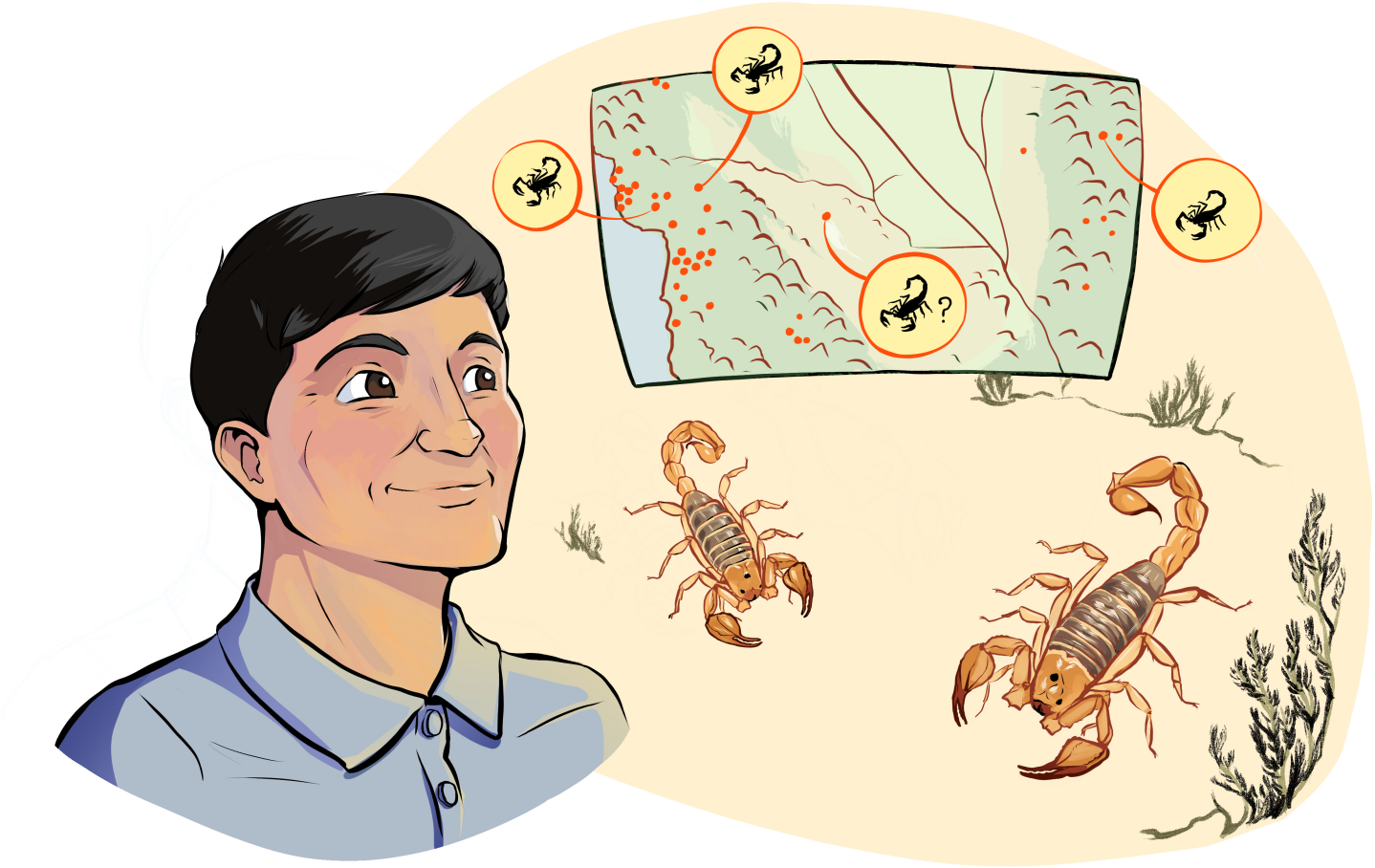
Mapping New Discoveries

with Lauren Esposito



Learning Objectives:

-Analyze and interpret publicly available biodiversity data through mapping

-Access publicly available biodiversity data

-Discuss the sources and potential uses of different types of datasets

-Form a hypothesis based on iNaturalist locality data and consider how that hypothesis would be tested.

