



# An holistic view of Citizen Science

Fermín Serrano, Fundación Ibercivis. University of Zaragoza

COST ENeL WG4 meeting

Barcelona, Spain, 31 March – 1 April 2016

@ferminserrano

You say you want a **revolution**,  
Well, you know, we all want to change the world.  
You tell me that it's **evolution**,  
Well, you know, we all want to **change the world**.  
But when you talk about destruction,  
Don't you know that you can count me out  
Don't you know it's gonna be alright.

You say you got a **real solution**,  
Well, you know, we'd all love to see the plan.  
You asked me for a **contribution**,  
Well, you know, we're doing what **we can**.  
But when you want money for people with minds that hate,  
All I can tell you is brother you have to wait.  
Don't you know it's gonna be alright.

You say you'll change the constitution,  
Well, you know we all want to **change your head**.  
You tell me it's the institution,  
Well, you know you better **free your mind** instead.  
But if you go carrying pictures of Chairman Mao,  
You ain't going to make it with anyone, anyhow.  
Don't you know it's gonna be alright.

*Revolution (J. Lennon, P. McCartney)  
1968*

A close-up photograph of a hand holding several paintbrushes. The brushes are arranged diagonally across the frame. The bristles of the brushes are coated with various colors of paint: light blue, purple, yellow, orange, and blue. The back of the hand is also smeared with these colors, creating a vibrant, multi-colored pattern. The background is a plain, light-colored surface.

Presentations

Context of borderless transformation

Vision of citizen science

Projects, experiments and experiences

# citizen science

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## SUSTANTIVO

[MASS NOUN]

The collection and **analysis** of **data** relating to the natural world by members of the general **public**, typically as part of a **collaborative** project with professional **scientists**:

*'the **director** of education sees a **need** for citizen science in **astronomy**'*

[AS MODIFIER]: *'citizen science projects'*

### – Más ejemplos en oraciones

*'Across the country, wildlife researchers are discovering the benefits of an emerging "citizen science" movement.'*

---

*'Citizen science really is what the Christmas Bird Count is about.'*

---

*'Finally, we have learned that these high-profile birds of conservation concern can be surveyed by the "citizen science" model pioneered in the Cerulean Warbler Atlas Project.'*

## citizen scientist

### SUSTANTIVO

#### – Oraciones de ejemplo

*'The future of our waterways may well depend on citizen scientists like the Water Sentinels.'*

---

*'Here, we report the results of a detailed demographic study and conservation assessment of Western Bluebirds conducted using data collected by citizen scientists.'*

---

*'The project uses data collected by citizen scientists to create an online map of bee populations.'*

---

# Citizen Science

Pooling of resources

Data collection

Human sensing

Analysis tasks

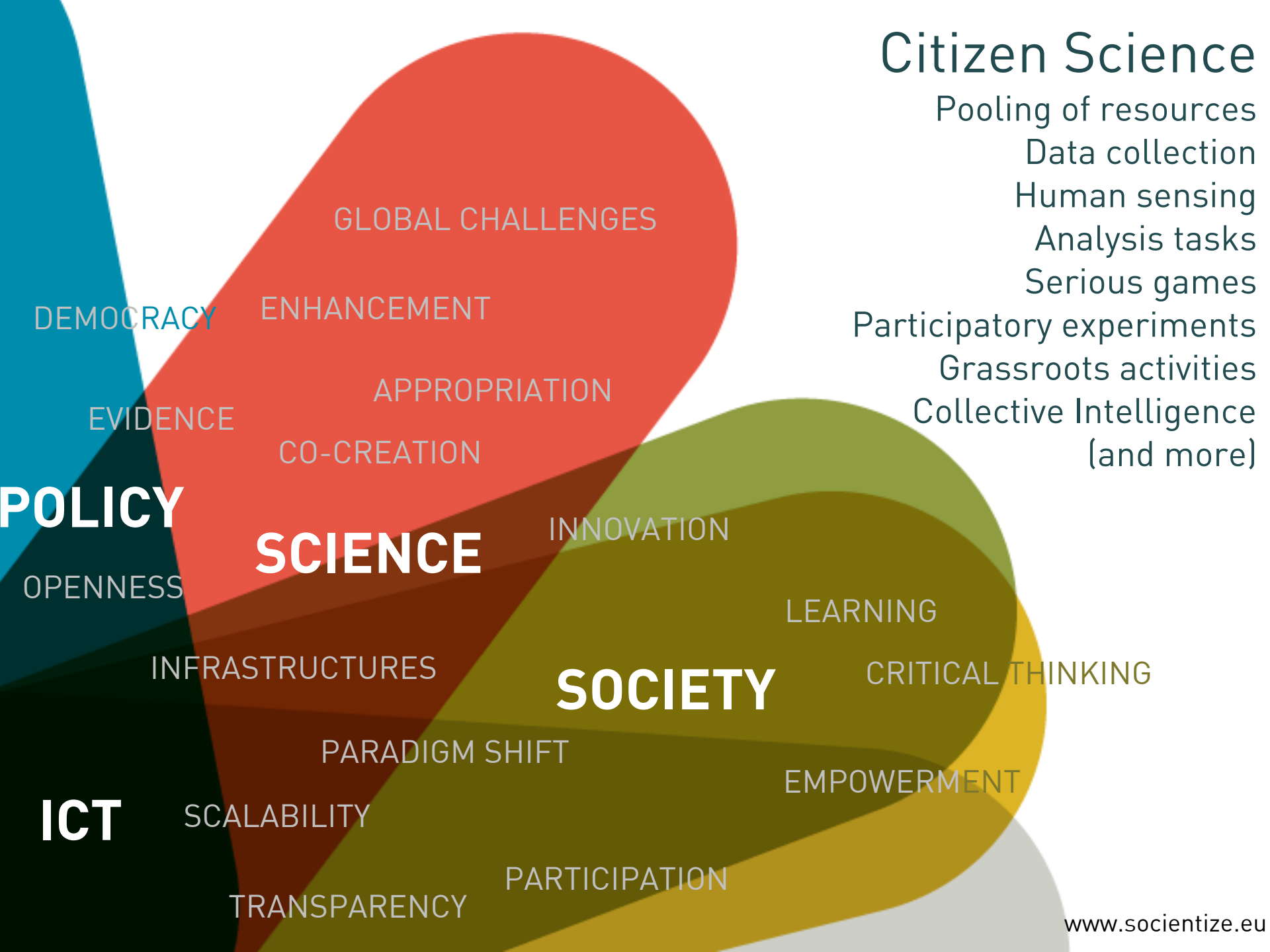
Serious games

Participatory experiments

Grassroots activities

Collective Intelligence

(and more)





Centralize/share resources/expertise

Hardware computing/storage/backup/monitorization/support

Software/middleware development/integration/adaptation/multi platform

Dissemination/outreach/empowerment/events/exhibitions/awards

Projects/proposals/sustainability/strategy

Research models/impacts/metrics/technologies

### Budget/year

- MINECO-PGE: 60k€
- Research projects in competitive calls
- Citizen Science as a Service



# 10 years in a nutshell

## +50.000 volunteers

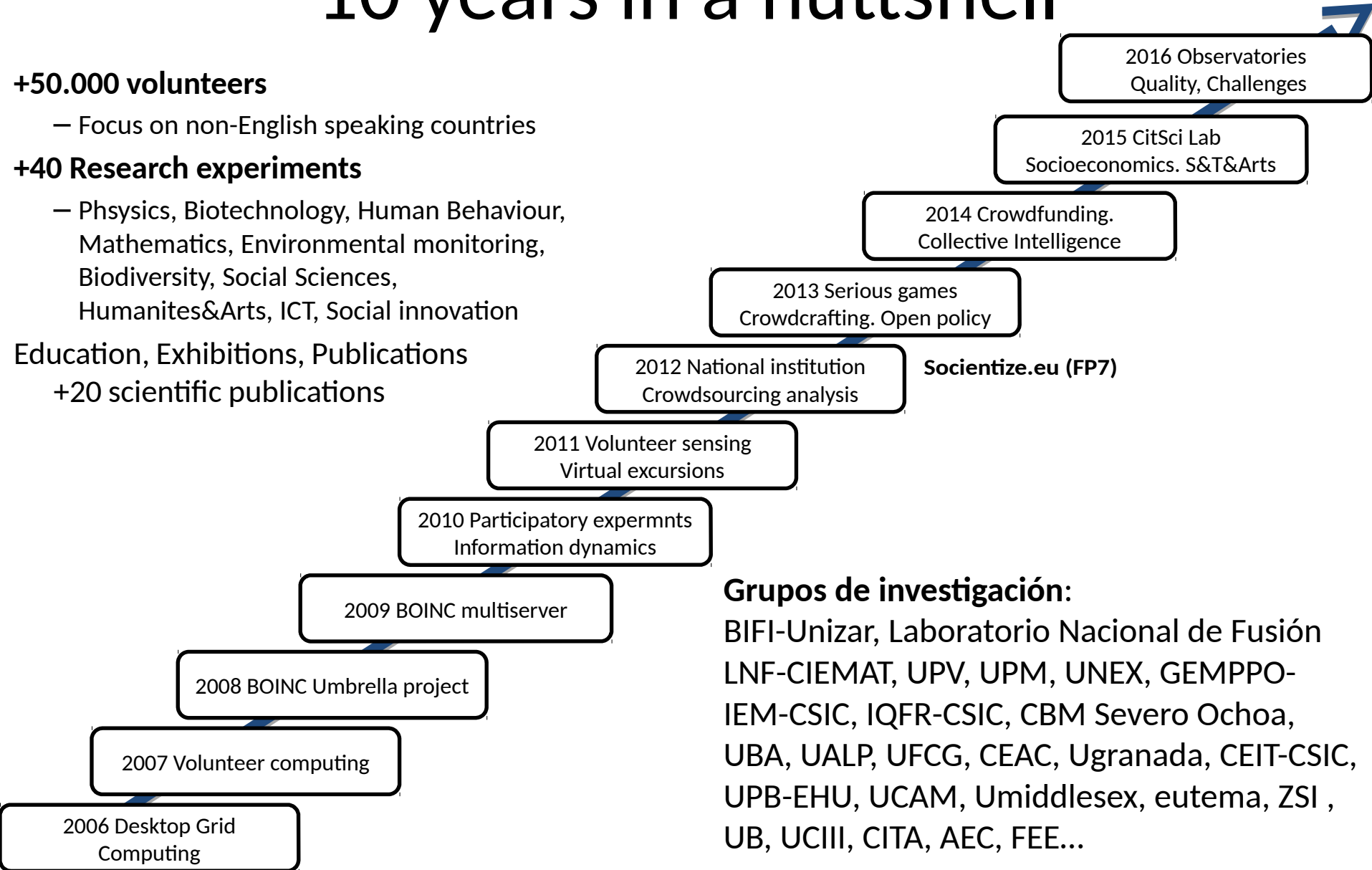
- Focus on non-English speaking countries

## +40 Research experiments

- Physics, Biotechnology, Human Behaviour, Mathematics, Environmental monitoring, Biodiversity, Social Sciences, Humanites&Arts, ICT, Social innovation

Education, Exhibitions, Publications

+20 scientific publications



**Socientize.eu (FP7)**

## Grupos de investigación:

BIFI-Unizar, Laboratorio Nacional de Fusión LNF-CIEMAT, UPV, UPM, UNEX, GEMPPO-IEM-CSIC, IQFR-CSIC, CBM Severo Ochoa, UBA, UALP, UFCG, CEAC, Ugranada, CEIT-CSIC, UPB-EHU, UCAM, Umiddlesex, eutema, ZSI, UB, UCIII, CITA, AEC, FEE...

