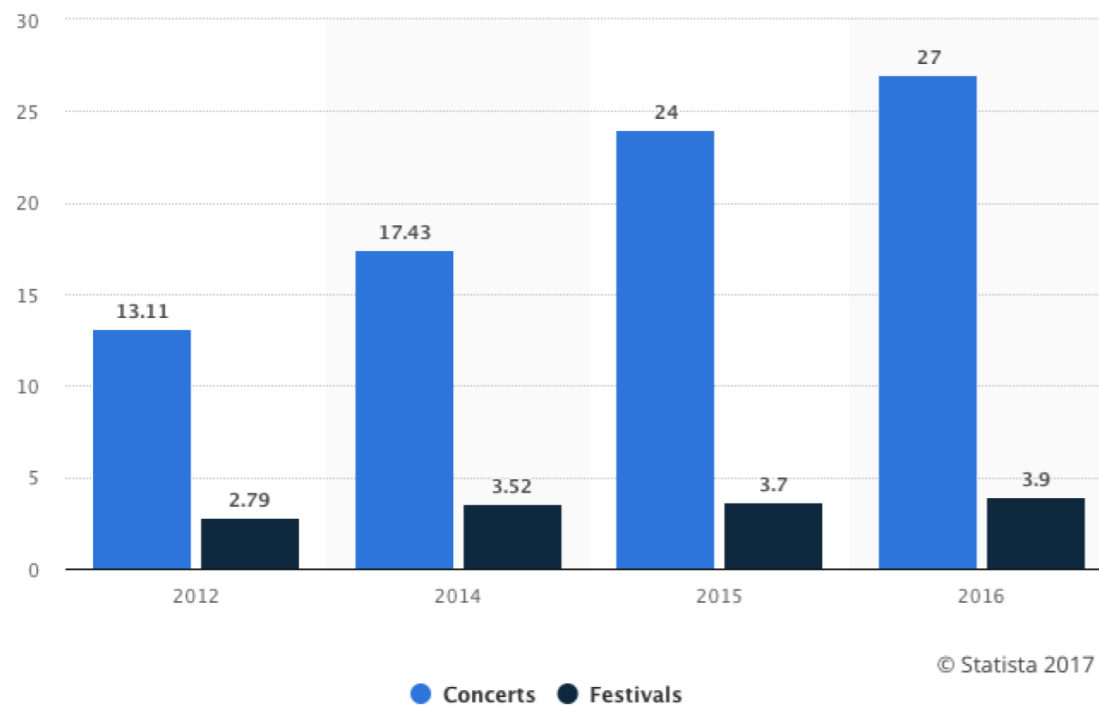


Above: First ever public Masterclass at MOOGFEST.

Right: Music and Physics at the Montreux Festival.



UK:
Attendance in millions



- ▶ Fantastic way to meet new people who might not usually go to a science event!

COLLABORATING WITH ARTISTS

- ▶ Arts at CERN: art and science programme fostering the dialogue between artists and physicists.
- ▶ Visits from artists to CERN.

Arts at CERN programmes



Screenshot from CERN YouTube video: LHC "Collide" (with subtitles). Howie Day parody, sung by Howie Day. <https://youtu.be/1YB0xM9cgr8>



There will be an **ORIGIN exhibition** in parallel to this conference with special LHC-inspired art. The exhibition is open to the general public.

**Outreach is about
creating a scientific
community that
includes everyone**

SOMETHING IN COMMON

- ▶ Scientists come from many different communities.
- ▶ By sharing what we have in common, people are more likely to listen to the science AND feel that science is a place for them.



Shared hobbies

@fit_life_physics

Instagram

Similar backgrounds



Emily Calandrelli. (Image: NASA)

