Transcript

Making Drifters… Tracking Ocean Currents

Jeremy Stalker: What we're building today, if you don't already know, and you probably already do, are some sea-going buoys.

Jeremy Stalker: This buoy that we built out of garbage that we found on the beach, in the Bahamas, was robust. It was strong enough to withstand the movement of water, and the huge waves of Hurricane Matthew to survive and still be pinging long after the hurricane passed, until it crash landed on the beach here, in Cape Canaveral.

Jeremy Stalker: This is the beauty of this experiment, you're all building your own. It's like a repeated experiment over, and over, with different designs and we see what does well and what doesn't do well.

Kiley Donaghy: We're tracking the ocean currents, so we had to build a buoy that would float just underneath the water.

Alyssa Olmstead: In the middle of it we have canvas, because that's the best pick up on the ocean currents. We want this to twist and move and float around with the ocean and we can map them.

Alyssa Olmstead: At the top of it, here, they glued their NOAA GPS tracker down. That tracker, there, sends a signal out to a NOAA satellite and it pings in once a day. We're going to be able to map, basically, where it's going.

Jeremy Stalker: These two drifters show us the scale of this project. Wilson the drifter was launched off the St. John's River and moved south in the coastal counter-current, along the coastline, until it got to about Cape Canaveral. There it got picked up by the bigger Gulf Stream system, which wraps around Florida here, and moved along the coast all the way up past the Carolinas and was brought offshore.

Jeremy Stalker: We have two water masses interacting here. We have the Gulf Stream moving north and that's being picked up by Wilson the drifter, here. We also have the coastal counter-currents, up here, along the coastline and that's busy flowing south. As these two currents meet up with one another, one flowing north, one flowing south, they start to interact and those interactions start to pull on each other and cause these eddies to occur. That drifter is telling us how big the eddy is, how quickly that eddy is moving, giving us a lot more information about these two water masses interacting.

Jeremy Stalker: The JU Drifter Project is part of the NOAA Drifter Project, a much bigger citizen science program. We've been launching drifters for about five years. We

produced 14 drifters, in conjunction with local high schools, like the Bolles School, Foundation Academy, but also with classes within JU. With our physical oceanography course and our oceanographic techniques course.

Christina LoBuglio: In class, we learn about eddies and currents and how they influence the ocean. Through the NOAA Drifter Project and building our drifters we're able to see, in real time data, how these eddies are working and are following our drifters through the currents and through the eddies, which is super beneficial to our learning process.

Megan Ditzig: It's different. Most projects aren't going out to colleges and building giant PVC pipe objects that they're going to throw into the ocean. It's something unique.

Jeremy Stalker: Here's rule number one, don't forget to glue it together. As you're thinking about building this, there's going to be this beautiful sort of medium between strength and resiliency. So bigger doesn't necessarily mean it's going to last longer.

Danielle Buttermore: Back home in Connecticut, I spend a lot of time building aquaculture systems for a shellfish hatchery. So I really enjoy building things, and systems, and tools, so it was very exciting to be able to make a drifter that was able to track ocean currents from scratch.

Jeremy Stalker: It's great to watch the imagination of these students. Where they conceptualize these buoys, they think about how they're moving in the ocean, they think about these physical properties and they actually make it happen.

Jeremy Stalker: They cut. They play with the PVC. They glue things together. And they actually make an active piece of scientific equipment.

Kyle Love: The weight is at the very bottom of the drifter, it's like a counterweight, so it doesn't tip over. It's hollow on the inside.

Megan Ditzig: And we'll fill it with sand or something that can make it weighed down.

Kyle Love: Or other materials that are heavier.

Megan Ditzig: His name's Bob, because it bobs in the ocean.

Kyle Love: He's a pun.

Jeremy Stalker: We're fortunate to have a great location at the MSRI, right on the St. John's River. Once these students have built their projects, we can walk out on the docks and they actually start testing them in the water, so they can see if their design is actually going to do what they think it's going to do.

Jeremy Stalker: Sometimes it requires some adjustment. We have buoys that are top-heavy, so they start to tip over. So we add floats and that stabilizes the buoy. Sometimes we make them a bit heavy, instead of floating, they begin to sink. Then sometimes the planning, the thought, the building, all comes together with a

little bit of luck and we get a buoy that floats the way it should and on the very first try.

Jeremy Stalker: What I think is remarkable about this project is that it starts very local. The students are building these drifters in their classrooms. They're releasing them in the local waters, but the data generated from this project is then put into these global flow systems, so we understand more about how water flows out through the entire Atlantic Basin. It's a great way for the students to realize that the data they can produce very locally, with these projects, goes beyond their classroom, goes beyond even the borders of Florida, and goes into a global system.

Jeremy Stalker: We were fortunate to collaborate with OCEARCH. They were headed offshore to do some shark tagging, so we could hitch a ride with our buoys and head offshore to drop these in the water; directly into the ocean currents.

Jeremy Stalker: If we launched them in the river, they could get hit by ships, they could get trapped in docks, so the OCEARCH ship allows us to go offshore, directly into the currents and drop these buoys where we want them to go.

Chris Fischer: One of OCEARCH's core values is inclusion. As we head out, outbound, on day one here, of our expedition to our first work site, a representation of that inclusion is the project that we're assisting with a local high school, Bolles High School, the Foundation Academy, and Jacksonville University. They need some buoys deployed.

Chris Fischer: We look at ourselves like servants when we come to these communities. We're serving scientists. We're serving the community now. We're serving the future generations of this community. So we're always having people on the ship. When we can assist a high school, and a project, that's going on, on the water, and perhaps shape future marine biologists that could be critical to our management, it's a privilege to be able to do that. And we take that obligation very seriously.

Megan Ditzig: His name's Bob, because it bobs in the ocean.

Kyle Love: He's a pun.

Jeremy Stalker: We don't know a whole lot about the coastal counter-current and what we get to see, through these buoys, is the activity just offshore. This is the track of the Bolles School drifter. It was the one that went the furthest of the five we launched that day. It's giving us a lot of information about this coastal counter-current. You can watch the drifter move in this long, lazy loop. This large swirl. This is one of these eddies that we really didn't understand a lot about, before we started these programs.

Jeremy Stalker: After this first large swirl, this first large eddy, you can watch the buoy move in smaller, and smaller eddies as it picks up speed and moves south along the coastline, until finally landing here, down at Cape Canaveral.

Jeremy Stalker: Through the five years of running this project, we've noticed this area off of Cape Canaveral being very interesting for where these drifters all end up. In red, we have Wilson the drifter. It came down south along the coastline and then spent two weeks eddying, just south of Cape Canaveral, before getting picked up and moved into the Gulf Stream.

Jeremy Stalker: In blue, we can see this is our Bahamas drifter. The one that got picked up by the hurricane, ended up crashing just off the coastline here. Then in yellow, we have the Bolles School. Their drifter came down south, was starting to enter this eddy, before it ended its career.

Jeremy Stalker: What's happening, this coastal counter-current seems to be terminating here as it meets the Gulf Stream moving north and it creates a very interesting patterns. We also know there's some interesting migratory animal patterns in this area. The lemon shark nursery, just to the south of Cape Canaveral here is probably there because of this same interesting eddy feature.

Jeremy Stalker: Additionally, sea turtle nesting to the south and to the north of this area are genetically very distinct. What's really awesome about this project is the students' drifters are showing us a really interesting current area. We know there's a lot of interaction here. We know there's a lot of biological interaction here. This means that their science and their research is bringing us to even more questions.

Jeremy Stalker: We can look at this system and answers some questions, but even better, we can come up with even more questions.