# Brochure Sept 2015 #D4Science



## Excellent Science in the Digital Age

Policy and Actions



The [SOCIENTIZE](#) project built on the concept of 'Citizen Science', which sees thousands of volunteers, teachers, researchers and developers put together their skills, time and resources to advance scientific research. Thanks to open source tools developed under the project, participants have helped scientists collect data to be analysed by professional researchers and performed tasks that require human cognition or intelligence like image classification or analysis, thereby supporting advances in areas from astronomy to social science. For example, the SOCIENTIZE projects '[Sun4All](#)' and '[Cell Spotting](#)' asked volunteers to label images of solar activity and cancer cells from an [application](#) on their phone or computer. Analysing this data would take years and cost hundreds of thousands of euros if left to a small team of scientists – but with thousands of volunteers helping the effort, researchers can make important breakthroughs quickly and more cheaply than ever before.

[Socientize](#) successfully provided a dynamic forum for the Citizen Science community and produced a [White Paper on Citizen Science](#) that will stimulate policies in the field of citizen science. In two years, the project has shown the added value of collaboration and knowledge sharing through digital tools by involving some 12.000 citizens in a large range of science projects from mapping flu outbreaks, labelling images of cancer cells to collective music creation at one of the most exciting festivals in Europe, Sonar. One sub-project had prisoners in Portugal participate in labelling images of solar activity, and showed how citizen science can help with social rehabilitation.





Research &amp; innovation

Innovation

Digital Infrastructures

Emerging Technologies

Components &amp; Systems

Open Science

Open Access

Citizen science

Global Systems Science

ICT &amp; Art

EU investments

Robotics

## Citizen science

Article

Latest  Blogs

Citizen Science spans a range of levels of engagement: from being better informed about science, to participating in the scientific process itself by observing, gathering or processing data.



Citizen science is a broad term, covering that part of [Open Science](#) in which citizens can participate in the scientific research process in

different possible ways: as observers, as funders, in identifying images or analysing data, or providing data themselves. This allows for the democratisation of science, and is also linked to stakeholders' engagement and public participation.

Depending on their personal interest, time, and technological resources, the citizen decides on how to be involved. Observing sightings of birds, identifying galaxies, or working out how to fold proteins, providing resources by lending computer time or direct financing as in crowd funding of scientific projects.



Share

# Green and White Papers on Citizen Science



Target groups  
Experts

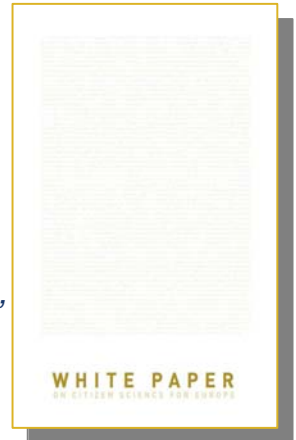
Online questionnaire

Success criteria  
Analysing topics



*“Several Commission services (including DGs CONNECT, RTD and the JRC) are using it as a reference document, and it is featured in the EC Vademecum for public engagement currently being developed.”*

John Magan, Digital Science Unit



Welcome

International ECSA Conference 2016

Join the community and be our guest for  
the first international conference of ECSA,  
the European Citizen Science Association!

**Citizen Science** 19-21 May 2016, Berlin  
Innovation in Open Science, Society and Policy

Image based on a foto by Mark Ahmann, CC-BY-SA-3.0

Join us for the 1st International ECSA Conference "Citizen Science - Innovation in Open Science, Society and Policy" that will take place in Berlin, 19-21 May 2016.

<http://ecsa.citizen-science.net>

# Citizen Science Association

A community of practice for the field of public participation in scientific research.

*Overview*

Planning

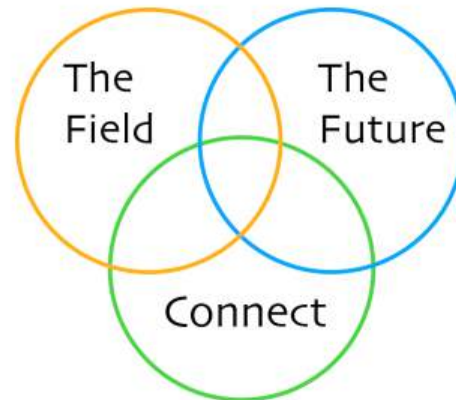
Membership

Conference



## Overview

**Free, inaugural membership now available.**



### *Recent Posts*

White House Recognizes Citizen Science, CSA Commitments, at Science Fair

Your Citizen Science 2015 Stories


Coop's Citizen Sci Scoop: Crowdsourced Hopes for the 1st Citizen Science Association Conference

<http://citizenscienceassociation.org>

# Australian Citizen Science Association

A COMMUNITY THAT SUPPORTS, INFORMS, AND DEVELOPS CITIZEN SCIENCE

[HOME](#) [ABOUT US](#) [MEMBERSHIP](#) [WHAT'S ON](#) [RESOURCES](#) [PAST EVENTS](#)



## 2015 Australian Citizen Science Conference

The first Australian Citizen Science Conference, which was held in Canberra during 2015, was a roaring success! Find out more about it by clicking on the "Past Events" menu at the top of the page.

### Welcome!

We're currently developing a national community of practice for all types of citizen science within Australia.

<http://csna.gaiaresources.com.au>

# Federal Crowdsourcing and Citizen Science Toolkit





[HOME](#)   [HOW TO](#)   [CASE STUDIES](#)   [RESOURCE LIBRARY](#)   [LAW AND POLICY](#)

## Resource Library

Welcome to the Resource Library! Here you will find all the resources included in this toolkit and you can browse through them by category. These resources are also placed within the relevant process steps within the "How To" section of the toolkit.

Disclaimer: This toolkit provides external links to resources as a convenience to users. The appearance of the links in the toolkit does not constitute endorsement by the federal government of the linked websites or of the information, products or services contained in them.

### What is Citizen Science?

- [Citizen Science \(Scientific American\)](#) 
- [Co-Founder of Innocentive Speaks on Challenge Authoring \(GovLab Video\)](#) 
- [Public Participation in Scientific Research \(Workshop, PDF\)](#) 
- [What Is Iterative Development? \(IBM, PDF\)](#) 

### How can I use Citizen Science?

- [Choosing the Right Question for Crowdsourcing \(Nature Magazine\)](#) 
- [Citizen Science Central: Resources for Projects \(Cornell Lab of Ornithology\)](#) 
- [Citizen Science Central: Toolkit Conference \(Cornell Lab of Ornithology\)](#) 
- [Designing a Social Change Project \(GovLab Academy\)](#) 
- [Guide to Citizen Science \(\[UK\]\(#\) Environmental Observation Framework, PDF\)](#) 
- [Most Participants in Citizen Science Give Up \(ARS Technica\)](#) 
- [Public Participation in Scientific Research \(Workshop, PDF\)](#) 



<https://crowdsourcing-toolkit.sites.usa.gov>



PARTNERINITIATIVEN

## WHAT IS CITIZEN SCIENCE OR OPEN INNOVATION?

Citizen Science, Open Innovation, Co-Creation, Crowdsourcing – science starts to open up: More and more citizens support researchers. They measure, observe, map. They work on a voluntary basis in scientific projects and enrich science with their special know-how and exciting new points of view.

[Read more ...](#)

### NEWS

#### Top Citizen Science

The new funding initiative Top Citizen Science funds expansions projects of currently running FWF and Sparkling Science projects.

[Read more](#)

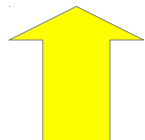
#### Open Innovation Platform

Borders between science/research and citizens are opening up and new knowledge can be produced. This means: More knowledge for everybody!

[Read more](#)

### EVENTS

April 2016						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
				1	2	3



<https://www.zentrumfuercitizenscience.at>

# (our) CS approach to the transformation of Society

## **Hyperconnected age / 4th industrial revolution / Post innovation / Policy making 3.0**

New ways of thinking, behaving, interacting, knowing

New data, new skills, new media, new spaces

New ways of creating, sharing, producing

New references, human-centered, sustainable, responsible

Evidence-based, global systems+microknowledge, closer to society



## **Digitally-enabled borderless transformation of science and research.**

The use of ICT is allowing new synergies and collaborations in knowledge sharing at large scales.

New innovations, new questions, new solutions and new approaches arise

from the involvement of researchers from all the disciplines with a wide range of contributors

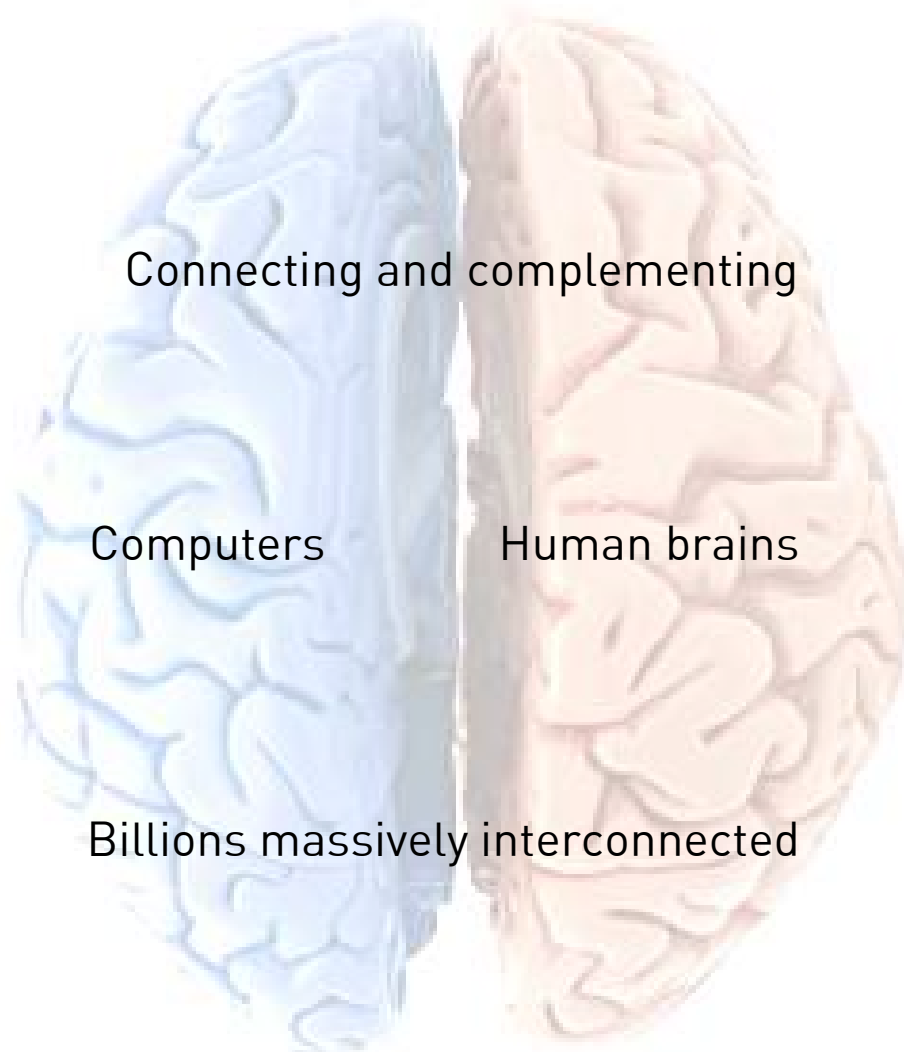
from all societal groups underpinning more efficient research outcomes that benefit both science and society



The image features a dark background with a light gray grid. Numerous small orange dots are scattered across the grid. In the upper-middle section, a network of white lines connects several orange dots, forming a complex, interconnected web. The text is centered in the lower half of the image.

