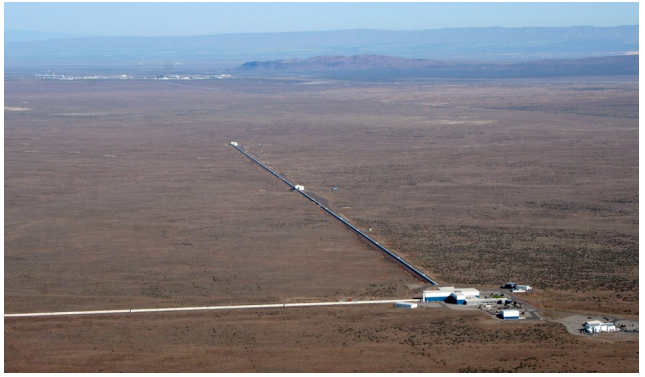
GOSH

How a grassroots movement is taking the lead to make Open Science Hardware ubiquitous by 2025

Andre M Chagas
Open Science Hardware Symposium
27.03.2018

Research & education require hardware



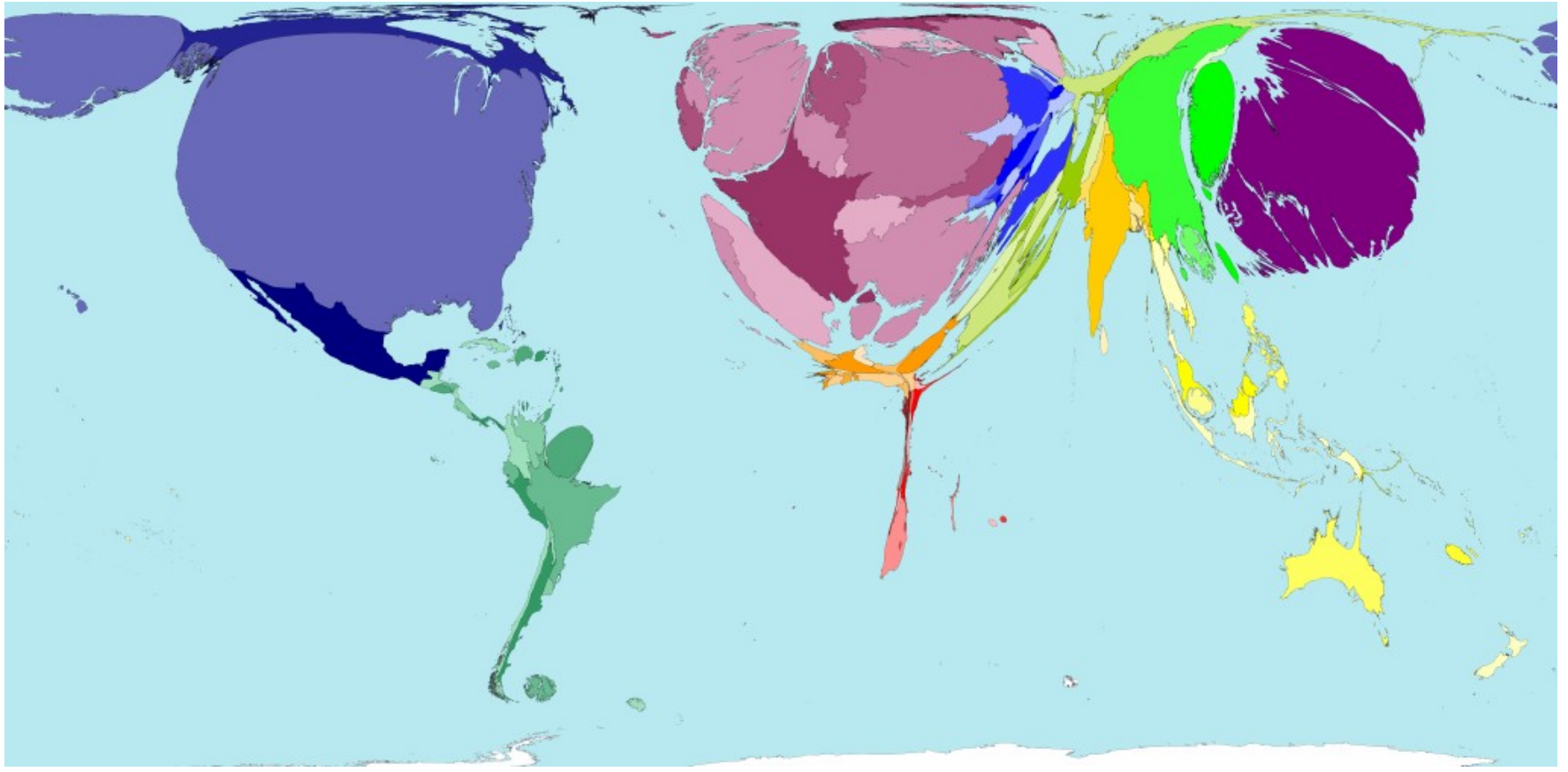
Research & education require hardware

500€

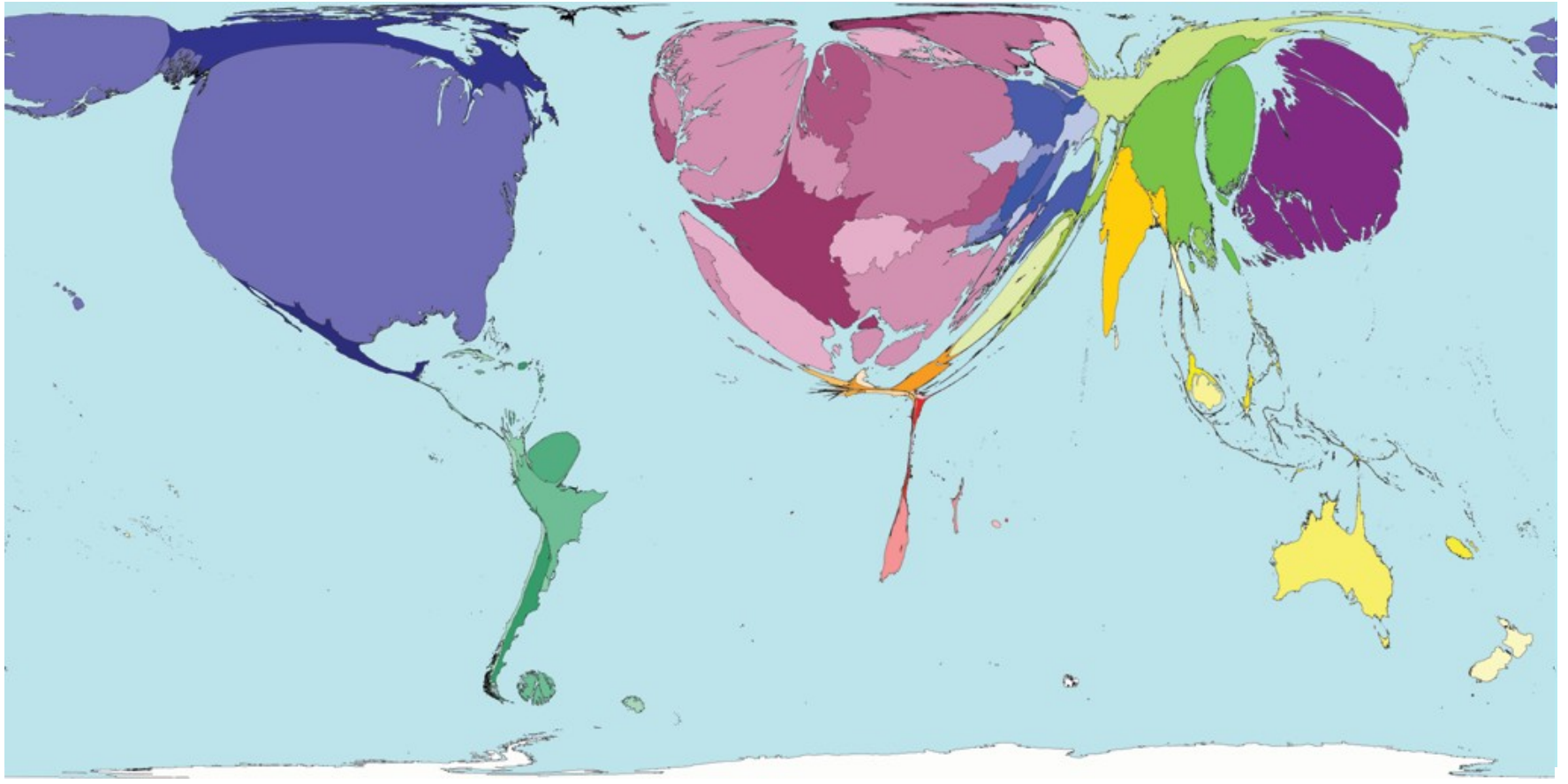
5000€

100€

Not all settings are the same – Demographics



