



CITIZEN SCIENCE



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CITIZEN SCIENCE

DEFINITION: Scientific research conducted, in whole or in part, by large numbers of amateur (or non-professional) scientists.

Citizens actively contribute to science with their intellectual effort, surrounding knowledge or with their tools and resources.



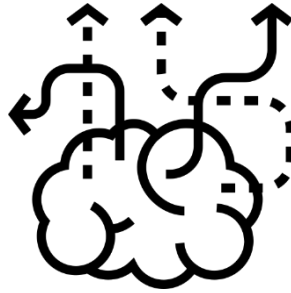
- Projects can be lead by scientists or citizens.
- Both work together as peers
- Anyone can participate: no special background is needed because you learn with the project
- Participants use the same protocol so data can be integrated and be of a high quality
- Results are open and shared

Research can move forward very fast
having a very large number of people collaborating!



CITIZEN SCIENCE IN THE BIOMEDICAL FIELD

How can a person without background in biology help me in predicting the structure of a protein?



Is my specific topic on basic research interesting for the general public? Why?

Some scientists from biomedicine have doubts about citizens' participation in their research...

But other researchers from this field, who have used CS approach to their scientific goals, recognize that collaboration with enthusiastic volunteers enable conducting research at a scale not otherwise possible! Even more, if the project is well designed, results obtained by citizen scientists can be highly comparable to those produced by experts.

“Multiple volunteers are asked to annotate the same image: with these data aggregation you can achieve a level of accuracy comparable to, or even better than, an expert.”

Lucy Collinson and Martin Jones, Etch A Cell project leaders

HOW TO RUN A SUCCESSFUL CS PROJECT



3 main suggestions

1. **Keep it simple**
2. **Listen to the participants**
3. **Give feedback, and stay in touch**

Gemma Conroy,
<https://www.natureindex.com/news-blog/how-to-run-successful-citizen-science-project>

“The highest quality data is produced when humans and machines collaborate, rather than when either work in isolation”

Helen Spiers, biomedical research lead on the Zooniverse

CO-CREATED CITIZEN SCIENCE PROJECTS

Citizen science projects that engage people in a deeper way and from the very beginning, involving them in the design process. In this way, the project can be shaped on certain collectives and deliver something that make sense in specific environments.

“Co-created projects are extremely challenging in comparison to other approaches to citizen science, but they are also highly impactful”.

Muki Haklay, geographer and computer scientist



Research moves
far
if enriched with
fresh
and surprising
views and ideas!

DEEP IN TO CITIZEN SCIENCE

Collaboration with patients

For biomedical projects, collaboration with patient organizations can be very powerful. Consider their participation in several stages of the projects, not only data collection. It is an excellent group of people to co-design protocols or communication plans for results dissemination, for instance.

“We are making an effort to empower them through training... they are learning not just about how they are individually affected, but a broader knowledge that arms them with ability to represent the entire community in medicinal development.

Researchers on the other hand are encouraged to include a lay abstract, outlining projects and the possible impacts that their work could have on patients”.

Traceann Rose, director of patient and volunteer engagement at the Children's Tumour Foundation (CTF) in New York)



Saca la lengua project, that also collaborated with Down Syndrome Associations

DEEP IN CITIZEN SCIENCE

Guidelines, perils, support

There is a lot of advocacy for citizen science but it is also important to think about risks, perils and misconceptions...



“If citizen science can reconnect amateurs and professionals in a new way around lab experiments, then there is something very exciting going on, but at the moment there is a lot of talk, but no huge breakthrough.”

Bruno Strasser, University of Geneva.
He leads an ERC-funded project looking at how citizens produce scientific knowledge

There is a need to better understand motivations for participation, build institutional support, develop guidelines for researchers



“Researchers embracing citizen science are ahead of the curve: the ivory tower does not cut it anymore—you want funding, you want impact, you really need to be out in the community, and this is the way to do it.”

Mary Ellen Hannibal, science journalist and author of “Citizen Scientist: Searching for Heroes and Hope in an Age of Extinction”

A CITIZEN SCIENCE CASE STUDY: 1



A co-created videogame to engage citizens in 3D genome research to study the anomalies that occur in cancer cells.

