

TEAMWORK WORKS

We talk to **Prof. Jan Marcin Węśławski** from the PAS Institute of Oceanology in Sopot about how scientists work with members of the public and the benefits it brings.

ACADEMIA: What are the origins of citizen science?

JAN MARCIN WĘŚŁAWSKI: It can be traced back to 19th century England and the popularity of bird-watching. It quickly became an important part of British culture – it was simply not the done thing for a gentleman to not recognize the species of birds visiting his garden. Making the most of this trend, scientists soon started publishing atlases describing different species with their behavior and migration patterns. Of course today all this information is readily available online. Astronomers and astrophysicists were the next to notice the benefits of citizen science, so they frequently ask Internet users for help with identifying objects in photos of the night sky [*Academia* published an article on the subject in issue no. 3/2015 – editors].

During one of our research trips, we came across a small yacht crewed only by an elderly man and his dog. The man was a carpenter from Schleswig-Holstein, popular in his community and an enthusiastic sailor. His local community had been skeptical about the reported climate change and decided to send him to Spitsbergen to find out what the situation was really like there. I couldn't believe that this could happen in Germany, a country with a vast budget dedicated to popularizing science. Locals would rather send out one of their own to confirm official reports. That's also an odd example of citizen science.

Is there place for emotions in citizen science?

The whole point is to show people the diversity of the natural world and to encourage them to feel positive about it. There's also another aspect: American sociologists have written about people experiencing stress originating from being cut off from nature. They noticed that children whose lives are mainly limited to their homes and computer screens respond to stimuli differently than those brought up closer to nature. They frequently struggle to concentrate and have problems with hyperactivity. According to the theory, contact with nature has a calming effect and

helps children manage their emotions, as well as providing intellectual stimulation, since the new experiences need to be categorized.

Participation in citizen science means that people are more likely to believe in the results of studies they were involved in – after all they collected the samples themselves and submitted them to the research team. It also helps channel the desire to learn about nature in places where human presence can be damaging. For example, seabird colonies in Spitsbergen are occasionally visited by tourist cruisers. They are all educated, clean, sensible, and concerned about the environment, and they all want to get a closer look at the animals they care about. This is great, but each vessel carries five thousand of them. Why shouldn't they have access to the birds if scientists do? Getting them involved in research projects which don't require them to be present at the colony could help solve the problem.

How do scientists work with the public?

Scientists ask questions they don't know answers to and ask the public for help in solving them. A few years ago in Germany, allotment holders were asked to note down when different plants start flowering in their gardens. The information was used to create a map showing when spring arrives across the country. The value of the project lies in its scale; information from a few individual gardens isn't especially meaningful, but when we're talking about, say, 50,000 participants, we have a fantastic collection of data.

It's impossible to imagine a single research team collecting such vast volumes of information.

Or even ten teams. It's far more difficult to design a similar project for marine ecosystems, but it is possible. An example of a successful campaign, held in Italy in recent years, involved cataloguing jellyfish. Beachgoers were given a laminated strip with photos of seven species and asked to send a message to an allocated number when they encountered a given species. Thanks to wide-reaching promotion and an

CITIZEN SCIENCE

efficient data collection system, the project received hundreds of thousands of submissions which were used to create the first ever jellyfish map showing the distribution of different species and how they move with currents; the data also revealed invasive species from the Red Sea. Jellyfish are important since they compete with fish for food, which means such research has significant practical applications.

What traits are crucial for research projects involving the help of non-scientists?

First of all, the research question needs to be genuine and fulfil a need – it's not a test. The aim also needs to be understandable and achievable. Of course there's always a chance you'll get someone sending pointless text messages, but with a high number of participants they don't affect the overall result, and neither do unintentional mistakes. Finally, the participants must be able to see the results of their work and they need tangible evidence of participation so they can talk about their input to family and friends.

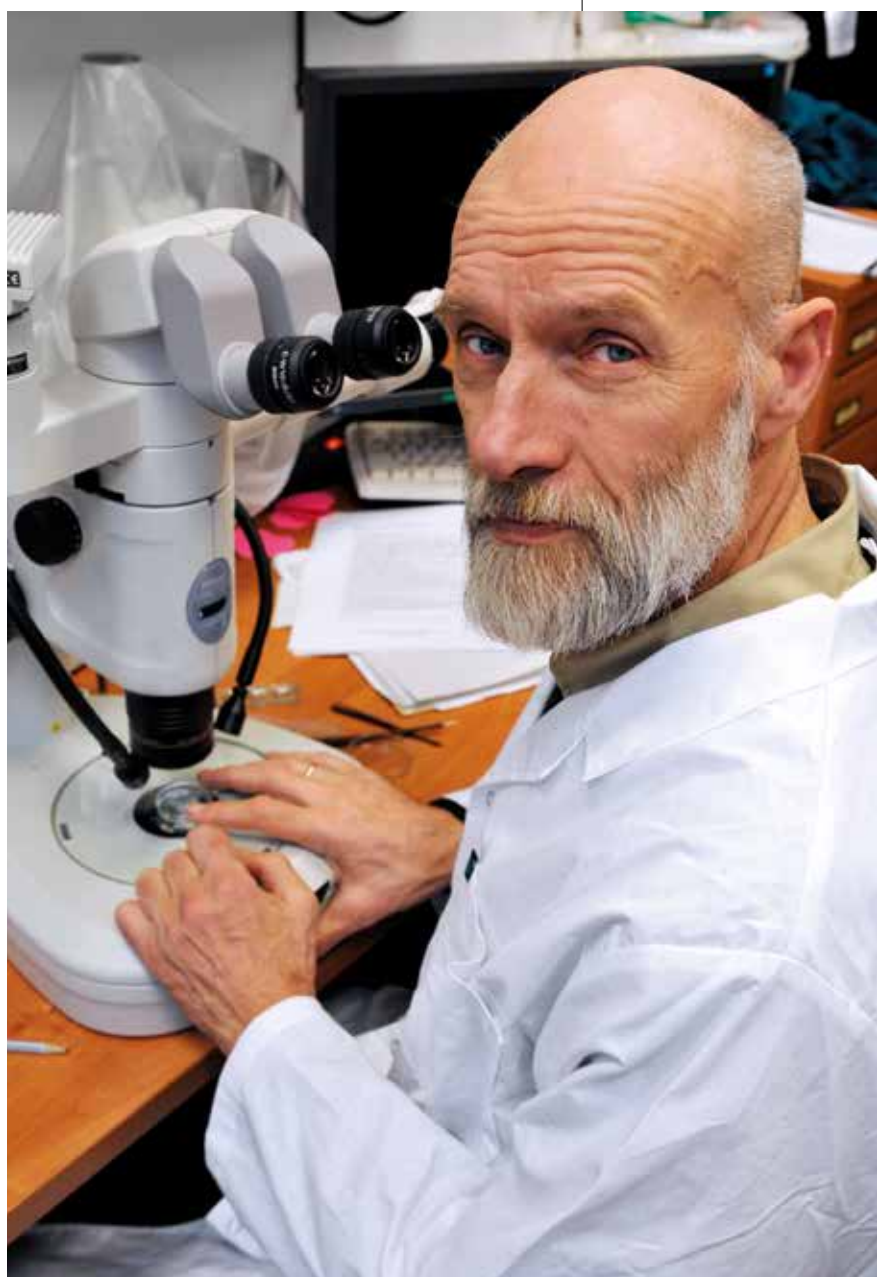
Citizen science shows people the **vast diversity of the natural world** and encourages them to feel positive about it.