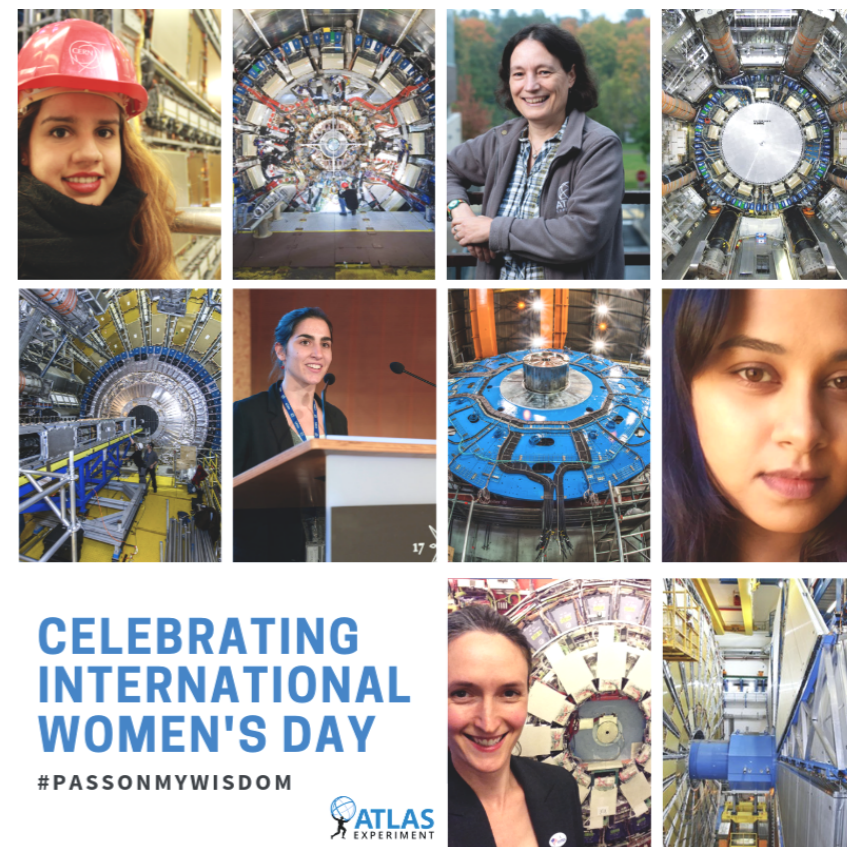
Same community



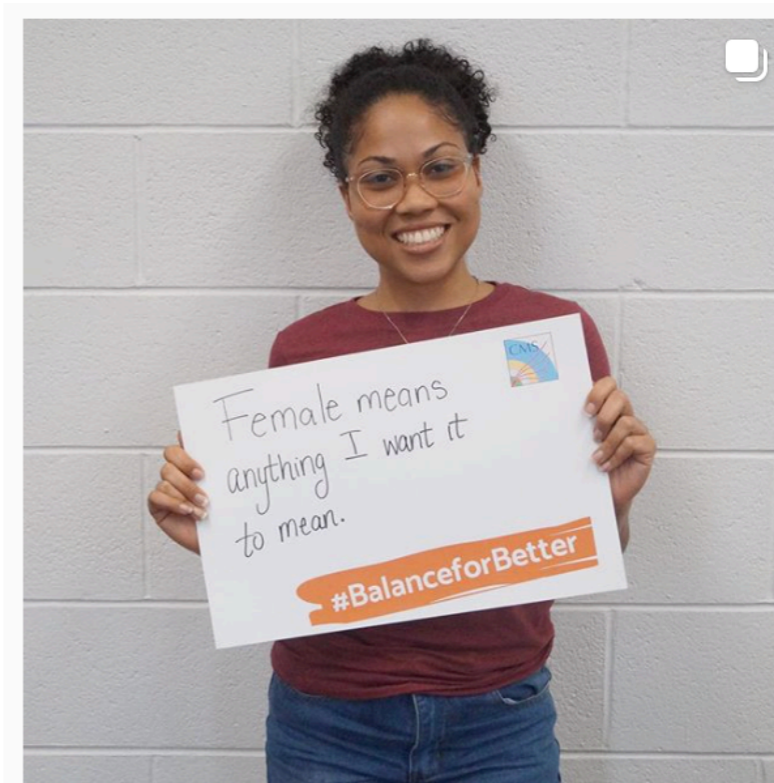
LGBT STEM Day 5th July

ACTIVELY SEEKING OUT NEW AUDIENCES

- ▶ Our audiences do not always reflect the general population.
- ▶ One way to start to change this is to mark international days and highlight under-represented colleagues.
- ▶ For example: International Women's Day.



You CAN be what you can't see, but you have to be first and that's hard.



INCREASING ACCESS

- ▶ Since we want to share our work with as many people as possible, this also means **making sure that it is accessible to as many people as possible.**
- ▶ A lot of our outreach can focus on visuals. People who are visually impaired cannot access this.

“Using specially developed tactile objects and fascinating soundscapes participants can lose themselves in a world of science and understand how the Large Hadron Collider works.” - **Tactile Collider**

If you're interested in discussing further, please contact Rob Appleby.

