

The young woman and the sea

Marine biologist Sarah Henkel on aquatic bioinvasions, wave energy, seaweed and more

It's about being really committed. I tell students who are not any smarter than their peers that this takes hard work . . . to work on one question for five to seven years. — Sarah Henkel

One never knows the waters a science-based article will dip into when a writer features one of OSU-Hatfield's multidisciplinary researchers. Scientists look at very focused questions while naturalists and generalist ecologists

look at systems from a broader range, but that interplay is less friction than analysis. As a journalist, my job is to dig deep and find those connections.

For Sarah

Henkel, looking at how human-made structures affect what happens at the bottom of the sea is both fascinating and important to all human-activities in and around marine systems.

However, one scientist's invasive is another scientist's opportunistic species. She's got cred in the study of the benthic zone (what's happening on the ocean's bottom) and wave energy.

In her office at Hatfield, Sarah and I recognize that the world of ecology is evolving due to innovative research and new questions scientists and policy makers are no longer afraid to ask.

She's not atypical – a smart scientist who is open to fielding a wide-range of inquiries.

Because of the heavy footprint humans have put upon the environment in the form of cutting down entire forests and jungles, as well as geo-engineering the planet through fossil fuel burning and all the chemicals released in industrial processes, newer challenges to both our species' and other species' survival end up in the brains and labs of scientists.

To say science is changing rapidly is an understatement.

One floating piece of debris can change an entire coast

Henkel wonders what the effects of one pylon, one mooring anchor and one attached buoy have on ecologies from the sea floor,



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upward.

The ocean, once considered immune to humanity's despoilments, is as far as its chemical composition and ecological processes fragile with just the right forcings. HMSC is lucky to have dedicated thinkers like Sarah Henkel working on questions regarding not only this part of the world, but globally.

Students working with Sarah gain from the knowledge she's accumulated in her transition from inland girl growing up in Roanoke, Virginia, where creeks, deciduous forest and terrestrial animals enchanted her and her sibling, to marine scientist in Oregon.

"Ever since I was around three, I knew I was going to be a marine biologist," she says while we talk in her office at Hatfield. When a child, she visited a "touch tank" at a museum near her home and was completely fascinated with the horseshoe crabs.

Posters of benthic megafauna – seaweed

and eel grass – adorn her office walls at HMSC. We're talking about kelps like bull whip, feather boa, deadman's finger, witch's hair, studded sea balloons and Turkish towel displayed on posters.

Symbiosis, cooperation, opportunism, invasiveness? That is the question.

While we talk about kelp/seaweed, she shifts to invasive species like *Undaria pinnatifida* which hitched onto debris from the 2011 tsunami in Japan. More than a dozen species on a worldwide list of invasive species were on broken dock moorings that washed up near Newport. Three—*Undaria pinnatifida*, *Codium fragile*, and *Grateloupia turuturu*—are particularly hazardous.

Some of Henkel's work looks at one gene expression, say, in *Egregia menziesii*, to uncover how the species responds to various conditions.

Some big issues dovetail to *Undaria pinnatifida* playing havoc in Australia and New Zealand.

Her fundamental question is how can certain invasive species establish niches in very different waters from where they evolved. Looking at temperature and salinity tolerances as well as desiccation limits of species helps cities, states and countries manage opportunistic invasives that not only thrive in new places, but push out endemic species.

East Coast-West Coast — transplantation

Henkel's a transplant herself, from Virginia, with a science degree from the College of William and Mary. She tells me that she was lucky to have gotten into a gifted and talented high school program where she attended half a day every morning, then getting bused back to her home school in the afternoon — for three years.

"It [Virginia Governor's School] was set up like a college, with professors and curriculum more like college-level courses."

She then transplanted herself to California State University--Fullerton in 2000 to work on a master's degree. Then, further north, to UC-Santa Barbara for a doctorate in marine sciences.

The final thrust northward was in 2009, to OSU, where she has been ever since.

We laugh at the idea of humans also being an invasive or transplanted species: She brings up a place like San Francisco Bay which is considered by scientists as a "global zoo" of invasive species with as many as 500 plants and animals from foreign shores taking hold in Frisco's marine waters.

"Scientists think there are more invasives in San Francisco Bay than there are native species."

She, her husband Wil, and their six-year-old live in Toledo because, as she says, "there's no marine layer to contend with and Toledo has a summer up there." Mountain biking is what the family of three enjoy – from Alsea Falls, to Mt. Bachelor and Mt. Hood.

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Paul Haeder is a writer living and working in Lincoln County. He has two books coming out, one a short story collection, "Wide Open Eyes: Surfacing from Vietnam," and a non-fiction book, "No More Messing Around: The Good, Bad and Ugly of America's Education System."