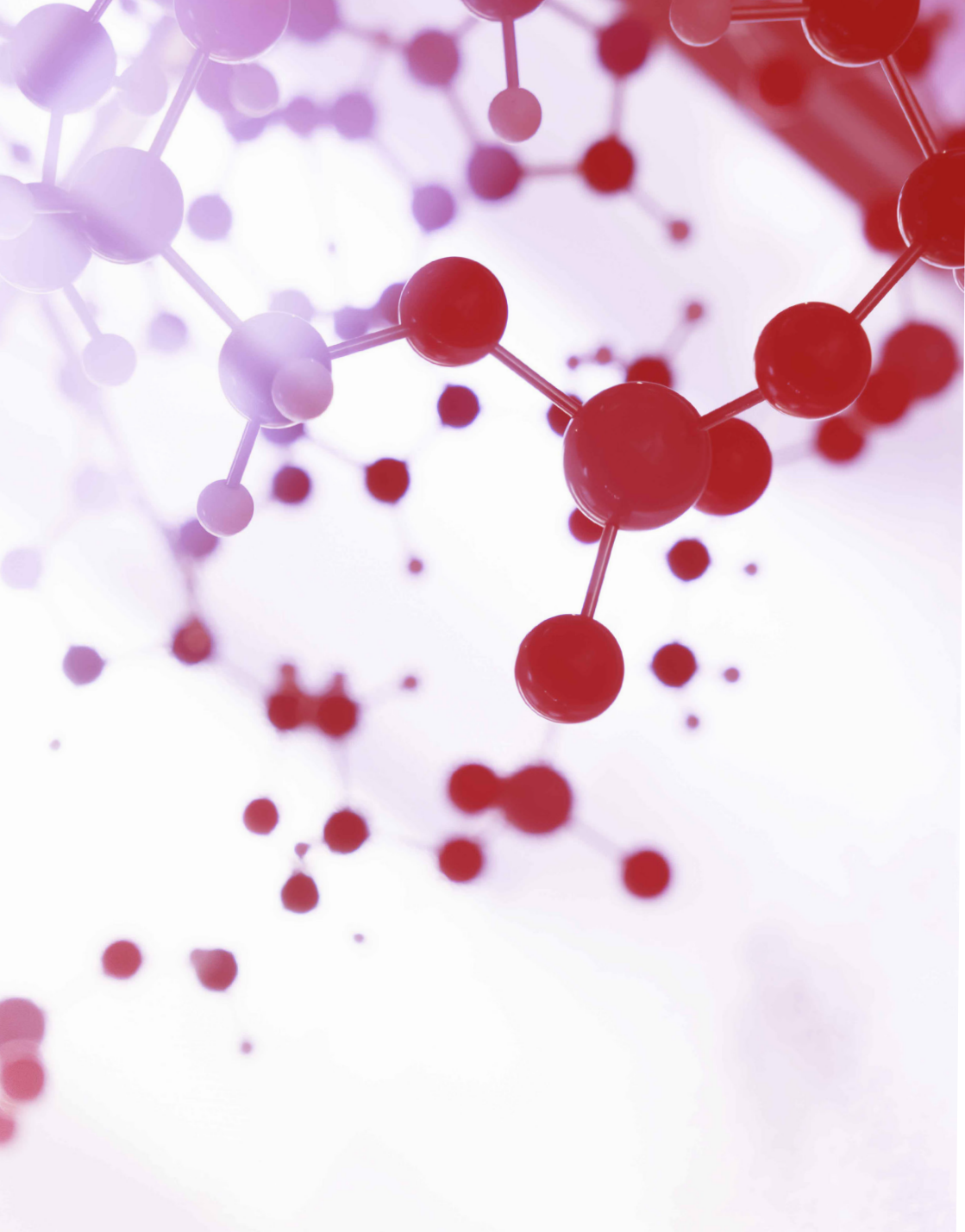




REINFORCE

REsearch INfrastructures FOR Citizens in Europe

Minimizing the
knowledge gap
between Large
Research
Infrastructures and
Society through
Citizen Science



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INDEX

The project.....	4
What is Citizen Science	6
What motivates citizen to join a citizen science project ?	8
Zooniverse	10
Large Scale Citizen Science Demonstrators	12
Participatory and inclusive design	14



This project has received funding from the European Union's Horizon 2020 project call H2020-SwafS-2018-2020 funded project Grant Agreement no. 872859 |