Not all settings are the same – Demographics



Not all settings are the same – Demographics

- Africa:
  - 15% of world's population but 2.6% of all papers published
  - Percentage of GDP invested in science: average < 1%
    - Germany 2.8%
- Gender:
  - Only 28% of all researchers are women

Research & education benefit from Open Source / affordable Hardware

500€

5000€

35€

50€

Research & education benefit from Open Source Hardware

500€

35€

- reduced costs = accessibility
- Open blueprints:
  - Customization
  - learning
  - calibration
  - BETTER RESEARCH

5000€

50€

Many independent developments

TReND

Open Neuroscience

BACKYARD BRAINS

NEUROSCIENCE FOR EVERYONE!

publiclab.org

bento lab

QCM OPEN quartz crystal microbalance

SAFECAST

OpenBCI

opentrons

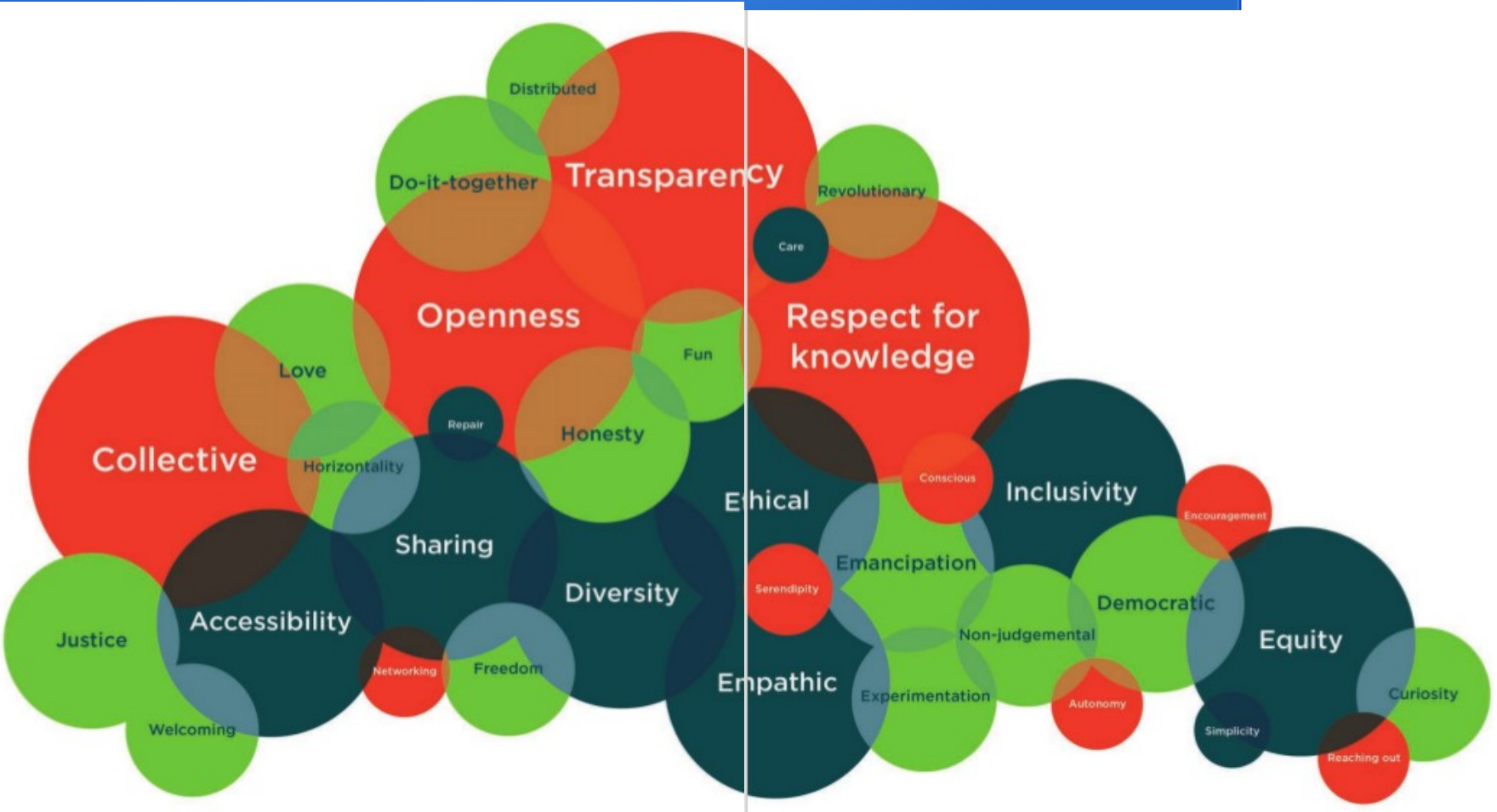
GOSH – Gathering for Open Science Hardware

