Keeping it Cool: A Biography of Lori Siegel

In 1989, the oil tanker Exxon Valdez spilled 11 million gallons of crude oil into Alaska's Prince William Sound. The oil slick killed hundreds of thousands of seabirds, seals, otters, and whales—pockets of which still remain today. This devastated the local economy with an estimated $2.8 billion loss. Yet, after the spill, the oil tanker—renamed—returned to service for another two decades.

At that time, Lori Siegel was a senior in high school. Growing up in Providence, she had always been more drawn to math and science—numbers and figures just made sense to her, and there was something comforting about there always being a right or wrong answer. It wasn't clear until then, however, what exactly she wanted to do with her interests and skills.

The oil spill seemed like an obvious wrong. It was horrifying, and then eighteen-year-old Lori questioned how we could've let such a disaster ruin our pristine environment. "What we humans do on a daily basis is heartbreaking," she lamented. "But we're learning."

Motivated by environmental disasters such as the oil spill, Siegal went on to get her bachelor's and master's degree in Environmental Engineering at Tufts University, and later her PhD at Northeastern University. Today, she is committed to fighting climate change. At Climate Interactive, a non-profit organization, Siegal builds models, driven by a system of mathematical equations, to help everyone from students to policymakers better understand the complex dynamics of climate change.

Climate change has long been a controversial issue. People struggle to understand it, not only because of the complex science it involves, but also because it's difficult to conceptualize—unlike other problems, climate change cannot be directly sensed by each individual. For this reason, people often have drastically different ideas about the course of climate change and what solutions should look like. This is one of the hurdles that Siegel's work uniquely overcomes. As she puts it, "Users are able to plug their own assumptions—what they believe to be the elasticity of the market clearing system for electricity, the sensitivity of the climate to carbon in the atmosphere, their own versions of reality—into Climate Interactive's models and see that even if there's a different magnitude of effect, we still need to take action." It works because people can see the problem for themselves, not just take others' words for it.

Although Siegel originally pursued math for its clear right versus wrong, black and white nature, she admits that her work now is almost entirely in the grey area. As an example, she tells me about her current project. This year, countries made pledges to reduce emissions by 2030. Various policies and strategies can be used to achieve these pledges, but in the long term, they lead to drastically different futures. "Picking the low hanging fruit to reduce emissions right now means there's no need to build a ladder today," Siegel explains, "But then it's going to be difficult for those reductions to persist because you won't be able reach

anything else tomorrow." Even though there is no wrong way to meet a climate pledge, a country can certainly optimize.

It's not just policy that lives in the grey area, but also math. Siegel's number one rule is remembering that models aren't crystal balls; her job is to simplify reality until she has the right level of complexity to answer the problem at hand. "That being said," she laughs, "We've seen that our models get pretty close to reality." To Siegel, the process of building and improving these models is like completing a puzzle; while it can be really frustrating the find the missing piece, once everything falls together, she gets what she jokingly calls a "modelling high."

At the end of the day, the whole issue of climate change and its solutions live on the margin. Siegel explains that one of biggest hurdles is that people think that climate change is all one country's fault, that there's a silver bullet solution (ie. "If China could just decrease its emissions…"). The scope of the climate change problem is so large that it feels like an all or nothing game. But this isn't true. Siegel talks about struggling to retrofit solar panels on her house, conversing about climate change at dinner parties, convincing her own dad that nuclear energy does not have to be part of the solution. Even if the difference seems marginal, we can't underestimate the influence we have as members of our own communities.

Lori talks to me sitting in the front seat of her car, sun setting as she waits for her sons to finish ski practice. I'm interested in all she has to say about climate change—arguably the biggest problem we face today—but also surprised by her passion and commitment to her work. She's worked in environmental science her entire career, confessing that she would do her job even if it wasn't her job. I'm inspired by her clarity, something I've never had about my own aspirations. When I tell her it seems like a gift, she laughs and clarifies, "A gift you have to work for."

There were times as a PhD student when Lori too was doing work that didn't entirely excite her. But she actively explored her interests—in fact, it was a chance meeting at a conference that led her to a project she still considers integral to where she is today. Her best advice: "Find people to support you, support yourself, and remember that you're capable of much grander things than you might think."

About the student:

My name is Yangyang and I'm a junior from the suburbs of Chicago. At Dartmouth, I double major in math and economics, both of which constantly challenge me to think about problems from different perspectives. I love keeping confusing ideas on my mind until they suddenly make sense—my favorite math classes so far have been abstract algebra and graph theory. I've spent previous off terms working in development, finance, research, and I'm currently following Lori's advice on figuring out what I want to do after college.