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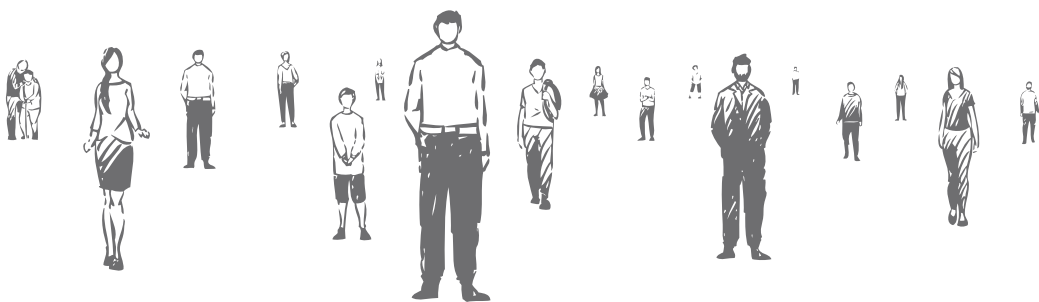
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THE PROJECT

The **REINFORCE** project (Research Infrastructures FOR Citizens in Europe) aims to engage and support citizens to cooperate with researchers and actively contribute in the development of new knowledge for the needs of science and society.



REINFORCE will invite citizens to contribute to online frontier science by using real and simulated data for analysis, taking advantage of simple affordable detectors and instrumentation to measure properties of objects such as cosmic rays.



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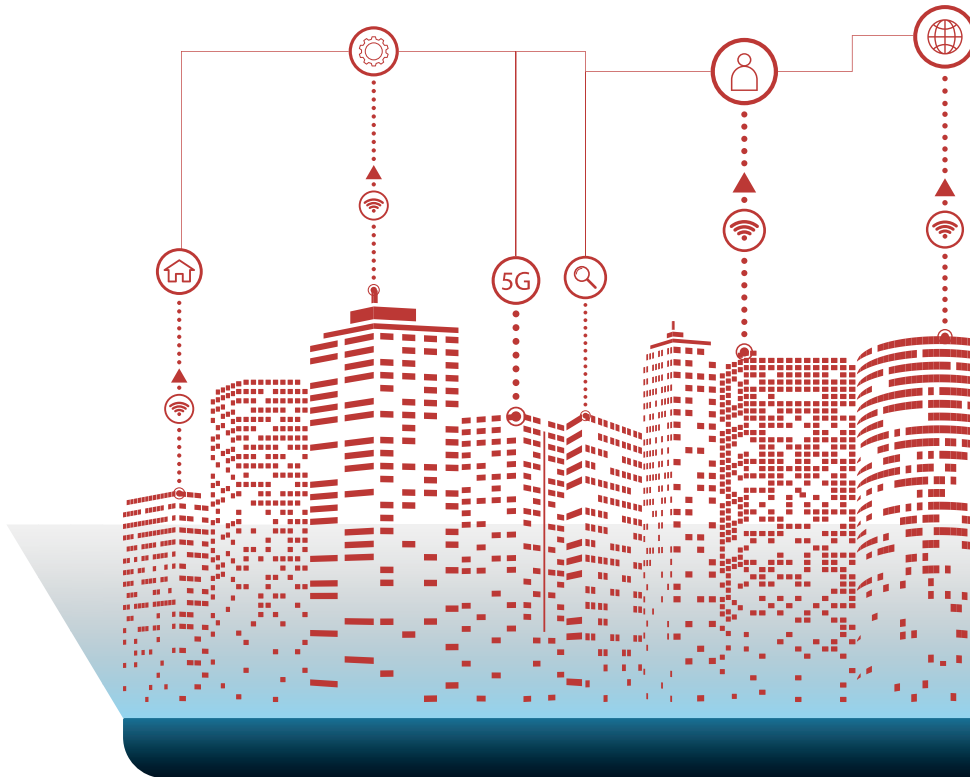
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WHAT IS CITIZEN SCIENCE?

It is an approach whereby citizens actively contribute to the generation of knowledge about important research questions.



Its outcomes are often advancements in scientific research, as well as an increase in the public's understanding of science.



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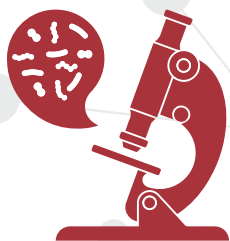


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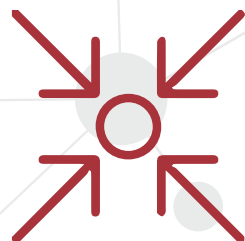
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WHAT MOTIVATES CITIZENS TO JOIN A CITIZEN SCIENCE PROJECT?



