

Citizen Science

Podcast Transcript

Anne Johnson: Welcome to Environmental Health Chat, a podcast about how the environment affects our health, from the National Institute of Environmental Health Sciences. I'm your host, Anne Johnson.

[Cell phone ring]

If you're like me, you probably mostly use your cell phone for texting or putting photos on Facebook.

[Cell/smart phone sounds]

But our ever more powerful handheld devices could be serving a higher purpose. Picture, for example, converting your phone's camera into a mass spectrometer to identify contaminants in water. [Sound of water and beeps] Or, turning its microphone into a noise sensor to document the din from a new drilling operation near your house. [Sound of drilling]

Those are just some of the big ideas behind the growing trend of citizen science. Increasingly, you don't need a Ph.D. or a big research grant to get ahold of sophisticated scientific instruments. Using cell phones or other low-cost devices, everyday people can collect and share data that makes a meaningful contribution to help us understand pollution, chemical exposures, and other factors in our environment.

Today's guest, Dr. Sara Wylie, co-founded a citizen science initiative called Public Lab. She's also an assistant professor of health sciences and sociology and anthropology at Northeastern University.

She says citizen science fits into a broader cultural trend.

Sara Wylie: I think people are really interested in getting engaged in this because we really are dealing with very large-scale environmental health problems that actually affect people's day-to-day lives. So the question of, you know, what's in my water, what's in my couch, what's in my personal care product, is really important to contemporary consumers, and people want to have a way of understanding their risks and also understanding their relationship to larger environmental questions like climate change. How does your energy usage contribute to the large-scale environmental health problems that we have? So I think the interests that people have is really about getting involved in studying their environments and really moving from being consumers of information—being told things—to seeing themselves as producers of information.

Johnson: Public Lab and other organizations give people the tools they need to become active producers of information.

Wylie: Public Lab is basically an online community working together to design new tools for environmental monitoring, and the really exciting thing about it is Public Lab tools are free and available to the public, so anybody can go and read about how to do this, learn how to make tools themselves,

and then share back their results – so basically building sort of a public form of research and development.

Johnson: People can contribute to both data collection and data analysis. Many citizen science initiatives give people instructions for building or buying inexpensive data collection tools. These often use everyday materials or devices you probably already have, like a smartphone or camera. Then there are software tools for bringing all that data together to generate meaningful findings.

One of the tools Public Lab developed is a method for making a detailed high-resolution map by flying a digital camera high into the air on a helium balloon. Volunteers used that tool to document the Gulf Oil Spill as it unfolded in the summer of 2010. In 2012, just after Hurricane Sandy hit the East Coast, a project called Open Street Map used another citizen science tool to corral 6,000 online volunteers to search images of the damaged coastline and help FEMA quickly identify the areas that were hit hardest.

Sara said citizen science makes it possible to get environmental data at levels of detail that can be hard for more formal scientists to achieve.

Wylie: I see this as really being the ability to measure at a whole different level. Historically, we've done measuring through stationary monitors managed by an agency like the EPA to look at specific chemicals in the air, but that's, you know, not really a great representation of everyday exposures, and so, how can we kind of fine-tune our monitoring down to the level of what's important to an individual and then scale up from that individual to asking large-scale questions. So I think that's the really exciting part of the emerging citizen science trend is to really focus on connecting the level of everyday exposure to rigorous scientific investigation across locations.

Johnson: Sara said citizen science spans a wide spectrum. At one end is outfits like Public Lab, where non-scientists can essentially carry out research projects—start to finish—on their own. At the other is a growing number of professional academic researchers who are working directly with community members to plan research projects and collect data – an approach also known as community-engaged research.

As an example, Sara points to one project overseen by Dr. Monica Ramirez-Andreotta in which Arizona gardeners were trained to collect samples from homegrown vegetables in a study of arsenic uptake. The study revealed that the community's public water supply was exceeding arsenic regulatory standards and led to corrective actions.

Wylie: In infrastructure, I think what we're going to be seeing is formal scientists being trained more in how to work with communities and a research-and-development process that starts to focus on developing alternative, low-cost tools that produce data that can be useful to agencies and can be integrated more responsibly into our regulatory infrastructures.

Johnson: Of course, citizen science is not without its limitations, nor is formal science. As always, it's important to ensure instruments are calibrated correctly. Methods should be shared to allow others to replicate experiments, and data should be verified and trackable.

Citizen Science – Podcast Transcript

Visit our website for more discussion of these issues and for a list of innovative citizen science initiatives around the world. Thanks to our guest, Dr. Sara Wylie, who also sends her thanks to the Public Lab community for making the vision a reality.

You've been listening to Environmental Health Chat. I'm your host, Anne Johnson, and our podcast is brought to you by the Partnerships for Environmental Public Health, a program of the National Institute of Environmental Health Sciences.

Find us online at niehs.nih.gov/podcasts.