HOW CAN I GO FORWARD WHEN  
I DON'T KNOW WHICH WAY  
I'M FACING?

# Collective intelligence



Connecting and complementing

Computers

Human brains

Billions massively interconnected

## Crowdsourcing

The Norwich line steamboat train, from New-London for Boston, this morning ran off the track seven miles north of New-London.

morning

morning overlooks

Type the two words:



# Communities

GitHub

This repository Search or type a command

Explore Features Enterprise Blog

Sign up

Sign in

PUBLIC torvalds / linux

★ Star

12,048

Fork

4,502

## Linux kernel source tree

10,000+ commits

1 branch

356 releases

3,438 contributors

branch: master linux / +

Merge tag 'trace-fixes-3.14' of git://git.kernel.org/pub/scm/linux/ke...

torvalds authored 6 hours ago latest commit ba635f8cd2

Documentation	Merge tag 'stable/for-linus-3.14-rc0-tag' of git://git.kernel.org/pub...	6 hours ago
arch	Merge tag 'cris-for-3.14' of git://jmi.nu/cris	6 hours ago
block	Merge branch 'for-3.14' of git://git.kernel.org/pub/scm/linux/kernel/...	6 days ago
crypto	Merge git://git.kernel.org/pub/scm/linux/kernel/git/herbert/crypto-2.6	4 days ago
drivers	Merge tag 'pwm/for-3.14-rc1' of git://git.kernel.org/pub/scm/linux/ke...	6 hours ago
firmware	USB: emi62: Provide the correct bitstream firmware	2 months ago
fs	Merge branch 'for-linus' of git://git.kernel.org/pub/scm/linux/kernel/...	a day ago
include	Merge tag 'mmc-updates-for-3.14-rc1' of git://git.kernel.org/pub/scm/...	a day ago
init	Merge branch 'for-linus' of git://git.kernel.org/pub/scm/linux/kernel/...	2 days ago
ipc	ipc,shm: correct error return value in shmctl (SHM_UNLOCK)	2 months ago
kernel	Merge tag 'trace-fixes-3.14' of git://git.kernel.org/pub/scm/linux/ke...	6 hours ago
lib	Merge tag 'stable/for-linus-3.14-rc0-tag' of git://git.kernel.org/pub...	6 hours ago
mm	mm: ignore VM_SOFTDIRTY on VMA merging	4 days ago

Code

Pull Requests 26

Pulse

Graphs

Network

HTTPS clone URL

https://github.com/

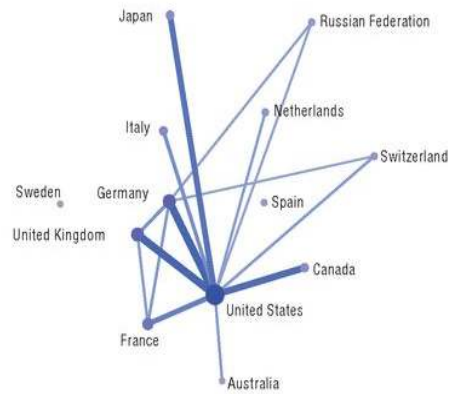
You can clone with HTTPS, or Subversion.

Clone in Desktop

Download ZIP

### 54a. International collaboration networks in science, 1998

Whole counts of internationally co-authored documents



Source: OECD calculations based on Scopus Custom Data, Elsevier, version 5.2012, June 2013. See chapter notes.

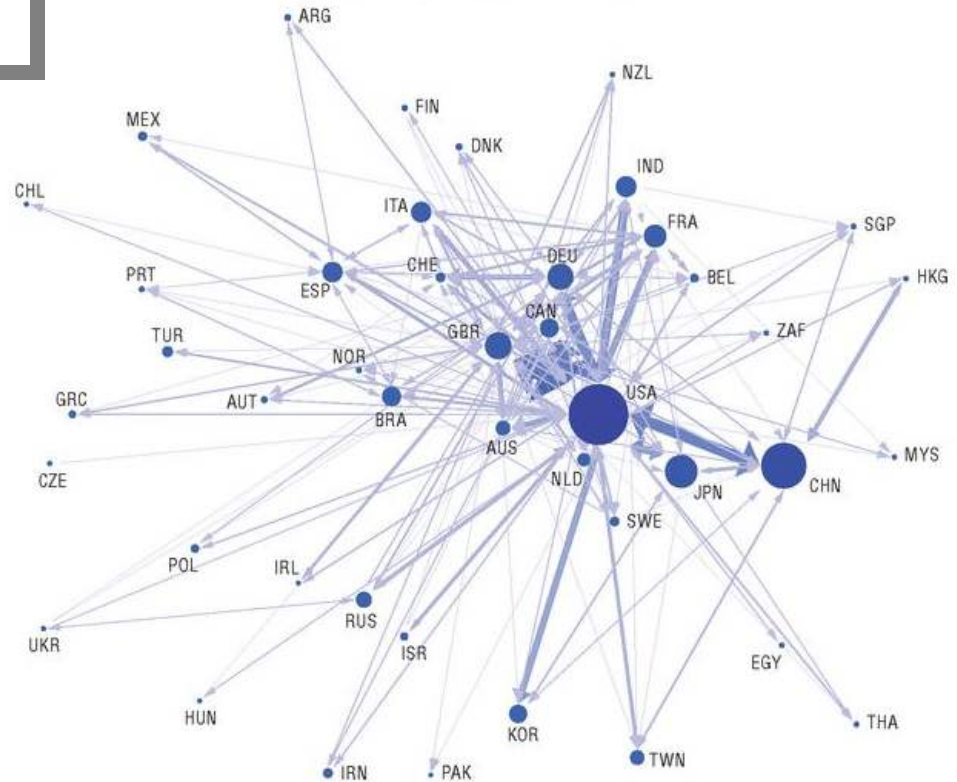
borderless  
transformation of  
science and  
research

Scalability

Network of  
collaborators

### 57. International mobility network, 1996-2011

Counts of bilateral flows, by first and last affiliation



Source: OECD calculations based on Scopus Custom Data, Elsevier, version 5.2012, June 2013.

Supercomputing is for special, very heavy needs, but also a way to progress, and change our way of thinking. This must be possible, since supercomputing of tomorrow will be so much more and so much power than supercomputing of today.

Can we get intellectual revolutions again, with supercomputing?

Let me summarize my point.

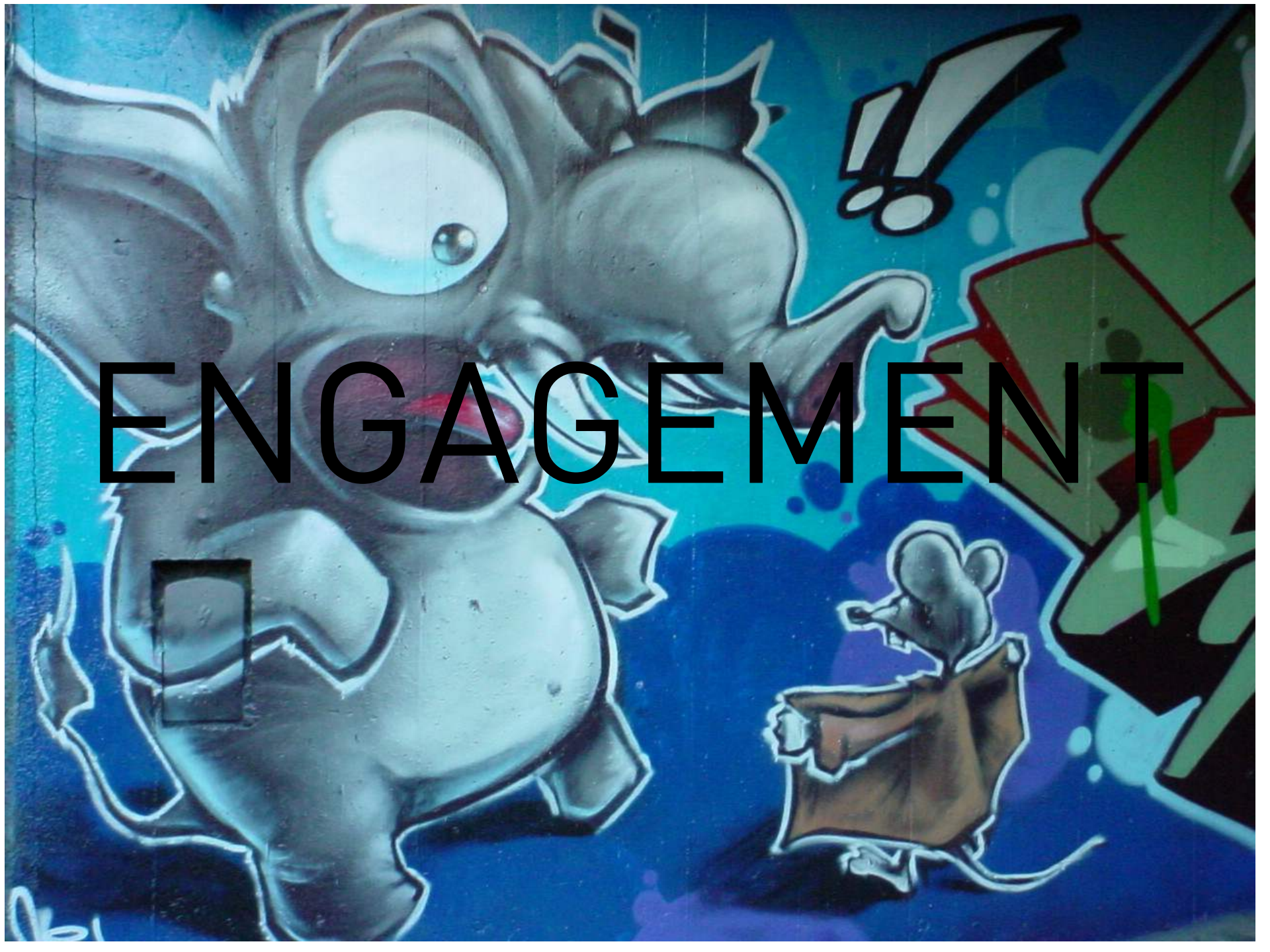
Are we able to give to students and to people starting their research with us the idea that “supercomputer” tools can change their approach to scientific questions?

