

Q&A with Nalini Nadkarni

Interviewed by Susan Straight

This is Susan Straight, editor of *Dimensions* magazine, and today I'm speaking with Nalini Nadkarni, an ecologist and professor at the University of Utah, a pioneer of treetop canopy research, a National Geographic Explorer, and an adviser for Mattel's new line of Explorer Barbies. She has won numerous major awards, such as a John Simon Guggenheim Fellowship and an AAAS Public Engagement with Science Award. She is also a fearless science communicator who has worked with prisons, pastors, physicians, policy makers, and more to engage all people in science and conservation.

Nalini, it's a delight to connect with you today. Your work fits this issue's "Breaking Down Silos" theme so well. You have broken down so many silos in terms of reaching out to groups who might not otherwise pursue scientific knowledge in traditional science education venues.

The work I have done in public engagement is not so much about "breaking down silos" as it is revealing existing common ground between different spheres of understanding and taking action in the world. I like to envision this as weaving a "tapestry of understanding," in which I and others can weave the different colored threads of each of our worlds into an entity that is like a tapestry, something that is complex, connected, strong, useful, and beautiful.

You recently started delivering sermons in churches and synagogues. Say a little about that experience and why you felt compelled to reach out to religious groups.

I like to reach out to everybody—especially groups that are very large. I learned that over 80% of people on our planet identify as being religious or believing in a higher being. That is a far larger percentage than those who self-identify as environmentalists or people who care about ecology.

I was raised in a household of mixed religions: My dad was from India; he was a Hindu. My mom was from Brooklyn, New York; she was an Orthodox Jew. So I learned from an early age that seemingly different religions can exist in harmony, because there is common ground among them—respect others, live with a sense of reverence for the world, celebrate holidays and rituals.

As a grown-up and a scientist, I observed the controversies between science and religion—evolution and creationism—which created deep divides between science

and religion. I figured that if I could draw upon the very authorities religious people already believe in to make a case for understanding and protecting trees (and by extension, all of nature), then I would have a better chance of real dialogue and open-mindedness than if I just threw scientific authorities at them.

So I read the holy scriptures of the world's religions (the Old Testament, the Koran, the Talmud) and searched for all references to "tree" and "forest." And what I learned was that those verses that had the word "tree" or "forest" in them described the central roles that trees play in the lives of all of us, including the faithful of that religion and really all other religions. In the Old Testament, there were actually 328 references to the words "tree" and "forest," and they referred to the practical use of trees, the adornment of temples, analogies to God. Those verses provided the data I needed to compile a sermon about trees and spirituality.

I started knocking on church doors and synagogue doors and talking to the pastors and rabbis, and since then I have delivered my "Trees and Spirituality" sermon to over 40 congregations from the pulpit of churches, synagogues, and temples. Never once was there any conflict in "science vs. religion" because the congregations couldn't argue with what was written in their own Bible or Talmud or Koran. Instead, we were able to open up dialogues about how the sacred ground of their churchyards shelter trees and how sacred they are. We organized tree plantings together. We discussed ways that seminarians could include more science in their trainings.

This work also provided an example of how scientists really can and perhaps even should back off from only relying on their own authorities—that is, their scientific journals and textbooks—to carry out effective public engagement.

Your lifelong love of trees propelled you to the very top of the rainforest canopies, and because of your work and the work of other canopy researchers, this area is now part of the scientific research. What frontiers are left in terms of forest ecology?

There are so many frontiers that still remain in forest ecology! Forests themselves are a tapestry of complex and interwoven interactions. Understanding the canopy is one way we can understand forests, but there are so many places that we still need researched so badly. These involve places within forests—such as the belowground world of roots and fungi. They have been difficult to study because the act of investigating belowground worlds involves a great deal of disturbance of them.

Another area is understanding how to scale up from leaf to tree to forest to landscape, and the new tools of remote sensing, satellite imagery, and drones can help us scale up. I think the biggest challenge is working at the interface of forests and people—recognizing that humans are an integral part of nearly every forest ecosystem. But we do not yet know how our actions—our harvesting of trees, our reduction of biodiversity, our changing of the climate our landscape- and global-level changes—will affect forest health and vitality in the future.

