

Studying 'whale snot' to help protect Arctic marine mammals

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Credit: Justin Richard

Justin Richard spent nearly 10 years as a beluga whale trainer at Mystic Aquarium, where he taught the Arctic marine mammals to voluntarily submit to regular health screenings. But it's not so easy to conduct health screenings of wild whales. So he has taken what he learned at Mystic to the University of Rhode Island in an effort to find non-invasive ways of monitoring the health of wild beluga populations.

A doctoral student in the URI Integrative and Evolutionary Biology Program, Richard says he is trying to learn whether he can determine a whale's gender, reproductive status and other information from the cells and hormones that they exhale.

"Essentially, I study whale snot," he said with a smile. "The idea is to

develop non-invasive methodologies for learning about belugas. The current standard practice for collecting this information is to fire a biopsy dart into the animal. But we may be able to learn most of what we want to know simply by catching their exhale."

According to Richard, [beluga whales](#) have a number of adaptations that allow them to thrive in the Arctic, including their bright white color, large deposits of insulating blubber, [vocalizations](#) that enable them to communicate in an ice-covered environment, and their ability to feed on whatever food comes their way. But the [Arctic environment](#) is rapidly changing due to global warming, which raises concerns about their conservation. Some populations of belugas, including those in Cook Inlet, Alaska, and the St. Lawrence Seaway, are already threatened.

"The methodology I'm developing would be most useful in situations where researchers aren't allowed to catch the animals because they're endangered," explained Richard, a resident of North Stonington, Conn., who was awarded a graduate fellowship from the National Science Foundation to enroll at URI. "It will help scientists answer questions that they haven't been able to answer before because they can't access the animals," like the sex rate and pregnancy ratio of a particular population of whales.



Credit: Justin Richard

Richard is beginning his research with the beluga whales at Mystic Aquarium, where he conducted a number of research projects during his years as a whale trainer. By collecting exhale samples and matching blood samples from the same animals, he will be able to compare the cell and hormone levels in the two.

"Other researchers have studied whale hormone levels in their blow, but without the ability to compare them to blood samples, it's a challenge to understand what these levels mean for a whale," he said.

He also intends to spend time in Arctic Canada in the next two summers to try to catch exhale samples from wild belugas.

"Nobody has ever seen belugas breed in the wild, so there's not a lot known about their reproduction," Richard said. "At certain times in the summer they come into shallow water with their calves, and I hope to collect exhale samples from a platform mounted where the whales are. The previous calf may hang around with mom to take care of the next calf, so I want to document that behavior and collect exhale samples to learn about that relationship."

Richard enrolled at URI in part because of the work of Assistant Professor Becky Sartini, who studies various aspects of animal reproduction.

"She studies mostly cattle, but a lot of our scientific questions overlap," Richard said. "She is a terrific advisor because she challenges me to look more closely at my questions rather than just at the species I'm studying."

When Richard finishes his doctorate in four or five years, he hopes to become a college professor and continue his research.

"I want to continue studying marine mammals, not just belugas," he said. "I would find a great deal of value and satisfaction in being able to contribute to their conservation."

Provided by University of Rhode Island

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