- Establishing a network of networks:
  - Build cohesive group while maintaining autonomy in each subgroup
  - Optimize efforts/resources
  - Understand what is necessary to make OSH more present
  - Dialogue with agencies/policy makers
  - Give space to voices that are normally not heard

GOSH 2017

100 PARTICIPANTS FROM 30 COUNTRIES
48%
WOMEN
OR TRANS
25%
PEOPLE
OF COLOR
55%
LOW GDP
COUNTRIES
33%
LATIN AMERICA
34%
FROM NGOS
OR COMMUNITY
GROUPS
THE GROUP INCLUDED SCIENTISTS, SOCIAL SCIENTISTS, ARTISTS,
LAWYERS, ARCHITECTS, COMMUNITY ORGANIZERS, DEVELOPERS,
TEACHERS, AND STUDENTS

GOSH 2017


Distributed
Do-it-together
Transparency
Revolutionary
Care
Openness
Respect for knowledge
Love
Fun
Repair
Honesty
Collective
Horizontality
Conscious
Inclusivity
Ethical
Encouragement
Sharing
Emancipation
Serendipity
Diversity
Democratic
Accessibility
Justice
Non-judgemental
Equity
Networking
Freedom
Empathic
Experimentation
Autonomy
Curiosity
Simplicity
Welcoming
Reaching out

GOSH 2017

WHO WE ARE

THE **GLOBAL OPEN SCIENCE HARDWARE COMMUNITY (GOSH)** IS A DIVERSE GROUP OF PEOPLE UNITED BY THE GOAL OF MAKING OPEN SCIENCE[1] HARDWARE UBIQUITOUS BY 2025.

GOSH – Gathering for Open Science Hardware

- Establishing a network of networks:
  - 2 gatherings so far:
    - Geneva, Switzerland 2016
    - Santiago, Chile 2017
    - The next one to happen in Shenzhen China 2018
      - In focus: think about ways to bring prototypes to production scale

GOSH 2016

GOSH – Gathering for Open Science Hardware

- Establishing a network of networks:
  - Gatherings output:
    - Report after each event
    - Manifesto (Show and Please sign it!)
    - Roadmap – Guidelines/suggestions to make Open Science hardware ubiquitous by 2025
    - Many interdisciplinary collaborations / spin off events
    - Forum

GOSH Manifesto

- Fast read on what Open Science Hardware represents:
  - Created collaboratively by more than 100 people, translated into 7 languages
  - Major points:
    - Accessible
    - Ethical
    - Empowers people
    - Democratizes science and makes it better

