From Moedas 3O's strategy to Horizon Europe: the growing attention towards open science
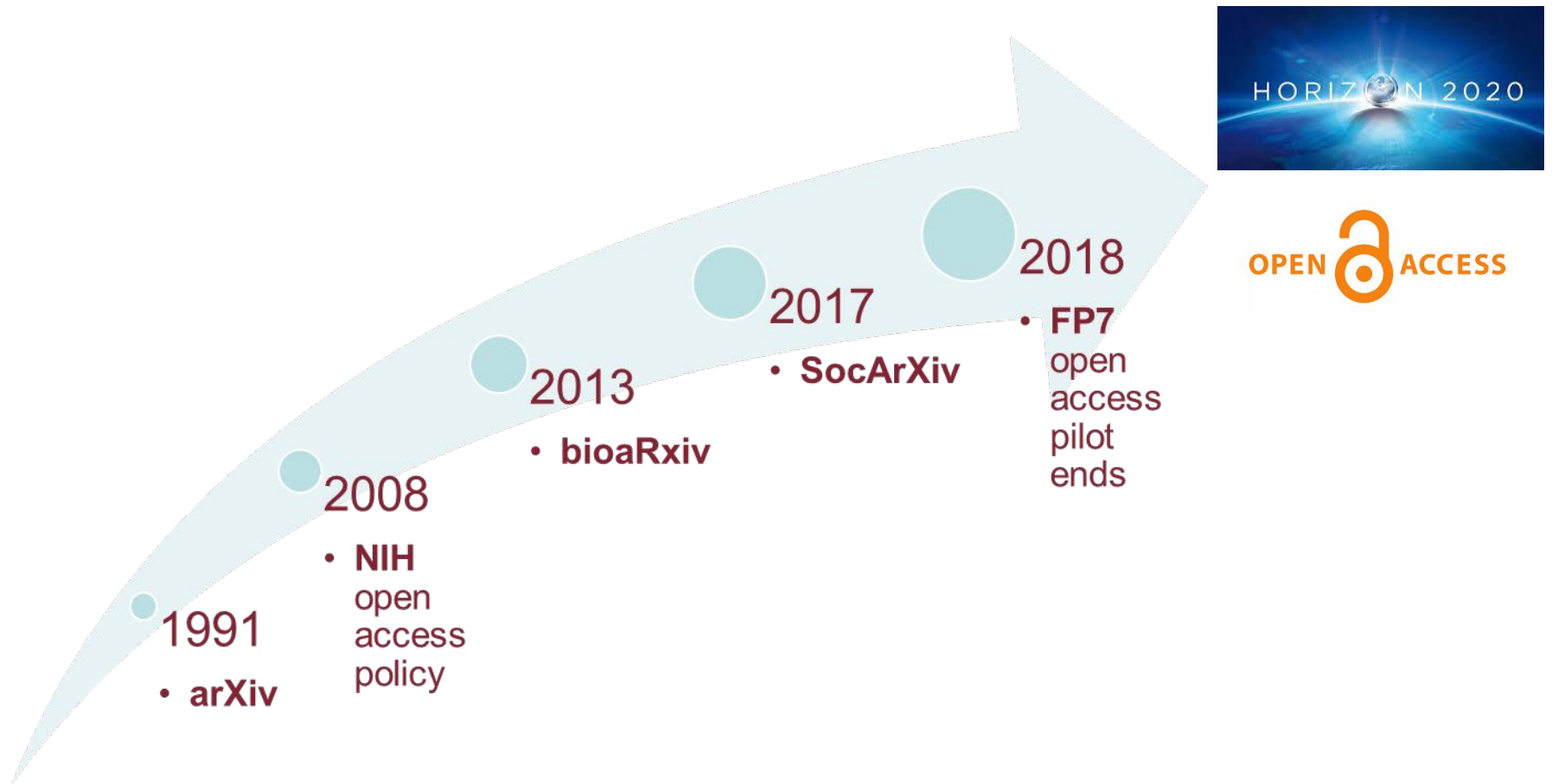
SAPIENZA
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Fabio Sciarrino

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The road to open science in EU

1991
• arXiv

2008
• **NIH** open access policy

2013
• **bioaRxiv**

2017
• **SocArXiv**

2018
• **FP7** open access pilot ends

HORIZON 2020

OPEN ACCESS

FP7 post-grant Open Access Pilot

OpenAIRE

Results - 2015- 2018

Project results published open access:

