Chapter 4
Building Authentic Connections to Science Through Mentorship, Activism, and Community, in Teaching and Practice

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4.1 Introduction

Amid the height of the COVID-19 pandemic, which highlighted the disproportionate rates of mortality amongst Black Americans,[1] violent deaths by the hands of the police and white mobs resulted in the deaths of Ahmaud Arbery, Breonna Taylor, and George Floyd.[2] On the same week as George Floyd's murder in the summer of 2020, Christian Cooper, a black birder and prominent member of New York City's Audubon Society was harassed by a white woman in Central Park who weaponized

[1] Yancy, C. W. (2020). Covid-19 and African Americans. *JAMA*, *323*(19), 1891. https://doi.org/10.1001/jama.2020.6548

[2] Brown, D. N. L. (2021, May 4). *Violent deaths of George Floyd, Breonna Taylor reflect a brutal American legacy*. History. Retrieved December 16, 2021, from https://www.nationalgeographic.com/history/article/history-of-lynching-violent-deaths-reflect-brutal-american-legacy

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a police call after Cooper asked her to leash her dog.[3] The long legacy of violence against Black men and women in the United States not only sparked one of the largest protests in the nation, but also garnered global attention and international support for the Black Lives Matter (BLM)[4] movement. This constant and systematic attack on Black bodies sparked a different kind of movement amongst Black nature enthusiasts and scientists who wanted to increase the visibility of Black members enjoying and participating in the outdoors and within predominantly white spaces. #BlackBirdersWeek,[5] the first social media movement aimed at amplifying Black birders and their experiences was launched on May 31st, 2020. Three days after #BlackBirdersWeek ended, Dr. Tanisha Williams sent out a call *via* Twitter, asking others about sharing the same positivity and awareness of Black people and their love of plants across the botanical community and beyond. Many botanists answered the call and began the work to create the next science-related social media movement. #BlackBotanistsWeek[6] was launched on July 6th, 2020 and gained global participation in their week-long online events that expanded social and professional networks and led to the collaboration amongst the authors of this chapter. Since then, the creation of social media movements in STEM fields, such as #BlackInEnvironWeek,[7] #BlackInAstro,[8] #BlackInMicro,[9] #BlackInChem,[10] #BlackMammalogistsWeek[11] amongst others, have exploded with much support and gratitude for their help in elevating the voices and comradery of members who exist and participate in these predominantly white fields. The systemic economic and cultural barriers in academia and our larger society inhibit racially ethnic and gender-diverse students from fully participating and authentically engaging in the sciences. Building meaningful connections to the field of environmental sciences and sustainability requires integrated approaches that extend "beyond the walls" to

[3] Nir, S. M. (2020, June 14). *How 2 lives collided in Central Park, rattling the nation*. The New York Times. Retrieved December 16, 2021, from https://www.nytimes.com/2020/06/14/nyregion/central-park-amy-cooper-christian-racism.html

[4] *Black Lives Matter homepage*. Black Lives Matter. (n.d.). Retrieved December 16, 2021, from https://blacklivesmatter.com/

[5] *#BlackAFinSTEM and #BlackBirdersWeek twitter page*. #BlackAFinSTEM Twitter. (n.d.). Retrieved December 16, 2021, from https://twitter.com/BlackAFinSTEM

[6] *#BlackBotanistsWeek homepage*. #BlackBotanistsWeek. (n.d.). Retrieved December 16, 2021, from https://blackbotanistsweek.weebly.com/

[7] *#BlackInEnvironWeek twitter page*. #BlackInEnvironWeek Twitter. (n.d.). Retrieved December 16, 2021, from https://twitter.com/BlackInEnviron

[8] *#BlackInAstro homepage*. #BlackInAstro. (n.d.). Retrieved December 16, 2021, from https://www.blackinastro.com/

[9] *#BlackInMicro twitter page*. #BlackInMicro Twitter. (n.d.). Retrieved December 16, 2021, from https://twitter.com/BlackInMicro

[10] *#BlackInChem homepage*. #BlackInChem. (n.d.). Retrieved December 16, 2021, from https://blackinchem.org/

[11] *#BlackMammalogistsWeek homepage*. #BlackMammalogistsWeek. (n.d.). Retrieved December 16, 2021, from https://blackmammalogists.com/

encourage, inspire, and motivate students to take an interest in studying and pursuing careers in ecology and the earth sciences. The following conversation centered around critical race theory and intersectionality, features four BIPOC scientists and educators as they discuss the challenges and rewards of helping students navigate science in academia. They also examine how their advocacy for diversity, equity, inclusion, and justice translates into actionable approaches that deconstruct the barriers that have prevented equal representation and empowerment of marginalized groups in the environmental sciences. See also Behravesh (this volume).

