***Citizen Science: Stories of Science We Can Do Together***

**Season 2, Episode 3: Citizen Science Month Roundup**

*[Theme music]*

Welcome to Citizen Science: Stories of Science We Can Do Together. In this thrilling episode, we'll be distilling 30 excitement-packed days of Citizen Science Month pandemonium into a single podcast of non-stop science action!

*[Theme music fades out]*

**Bob Hirshon**

Hi, citizen science fans. Wow! I still can’t believe Citizen Science Month is over. That was such an intense and exciting 30 days. First, credit where credit is due -- a huge thank you to the All of Us Research program and the Network of the National Library of Medicine for supporting SciStarter and Arizona State University during Citizen Science Month. We’re still unpacking the Month here; in fact, our evaluators from Arizona State University will give us a full report about how we did sometime in June. Meanwhile, you can visit citizensciencemonth.org to learn about the projects featured during Citizen Science Month and watch related videos– including videos of some of the webinars we'll learn about in this podcast– at scistarter.org/citizen-science-videos, with hyphens separating the words citizen, science and videos. We've got a link right on the information section of this podcast.

And now, let’s relive some of the experience! The whole SciStarter team, including my co-host, Caroline Nickerson, worked with people all around the world to host over 100 online events. There were brilliant project leaders, inspiring volunteers, and extraordinary libraries participating.

Let's start with a project called SciQuest. You know those online quizzes that will tell you what kind of dog you'd be if you were a dog, or what house at Hogwart's School for Wizardry you'd be sorted into, or what Myers-Briggs personality type you are? SciQuest is sort of like that, but it's designed to find out what kind of citizen scientist you are. So, yes, it's a citizen science project about citizen science. Because the National Science Foundation and many other groups invest in citizen science, and they want to know not only how it helps scientists, but also what effect it has on the people who volunteer.

**Bradley Allf**

"The real goal of SciQuest is we just really want to know who you are. Who are Citizen Scientists?"

**Bob**

That's PhD student and researcher Bradley Allf, who runs the SciQuest project.

**Bradley**

"You know, it's pretty amazing if you stop and think about it. All over the world, right now, there are tens of thousands, maybe hundreds of thousands of people contributing to scientific progress. Right now there are people in their backyards measuring how much rain is in their rain gauge through CoCoRaHS. Right now there are people on iNaturalist identifying hundreds of species from all over the world that have been submitted by strangers to this database, altogether working to advance what we know about ecology. Right now, there are people reporting their COVID symptoms for a COVID citizen science research project, which has been instrumental in understanding how COVID has been spreading through different communities and how public health authorities can respond to outbreaks. All of that is happening right now and it's all because of this idea of citizen science, of allowing for amazing and unique partnerships between science and the public. And building on what we know about that phenomenon I think is super- important. That's what the goal of SciQuest is. And so, who are those people who are doing that, what are their motivations and what are they getting out of the experience?"

**Bob**

You can join SciQuest at SciStarter dot org, and we have links to the project and to the SciQuest webinar here on the podcast page. By the way, that goes for ALL of the projects I'll be including on this podcast.

And speaking of "all the projects I'll be including on this podcast," another one is Caterpillars Count-- how's that for a segue? What you do in Caterpillars Count is you... don't all answer at once!-- Yes, Count Caterpillars! And other bugs living on one or more small, leafy branches. Now why would you do that? Well, University of North Carolina researcher Allen Hurlbert, who started Caterpillars Count, explains that bugs like caterpillars are in trouble.

**Allen Hurlbert**

"There have been some alarming studies from different parts of the world suggesting that insects, different insect groups may be declining over time and, of course, in different parts of the world that could be due to different sorts of things: it could be due to climate change and warming, it could be due to pesticide use, it could be due to land use conversion and things like that, but, so there have been enough studies where eyebrows are being raised and we're sort of concerned about how widespread these insect declines are."

