



CITIZEN SCIENCE

WE WORK ON BUILDING CITIZEN SCIENCE PROJECTS THAT GET PEOPLE HOOKED

New science projects based on citizen observation and data collection paired with innovative technologies can strengthen environmental monitoring capabilities and have a very favourable cost benefit ratio. However, citizen science requires the empowerment of thousands of active citizens. For that reason we are testing new approaches to build habit-forming products and projects capable of engaging increasing audiences and/or maintaining the interest of citizens who are already engaged. For this, we are developing methods to motivate citizens in the short and long term, and for the collection of more challenging and specific data going beyond species observations (such as geological data, experimental data, etc.)

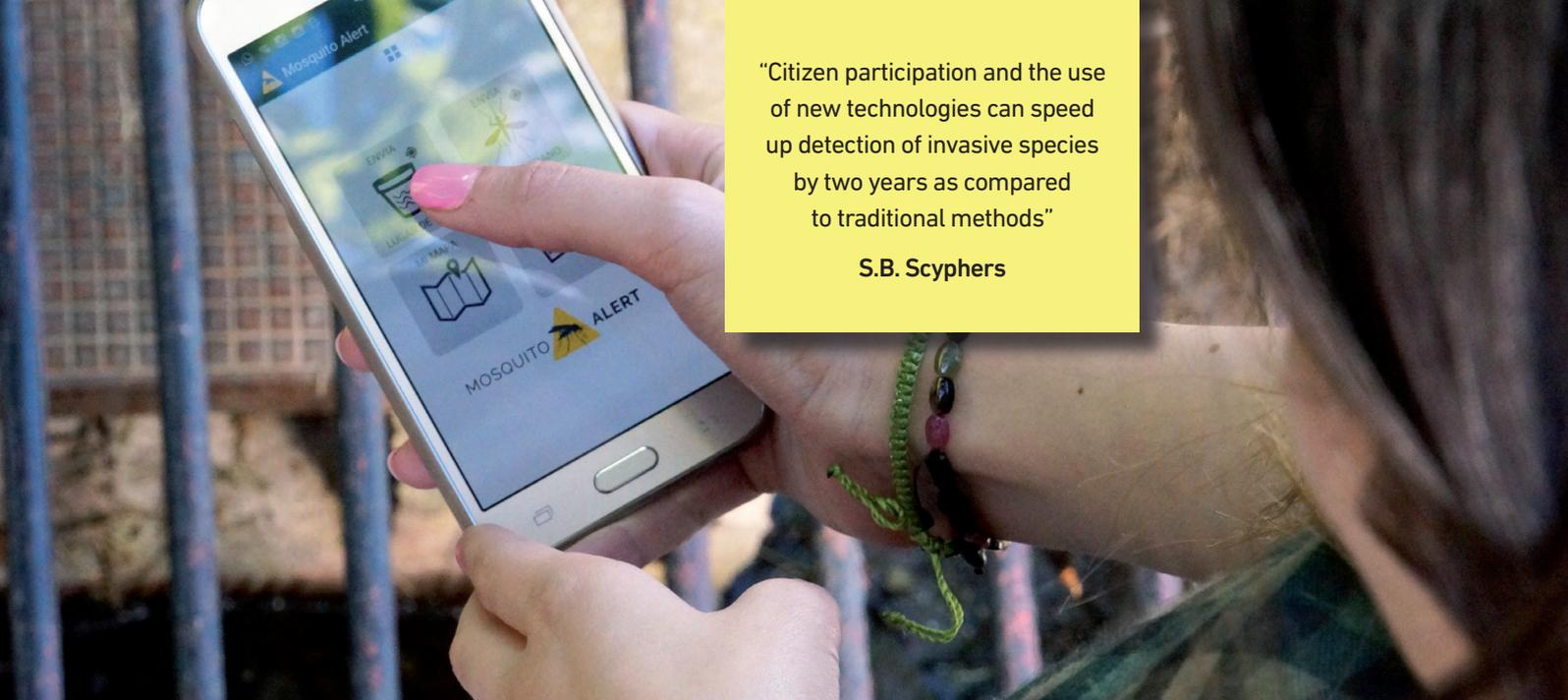
WE WANT TO STANDARDIZE CITIZEN SCIENCE DATA IN ORDER TO ENHANCE THEIR LEGITIMACY AND FITNESS FOR REAL-WORLD

