

# CT Sea Grant fellows: adding nature and humanity to the economic prism

By Bill Hanrahan



Ethan Addicott at a beach in Florida, where he grew up. Photo: Laura Addicott. Bottom, Samjhana Koirala at the UConn campus in Storrs, where she is pursuing her doctorate. Photo: Bill Hanrahan



The first two Connecticut Sea Grant Marine and Coastal Economics graduate fellows come from different countries and vastly different environments.

Yet both share a commitment to research projects that have the potential to change the way we think and respond to coastal realities in a time of climate upheaval.

From his younger days on the shores of South Florida to her early years in the mountains of Nepal, Ethan Addicott and Samjhana Koirala have both followed academic journeys leading them to question how economics, people, the land and the sea all play into our decision making.

From analyzing the value of sand dunes that protect homes, to the social aftershocks of floodwaters that wash away others, the research projects of both Addicott and Koirala carry the promise of changing future policies and funding decisions—locally, nationally, even globally—by expanding our understanding of how ecosystems and economic decisions are—or should be—interrelated.

“Their work is rewarding to see,” said Sylvain De Guise, director of the Connecticut Sea Grant program. “Through this fellowship program, we are providing an opportunity for students to better themselves, and at the same time we benefit as a program and as a society. Smart young people tend to think differently, and we hope we are opening doors to careers that they might not have considered. And, hopefully, we help create the next generation of economists who are going to be interested and focused in their professional careers on coastal and marine issues.”

Addicott and Koirala, as the first and second fellows in the Sea Grant program, respectively, are pursuing CT Sea Grant-funded research projects that have general similarities, yet the details are as distinctive as their own life stories and intellectual curiosities.

## STUDYING HUMAN AND NATURAL SYSTEMS TOGETHER

Addicott grew up between Miami and Fort Lauderdale, about a block from the beach, and yes, he was a scientific beachcomber.

“My high school science fair project was about coastal dunes and sea oats and the relationship between coastal vegetation and beach width,” Addicott said. “So, I went out and measured beach width by hand at different beaches along the coast in high school. That was the first time that I started doing science on coasts.”

Addicott has never really stopped measuring beaches. Today, though, he’s using data from satellites and aircraft lasers. He’s also doing it on a massive scale, with specific projects in Florida, North Carolina, and thanks to Sea Grant, the Connecticut coast. Addicott, who attended Harvard as an undergraduate and holds a doctorate in environmental and natural resource economics from the Yale School of the Environment, is crunching the numbers on beaches, dunes and

sand to uncover something quite profound. He explains:

“In my research, I look at people who buy homes near beaches, and I try to back out what portion of the sale price is attributable to coastal features,” Addicott said. “So, if you have two homes that are identical, except one home is near a wide, pretty beach, and the other home is near a very narrow beach where waves are lapping against the side of the building at high tide, is there a difference in the sales prices for these homes?”

Addicott wants to know if even slight changes to beaches and dunes, such as height and vegetation, impact home values, then tries to back out the value of those varying attributes.

“We don’t have good estimates for many of these coastal features that we use in policy,” he said. “When we don’t have those estimates, we’re essentially treating these ecosystems as though they’re worth nothing. So, even capturing a small portion of their value at least brings them to the table when it comes to making decisions about how we manage coastal areas.”

The granular level to which Addicott is measuring beaches (pun intended) is due in part to his skill in mathematics and his intensive study for years in the fields of biodiversity and economics. But you don’t need an advanced degree to understand the broad implications of his work.

“There’s detailed methodology, but there’s a simple goal,” said De Guise. “The goal is to quantify the value of ecosystems and ecosystem services, specifically, beaches, to the value of your house and the value of houses in your neighborhood. So, if a beach is well protected by dunes that are planted with the appropriate plants, for example, that’s going to offer more protection. There’s a non-monetary value to that, but Ethan is quantifying the monetary value associated with that.... Ethan hopes to refocus the way people think about the value of the shore, beaches and properties in the vicinity. He’s really providing a different lens for people to make decisions.”

Addicott’s former advisor at Yale University was Eli Fenichel, a Knobloch Family Professor of Natural Resource Economics with the Yale School of the Environment.

“Ethan’s research takes seriously the complex ways that ecosystems and people interact,” Fenichel said. “His research accounts for the fact that one natural feature can provide many different services to people, and these services are sometimes competing.

“The other thing that I’m really excited about by Ethan’s work,” Fenichel added, “is the way he approaches research with a clear idea towards ‘How do I scale this? How do I repeat this? How do I make this more than a one-off?’ If we are going to think about including nature in our economic thinking, systematically, then we need to think about how we enable the regular and repeated measurement of the role of nature in our economy. This is something Ethan takes seriously.”

De Guise remembers well the day when Addicott made a presentation to the Sea Grant board at Avery Point in Groton. Addicott informed the board that, in part thanks to his fellowship, he was heading to England, where he had secured a professor’s position at the University of Exeter; he is there today, both teaching and continuing his research.