**Bob**

As a bug lover, that's enough to convince me. But Hurlbert is more of a bird lover, and he's concerned because these bugs are important food for songbirds.

**Allen**

"What I'm mostly interested in are foliage cleaning birds. A lot of our migratory birds are these little foliage cleaners, you know, warblers and vireos and things like that."

**Bob**

The general decline of bugs could be a big problem for these bug-eating birds. But climate change could make things a lot worse.

"So if the trees are leafing out earlier, that might mean the insects and caterpillars are coming out earlier. And so now imagine you're this little songbird down in Brazil. Spending the winter, chilling out. And it's like 'okay, now I'm going to migrate north to my breeding grounds and get all those tasty insects!' But you don't realize things have been advancing– you know, we call it phenology, right, that seasonal timing of the plants, the insects, everything is changing in your breeding ground. And you're a bird and you migrate at your normal time, you might actually miss that peak in insect availability. And with climate change there's the possibility of getting out of sync, or getting mismatched with those bird food resources."

**Bob**

And that could mean that the birds run out of bugs right when they need them to fuel up after a long flight, and then to feed their chicks. So if you care about bugs or birds or even trees– I mean, if all of these very hungry caterpillars munch away with no population control from birds, those poor trees are going to get eaten alive. So if this seems interesting and important, go to SciStarter and check out Caterpillars Count. Hurlburt says that even if you just do it once and send in your results, that's a big help.

Caterpillars Count is sort of the classic Citizen Science outdoor survey natural history kind of project. But for Citizen Science Month we also featured two projects that focus on the social sciences: Public Editor and Demo Watch, both run by Goodly Labs. They are an organization dedicated to equipping individuals with collaborative tools and opportunities allowing them to find common ground and take responsibility for building a better society. And, yes, I did just read that from their website, but what a great mission, right?

So let's start with Public Editor. You've probably read a news story and said to yourself "That doesn't sound right...that sounds kinda sketchy." But how do you know if it's sketchy? Well, that's what Public Editor is for. It shows you how to analyze news articles and determine how reliable they are. First, you complete a tutorial that teaches you what to look for and how to mark up the stories. Things like inferential mistakes, psychological biases, or argumentative fallacies. Then, you go to work labeling and correcting the misinformation in news articles, and share their results with the world. How cool is that?

Nick Adams is founder and chief scientist of Goodly Labs, and created Public Editor.

**Nick Adams**

The problem that we're trying to solve is one that everyone is familiar with at this point: you can call it misinformation, you could call it fake news, but it's not really a new problem. As long as we've had news, we've probably had some misinformation in our ecosystem. But now we have two billion amateur publishers; people who are passing articles and misinformation around via social media. And that is a huge problem with a huge scale, and we have to find ways to intervene in that.

**Bob**

He says teaching people how to spot misinformation could go a long way towards solving the problem– especially if they could use their knowledge to inform others.

**Nick**
So the goal of Public Editor is to create the possibility that we can all share reality again together. This is a collective intelligence system that provides nation-scale media literacy training while at the same time labeling all the dubious words and phrases in the most shared news articles on the web. So we're labeling all the problem news articles and we're also generating these credibility scores which can actually be used to raise the quality of our overall news diet.

**Bob**

Now Demo Watch is another project from the same group, this one focused on protests and how police and protesters interact. The project looks at media coverage of Occupy Wall Street, and you analyze the media to see what actions by protesters lead to violence by police, and what police actions lead to violence by protesters. NYU professor Alex Barnard works with Adams and others on Demo Watch:

 **Alex Barnard**

We're actually going to get into the events and observe how one action within them leads to another. How police use pepper spray and then a protester threw a bottle. People dropped a banner, and at that point police started making arrests. So within each of these events, we're going to look at the chain of actions and then we're going to see how they're linked over time. So one day the police had a very forceful in response and the next day the crowd that came to another protest was very very different and perhaps more ready to spark some sort of conflict.