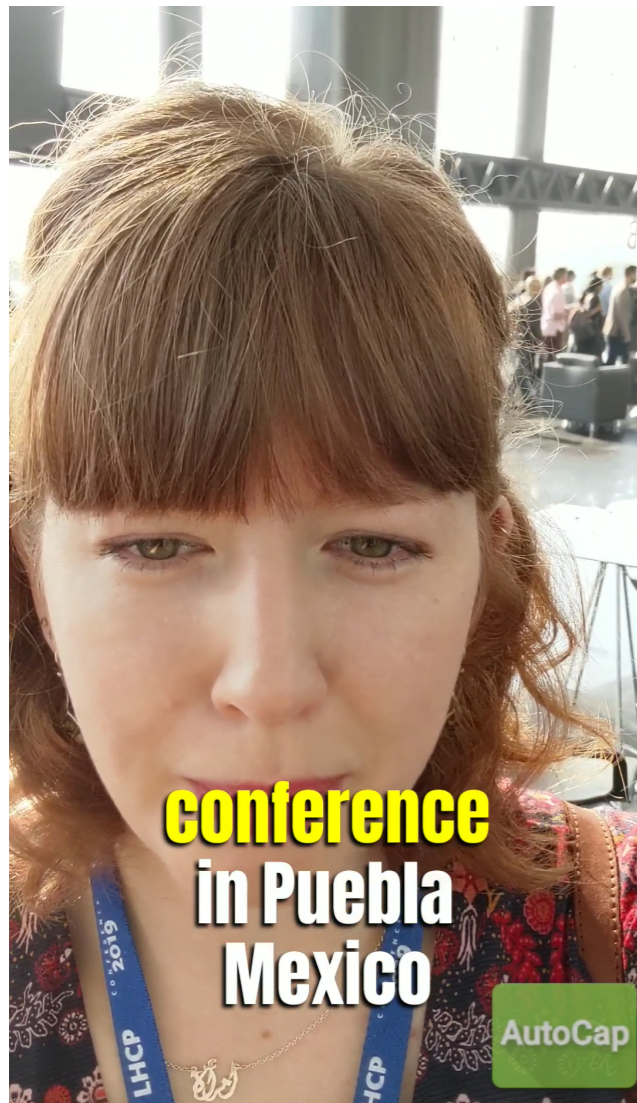


Scotland Tactile Collider Tour. (Image: Tactile Collider)

Thanks to Giordon Stark for consulting on this topic.

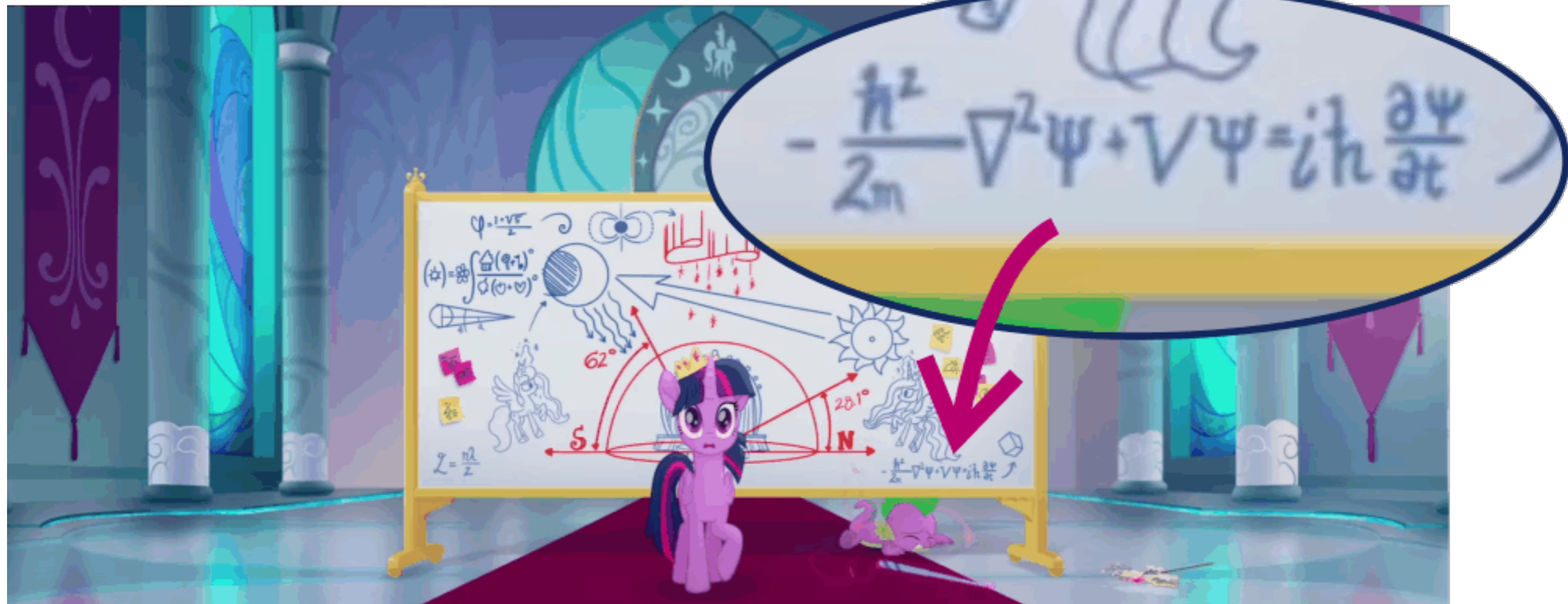
INCREASING ACCESS (2)