Can we have (and do we need to have) our beginning student thinking to a new problem moving very fast to the use of large computer resources and being able to see the problem in a different way because of it? And maybe to find new perspectives?

# e-Science

A photograph of a long, narrow particle accelerator tunnel. The tunnel is filled with complex machinery, including large cylindrical components and structural supports. The perspective is from the center of the tunnel, looking down its length. The text 'e-Science' is overlaid in a large, blue, sans-serif font across the middle of the image.

# ENGAGEMENT





Message-ID: <6484@cernvax.cern.ch>  
Date: 6 Aug 91 14:56:20 GMT  
From: timbl@info.cern.ch (Tim Berners-Lee)  
Newsgroups: alt.hypertext  
Subject: Re: Qualifiers on Hypertext links...

In article <64...@cernvax.cern.ch> I promised to post a short summary of the WorldWideWeb project. Mail me with any queries.

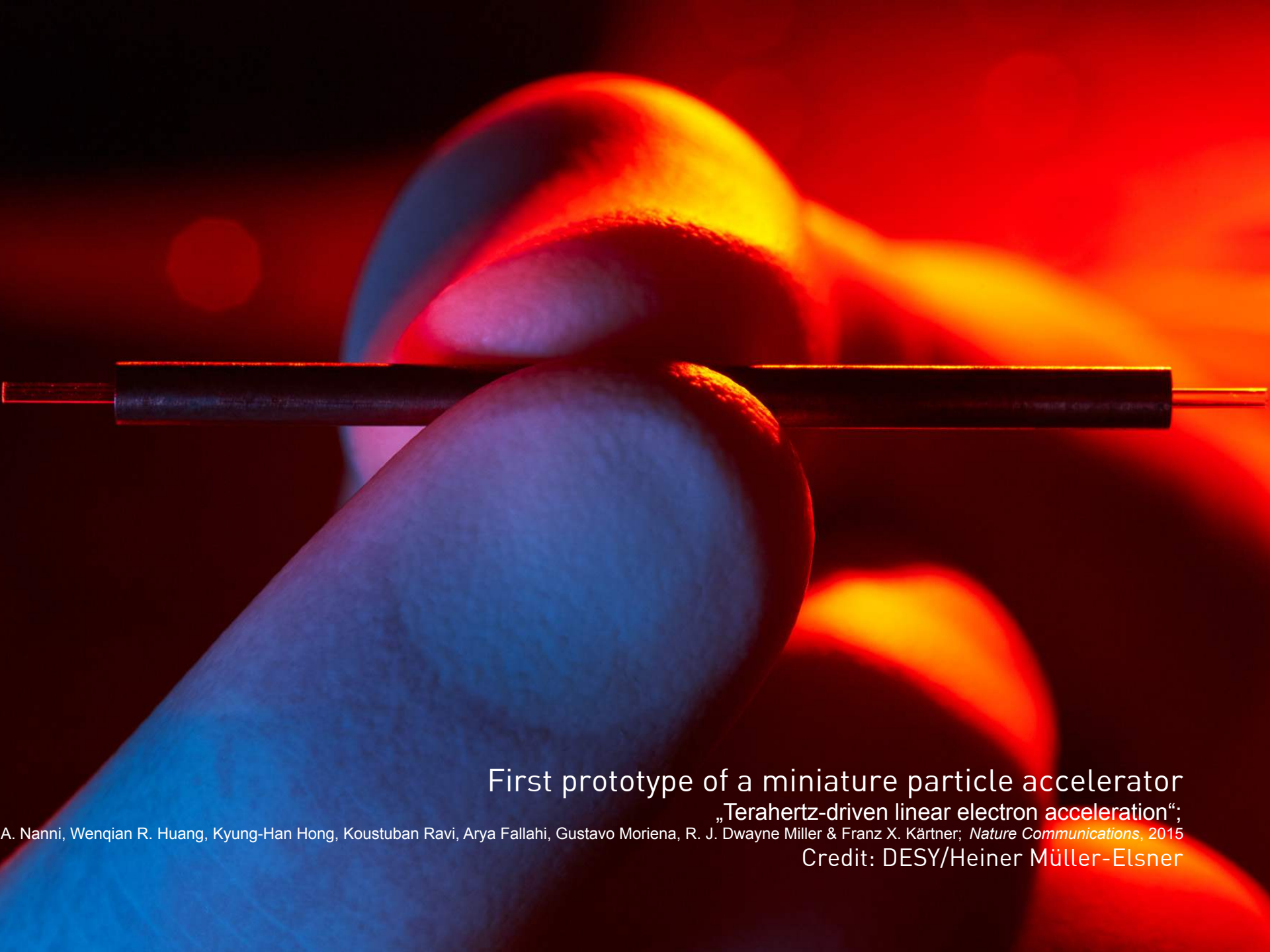
#### WorldWideWeb - Executive Summary

The WWW project merges the techniques of information retrieval and hypertext to make an easy but powerful global information system.

The project started with the philosophy that much academic information should be freely available to anyone. It aims to allow information sharing within internationally dispersed teams, and the dissemination of information by support groups.





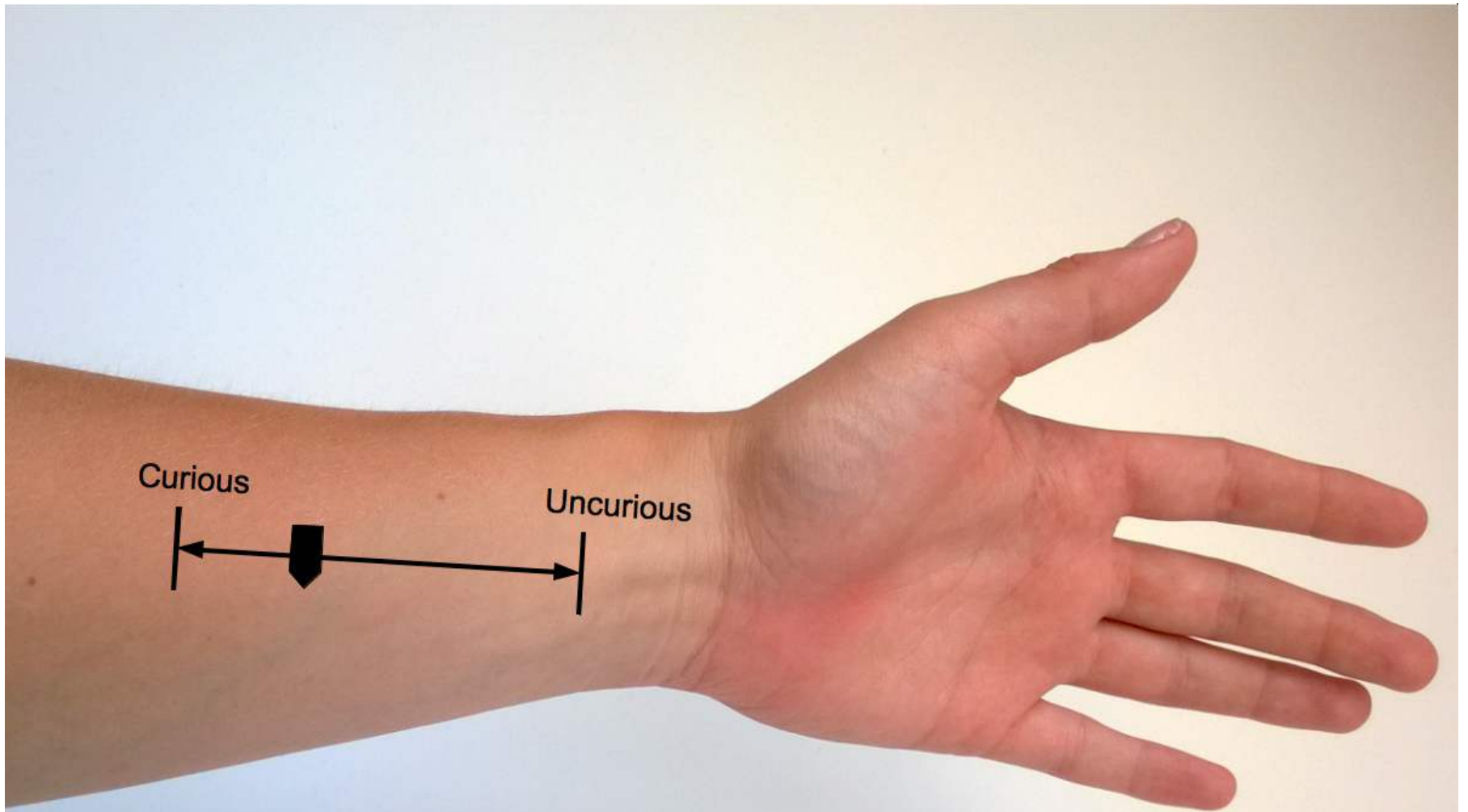


## First prototype of a miniature particle accelerator

„Terahertz-driven linear electron acceleration“;

A. Nanni, Wengqian R. Huang, Kyung-Han Hong, Koustuban Ravi, Arya Fallahi, Gustavo Moriena, R. J. Dwayne Miller & Franz X. Kärtner; *Nature Communications*, 2015