In March, Addicott returned to the United States to present his work at an academic conference that included sessions on measuring and accounting for environmental public goods; it was the first time he shared publicly his ongoing research, and it was enthusiastically received. He is also hopeful that his work will be considered by the U.S. government as it begins to take more seriously the value of natural resources in economic decision-making, particularly coastal regions under more urgent threat because of climate change.

“If any of this research gets used to influence policy, I’d be thrilled,” Addicott said. “It’s been said that ‘what gets measured gets managed,’ and we’re not managing our resources adequately when we lack measurements... At best, with new information, we may be able to change our decisions to do a little better.”

## TEASING OUT TANGLED STRANDS OF IMPACT

As an undergraduate in Nepal, Koirala surveyed Nepalese farmers to try to determine the impact of climate change on their lives and livelihoods. Like Addicott on the beach, this was only a beginning for Koirala in her passion for understanding and revealing the economic and human effects of climate change.

“Having grown up in Majhathana, one of the villages in Nepal, where agriculture was the primary source of livelihood for most families, I witnessed many households leaving for urban areas in search of better prospects, leaving behind a deserted agricultural sector,” Koirala said. “One of the primary reasons for their migration was the impact of unpredictable weather patterns on crop productivity, making it difficult to sustain their livelihoods. This realization piqued my curiosity about the role of climate change in farmers’ decisions to relocate.”

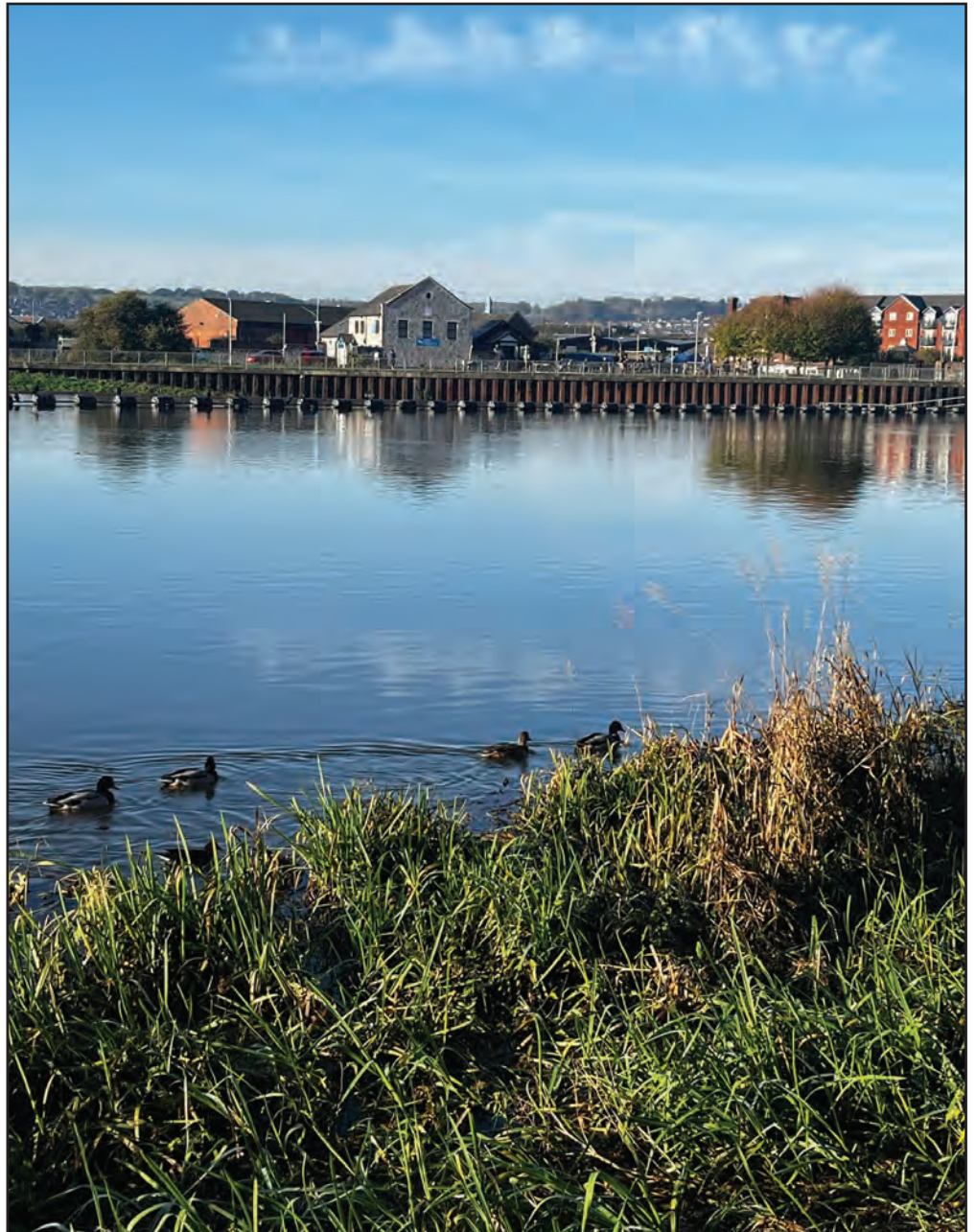
Her curiosity has not waned.



