

A Passion for Water: An Interview with Dr. Sibel Bargu Ates

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By Kristin Foss

What do you dream of becoming when you "grow up"? A physician, an astronaut, or perhaps a marine biologist? For Dr. Sibel Bargu Ates, a professor in the Department of Oceanography and Coastal Sciences at Louisiana State University (LSU), it all started with a passion for water.

As an undergraduate in Istanbul, Dr. Bargu Ates dreamed of going to Australia to study coral reefs. Despite her fear of water spurred from the movie *Jaws*, she gathered books, articles, movies, and anything dealing with marine science that she could get her hands on. Quickly, she switched her undergraduate focus to marine biology, and the rest is history.

"It was kind of fate, but a little bit of a dream to do something outside of your normal circle," Bargu Ates said. "Actually, I'm so afraid of water and get seasick! These were the things keeping me away from the area I want to study. I wanted to challenge myself. Today, I'm still scared and get super sea sick, but I love it. I know so much more about [the ocean] now."

When most people think of the field of marine biology, it is usually associated with diving vibrant coral reefs or perhaps swimming with dolphins. Well, Dr. Bargu Ates doesn't swim with dolphins on a regular basis. But she studies something just as important as coral reefs and marine mammals, and which perhaps has an even greater impact on our global food web systems: phytoplankton.

Phytoplankton are microscopic marine plants found in both marine and freshwater systems, and are critical for a majority of the world's primary production. In balanced ecosystems, phytoplankton are the base of the food chain for organisms such as shrimps, jellyfish, and even whales. Dr. Bargu Ates' research focuses on a broad range of impacts on phytoplankton and global food web systems, including harmful algal blooms.

Growth explosions from small portion of algae can create harmful toxins known as **harmful algal blooms**. These toxins can affect phytoplankton such as euphausiids (aka krill), critical key organisms in the food web. Dr. Bargu-Ates' **past research** focused on how these algal bloom dynamics and the toxins they produce affect these krill. Applying this to a larger picture, Dr. Bargu-Ates explored what happened to organisms, such as squid and blue whales, which ate the krill exposed to such toxins.

"This [food web interaction research] has always continued throughout my career," Bargu-Ates said. "I was always a phytoplankton person in training, but I love looking at the links to higher trophic levels." All food chains contain trophic levels, which are levels within a food chain where energy is transferred.

For example, phytoplankton are consumed by a secondary trophic level organism such as squid, which are then consumed by tertiary trophic level organism such as a whale, transferring energy at each level.

Now, science isn't always glamorous. Whether you are covered in seawater from phytoplankton net tows or mentally exhausted from long lab hours, fieldwork and laboratory experiments require months of preparation and countless hours dedicated to the task at hand. Recently, Dr. Bargu Ates and her graduate students pulled multiple all-nighters, even staying at the lab until the wee hours of the morning on weekends, to make sure experiments ran successfully in the lab. But despite those sleepless nights, Dr. Bargu Ates remains positive and excited for the next project. "The research [we do] it's almost like cooking- it's fun! What we do is so much fun," said Bargu Ates.

Nowadays, Dr. Bargu Ates' research focuses on addressing the influence of climate change on the size of phytoplankton. But how can climate change affect phytoplankton?

Due to their microscopic size, [phytoplankton are especially vulnerable](#) to the global patterns of increased sea surface temperature (SST) and the increased amount of carbon dioxide (CO₂) in the water. The ocean absorbs a quarter of all the CO₂ we release every year. So when we increase that CO₂, the ocean absorbs even more leading to ocean acidification. Ocean acidification is due to "[the chemical changes in the ocean as a result of carbon dioxide emissions](#)." These [acidic waters](#), due to the increased CO₂, may make it difficult for phytoplankton to grow, absorb nutrients, and overall render them vulnerable to toxins.

This is where Dr. Bargu Ates comes in.

Teaming up with Louisiana Sea Grant and scientists from the departments of Geology and Renewable Natural Resources at LSU, Dr. Bargu-Ates and collaborators are exploring how climate change is affecting the size and growth of phytoplankton, and what that means in terms of uptake of organic contaminants in higher trophic levels.

"There is a shift in large to small size phytoplankton when you are adding a trophic level," Bargu Ates said. "And if you are dealing with contaminants that can bioaccumulate [the accumulation of substances in living organisms], you will see an increase in higher level organisms. So we want to see how phytoplankton communities will respond to changes in levels of PCO₂ in laboratory experiments." PCO₂ is known as the atmospheric partial pressure carbon dioxide, and it represents the amount of CO₂ in the ocean.

This project (set to start in the next few weeks) includes both fieldwork and laboratory experiment components. All phytoplankton samples will be collected from both the Atchafalaya Basin and Grand Isle estuaries, and back in the laboratory these samples will be subjected to different levels of PCO₂ for a year. These varying levels of PCO₂ will mimic the different levels of absorbed CO₂ that could potentially be in the oceans, leading to ocean acidification. By using different amounts of PCO₂, Dr. Bargu Ates will be able to see how the phytoplankton handle the increased acidity. Will the phytoplankton become vulnerable and die? Or will they adapt? All critical questions that need to be answered to understand to potential impacts of ocean acidification on phytoplankton.

But how did Dr. Bargu Ates even enter the world of phytoplankton and climate change?

Determined to follow her dream of a career in marine science, she participated in a government program that sends students to the United States to earn both their masters and Ph.D. in five years. "It wasn't Australia, but at least it was somewhere else," Dr. Bargu-Ates laughed.

But before she could start her program, she had to overcome the monumental challenge of learning English. This was not an easy task. In English class at the University of California Davis, Dr. Bargu-Ates would underline every word to go back to learn, because she didn't understand it. "It came to a point where I was like, I can quit and go back home...I was already missing everyone anyway, or I told

myself I'm going to do my best and see if I can do it anyway," she said. "From then on, I only slept for two hours every single day for a year. I did it, and I passed all my English examinations!"

Five years later, Dr. Bargu-Ates earned both her masters in chemical oceanography and PhD in biological oceanography. Summing up her experience, Dr. Bargu-Ates said, "It's a challenge to yourself...a test and a promise you make to yourself- you are going to see if you can do it."

As a professor, Dr. Bargu-Ates has to balance the life of a teacher and a researcher. "I find this job actually very flexible," she said. "When you aren't teaching, everything is on your own time. But you need to work hard. Use your day time so efficiently, multitask and go go go until your time to leave." A typical day for Dr. Bargu-Ates is divided between managing her laboratory, writing new proposals, working on manuscripts, reviewing papers, mentoring students, and the list goes on.

However, being a research professor is not for everyone. "You need to know yourself and how you are going to manage your life," Bargu-Ates said. "That's the key- if you know you can fit to this life and be successful. It's a wonderful job- you interact with people, students- very rewarding. I like challenges, and this job gives me challenges every day."

Whether your dream career is becoming the next marine phytoplankton expert or another admirable profession, don't give up on your passions and continue to keep overcoming the challenges. Listen to this [clip](#) to listen to advice from Dr. Bargu-Ates about pursuing a field in marine science and career guidance.

Citations and Links:

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