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If you told me five years ago that today I'd be delivering a talk about our individual power to make a difference, I would have cringed. It was my job to study huge global systems. I was a researcher at NASA using satellite data to study the big picture. You can see a lot of things from space, like every ecosystem on Earth being threatened from pretty much every angle and global inequality in air and water safety. These kinds of things would keep me up at night. And then outside of work, I'd use this bird's-eye view while thinking about our huge social structures like education and media and health care, and it looked to me like they were all really struggling, too. So I felt like the world was just trapped in this huge self-amplifying system that was just spiraling towards destruction. And of course I wanted to do something about this, and I felt so small and utterly powerless. But I started to feel a little differently as my perspective shifted from the macro towards the micro.

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It began with bumblebees. I was using satellite imagery and field research to study these amazing, cute pollinators to see how they were doing in the midst of their own environmental crisis in Southern California. And from the macro view, I saw 22-lane freeways, endless suburban sprawl and water being diverted from parched rivers to grow lawns in the desert. It was pretty grim.

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But on the ground, there were actually some small opportunities for optimism, these tiny patches of resources known as "habitat fragments." If the right kinds of plants were growing along the edges of a Costco parking lot, and if in the neighborhoods nearby there were native plants in people's gardens, and in the canyons that were too steep for people to put their suburbs in, there were native plants instead of grasses then all of these in-between spaces would actually add up to create a network of habitat fragments. And this network meant that the bees could traverse through the concrete desert feeding from and pollinating the native plants. And these plants that the bees depend on and that the bees sustain are essential. They stabilize our steep hillsides. They provide food and homes to thousands of amazing species of animals, and, critically, they are helping to curb our devastating cycle of wildfires by preventing the growth of those invasive grasses that fuel the vicious flames that we're all too familiar with.

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It's a really vital and interconnected system, and some people could see how they were a part of it, and so they acted as habitat fragment gardeners. They planted native plants in their yards, and they even were tending to the land in corporate parks and in public canyons. In my research, I could actually see the impact that even one passionate gardener could make. And then, repeated

across the region, their habitat fragments were adding up to make a more resilient ecosystem -- not a perfect system, not by a long shot, but at least a system that was less likely to totally collapse under impending pressures like further development and drought.

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So I was looking at the world through this lens when I found myself in the waiting room of a public hospital in Brooklyn with my partner, Charles. We were sitting across from a group of teenagers who were slumped in their chairs and bored out of their minds and just refreshing their phones over and over again. And in a neighborhood with some of the lowest high school graduation rates in the city, this waiting room felt like a social habitat fragment just waiting to happen.

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So, we did some research to see what kinds of resources could we add to spaces like this one that would make an impact. And we settled on museums.

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Museums are the most trusted source of public information, more than the media and more than the government, but they also cluster in wealthier neighborhoods. New York has 85 museums in Manhattan, and the Bronx has eight, even though these two boroughs have almost the same size population. And then expensive tickets mean that a lot of people can't go to museums even if they live nearby. And these little injustices, they just go on and on and they add up to create sweeping inequalities in knowledge and empowerment. Across the US, almost 90 percent of visitors to art museums are white, and even at the Smithsonian's network of free museums, almost half of their adult visitors have graduate degrees, which, like, 10 percent of the broader population has. So it became clear to us that even though museums are these amazing educational and social resources, they're not reaching everyone. And a lot of museums are aware of this, and they're trying to change it, but there's all these structural hurdles that are slowing them down. So we set out to create a distributed network of museum habitat fragments.

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Working from a donated shipping container with the volunteer help of our friends and dozens of very generous scientists from all across the globe, we built our first prototype: the Smallest Mollusk Museum.

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(Laughter)

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Mollusks are these tentacled, slimy shape-shifters like oysters and octopuses and the giant squid, and if you've ever seen an alien in a movie, then I'll bet you it was inspired by a mollusk. Their slimy sci-fi vibes make them really fun tour guides for a biology museum, and they can teach us about the systems that we all share, with a wake-up call. Of all the animal extinctions documented since the 1500s, more than 40 percent have been our friends, the mollusks.

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So we tested this museum across the city to see if it resonated with all kinds of visitors, and it did. People really liked learning from it. So we built a fleet of tiny science museums, each one small enough to fit into preexisting locations with information dense enough that they could still pack a punch. And they're modular, so they can be distributed at a scale that can reach everyone. And then we partnered with libraries and community centers and transit hubs and the public hospitals so that we could transform their in-between spaces into habitat fragments for social learning. And, fittingly, we named our fleet of museums "MICRO." Even though each habitat fragment is small, it provides the essentials. It draws people in so that they can explore and learn together in a social way. And then, distributed across the landscape, we're able to invite people everywhere into conversations around science.

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When we partnered with a public hospital in the South Bronx, we became the Bronx's first and only science museum. Yeah, that's really weird. (Laughs)

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(Laughter)

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And really quickly, families started coming by with their kids and schools started arranging field trips, all to this tiny museum in the front lobby of the public hospital.

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(Laughter)

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And the museum became so popular that we started hiring local students to be museum docents, so they could lead tours and activities for all the talented kids. And every spark of curiosity that we're able to fuel and each new fact learned and every new friend made at the museum and every kid who can have a meaningful and important after-school job, it all contributes to a stronger system.

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So today, I try to keep the MICRO view in mind. I'm always examining how small actions can add up to create shifts at the macro scale of systems. And honestly, I'm seeing a lot of really good things. There are habitat fragments everywhere, nurtured by talented, passionate, strategic individuals in groups of all sizes, who are building towards systems with more equal access to food and employment, health care, housing, political empowerment, education and healthy environments. One by one, together, we're filling gaps, strengthening the systems that we're all a part of.

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We have to work on the big institutions too, of course. It's just that they're so slow, and we're living in the midst of rapid change. It's a defining feature of our time. So maybe in some cases our small actions can be Band-Aids until the big guys catch up. But without us, what are they going to be catching up to?

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Am I still scared about the world? Yes. (Laughs) That's why I'm talking to you. The world needs so many more habitat fragments. So, if you've been feeling overwhelmed or powerless lately, then I'm asking you to please try this very small strategy on for size, and let's see how it goes.

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Step one: zoom in. It's not one huge system that's just barreling unstopably towards destruction. What we have are many overlapping systems, and the ways that they interact determine everything.

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Step two: look for the resource gaps, because that's where you can make the biggest difference. And do some research to understand how your ideas are going to interact with the systems that are already on the ground.

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Step three: find the other habitat fragments. Find out how they can support you and how you can support them, because we're building a network together.

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And step four: transform your fragment. You might not have the leverage to change multiple systems at once, but there are so many small, meaningful and strategic things that each of us can do. And there are a lot of us, so it will add up.

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Thank you.

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(Applause)