Samjhana Koirala, center, talks with farmers in her home country of Nepal about how climate change is impacting their livelihood. Photo courtesy of Samjhana Koirala



Ducks swim on the River Exe near the campus of the University of Exeter in Great Britain, where Addicott is now teaching and continuing his research. Photo courtesy of Ethan Addicott



Woodmont Beach along with two other neighborhoods in Milford and several in Bridgeport and Fairfield are where Koirala and her colleagues will conduct focus group meetings to hear input from residents about the Federal Emergency Management Agency identifying these areas as having a high likelihood of experiencing flooding. Photo: Judy Benson



“I was motivated to investigate how extreme weather events can shape individual decision-making processes concerning adaptation choices in different parts of the world, and I wanted to pursue my career in this field,” she said.

Moving to the United States, Koirala earned a master’s degree at the University of Idaho. Recently, while working on her doctorate at UConn, her focus included analyzing how varying degrees of snow melt in the American West impact farming, farmers and agriculture.

Today, however, as a Sea Grant fellow, Koirala has zeroed in on the Connecticut shore to try to tease out the tangled monetary and non-monetary factors that impact lives in vulnerable coastal regions. She hopes her work will someday make disaster relief and other coastal programs more equitable and effective for people living in vulnerable coastal communities.

“Sam’s work is exciting for our department,” says Kimberly Rollins, Koirala’s advisor at UConn and also the department head for Agricultural Resource Economics. As an applied economist, Rollins guides her students not only in economic theory and methods, but in ways to analyze difficult societal challenges, to try to determine and define where societal economic problems lie, and what information is needed to help support solutions to such problems.

“That’s how we—and Sam’s work—fit so well into the Sea Grant mission,” Rollins said, “because our Connecticut Sea Grant is focused on human communities that use marine resources.”

It’s also why Koirala’s work is so important, Rollins said, as factors impacting coastal residents are going to be similar to those disrupting the lives of people in other places also suffering natural disasters caused at least in part by climate change.

“Sam’s work is not just going to be for Connecticut,” Rollins said. “We hope that it will be the basis of a methodology that can apply elsewhere. It could even apply to wildfires. People live in areas prone to wildfire risk and they don’t move. Consider Paradise, CA, for example. People wouldn’t leave. Why?”

Koirala wants to answer that “why,” and see if she can offer insights on how policies could be more equitable and accommodating to the real-life variables people face—and their varying responses—when impacted by floods and other natural events.

“The destruction of someone’s house can leave them with no option but to leave their community,” Koirala said. “However, this decision comes with significant social costs. For example, leaving their community would mean losing their social network, uprooting their children, and potentially losing their cultural roots.

“Despite being aware of the potential risks of experiencing extreme weather events and the costs associated with living in a coastal community, some people may choose to stay due to their attachment to their community, friends, and family,” Koirala continued. “They may also have jobs that are linked to the water, such as fishing, which is a part of their identity. Beginning a new life all over again in a new place would be a daunting challenge itself. In addition, there are intangible benefits of living in a coastal community, such as enjoying the view of the water. These cannot be overlooked.”

Koirala will be holding focus group sessions this spring to help design a full survey that will go to select coastal residents in Connecticut later this year. The survey data will be analyzed in many ways.

“We hope to see if existing policies need to be tweaked to take into account some of those non-monetary factors that are the realities of the lives of people in certain communities,” Koirala said. “The question is, ‘Can we target and adapt policies to more vulnerable groups so we can create more resilient communities?’ That is the goal of my research.”

De Guise praised Koirala’s efforts.

“This is exactly accomplishing the goals of our fellowship,” he said. “Sam could have continued her work on snowmelt in the mountains, and gone on to a career out West, but now we’re opening her eyes to other things that could be related to climate adaptation, including storm surge and flooding, and who knows, that may turn out to be the route she chooses to go when she completes her degree.”

The fellowship is achieving its purpose, De Guise said, through the work of both Addicott and Koirala.

“We’re still opening new doors to understanding our coastal communities that struggle with climate adaptation,” he said. “In the end, with work like that of both Sam and Ethan, we’re hopefully going to be able to better understand the decision-making process and achieve our mission to better serve our coastal communities.”



West Beach in Westbrook is one of the areas identified by Addicott with natural features that enhance the value of nearby homes. Photo: Judy Benson