**Bob**

Barnard says that is not an anti-police kind of thing; there are many law enforcement agencies that want this information. They want to see how these interactions unfold and how they resolve. Your work could help efforts to improve law enforcement at public demonstrations, reduce tensions, and help make these events safer for everyone. And again, that project is called Demo Watch, and it's a sister program to Public Editor, both produced by Goodly Labs.

Now, earlier in the podcast, Bradley Allf, who runs the SciQuest project, said that all over the world, there are... how did he put it?

**Bradley**

All over the world, right now, there are tens of thousands, maybe hundreds of thousands of people contributing to scientific progress.

**Bob**

That's it. And to demonstrate that, in real time, Caroline Nickerson hosted a Citizen Science Around the World webinar, hopping from continent to continent to check in on amazing citizen science efforts all over the globe. Even in Antarctica, where oceanographer Allison Cusick and geophysicist Laura Smith help run the Polar Citizen Science Collective, bringing together scientists conducting research there with tourists and other visitors. Why Antarctica? Cusick explains.

**Allison Cusick**

It is a very important continent; it is covered in ice. It is surrounded by an ocean. And this is the coldest ocean in the world that actually ends up circulating to all of the other ocean basins, and it's earth's air conditioning system. It's also one of the fastest warming regions in the world which is a problem for ice-covered ecosystems. So how things are changing here will affect global processes everywhere.

**Bob**

One of their projects is called Fjord Phyto, as in phytoplankton.

**Allison**

It's looking at how phytoplankton, or this microscopic level of life, is being influenced in the coastal fjord ecosystem by melting glaciers.

**Bob**

Phytoplankton is at the base of food chain, and samples collected by the volunteers help scientists track ecosystem health. Other projects included in the Polar Citizen Science Collective include cloud observations for NASA's GLOBE Observer, seabird surveys for the Antarctic Site Inventory, whale observations for Happywhale, and sea ice measurements for Ice Watch.

In a much warmer climate, in Nigeria, Victor Sunday leads a team called the Unique Mappers Network. Their many programs include "mapathons" where they train volunteers on how to collect mapping data. The data is used by researchers to find areas that are vulnerable to floods and other natural disasters. They also participate in a variety of international citizen science projects. Uchechi Shirley Anaduaka is Research and Training Associate for Unique Mappers, and explains that much of their work is framed by the United Nations' 17 Sustainable Development Goals, or SDGs.

**Uchechi Shirley Anaduaka**

And so as a citizen science community, we do run inclusive community empowerment programs and trainings, both in person and virtual. And the aim is to drive the SDGs. We run the Stall Catchers to fight Alzheimer's Disease; Mapathons for vulnerable communities to save lives and property; We also map light pollution, and mosquito habitat to eliminate malaria.

**Bob**

You can learn more about the Stall Catchers project to study Alzheimer's Disease, Globe at Night, and Globe Observer's Mosquito Habitat Mapper at SciStarter.org.

Scott Edmund is co-founder of Citizen Science Asia, a group that includes 50 countries, some of which have been somewhat isolated from the international citizen science community, despite having practiced citizen science for thousands of years.

**Scott Edmund**

The concept itself may not be relatively well known amongst the populace, but people are doing this stuff and they have for millennia. The longest running citizen science project in the world is monks in Japan recording cherry blossom blooms for example. And there are programs in China that are two thousand years old looking at locust swarms, for example.

**Bob**

He explains that Citizen Science Asia is bringing this long tradition into the international citizen science community, and spreading the practice more widely within Asia. Citizen Science Asia Japan Ambassador Emu Felicitas-Miyashita described a program called Safecast, created in response to the 2011 nuclear accident at the Fukushima nuclear power plant. The lack of electricity in the area made it difficult to collect and report data on environmental radiation. The Safecast project created do-it-yourself geiger counter kits volunteers could build, allowing them to collect and report information of critical importance to scientists.

**Emu Felicitas-Miyashita**

Now there are more than 5000 of these kits, and now we have one of the largest data sets: More than 160 million data spots now.

