A Climate of Convergence

Emma Cutler has spent her life wandering through foliage, observing the metamorphosis of Northeastern leaves falling or the pulsing brilliance of Sri Lankan jungle greens. She grew up in Northampton, Massachusetts, finding joy in snow, sunshine and the patterns of mathematics. A rower, biker, hiker, and skier, Emma developed her commitment to the natural world through the tactile experiences of wind, water, cold, and lactic acid. Inside school, she puzzled through math problems with patience and elegance. Her two worlds—indoors and out-of-doors, precise and messy—didn't seem to collide.

When Emma arrived at Bowdoin College in the woods of Maine, she was interested in pure math and environmental science, but did not know how those disciplinary lines could blur. Ecology, pollution, and rocks seemed to run counter to her interests in equations and differentiations. However, she signed up for an applied math course that combined different types of biology and modeling. There, she found her nexus.

With guidance from her mentor, Emma developed her conception of what math could accomplish. She took more classes in modeling and learned how to think across time and space by examining interactions between temperature and carbon from a five-mile perspective. Through learning paleoclimate modeling, she learned how feedbacks interact to create change over glacial time scales. Her mentor, Mary Lou Zeeman, also educated her about different setbacks she had faced, and was always a presence as a second woman in the room. With the trail bushwhacked by women before her, Emma's work was allowed to speak for itself.

After tracking the evolution of one kind of climate change, Emma shifted her focus to the one she could look at on her time scale. Further, she shifted her focus from the pre-human to the distinctly human. Emma took herself from the familiar Maine forests to the jungles of Sri Lanka, where she spent months as a Fulbright scholar farming and listening. During a youth leadership program at a large farm, Emma joined local students working on the farm, harvesting rice with an awkward blade, or weeding the vegetables. In the evening, the students shared stories and songs from their homes. Together, they muddled through conversations and created a community that inspires Emma to tackle her research each day.

Now, Emma applies the lessons she's learned from forests, people, and mathematics in order to create more accurate models of socio-ecological interaction and resilience. One aspect of her thesis research attaches mathematic modeling to disaster resilience. When a disaster strikes, how well will that community be able to recover? By analyzing socioeconomics, demographics, and infrastructure, Emma can help identify who is the most vulnerable and how they could be helped. Much of the current literature on resilience is grounded in theory rather than data, so Emma will augment existing ideas with new methods. The value is thinking about not what is lost but how resilient a community is and how well they can prepare for and adapt to changes.

Emma works at a confluence of passions. She applies thinking from economics, mathematics, science, as well as applying a dedication founded in love. While change happens on many time scales— glacial, geologic, seasonal, or moment-to-moment— the threshold is now, and Emma is part of the change.