Citizen science can help authorities and projects obtain evidence, with the potential to eventually inform environmental policy-making. However, the acceptance of citizen science data must be hastened, and full acceptance will only be possible once data and information sharing is ensured. We are collaborating with different groups specializing in data science

in order to improve communication of data between different platforms; this includes, for instance, increasing interoperability and standardization of data and metadata.

WE DEVELOP CITIZEN SCIENCE-BASED EARLY WARNING SYSTEMS

Citizen science has already proven to be a useful early warning system, whereas the primary role of surveillance (e.g. for exotic species, etc.) is to provide early warning signals. Citizens are capable of identifying signs of environmental risks, and citizen observation can contribute to initial warnings based on changes in key indicators (e.g. rising water levels, invasive alien species presence). Messages from citizens can be transmitted in a 'bottom-up' manner to centralised systems using communications technology such as smartphone apps. We are developing tools along these lines in order to make citizen science data more accessible and useful to stakeholders; to date such tools have included expert validation systems, interactive and real time maps, management platforms, and more. We expect to be able to use both citizen science and expert surveillance data together with novel modelling approaches to produce models which can be more robust and more relevant than those using other methods, and to improve predictions about risk factors for the environment and public health.



“Citizen participation and the use of new technologies can speed up detection of invasive species by two years as compared to traditional methods”

S.B. Scyphers

■ AT CREAM WE HAVE SIX MAIN LINES OF WORK ON CITIZEN SCIENCE

- 1 **We design and develop IT platforms used for input and validation of citizen environmental data:** we are working on all-inclusive projects which, from project initiation, encompass usability of the platform or mobile application, the architecture of contents, interaction with the user, and expert and/or cloud validation.
- 2 **We create predictive models which can use data bases created with citizen science:** we create models for distribution, population trends, and biodiversity indicators, all using data collected from different citizen science projects. More specifically, we also have experience creating epidemiological risk models for disease transmission from the tiger mosquito and yellow fever mosquito.
- 3 **We adapt citizen science projects to the necessities of the educational sector**
- 4 **We conceive and develop management platforms based on citizen information:** the functionality of such systems is adapted for environmental managers to be capable of providing responses and specific control solutions in real time (e. g. early warning systems, surveillance and control of species, etc.).
- 5 **We scale up citizen science systems to the scale of big data and the global scale.**
- 6 **We work on the interoperability of citizen science platforms:** we are members of international data and metadata standardization groups. We are also adapting citizen science data-gathering to the EBV (Essential Biodiversity Variables) and we collaborate on integrating citizen science projects for the European scale (e.g. Euro Bird Portal).

■ CREAM'S RESEARCH PROJECTS ON CITIZEN SCIENCE

- **MosquitoAlert:** an open source, expert-validated citizen-science system for tracking the mosquitoes that transmit Zika, chikungunya, and dengue <http://www.mosquitoalert.com>
- **Wildlife in the changing Andorran Pyrenees:** a long term citizens' survey of high elevation organisms and some of their interactions. Earth Watch Institute
- **Natusfera:** citizen science project based in on the iNaturalist app and in collaboration with Spanish high schools, used in biodiversity- related projects. <http://natusfera.gbif.es/>
- **ATiCO:** advanced technologies for environmental citizen observatories.
- **Euro Bird Portal:** EBP. European Bird Census Council (EBCC)
- **FenoDato:** Phenological observations created and validated by citizens for scientific analysis of global change. <http://www.fenodato.net/>

CONTACT

Communications Department of CREAM
Anna Ramon a.ramon@creaf.uab.cat
+34 935 811 488

Edifici C. Campus UAB. 08193 Bellaterra. Spain. www.creaf.cat