- 1231 articles
- 71 monographs
- 18 book chapters
- 2 conference proceedings

Total EU funding for open access: nearly 2MLN EUR

2015 - Carlos Moedas
'A new start for Europe: Opening up to an ERA of Innovation'

With Horizon 2020, we are funding research on an unprecedented scale. But we must be honest about the challenges we face. I see three major challenges:

1. *<u>We are too rarely succeeding in getting research results to market.</u> Technologies developed in Europe are most of the time commercialised elsewhere.*
2. *Although Europe generates more scientific output than any other region in the world, in some areas we fall behind on the very best science. At the same time, there is a revolution happening in the way science works. <u>Every part of the scientific method is becoming an open, collaborative and participative process.</u>*
3. *Europe punches below its weight in international science and science diplomacy. <u>Our collective scientific importance should be matched by a more active voice in global debates.</u>*

So, ***In order to overcome these three challenges I see three strategic priorities:***

Open Innovation,

Open Science, and

Openness to the World.

From Moedas 3O's strategy to Horizon Europe

Open science in Horizon 2020

- **FAIR**: **f**indable, **a**ccessible, **i**nteroperable and **r**eusable

- Three strategic priorities:
  - Open Innovation
  - Open Science
  - Openness to the World

  (Carlos Moedas, former Commissioner for Research, Science and Innovation)

Open science in Horizon 2020

- **Aim of Open Science policy:**
  – Build on previous research results
  – Greater efficiency (encourage collaboration)
  – Speed up innovation (faster progress to market means faster growth)
  – Involve citizens and society (improved transparency of the scientific process)

OPEN 🔓 ACCESS ➕

Data management plan

Horizon 2020:
Open access becomes mandatory

- **Grant Agreement (art. 29.2):**

*"[Beneficiaries] ensure open access… **as soon as possible** and at the latest on publication, deposit a **machine-readable electronic copy** of the published version or final peer-reviewed manuscript accepted for publication in a **repository for scientific publications** together with bibliographic metadata providing the name of the action, acronym & grant number"*

Personal experience:
A "quantum case" of Open Science

- On November 30th, 2016, more than 100,000 people around the world contributed to a suite of first-of-a-kind quantum physics experiments known as **The BIG Bell Test**.

the **BIG BELL TEST**

Worldwide quantum physics experiments powered by human randomness

www.thebigbelltest.org
November 30, 2016

The BIG Bell Test

- Using smartphones and other internet-connected devices, participants contributed unpredictable bits, which determined how entangled atoms, photons, and superconducting devices were measured in twelve laboratories around the world.

- *"Challenging local realism with human choices"*
  The BIG Bell Test Collaboration. Nature 557, 212–216 (2018)
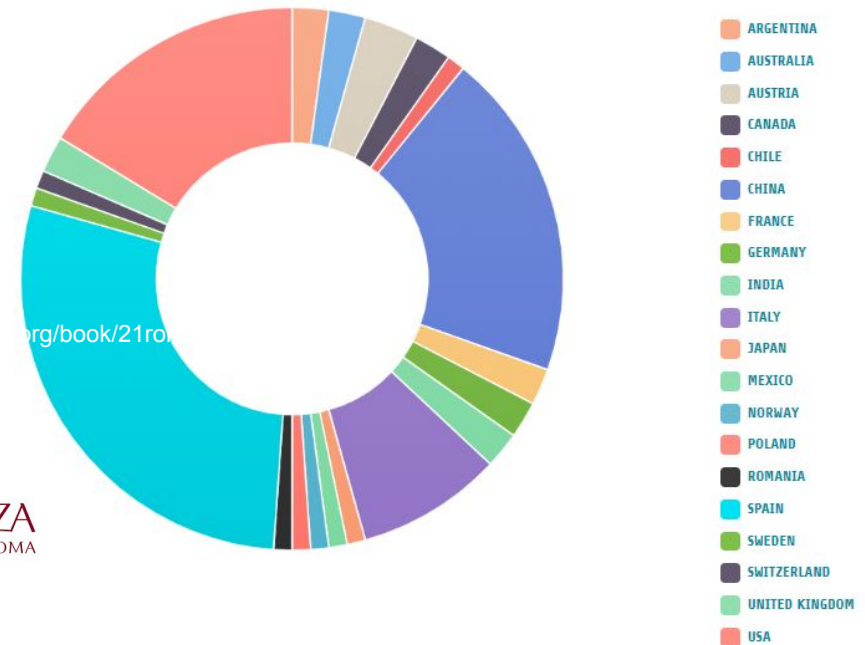
The BIG Bell Test