- ▶ Important to make sure that our outreach is also **accessible to people with hearing loss.**
 - ▶ This also improves access for people for whom English is not their first language.
 - ▶ We have also found that people increasingly watch videos on their mobile devices without sound.
- ▶ Some options:
 - ▶ There are 3rd party options coming in to add live captions to social media.
 - ▶ CERN can request French sign language interpreters for events in the Globe.
 - ▶ All new video content in the Microcosm is subtitled.
 - ▶ Hearing loops have been added in key locations at CERN.



AND NOW FOR SOMETHING COMPLETELY DIFFERENT

- ▶ Do outreach that entertains you and it will entertain others.
- ▶ Such as: My Little Pony Fan Fiction!



HOW CAN YOU GET INVOLVED?

- ▶ Still opportunities to volunteer for the CERN Open Days.
- ▶ You can volunteer with CERN, or contact one of the experiment Outreach Teams to discuss options.



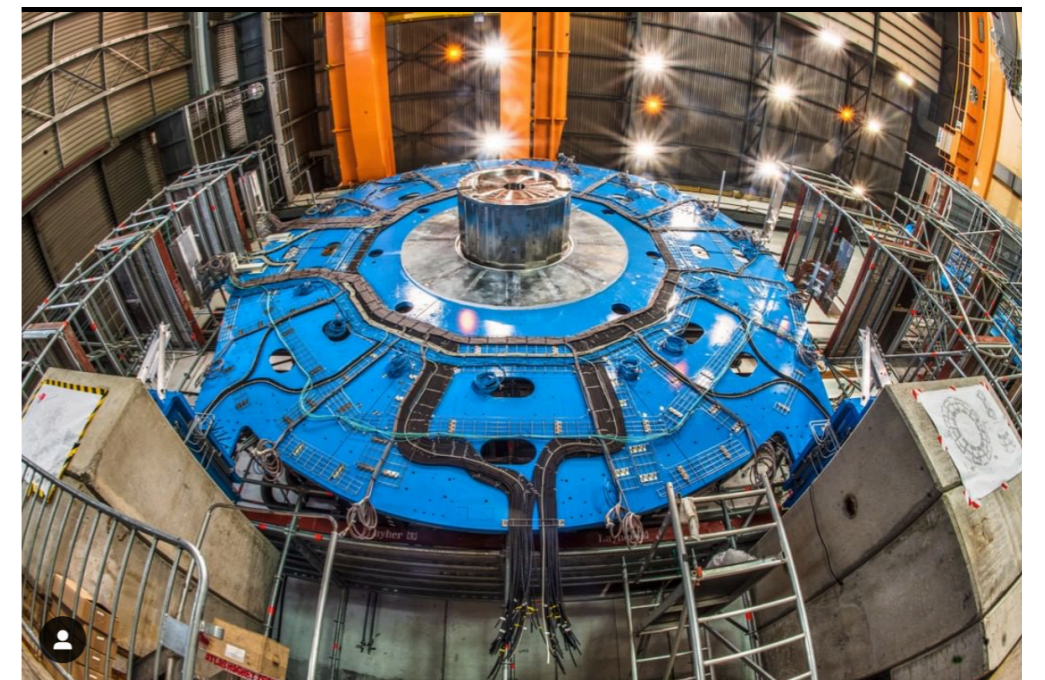
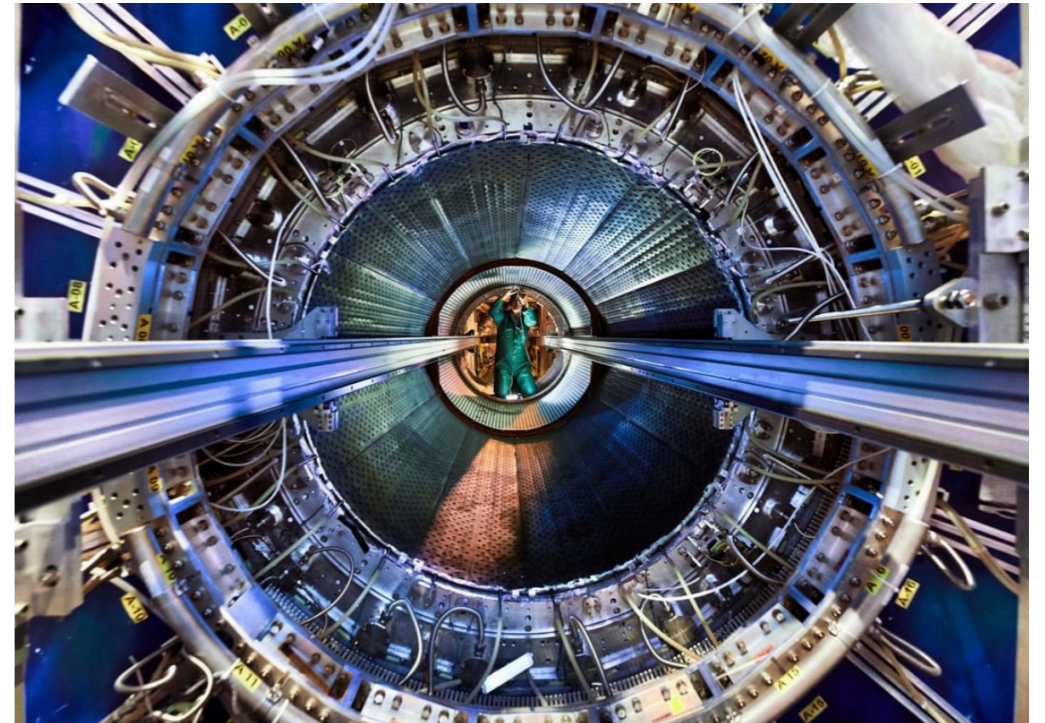
CERN
OPENDAYS

14-15 / 09 / 2019

- ▶ Explore the future with us
- ▶ Explorez le futur avec nous

CONCLUSION

- ▶ There are **many fantastic outreach projects** taking place.
 - ▶ Too many to be able to mention them all here.
- ▶ However, it's important that we're thinking about who we might be excluding in our outreach and working on **increasing accessibility and inclusion.**
- ▶ Please check out the **parallel session** on Tuesday afternoon!





THANK YOU!