Project leader: Marco Di Stefano (CNAG-CRG)
Citizen science coordinator: Elisabetta Broglio (CRG)

Through a videogame, citizens will analyze small pieces of genome from cell lines of different tumors to discover eventual translocations and other rearrangements that can induce aberrant cell functioning.



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A CITIZEN SCIENCE CASE STUDY: 1



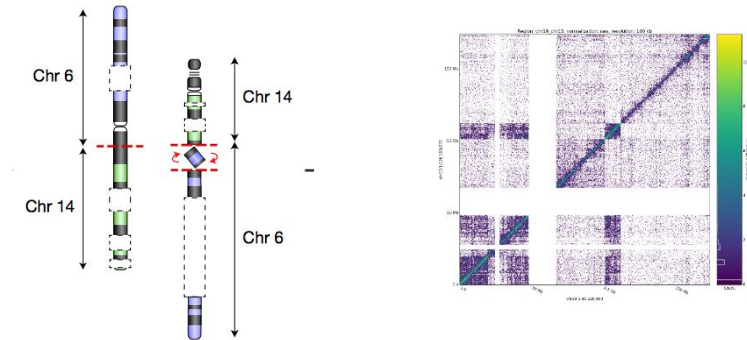
- 1) Co-creation to design a game aligned to the interest of society

3 workshops:

1. With scientists, teachers and artists
2. With patients and storytellers
3. With gamers



- 2) Looking for big data from different people: it will speed the research and improve results (eyes can solve patterns better than algorithms)



“It’s not about simplifying science concepts for lay audiences, it’s about using the right vocabulary and overcoming language barriers”

Marco Di Stefano, about his experience with CitizenScience within @ORION_opensci.
He is a CNAG-CRG postdoc leading scientific component in Genigma project.

A CITIZEN SCIENCE CASE STUDY: 2



A citizen science project to study the mouth's microbiome and its possible relationship with our environmental characteristics and lifestyle.

Scientific director: Toni Gabaldón (CRG)

‘Stick Out Your Tongue’ (‘Saca la Lengua’) involved the public at different stage of research:

- 1) To collect variables to incorporate into the initial hypothesis
- 2) To collect samples and data from citizens.
- 3) To co-create a card game based on scientific results obtained, used as a tool to share the research output with society.



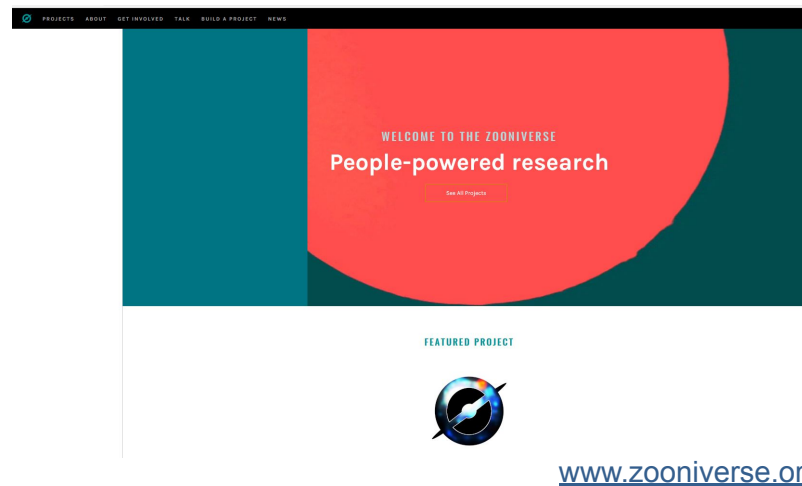
“Institutions move slowly, and scientists are not used to collaborate as a pair with people out of their field. However, I observed a change in their approach once they experience the benefit of getting people involved in their research with fresh and innovative ideas to offer.”

Elisabetta Broglio, Citizen
Science facilitator and CS project
manager at CRG

www.sacalalengua.or
[@_SacaLaLengua](https://twitter.com/_SacaLaLengua)

CITIZEN SCIENCE ASSOCIATIONS

Zooniverse: the world's largest and most popular platform for people-powered research.



...and many more examples that you can find online...



ecsa.citizen-science.net



ECSA: A non-profit association set up to encourage the growth of the Citizen Science movement in Europe.