15 Collaborating laboratories:
- Buenos Aires (Argentina)
- Brisbane (Queensland, Australia)
- Vienna (Austria)
- Natal (Brazil)
- Concepción (Chile)
- Beijing, Changsha, Nanjing and Shanghai (China)
- Nice (France)
- Garching and Munich (Germany),
- Roma (Italy)
- Barcelona and Seville (Spain),
- Linköping (Sweden)
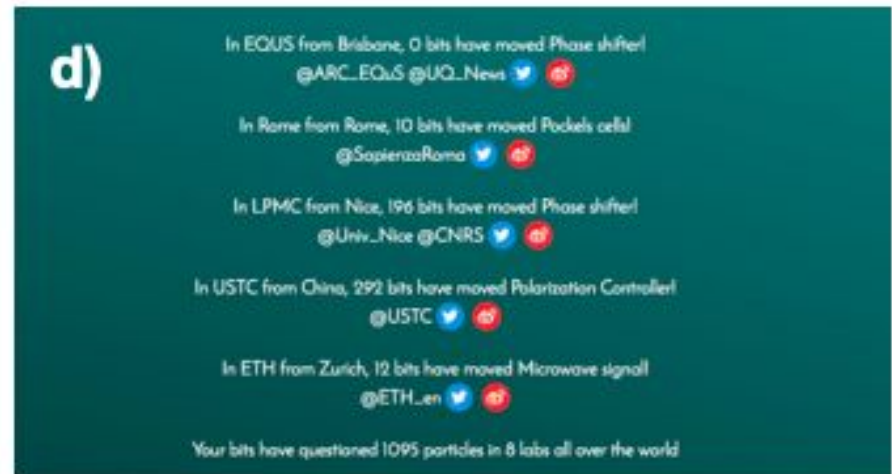- Zurich (Switzerland)
- Boulder (CO, USA)

ICFO[R]

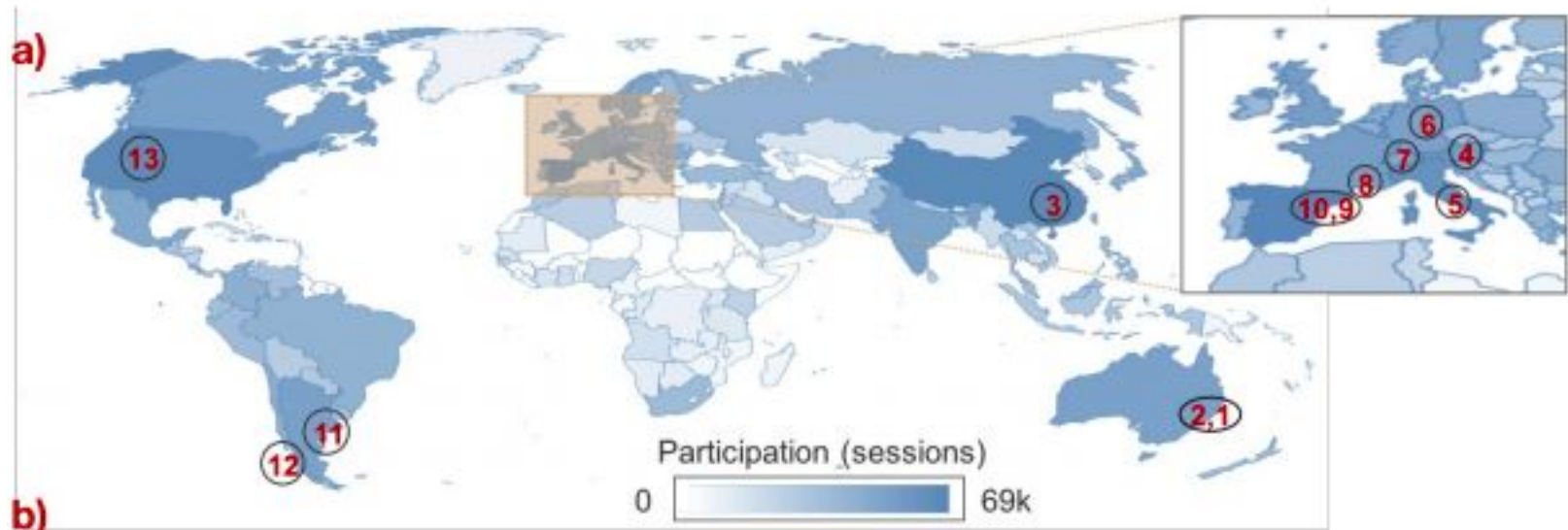TOP 20 MOST PARTICIPATIVE COUNTRIES IN % (90% OF TOTAL)