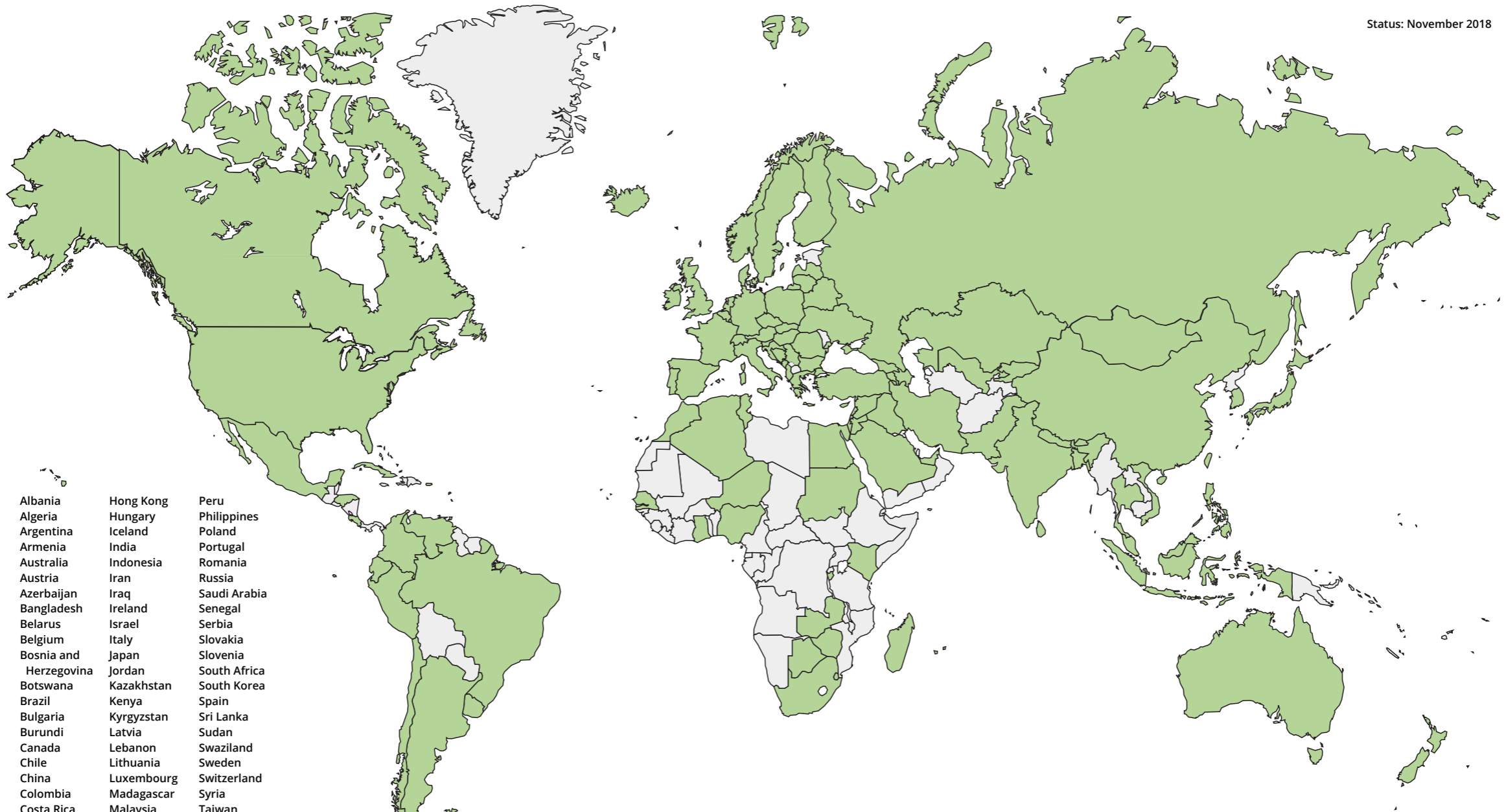
HERE'S ONE I PREPARED EARLIER...

Backup

**You CAN be what you
can't see, but you have to
be first and that's hard.**

IT TAKES A VILLAGE

Status: November 2018



- | | | |
|------------------------|-------------|--------------|
| Albania | Hong Kong | Peru |
| Algeria | Hungary | Philippines |
| Argentina | Iceland | Poland |
| Armenia | India | Portugal |
| Australia | Indonesia | Romania |
| Austria | Iran | Russia |
| Azerbaijan | Iraq | Saudi Arabia |
| Bangladesh | Ireland | Senegal |
| Belarus | Israel | Serbia |
| Belgium | Italy | Slovakia |
| Bosnia and Herzegovina | Japan | Slovenia |
| Botswana | Jordan | South Africa |
| Brazil | Kazakhstan | South Korea |
| Bulgaria | Kenya | Spain |
| Burundi | Kyrgyzstan | Sri Lanka |
| Canada | Latvia | Sudan |
| Chile | Lebanon | Swaziland |
| China | Lithuania | Sweden |
| Colombia | Luxembourg | Switzerland |
| Costa Rica | Madagascar | Syria |
| Croatia | Malaysia | Taiwan |
| Cuba | Malta | Thailand |
| Cyprus | Mauritius | Tunisia |
| Czech Republic | Mexico | Turkey |
| Denmark | Mongolia | Ukraine |
| Ecuador | Montenegro | UAE |
| Egypt | Morocco | UK |
| Finland | Nepal | USA |
| France | Netherlands | Uruguay |
| Georgia | New Zealand | Uzbekistan |
| Germany | Niger | Venezuela |
| Ghana | Nigeria | Vietnam |
| Greece | Norway | Zambia |
| Honduras | Pakistan | Zimbabwe |
| | Palestine | |

ATLAS Collaboration member nationalities

Over 5500 members of 103 nationalities