Credit: DESY/Heiner Müller-Elsner

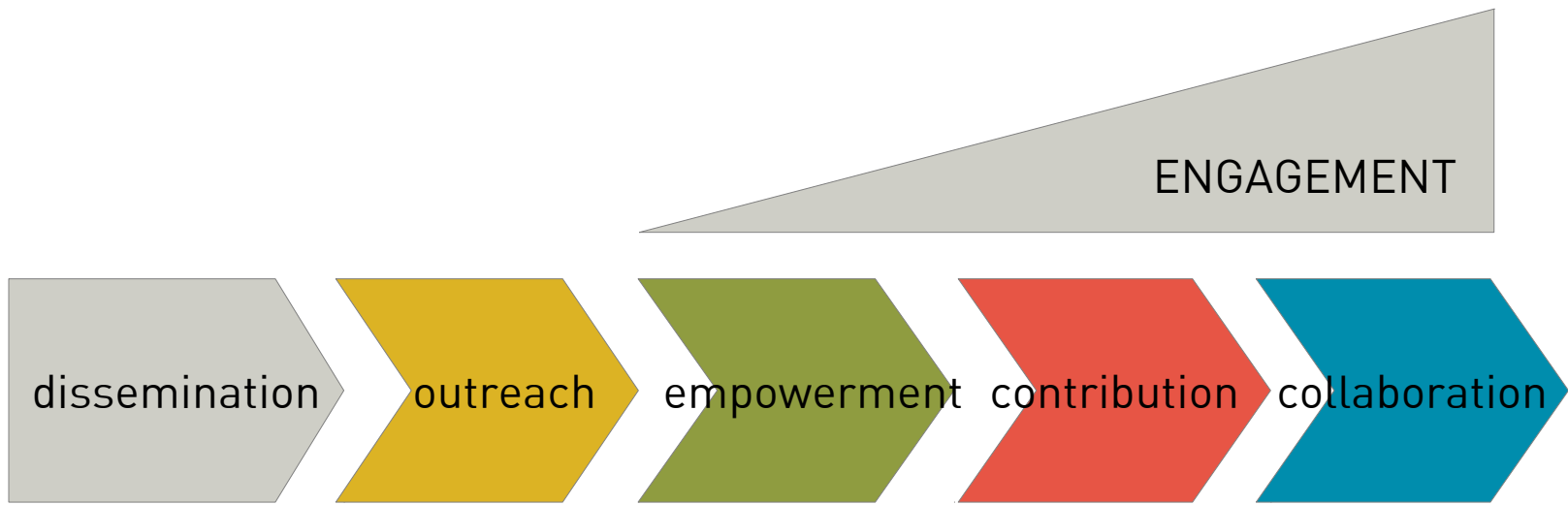


# Curiosity controller

Future Innovators Summit. Group F  
Ars Electronica 2014

<https://youtu.be/8FUkDhwgKEU>

**A new kind of CS based on experimentation  
and observation is needed**



# Agora

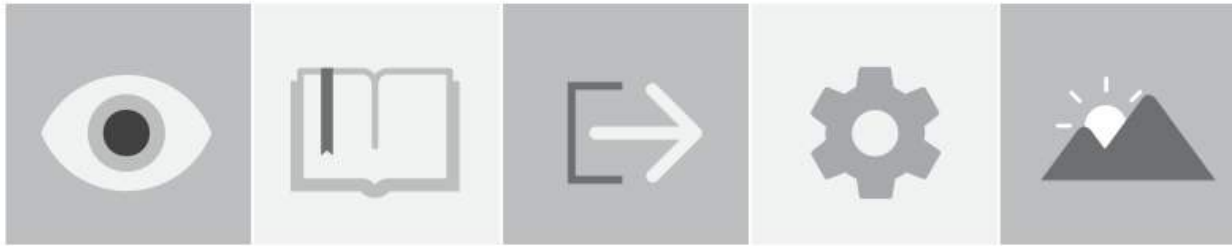
Researchers



Society



# CITIZENS ARE...



Discovering

Learning

Initiating

Developing

Emerging



Supporting

Catalyzing

Participating

Using

Collaborating



Evaluating

Appraising

Changing

Shifting

Evolving

# RESEARCH

## **Topic selection, plan and design, formation of collaboration group**

- Open peer review, crowd funding of research, online problem data bases and open innovation systems, international cooperation

## **Development of tools, pooling of resources**

- Open source, digital prototyping and manufacturing, crowdfunding, open methodologies

## **Experimentation, observation, data collection**

- Big data, new sensor systems, automated data collection from 'internet-of-things', laboratory robots, interaction with citizens, open science commons, volunteer computing

## **Data analysis, generation of hypotheses and theories**

- Artificial Intelligence-based and statistical methods of knowledge discovery, data mining, interactive and visual data analysis; new computing infrastructure, interaction with citizens

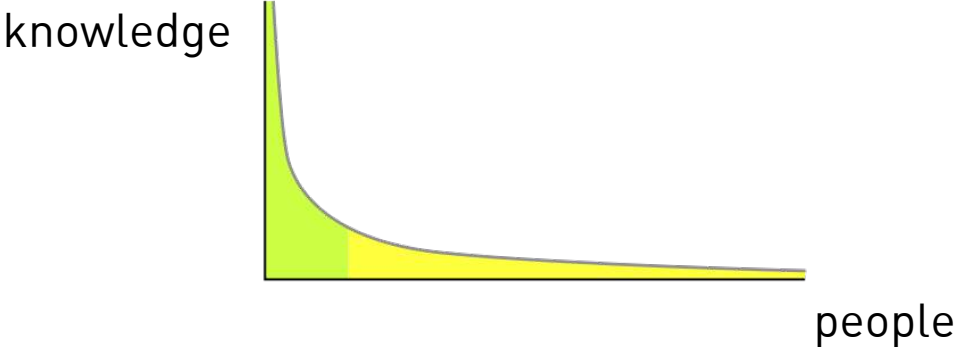
## **Cooperation, discussion, evaluation and critical reflection**

- New electronic forms of discussions, collection of micro- knowledge, interaction with citizens and artists, new metrics, reputation and recommender systems

## **Publication, knowledge sharing, education, outreach,**

- Open access publication, open data (data re-use), open source software (software re-use), open methodology, collaborative writing, new media, social networks

# Trust (in you & in others)





I hear and I forget  
I see and I remember  
**I do and I understand**

## Models

Volunteer computing

Volunteer sensing

Volunteer thinking

Participatory activities

Participatory experiments

## Volunteer computing



Heading ExaFLOPS

CPU 2 billion PCs by 2015

(1 ExaFLOPS = (40MPCsx 100GFLOPS x 0.25 availability)

Cost per TeraFLOPS-year

Cluster: \$124,000

Amazon EC2: \$1,750,000€

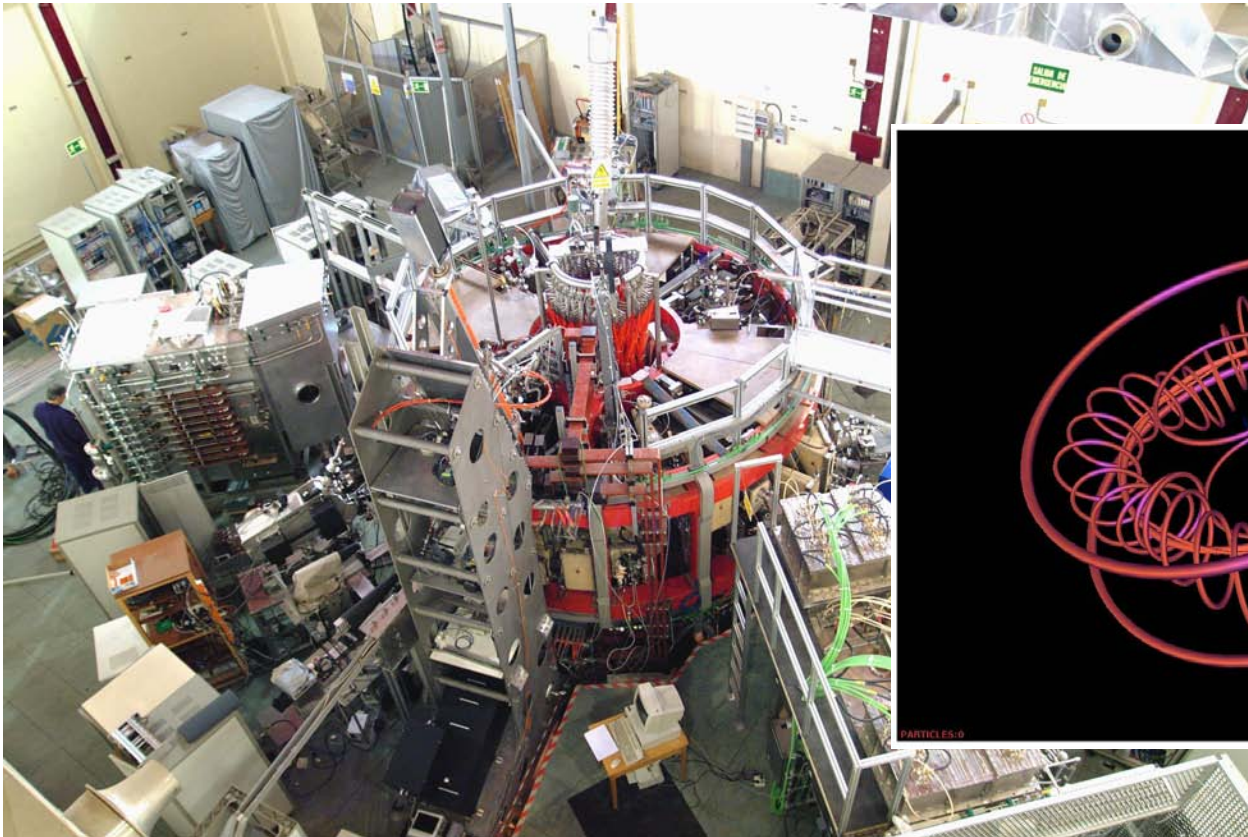
Volunteer computing: \$2,000

(source. David Anderson Univ. Berkeley)

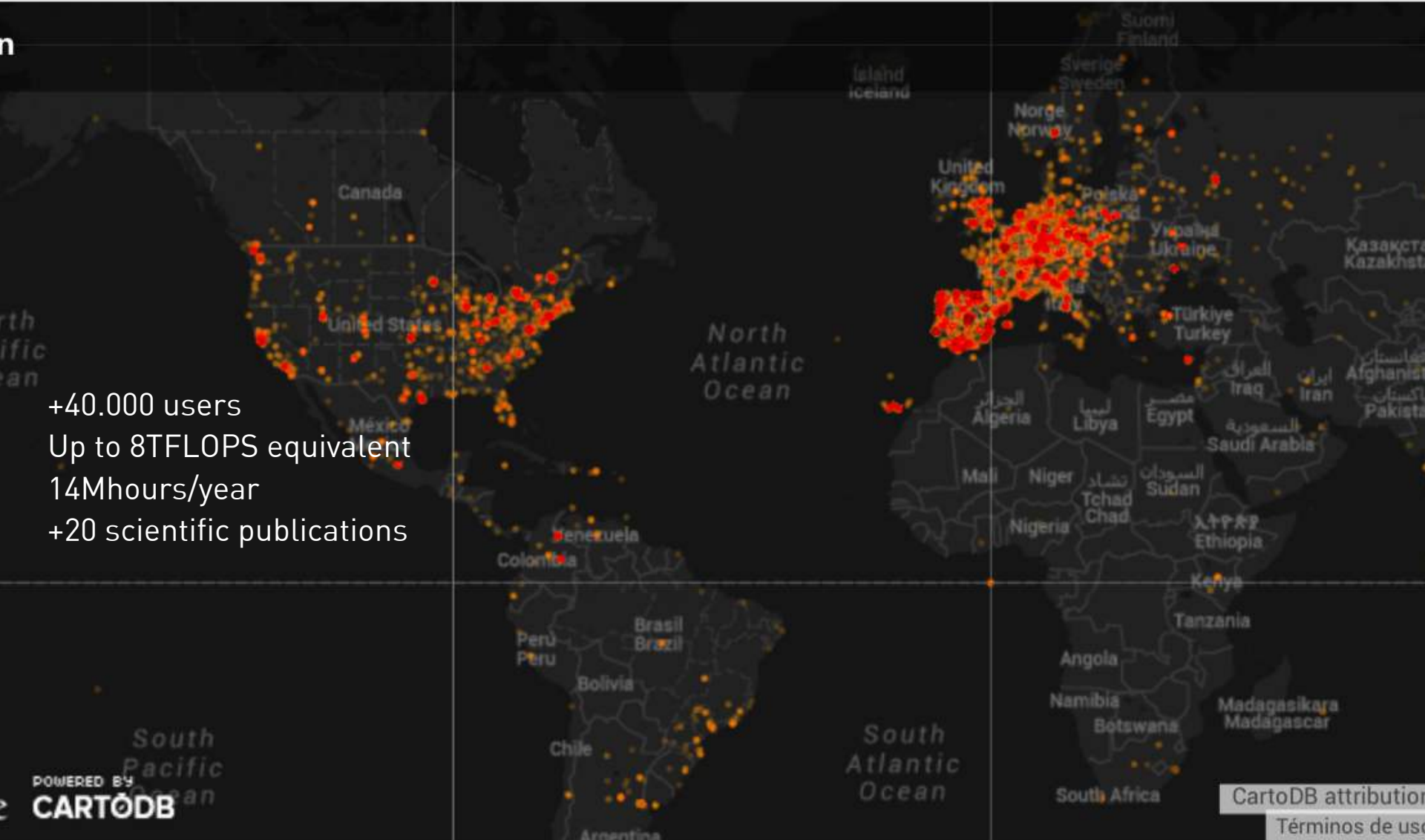
IBERCIVIS: Up to 8TFLOPS equivalent and 14Mhours/year