GOS

- Fas sents:
  - nslated
  -

Gosh Roadmap

- Longer read on guidelines and suggestions to make Open Science Hardware Ubiquitous by 2025
  - Again written by many hands
  - Goals:
    - Make copies reach policy makers / funding agencies etc.
    - Reference for the community when planning/executing events
  - Lessons:
    - Not possible to have one solution to fit all needs / demands
    - Local chapters are needed

GOS

- Fas ents:
  - slated
  -

GOSH Collaborations / spin off events

- Africa OSH (Similar to GOSH but more focused on needs and specialties of Africa)
- GOAT (Gathering for Open Agricultural Technologies)
- Advanced School on Open Labware (Give participants space and time to build hardware for 2 weeks)
- Open source hardware event at Re:publica
- Building drones with populations in at-risk areas
- Many new subgroups formed with common interests

Gosh Forum

- >300 people
- Active / welcoming space to find:
  - Collaborators
  - Funding opportunities
  - Suggestions and resources for projects
  - People willing to debate concepts / ideas

Read about GOSH

- Nature
- PLOS
- Gosh website
- Forum

Punk science

Do-it-yourself science is taking off

A growing movement seeks to make the tools of science available to everyone (including you)

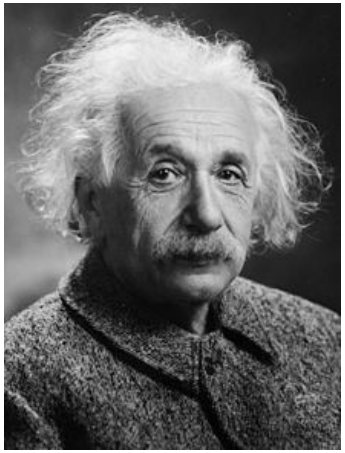
Summary

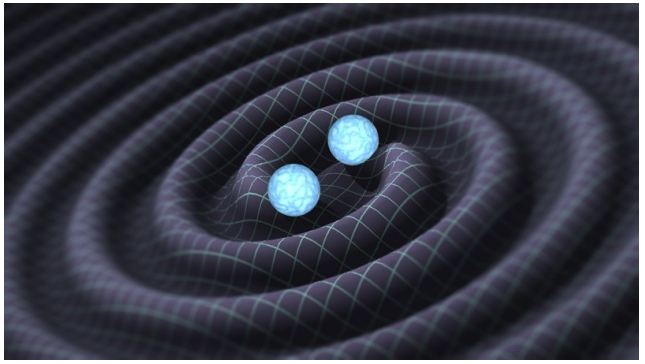
- GOSH:
  - Closer to true diversity / global society representation
  - Interdisciplinary (Science and arts, academics and non-academics)
  - Network of Networks with common goals

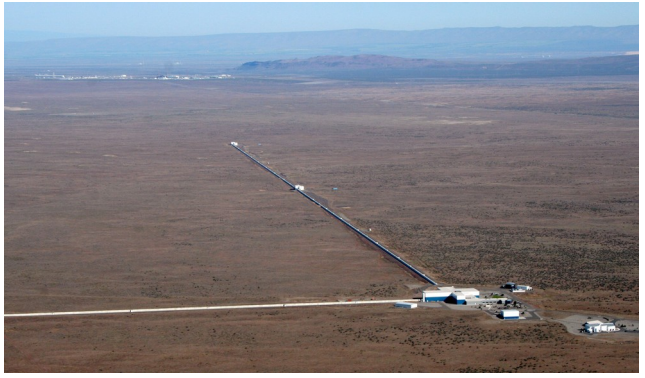
Thank you!

- Balancing representation of different interest groups and contexts requires negotiation and will not always be successful: OScH is found in traditional institutions but also progressive grassroots organisations; it is used as a tool to improve the reproducibility of academic science and to teach adults and children in disadvantaged communities. It was more difficult than anticipated to create a document which presented all of these perspectives and that balanced the need for change in incumbent institutions with promotion of non-traditional forms of engagement. After much redrafting and negotiation we believe we managed that goal successfully. What

Introduction







Science & Education funds

- Some figures if possible on GDP percentage
- Tax money for research

Research demographics

-
- 28% of women in science