So who can take part?

Anyone can become involved in citizen science. Many projects are aimed at schools. Senior citizens are a popular group since they have spare time and they tend to be scrupulous with data collection and reporting. Marine biologists value the participation of sailors, and the growing popularity of cruise holidays means that the seas and oceans are full of boats and yachts carrying potential citizen scientists. For example, crews can be given simple temperature sensors which send measurements directly to the research center via a satellite link. Or they can monitor water transparency using Secchi discs – plain white discs lowered on a rope into the water until they are no longer visible. Water transparency is an important parameter providing information about microplankton, water turbidity, productive zones and so on.

What are the risks involved with this type research?

Data collected through citizen science projects is publicly available, so anyone can analyze it to draw conclusions and use them to further their own



agenda. This means we need professional researchers to monitor the analysis so that it follows rigorous scientific methods.

What kinds of citizen science projects are being carried out at the Institute of Oceanology?

We recently studied the distribution of the sand hopper, a small beach-dwelling crustacean. During the 1960s, it could be found all along the Polish coast. We asked children to make small hollows in the sand spaced a few meters apart between the waterline and the edge of dunes, and count the sand hoppers emerging from them. We quickly received several thousand replies, which we used to sketch a map. We followed this by repeating the study in a more struc-

Prof. Jan Marcin Węśławski

is the head of the Ecology Department at the PAS Institute of Oceanology. He specializes in the taxonomy of marine crustaceans, and studies various aspects of ecology including biodiversity, climate change, trophic networks, and managing marine resources.

weslaw@iopan.gda.pl

ACADEMIA Insight Cooperation

tured, controlled way: a hundred children walked along the coast from Hel to Jurata, making hollows in the sand every 100 meters. We learned that sand hoppers start appearing at least 200 meters from the entrance to the beach. The following year, with the help of schoolchildren and students, we counted beachgoers; by combining this information with aerial photos, we determined that 90% of people set up their beach towels no further than 200 meters from the entrance to the beach. This explains the distribution of sand hoppers: they live near sources of food, which tend to be away from busy areas.

This kind of information is important in the conservation of coastal regions. If we place all tourist attractions near each other, they will draw the crowds, and in turn large sections of the coast are preserved for wildlife. We don't need to close beaches – all we need is to follow simple psychological tricks. Although many beachgoers claim they would prefer to be on empty beaches, they generally require infrastructure and tend to stay near it. They also like being able to stand on tiptoe and see a wild beach further away, and telling themselves that they could always move there if they wanted.

The Institute also works with Polish yachts traveling to the Far North. The sailors are thrilled to reach

Spitsbergen and see the fjords, and it turns out they enjoy collecting data for us. Spitsbergen glaciers are receding at a rapid rate, reaching hundreds of meters per year. This can be monitored by studying particles suspended in the water. We ask people to sail along the glacier edge and collect half-liter samples of water which we study to determine the chemical composition. We also ask them to measure water transparency, and to take photos – everyone takes pictures anyway, and they can provide fascinating information. For example, we have seen huge flocks of seabirds, mainly black-legged kittiwakes, where glacier waters melt into the sea. Where seawater and fresh water mix, sea plankton dies and rises to the surface, where it is eaten by birds [as described by Dr. Katarzyna Błachowiak-Samołyk from the PAS Institute of Oceanology in issue no. 1/2016 – editors]. The phenomenon is well known, but until we have seen the photos we believed it occurs at all glaciers, which turns out not to be the case. We have received over 500 images, which means we now know where to find bird aggregations. Now we want to study the phenomenon more systematically – with the public's help again, of course.

INTERVIEW BY AGNIESZKA KŁOCH
PHOTO: JAKUB OSTAŁOWSKI

special edition 1/2/2016

ACADEMIA

THE MAGAZINE OF THE POLISH ACADEMY OF SCIENCES

Vaccinations

WWW.SCIENCEONLINE.PL