# ZIVIS Fusión nuclear (2006)



# Volunteer computing





# Volunteer Sensing

GripeNet.es

## Perfil



**Fermin**  
fermin@bifi.es

- Boletín
- Cuestionario de síntomas
- Mi perfil
- Mi grupo
- Configuración
- Salir

Si lo deseas y tienes su permiso, puedes añadir a más personas a tu perfil (por ejemplo, familiares o personas que viven contigo, van a tu clase o trabajan en tu empresa), e informarnos de su estado de salud en su nombre. Para ello, pulsa el pequeño recuadro a la derecha de la columna "Miembro". Para comunicarse con el equipo de GripeNet, recibir información, enviar sugerencias, etc, envía un mail a [info@gripnet.es](mailto:info@gripnet.es).

Estás completando el cuestionario para fermin

\* ¿Has tenido alguno de los siguientes síntomas desde tu última entrada (o en las pasadas semanas, si es la primera vez que entras)?

- Ningún síntoma
- Fiebre
- Escalofríos
- Moqueo y/o congestión nasal
- Estornudos
- Dolor de garganta
- Tos
- Dificultad para respirar
- Dolor de cabeza
- Dolor muscular y/o de articulaciones
- Dolor en el pecho
- Cansancio
- Pérdida de apetito
- Esputo coloreado, flemas
- Ojos rojos y/o llorosos
- Náuseas
- Vómitos
- Diarrea
- Dolor de estómago
- Otros

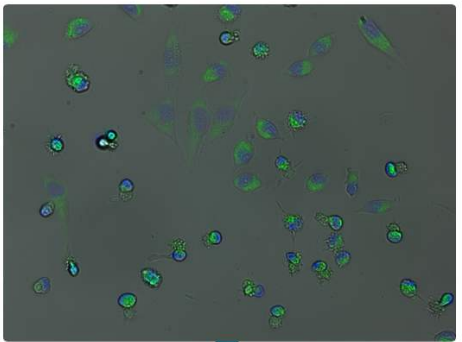


EPIWORK 

# Volunteer thinking

How many live cells do you see?

Channels  Normal  Blue  Green




How many live cells are there? And dead? The cells in the first sample image are alive, while the ones in the below image are dead.

Example of live cells



Example of dead cells

Apoptosis



Necrosis



Alive  Dead

Not sure

Alive Cells | Cell Shape | Cell Content Release | Nucleus Shape | Mitochondria Shape | Mitochondria Distribution | Nucleus Mobility | Cell Mobility | Remarks

[Cellspotting.scientize.eu](https://www.cellspotting.org)

GALAXY ZOO HUBBLE

Home | How To Take Part | My Galaxies | Contact Us | Profile | Logout

Classify galaxies

Answer the question below using the buttons provided.

Is the galaxy simply smooth and rounded, with no sign of a disk?

Smooth  Features or disk  Star or artifact

Invert galaxy image | Add to my favourites

<https://www.galaxyzoo.org>



## Unalga (II)



Freighter

Tonnage: 5650

Forum links [Sample transcriptions](#) ·

[Ask questions](#)

Learn more at [Naval-History.net](#)

50% COMPLETE

Transcribe logs

## Unalga (II)'s crew

The crew of this ship for the current voyage

 **jpiquard**  
Captain  
575

## Similar vessels

There are no similar vessels

[View all vessels](#)

# Volunteer thinking

The screenshot shows the Foldit game interface. At the top left, the window title is "Foldit" and the user is identified as "Dr. David Baker". A message box on the left says: "You've started a Wiggle Backbone! The protein's backbone will improve for a while. Click Stop Wiggle or hit space to stop it." The main area displays a 3D protein structure with a green backbone and brown side chains, surrounded by a field of colorful stars representing amino acids. On the right, a progress bar shows "Progress: 8317 of 8200" and "Level 2-3: Wiggle the Backbone". Below this, a text box contains a user comment: "I know, I can't even begin to describe how awesome this is. Worst player, so it can try different solution than before. I'm using the herb hands -> wiggle -> shake -> remove. Labels -> wiggle -> shake". At the bottom left, there are three buttons: "Shake Sidechains", "Wiggle Backbone", and "Reset Puzzle". A bottom menu bar includes "Actions", "Undo", and "File". The bottom right corner says "Puzzle Complete!".



## Participatory experiments

# Mindpaths.socientize.eu

WHAT IS THE PATH FROM 'JAIL' TO 'PARTY' ?

The interface displays a mind map starting with a central black circle labeled 'MUSIC'. Radiating from this center are ten white, fan-shaped nodes containing the following words: HALL, HEAR, ART, DANCE, LISTEN, LOUD, MELODY, GUITAR, MAJOR, BAND, and FLUTE. To the right of the 'MUSIC' node is a grey arrow pointing towards a second circular node labeled 'PARTY'. This 'PARTY' node is filled with a multi-colored gradient (red, yellow, green, blue, purple). Below the 'PARTY' node are two progress bars: 'Word Time' (a thin black bar) and 'Game Time' (a thicker black bar).

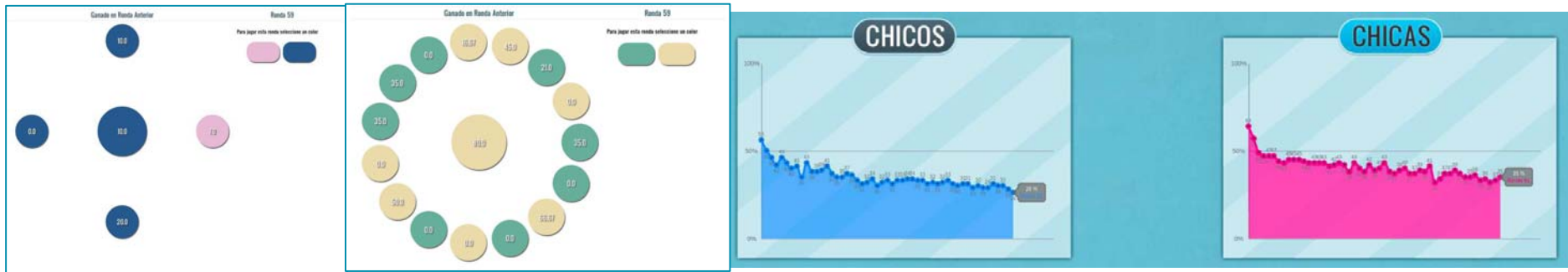
On the left side of the interface, there are two circular icons with arrows, one above the other. At the bottom left, a horizontal line with five dots is shown, with the dots labeled from left to right: Jail (black), Bar (red), Club (red), Dance (red), and Music (red).

At the top right, there are four social media icons: a red 'i' icon, a Twitter icon, a Facebook icon, and a Google+ icon.

# EXPERIMENTOS PARTICIPATIVOS



Large participatory experiment on human behaviour in real time  
+1300 students



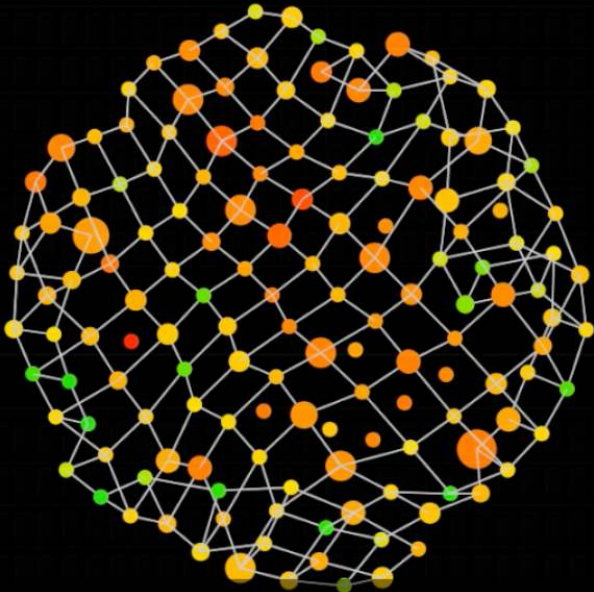
En familia, aceites, galletas....



# Collective Music Experiment



<https://vimeo.com/111102506>



# [Swarm surveys] Project Q – The Lab



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nukru / projectQ

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Pull requests 0

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Graphs

implementation of experiment "ciencias sociales, ciencias ciudadanas" on the platform Swarm Surveys

