

Dr. Kelly Benoit-Bird interview on Discovery of Sound in the Sea

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Interview Transcript

Q1

How did you first become interested in science?

That's a really hard question. I guess as a kid I was always the one who wanted to know how everything worked and why. I always took everything apart and tried to put it back together. So I guess when I learned that scientists were the ones who got to answer those questions before anyone else knew the answer I knew that that's what I wanted to do.

Q2

What is the focus of your research and why did you choose this field of study?

"My research focuses on how animals in the open ocean feed; how they find their food and how they interact with that food. And the flip side of that is how does the prey try to avoid becoming dinner. I guess I really got interested in it in thinking about the world, the way we see it in two dimensions where everything is pretty flat and we live on a two dimensional surface, but things in the ocean are so much more complicated because the animals have to live in three dimensions. And so much of what we know about the ecology of animals is based on things that live on the substrate even in the ocean that it was more of an open area that I felt that I could make newer findings in."

Q3

What have been some of the recent discoveries in the foraging behavior of spinner dolphins and deepwater snappers?

"Some of our most exciting discoveries have been how dolphins work together. It turns out that it's pretty hard to make a living as a dolphin; they eat really small animals so they need to eat a lot of them each night and that's really a hard thing to do. So instead of trying to find prey alone, dolphins work together in groups of up to twenty-eight and just taking what's there, they make the density of their prey even higher than it is, by up to 200 times actually of what it is naturally. By doing that it makes it a lot easier for them to eat a lot of these little fish over the course of the night. So that's the kind of new and exciting finding."

Q4

How do you use acoustics to study foraging behavior?

"Well there is a lot of different ways that we use acoustics. The first one is to use active sonar, or things like an echo sounder, we typically use on the boat to find a fish. The systems that we use are a little bit more complicated than what you might have on your boat at home, for those of you who live on the coast. In Hawaii everybody has a boat pretty much. By using that we can look at both the fish that the dolphins are eating and the dolphins themselves because dolphins are really unique. Animals in the ocean are known to have air inside their lungs so that makes them a different target than the fish that they are eating. So that's one way to look at both the prey and the predators by using active acoustics or sonars. But other ways that we use it are to put a hydrophone in the water and listen to the sounds that the animals are making to try and learn how they use their sonar while they're foraging. Another technique that we're now working with, with the fish, is to put a tag on the fish that makes noise and then we can follow that tag in three dimensions in the water, while we use sonar to look at what their prey is doing because it is much more difficult to separate a big fish from littler fish than it is to separate a dolphin from little fish."

Q5

What challenges have you faced when studying the behavior of animals that forage beneath the sea surface?

"The biggest one is seasickness. But after that the problem is that these animals feed mostly at night and they feed beneath the surface of the water. So we can't see them and they're probably not using vision the way we think of it to feed either. So it's really hard to think about how they might be interacting with their prey in this really complex three dimensional world with very little light. And trying to come up with techniques to remotely sense the things that are happening where we can't go and we can't see has been a really big challenge."

Q6

What has most surprised you about the foraging behavior of spinner dolphins?

"I think the most surprising finding is how much we underestimate what they're capable of. We knew it was really hard to be a dolphin, to make a living. But we really didn't know how well they were able to solve their problems and I guess that's our own shortcomings as people, but the way that they solve their problems have been really astounding."

Q7

What skills are important in your area of research?

"I think the most important skill that I found for me in research is trying to take huge data sets and figure out how to explain them to other people. You can collect 200 gigabytes of data using active sonar with dolphins in just a few nights, so how to take that huge data

set and understand it for ourselves, but also try and explain it to others is really a big challenge that means learning a lot about statistics. But people don't like to talk in those terms so coming up with ways to really explain the concepts that we've been finding so that other people can appreciate the unique lives of spinner dolphins."

Q8

What are the opportunities in studying foraging behavior? Can people without PhD's participate in some way in this type of research?

"Well I think that the most exciting thing about studying foraging behaviors is that everything eats so you can study the foraging of just about anything. It can be the bumblebee in your backyard and how it finds flowers and uses those. It can be just about anything. So the opportunities for studying how animals interact with their food, whether it be a plant or an animal, and how they find that and how they make their living is something that anyone can do, either as an amateur naturalist or obviously in a more advanced way as a scientist."

Q9

What is the greatest impact/relevance of your research?

"That's a very tough question to answer. I think the most exciting part of the research and the most relevant is really learning how animals that we encounter and that we interact with and that often exploit, like the deep water snappers that are a huge commercial fishery, how their environment shapes the animals that they are and the solutions that they've come to have how they've evolved over time. And that is important for understanding how we can protect them. For example, with the bottom fish, there have been restricted fishing areas set up to try and protect these species but we know so little about what areas of their habitat are important both in terms of feeding and reproduction. We really need to understand how they find their food and what they do with it in order to make informed management decisions."

Q10

What continues to inspire you about your work?

"I think the greatest part about my work is that it's fun so it inspires me because I enjoy doing it and the animals always pose new questions and every time we come up with one answer we have a thousand more questions to answer about what they're doing and the most exciting part about research is the continued discovery."

Q11

What advice would you give a high school student who expressed interest in pursuing a career in your field?

"I guess I would tell them to take as many math classes as they possibly can, to learn a lot of statistics, if your really interested in looking at complex data analysis using sonar. To learn some computer programming while you are still young and it's easy. And take the hard classes in your interest area because there's a lot of the advances being made in biology are by applying the new technologies to biology and really being able to cross between disciplines. So don't just think that taking the classes that seem most relevant, sometimes you find that the courses you thought was the least relevant to things are the most important, so explore, a lot."