**Bob**

She says Safecast has also moved into new areas of citizen science education and engagement.

**Emu**

They have partnered with a lot of elementary schools, also universities and provided course materials within Japan and also globally. And additionally to radiation data, Safecast is also developing now devices to measure the air quality, like pm2.5.

**Bob**

The Citizen Science Around the World webinar also featured scientists in Australia, South America, North America, and Europe. But you don't have to book international travel to participate in an international science project. There are dozens of them that are as close as your nearby library.

In fact, in one of the many library-based webinars supported by the National Library of Medicine, our own Caroline Nickerson traveled virtually to Oregon to join Waldport Public Library Director Sue Bennett and Family Outreach Coordinator Sharon McCrum. Together, they shared all of the incredible projects available through the library. They include Marine Debris Tracker, to help scientists track coastal trash, iNaturalist to sample biodiversity, and a cool new health-related project called All of Us that Caroline described.

**Caroline Nickerson**

The All of Us research program is a really a pivotal part of citizen science month. So there are a lot of different featured projects, and one of the most important, that makes the rest of citizen science month possible with their support, is the All of Us research program. So if you go to join allofusresearch.org/nlm, you can take part in an exciting precision medicine initiative by contributing surveys or contributing your own samples, like blood and urine to the All of Us Research Program. So you might be wondering "What is Precision Medicine?" Precision medicine is an emerging approach for disease treatment and prevention that takes into account the individual variability in lifestyle, socioeconomics, environment and biology. So basically it's a radical shift in how each of us can receive the best care possible based on our unique makeup. And it's not science fiction. There are already some examples of precision medicine that you already see in your own life. Like the glasses I'm wearing right now. They're prescribed to me. They match my eyes precisely. Other people probably wouldn't be able to see with them. Same with insulin pumps, blood transfusions, and hearing aids. They're all personalized to people to make sure they can help them. The All of Us Research Program, through collecting different samples and survey data, wants to expand this approach to all different types of medicine, to end one size fits all medicine, and make sure everybody gets the right treatment that they need for whatever they need.

I really think it's amazing how they're trying to get a million volunteers to revolutionize medicine and you all are invited to participate. Maybe you'll do one of our other featured projects, like Marine Debris Tracker and Globe at Night in addition to All of Us, but I really would urge you all and I invite you all to sign up for the All of Us Research Program via joinallofus.org/nlm and I'm just really grateful to them for the support they provide for Citizen Science Month.

**Bob**

Well, I'm discovering right now that it's just not possible to sum up a month's worth of Citizen Science events in one podcast, but I do want to highlight the Kid Science webinar, with the hosts of National Geographic's Weird But True television show, the creator of the iNaturalist Seek mobile phone app– which I use all the time and you should, too– also, the PBS television series SciGirls. If you've got kids, listen to that one together with them.

And, definitely not for kids, but just for fun, there's a great Nerd Nite webinar with Guiness World Records that you can break, the science of hangovers and a dry t-shirt contest, looking for the nerdiest t-shirts.

So even if you missed Citizen Science Month, you didn't miss Citizen Science Month: it's all there for you at SciStarter. Just click on the CitSci Month link and binge out. I'm Bob Hirshon. Thanks for listening.

*[Theme music]*

This podcast is brought to you each month by SciStarter, where you'll find thousands of citizen science projects, events and tools that you can get started with to turn your curiosity about the world into real impact. It's at SciStarter.org, that's S-C-I S-T-A-R-T-E-R – like you're starting the science– dot org. SciStarter is supported by a number of generous partners and collaborators from all around the world. SciStarter's founder is Darlene Cavalier. And thank you so much to you, the listener and the citizen scientist for getting involved and making a difference. If you have any ideas that you want to share with us, and any things you want to hear on this podcast, get in touch with us at info@scistarter.org. Once again, our email address is info@scistarter.org. Thanks again and I'll see you next month!

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