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Legend:
- ARGENTINA
- AUSTRALIA
- AUSTRIA
- CANADA
- CHILE
- CHINA
- FRANCE
- GERMANY
- INDIA
- ITALY
- JAPAN
- MEXICO
- NORWAY
- POLAND
- ROMANIA
- SPAIN
- SWEDEN
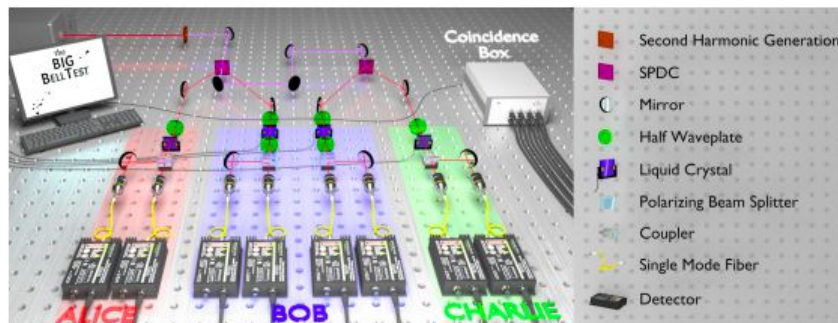- SWITZERLAND
- UNITED KINGDOM
- USA

The BIG Bell Test

The BIG Bell Test

a)

b) ⓢ Experimental bilocality violation with human randomness

Authors: Luca Santodonato, Gonzalo Carvacho, Francesco Andreoli, Marco Bentivegna, Rafael Chaves and Fabio Sciarrino

Participation (sessions)
0 — 69k

Second Harmonic Generation
SPDC
Mirror
Half Waveplate
Liquid Crystal
Polarizing Beam Splitter
Coupler
Single Mode Fiber
Detector

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From Moedas 3O's strategy to Horizon Europe

Horizon Europe
fully embraced open science

*"**Open science**" means **an approach** to the scientific process based on open cooperative work, tools and diffusing knowledge*

(Horizon Europe Regulation and Model Grant Agreement)

*The concepts of **Open Science**, Open Innovation, Open to the World should ensure **excellence and impact** of the Union´s investment in research and innovation, while safeguarding the Union's interests*

(Recital 7 Horizon Europe Regulation)

*The work programme may provide for **additional incentives or obligations** for the purpose of adhering to **open science practices***

(Horizon Europe Regulation, article 39)

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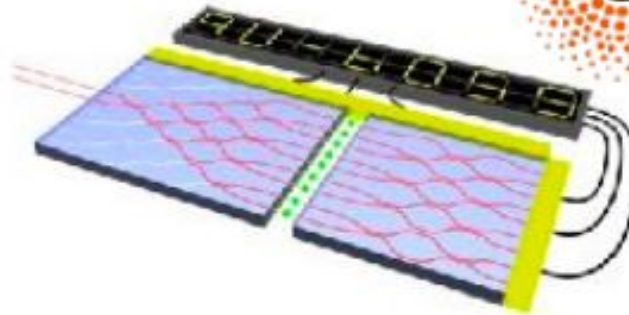
Horizon Europe Open Science practices

Based on FAIR principle

- **early and open sharing** of research (for example through preregistration, registered reports, pre-prints, or crowd-sourcing)

- **research output management** including research data management

- measures to ensure **reproducibility** of research outputs

- providing **open access** to research outputs (e.g. publications, data, software, models, algorithms, and workflows) through deposition in trusted repositories

- participation in **open peer-review**

- **involving all relevant knowledge actors** including citizens, civil society and end users in the co-creation of R&I agendas and contents (such as citizen science)

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