522 commits

1 branch

0 releases

1 contributor

Branch: master

New pull request

New file

Find file

HTTPS

https://github.com/nukr



Download ZIP

nukru fixed bug and change write\_stats to shoy the correct results

Latest commit 0a27a85 on Dec 2, 2014

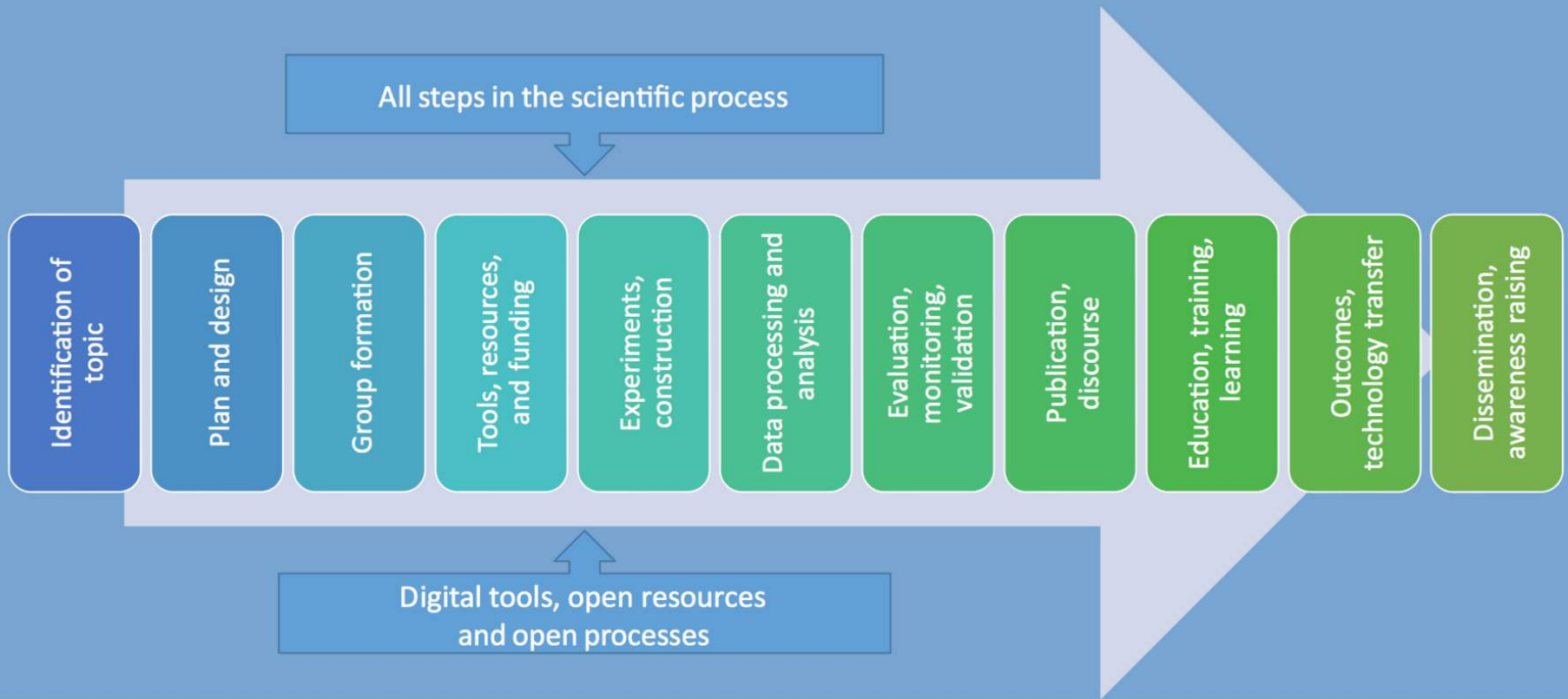
SchemaDisplay	update changes	2 years ago
app	fixed bug and change write_stats to shoy the correct results	a year ago
diseño/the lab web	update changes	2 years ago
html	update changes	2 years ago
jmeter	update changes	2 years ago
logs	update	2 years ago
pruebas	update changes	2 years ago
temp	update changes	2 years ago
tests	Update email.py	2 years ago
varios	update changes	2 years ago
.gitignore	fixed bug when QuestionChoice.render='select'	a year ago
LICENSE	update changes	2 years ago



# OPEN DIGITAL SCIENCE Study (2015)

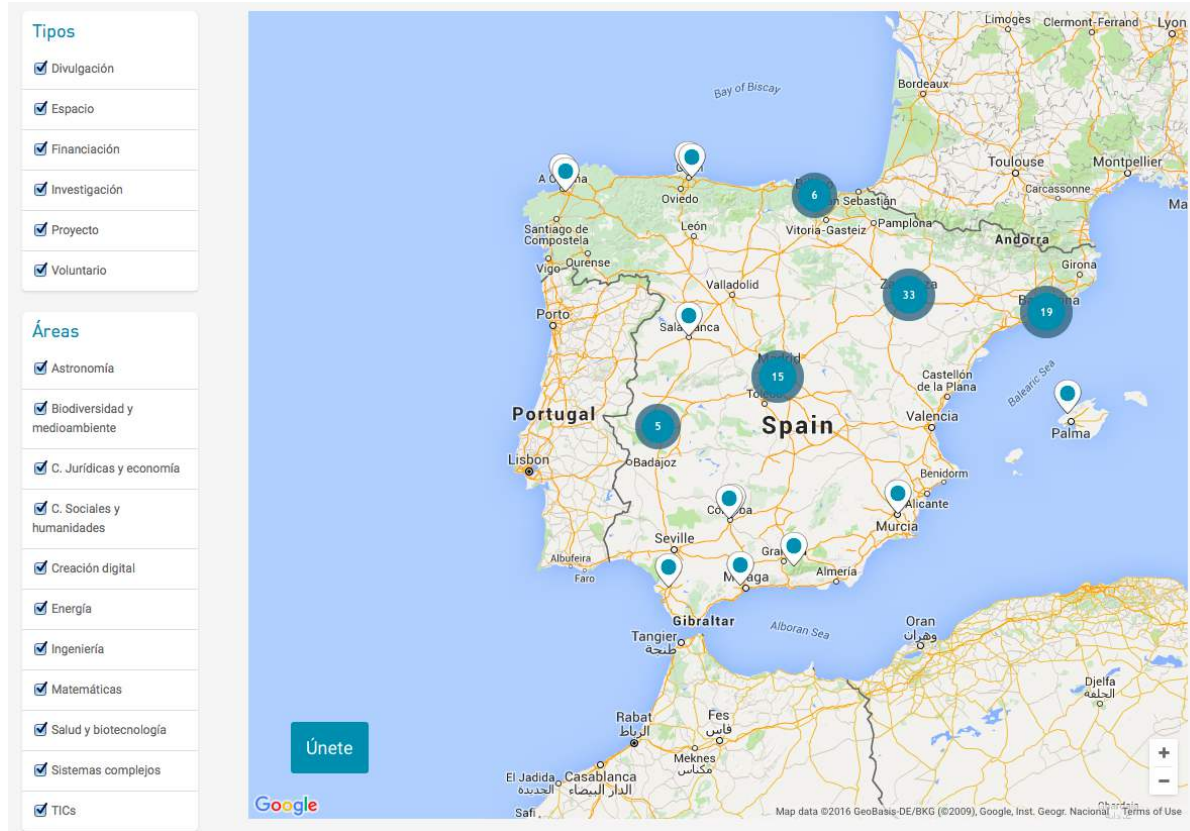
OS

Open Science is the idea that scientific outputs of all sorts should be openly shared as early as is practical in the discovery process. The use of digital technologies facilitates openness regarding data, methods, results, or actors involved.



# OBSERVATORIO CIENCIA CIUDADANA EN ESPAÑA

[www.ciencia-ciudadana.es](http://www.ciencia-ciudadana.es)



Map of agents, places, projects

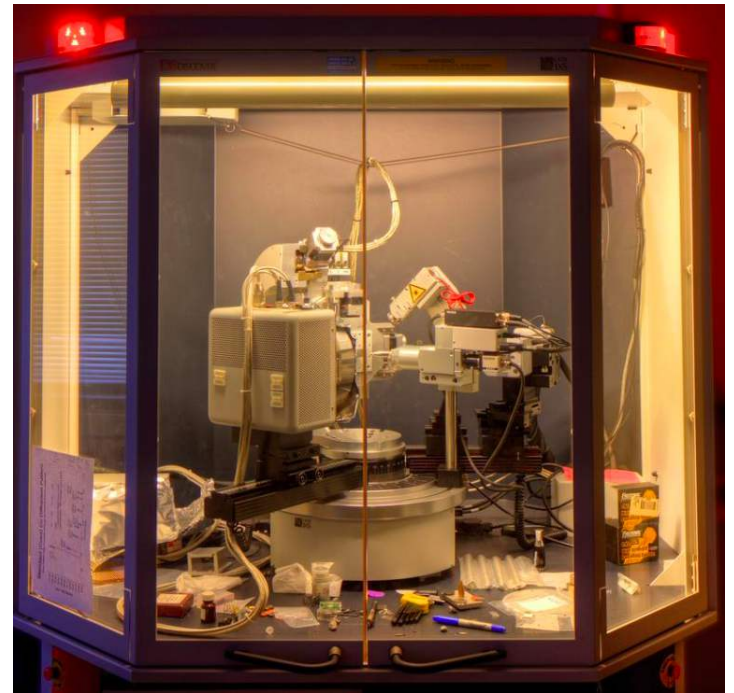
Meta analysis

Repositories of resources and tools

Workshops, also #CitSciChatES

Impact analysis → data science (Kampal) and social sciences (Antonio Lafuente CSIC)

## Tools for science





**citizen science and participation**



**robotics and neurotechnologies**



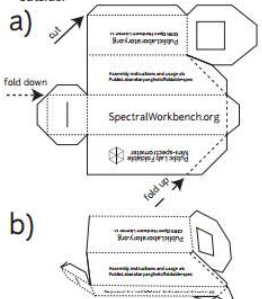
**collective intelligence and creativity**



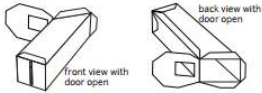
**environmental monitoring**

# No more silos. Non linear outcomes.

- 1. cut and fold**  
Cut along the outer edge. Fold up or down as indicated by the dotted and dashed lines. All labels should stay on the outside.



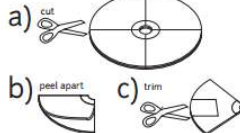
Except for the diffraction grating door, glue or tape all flaps down onto the outside.



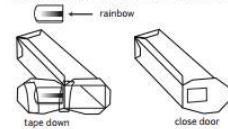
- 2. make a diffraction grating from a DVD-R**  
A diffraction grating is a series of close slits that disperse light.



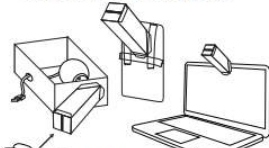
To make one from a DVD-R, split it into quarters, peel off the reflective layer and trim a small clean square out of the transparent layer. Try to pick a clean piece without fingerprints or scratches.



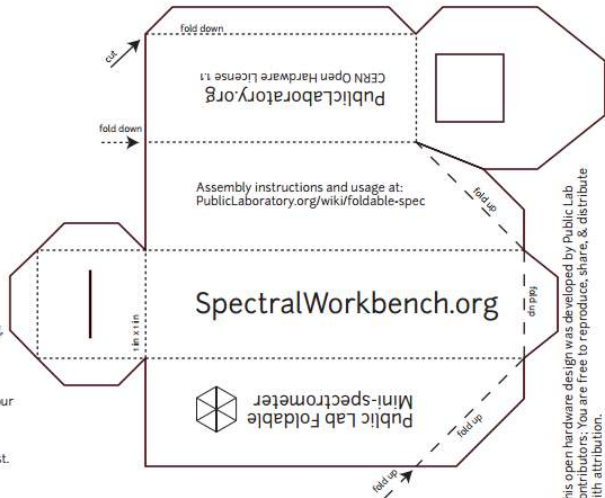
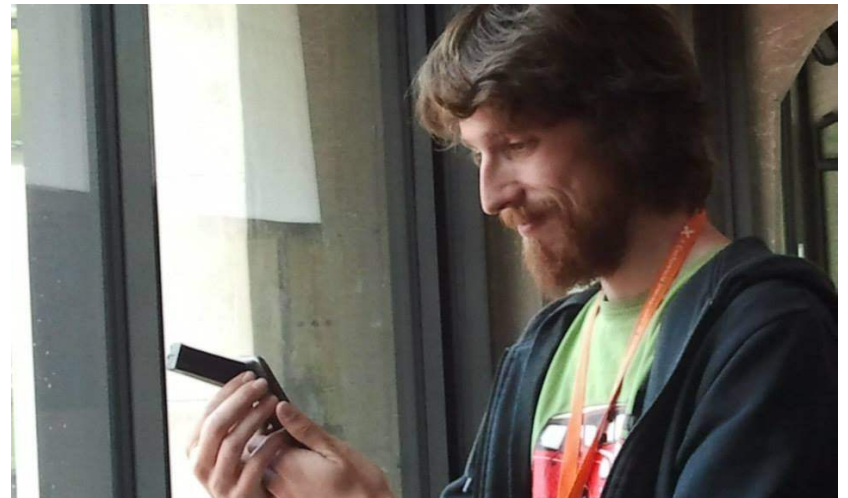
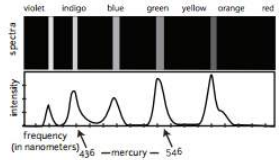
To work as a diffraction grating the DVD-R must be placed so that its grating is vertical, making a horizontal spectral rainbow. Tape your DVD piece to the inside of the spectrometer's door, then tape or glue the door closed.