Meet the scientist:

I'm the Schlinger Curator of Arachnology at the California Academy of Sciences, and the co-founder/director of a science, education, and conservation non-profit called Islands & Seas. My research focuses on documenting the world's arachnid biodiversity and understanding the patterns and processes that lead to the diversity on Earth today. I live in the gayest city in the World, San Francisco, with my partner and two kids. I'm also the creator of 500 Queer Scientists, which is a visibility campaign for LGBTQ+ people and their allies working in STEM and STEM-supporting jobs.

A time biodiversity data led to discovery:

Increasingly we are using citizen science contributed information, like through the iNaturalist platform, to help inform where we go to do field collections. If we are looking for something in particular, it's not hard to just open up iNaturalist and see where people have seen that thing and then go to those places.

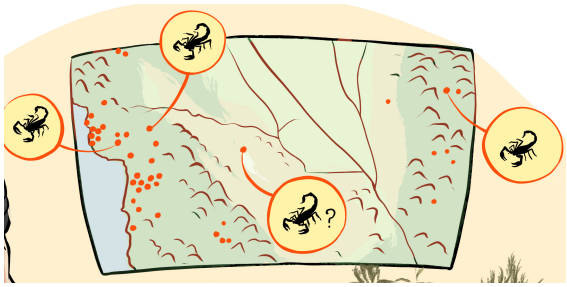
In many parts of the world, there's more fine-scale information available through crowdsourced data collection than what's available in the formal scientific record.

Recently, I published a paper with two young scientists from California, Prakrit Jain and Harper Forbes. They are pretty avid iNaturalist users. They make and upload a lot of observations and identify a lot of stuff for other people. They had seen some unusual observations of scorpions near a soda lake on iNaturalist and decided to go investigate further.

So we collected specimens around the soda lake, and then compared them to known species in our natural history collection and other natural history collections to try and identify them. The three of us concluded that they were a species that's new to science. And so we described them formally and published those species descriptions in a paper.

It's a recurring theme in our research. We look on iNaturalist. We find things that look unusual. We go and collect them and they're typically new species.

There's another species that we have in review at the moment. It's a new species, and we've evaluated its population demographics to be petitioned for inclusion in the list of endangered species. So hopefully it will be included but that's a pretty long process. So that one is both new to science and potentially already endangered.



Exercise:

1. Go to iNaturalist and bring up observations of *Paruroctonus.*

2. Find Carrizo Plain National Monument Soda Lake. Click on a few observations and find *Paruroctonus soda.*

3. Try turning on the **satellite view** on the map. Why might this view be useful?

4. Looking around at the observations of *Paruroctonus soda* and other *Paruroctonus* species, what do you notice? Think about habitat, such as mountains, forested areas, desert valleys, and salt/soda lakes.

5. What is unique about *Paruroctonus soda*'s habitat compared to other Paruroctonus species observations?

6. Look around the map at 3 other observations of *Paruroctonus.* Note the quality of each observation and if there has been any discussion about it on iNaturalist.

Obesrvation 1:

Obersvation 2:

Observation 3:

7. Can you find other outlying observation of *Paruroctonus* that don't seem to match the usual patterns? What is the quality of the observation? Does it have an ID?

8. Form a hypothesis about *Parucoctonus* based on your chosen outlying observation. How would we test that hypothesis?

Development of this module was supported by the National Science Foundation under DBI-1730526 RCN-UBE: Biodiversity Literacy in Undergraduate Education - Data Initiative (BLUE Data Network) and DBI-1746715 RCN-UBE: Engaging Underrepresented Populations in Biodiversity Sciences: A Series of Workshops for Undergraduate Students.
Any opinions, conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.