Angelica Patterson We are going to get started with formal introductions. Please tell us your name, briefly describe your current position, your current institution, what your job entails, and what is your favorite part about what you do. I will start. My name is Angelica Patterson. I am the Master Science Educator at Black Rock Forest[12] in Cornwall, New York. My job entails being a liaison to about 18 consortium members that are made up of K-12 private and public schools, cultural institutions like the American Museum of Natural History,[13] as well as colleges and universities, both public and private. I am there to connect students to the forest through research and education. I work with educators to create curricula that engage and encourage students to learn about the environment and the ecology. My favorite part about what I do is curriculum development. I really enjoy speaking with teachers about their goals and how we can creatively develop activities students can experience either virtually or hands-on to learn about some complex environmental topics.

Tanisha M. Williams My name is Tanisha M. Williams, and I am the Burpee Postdoctoral Fellow in Botany at Bucknell University[14] in Lewisburg, Pennsylvania. I work with Dr. Chris Martine, a biologist at Bucknell. The overall goal of the Martine lab is to conserve biodiversity, and we do this locally in Pennsylvania and internationally in Australia. In Pennsylvania, we are updating the conservation status of rare plants using genomics methods. We also work with local government organizations like the Western Pennsylvania Conservancy[15] and the Pennsylvania Natural Heritage Program.[16] They are the boots on the ground, and we are the boots in the lab. The research project that really got me excited about coming to a primar-

[12] *Black Rock Forest homepage. Black Rock Forest. (2021, June 29). Retrieved December 15, 2021, from https://www.blackrockforest.org/*

[13] *American Museum of Natural History homepage*. American Museum of Natural History. (n.d.). Retrieved December 16, 2021, from https://www.amnh.org/

[14] *Bucknell University homepage*. Bucknell University. (n.d.). Retrieved December 15, 2021, from https://www.bucknell.edu/

[15] *Western Pennsylvania Conservancy homepage*. Western Pennsylvania Conservancy. (2021, December 1). Retrieved December 15, 2021, from https://waterlandlife.org/

[16] *Pennsylvania Natural Heritage Program homepage*. Pennsylvania Natural Heritage Program. (n.d.). Retrieved December 15, 2021, from https://www.naturalheritage.state.pa.us/

ily undergraduate institution is this plants and people project in Australia. We are working with the Martu people. The Martu are Aboriginal people in Western Australia. The Martu are teaching us how they use *Solanum* plants and what they use them for. We are going back to look at the genetics of this plant in order to assess how the Martu people assist in gene flow and how they are conserving and preserving the species by their use of certain plants as a staple food source. This is a long-term collaboration that has taken decades to build. It is nice working with a team that knows the importance of Indigenous knowledge, not only when collecting information, but giving proper credit, authorship, etc. It is nice to know that this is not just a fly-in kind of project. We are doing research that the Martu people are interested in. These are questions that they have about the plants around them. So, that is a really nice part of this work.

My favorite part of the job is working with undergraduate students. I never knew how much I would enjoy working with undergraduate students. I am the postdoc/lab manager, so all of the students' projects come through me, and it is just a joy seeing them. I will tell a very quick story about what a joy it is to work with students. One of my students graduated with an honors thesis on one of the local Pennsylvania rare plant projects I mentioned earlier. They did such great work, and we are currently writing up the manuscript. I cried when they finished their honors thesis presentation. It is wonderful to see undergraduate students' level of research, and it is fulfilling to be a part of their learning process.