- 3. attach to a webcam, phone, or laptop**  
The spectrometer can be mounted on a camera phone, laptop, or with the help of a box, attached to a webcam. Line up carefully so that the rainbow is in the middle of the image, and tape down firmly so that the spectrometer stays rigid.



**reading spectra**  
Every molecule emits only certain frequencies of light, and under the right conditions a spectrometer can detect these as rainbow bands. With two clear bands, the mercury in compact fluorescents makes calibration easy.



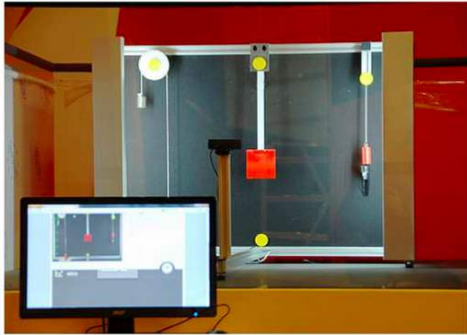
Join up, calibrate, & share spectra  
Go online to [Spectralworkbench.org](http://Spectralworkbench.org), follow the calibration instructions, and you'll be ready to upload calibrated spectra!

Don't forget to share and publish your research as Research Notes on [Publiclaboratory.org](http://Publiclaboratory.org), and ask questions through the Public Laboratory Spectrometry mailing list.





This open hardware design was developed by Public Lab contributors; you are free to reproduce, share, & distribute with attribution.

# cienciaREMIX

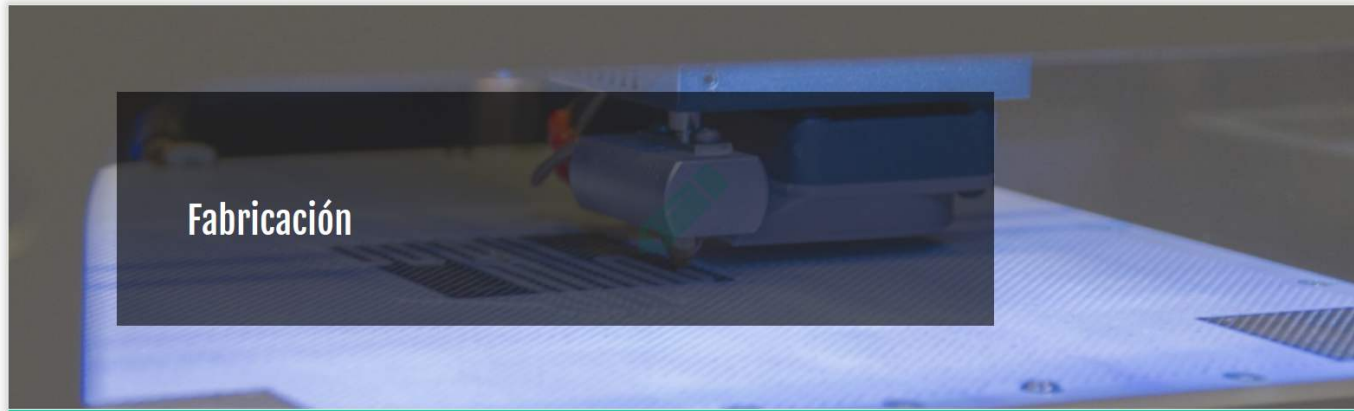
Re-contextualizing science  
Open your data, your  
methodologies, your outcomes...  
Open your labs



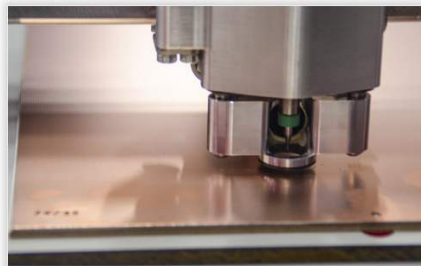
PROYECTOS DESTACADOS

 <b>Sun</b>			
<b>APRENDIZAJE 2.0</b> VISOLARSYSTEM Este escenario ha sido diseñado para explorar el Sistema Solar controlando la cámara con sus...	<b>SUN4ALL</b> Entender lo que pasa en el centro de nuestro sistema solar también es una forma de...	<b>TEST DE TURING</b> Con un interfaz creado para este experimento, puedes participar con otros y descubrir si estás Interaccionado...	<b>COLLECTIVE MUSIC EXPERIMENT</b> Uno de los retos de la era de la información es entender la inteligencia colectiva y...
<a href="#">LEER MÁS</a>	<a href="#">LEER MÁS</a>	<a href="#">LEER MÁS</a>	<a href="#">LEER MÁS</a>

# Etopia Center Art and Technology



Visualización



Prototipado



Wetlab



Robótica



Mobiliario

*digital transformation is enabling borderless society, innovation and also science*

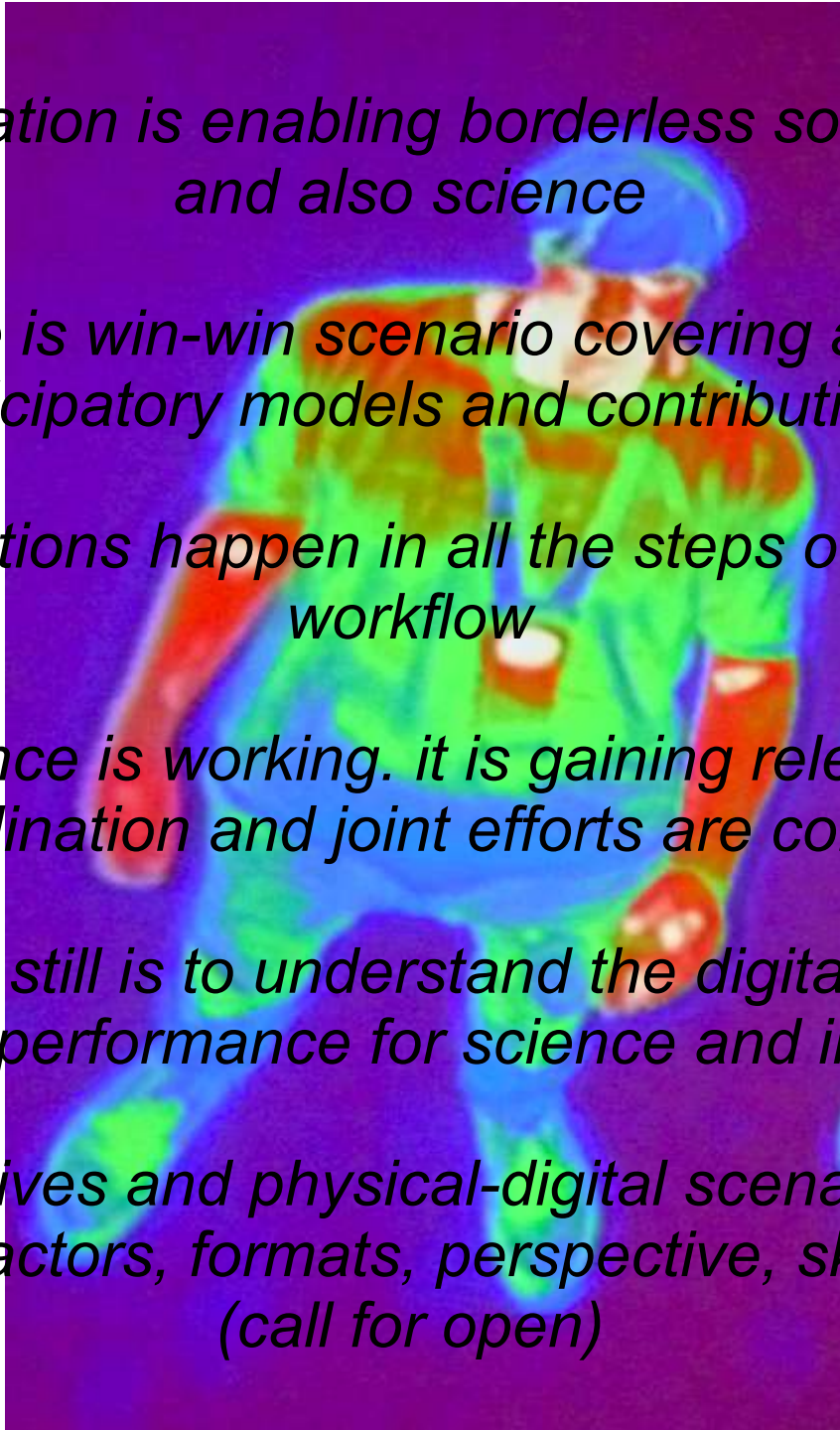
*citizen science is win-win scenario covering a wide range of participatory models and contributions*

*these contributions happen in all the steps of the scientific workflow*

*citizen science is working. it is gaining relevance, more coordination and joint efforts are coming*

*the challenge still is to understand the digital society to fully exploit its performance for science and innovation*

*new virtual narratives and physical-digital scenarios are emerging to work with new actors, formats, perspective, skills and creativity  
(call for open)*





# INICIO



## EXPERIMENTOS DESTACADOS



SCI IN YOUR MOBILE



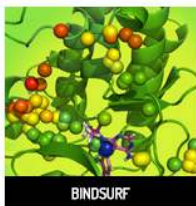
AQUA



SUN4ALL



HAPPY UP



BINDSURF



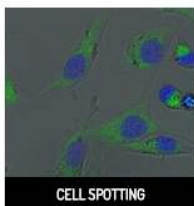
WILSON



GRIPENET



MIND PATHS



CELL SPOTTING



## IDIOMA

EN ES PT

## BUSCAR

## APP



## ACTUALIDAD

Entrevista acerca del movimiento de software libre y código abierto

La app "Science in your mobile" en los medios

¡Este verano sol para todos! Prueba nuestra app

## EVENTOS

III Jornadas de Divulgación Innovadora D+i

La Comisión Europea presenta el nuevo programa STARTS – Innovación en el nexo entre Ciencia, Tecnología y Arte- en el festival Sónar.

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