So if I were to give advice to young ecologists, I would say look up, look down, and look all around and you'll find all kinds of things that have yet to be understood about forest ecosystems.

You've spoken to so many people who may never have met an ecologist or thought about conservation. What's an example of a challenge you've had to overcome to get people to listen to you?

The most challenging aspect of this work is to realize that not everyone shares the same values as our own. As ecologists and scientists, we are so passionate about our work that we assume everyone holds the values and curiosity for what we study. But then I think that baseball fans are as passionate about who wins the World Series as I am about trees. Baseball is something I don't really care about at all, and I can't understand why anyone would want to spend time and money going to baseball games.

So, for example, when I started bringing science lectures and conservation projects to men and women who are incarcerated in state prisons, I really had to think deeply and go through a step of intellectual humility to understand what [prison administrators'] values are and why they might help me bring science education to their prisoners. When I started that work, I yammered about how important it is to expose inmates to nature to help them feel better and would excite their sense of curiosity. But those "benefits" did not fall on listening ears in terms of the men and women who were administrators at the state prisons because that isn't really their job.

It was only when I linked science education to the documented reduction of recidivism and increased probability of post-release employment that I was able to make progress in bringing science education, science lectures, conservation projects, and nature imagery to inmates in prisons.

I learned that I needed to carry out intellectual humility and place the values of these other people ahead of mine. I think it results in the same outcomes—the inmates that we bring lectures to still get the benefit of science education—but the reasons for doing it were something I had to learn about.

I had to step aside from my own podium and really think deeply about the values of others so that I could explain why they might want to spend time, spend resources, change the routine of their prison so they could accommodate science education like this. When I was finally able to do that, that's when I had success in breaking down silos between correctional institutions and educational institutions—the prison tower and the ivory tower—and really make some valuable connections for both parties, the incarcerated as well as the scientists.

According to National Geographic, you're known as the Queen of the Forest Canopy. You're a pioneer and leader in your field. You've won countless awards and distinctions. Mattel has even created a Barbie in your own likeness—Treetop Barbie. What's next?

Just as there are a lot of frontiers left in forest ecology, there are so many frontiers left in public engagement. I've knocked on the doors of a number of institutions, but the one I'm beginning to approach now is the realm of fashion! Even though ecologists like myself generally dress like schlumps, especially when we go into the field, I recognize that clothing and the fashion industry is a hugely important part of peoples' lives, especially urban people who may not have much of a connection to nature. It links to self-identity. Choosing which clothes to wear defines what we want to convey about ourselves as we walk through our day. Fashion is a \$2.5 trillion industry.

So it seems a good idea to use clothing and fashion to transmit messages about the importance of nature and biodiversity. I've been working with designers in New York City to begin the creation of an "eco-fashion" line. [These] are clothes that are made of fabric that is printed with botanically correct images of trees and other plants, made into garments, and accompanied by hangtags that provide scientifically sound information about the biology and conservation of the species depicted. That way, everyone who wears the clothing can become a walking, talking educator and conservation advocate.

So if I'm wearing a jacket that has an image of a plant that grows in the rainforest and someone says, "I like your jacket," I can start telling them about the importance of that plant, its interesting biology, and how they might go about helping to conserve that species.

I've found that the fashion world is difficult to break into, probably harder than the prison world. But I've learned that there is a sizable group within fashion who are increasingly concerned with the sustainability of fashion—and reducing its environmental effects, [such as] using dyes and manufacturing techniques that are less harmful to the planet.

So what I've been finding, in fact, is that in breaking down these silos, there is common ground between the world of ecology and the world of fashion—two groups that you wouldn't normally put together as partners or collaborators. But with the need to transmit the importance of science and nature, we can make partners with basically anybody.

So true. Thank you so much for talking with us today, Nalini.

You're welcome. Thank you.