CONTRIBUTION TO ORIGINAL SCIENTIFIC RESEARCH

INTEREST IN THE TOPIC



LEARNING OPPORTUNITIES

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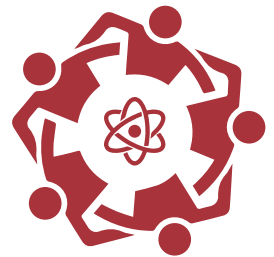
SELF-GRATIFICATION

FEEDBACK FROM SCIENTISTS



DISCOVERY NEW DATA

WILLINGNESS TO HELP SCIENTISTS



Source: M.J.Raddick et.al (2013), "Galaxy Zoo: Motivations of Citizen Scientists"



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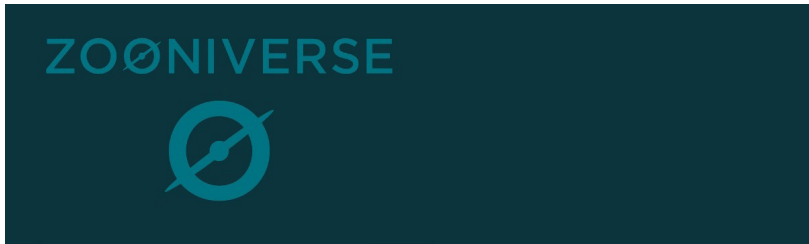


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ZOONIVERSE



REINFORCE will be using Zooniverse as the platform on top of which it will build its infrastructure and engage with its community. Zooniverse is known as **the world's largest platform for online citizen science**. It was developed in 2010 following the paradigm of Galaxy Zoo, one of the first projects where citizens were asked to participate in data analysis by classifying galaxies' images, with the idea to transfer the lessons learnt to other scientific domains.

**+460.000.000 CLASSIFICATIONS SO FAR BY
+1.900.000 REGISTERED VOLUNTEERS**

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Zooniverse allows researchers across Europe and beyond to build and run their own projects without requiring software development expertise, at the same time giving participants the chance to focus on skills development, playing **a full role in scientific exploration**. Because of the uniquely shared nature of the platform, any tools built for one project are immediately available to a large audience of research groups and communities they work with.



LARGE SCALE CITIZEN SCIENCE DEMONSTRATORS



**Deep Sea
Hunter**

Deep underwater neutrino telescopes measure neutrino events as well as environmental events that constitute “noise” for the neutrino searches. These environmental events range from biological bioluminescence, to acoustic signals from mammals and earthquakes. Citizens will help to improve neutrino detection algorithms, while gaining a greater insight of the unexplored deep marine environment.



**Search for New
Particles**

Citizens will be engaged in the quest of the Large Hadron Collider of CERN for the discovery of the ultimate structure of matter as well as particle theories beyond the Standard Model. For this purpose, the innovative interactive software HYPATIA will be used, allowing citizen scientists not only to classify static images but also to interact with the event display, select specific tracks, calculate invariant masses, etc..



Geoscience & Archaeology

In order for citizens to help explore the connections across the fields of cosmic ray physics, geology, volcanology and archaeology, REINFORCE will focus on interdisciplinary efforts for a multimessenger study of the Earth, and its climate, contributing to the understanding of topics such as climate change, volcano, earthquake monitoring and marine life, as well as their societal impact.



Gravitational Wave noise hunting

The sensitivity of Gravitational Wave detectors is limited by several types of noise. Recognising how they affect GW data is crucial to understand their origin and eliminate them. Citizen scientists will contribute to this activity by looking at chunks of data and identifying the presence of noise. This outcome will serve as a basis to train machine learning algorithms that will automatically recognize and isolate noise in GW data.



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PARTICIPATORY AND INCLUSIVE DESIGN

REINFORCE goes one step ahead in the field of inclusion by exploring diverse and underrepresented groups in science (such as **elder people and people with visual impairments**) and by providing them with tools (sonification of data for visually impaired people, virtual training workshops for people of rural areas, specialized ICT training workshops for senior citizens) and training to overcome specific barriers.

Within this perspective, REINFORCE considers the gender dimension of science by equally recognizing the impact of male and female role models in the development of frontier science.

PARTNER



Coordinator



UNIVERSITÀ DI PISA



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