Suzanne Pierre My name is Suzanne Pierre. My pronouns are she and her. My title is Research Scientist at the California Academy of Sciences[17] and the IBSS[18] department, which stands for Institute for Biodiversity, Science and Sustainability. I am also the founder and director of the Critical Ecology Lab,[19] a not-for-profit research, education, and anti-oppression organization. I started the Critical Ecology Lab in early 2020, right around the pandemic's start. The way that I define or describe the organization is meaningfully evolving, and I think that is intentional in some ways. The Critical Ecology Lab focuses on advancing the questions and methods that meaningfully relate the study of power and privilege with the study of biophysical change in response to anthropogenic drivers—applying the kind of critical theory that undergirds our understanding of oppression and extraction as a kind of fundamental, social process and describing or relating those dynamics through observation and experimentation in the biophysical realm.

[17] California Academy of Sciences. (n.d.). Retrieved December 15, 2021, from https://www.calacademy.org/

[18] *Institute for Biodiversity Science & Sustainability*. California Academy of Sciences. (n.d.). Retrieved December 15, 2021, from https://www.calacademy.org/scientists

[19] *Critical Ecology Lab. (n.d.). Retrieved December 15, 2021, from https://www.criticalecologylab.org/*

In our lab, because of my background as a biogeochemist and ecosystems ecologist, most of the basic research focuses on the terrestrial environment, nutrient cycling, and plant ecology. But, the deep goal of the organization is to advance how we approach science, how we come up with the questions that we prioritize and who comes up with them and also to influence the ways that we conduct ourselves when we do research. The Critical Ecology Lab is both an academic response to a gap in what we know, but it is also a response to the prevailing culture in academic research and a kind of rebuttal to that, to say we actually can structure our laboratory teams and their culture to orient towards compassion and justice, rather than competition and supremacy. My job entails doing basic research, writing grants, establishing partnerships, and doing this field development work.

What does it look like to find the right collaborators and the right students to advance an idea and then bring that to life through basic research? I do a lot of mentoring. I am talking to undergrads, masters, and Ph.D. students, none of whom I formally advise through university because, as you know, I am at non-traditional institutions. It is a really interesting part of my work to be a mentor, but not in a formal sense. It is also my favorite thing, and I think it is the basis of culture building. My favorite part of my work is being responsible for establishing a culture of compassion and then making sure and holding myself accountable for doing that and living that every day.

Jorge Ramos My name is Jorge Ramos and I am the Associate Director for Environmental Education at Jasper Ridge Biological Preserve[20] at Stanford University.[21] At Jasper Ridge, we are guided by three pillars: research, education, and conservation. I am the Associate Director of the pillar of education. Our Research Director establishes what type of research goes on and the logistics around research. I co-teach a course, and I also guide all of the outreach and education requests, organize the field trips that are requested, and work with all of the community and educational partners that want to visit Jasper Ridge. It is not a recreational space, so every outreach and educational activity has the intent of learning while you are here. Are you interested in something in particular? If it's a bird-oriented activity, we will find you a docent that might focus on birds. The whole program of education ranges from very internal to external. First, we host many Stanford classes, and these can go outside of STEM. For example, if we have language classes, they might request a tour in Spanish, so I can give that one. There are archeology and anthropology classes that focus on history. We have a physics class where they might come to explore some of our projects in physics and engineering. We have a lot of geosciences research projects. I coordinate all of these class visits and make sure they follow safety protocols.

[20] Stanford University. (2021, December 8). *Jasper Ridge Biological Preserve homepage*. Jasper Ridge Biological Preserve. Retrieved December 15, 2021, from https://jrbp.stanford.edu/

[21] *Stanford University homepage*. Stanford University. (n.d.). Retrieved December 15, 2021, from https://www.stanford.edu/

What is the culture that we offer here at Jasper Ridge so that the field does not reflect the stereotypical old "macho" white men that used to always be in the field sciences? How do we transform that from the very beginning of their experience as they step into the preserve? We have that other tier that is our educational partners inside of Stanford. I also build relationships with community colleges, K-12 schools, and nonprofits like Latino Outdoors.[22] I am the mentor for Stanford's Society for Advancement of Chicanos, Hispanics, and Native Americans in Science (SACNAS)[23] chapter, as well as the mentor for the Ecological Society of America Strategies for Ecology Education, Diversity, and Sustainability (SEEDS)[24] Stanford chapter. I also build communities outside of Stanford.

Our other big component is our docent community. The course that I co-teach with Professor Rodolfo Dirzo, titled "The Ecology and Natural History of Jasper Ridge," trains Jasper Ridge docents. Since it is not a recreational park, in order to come into Jasper Ridge, you always have to request a tour guide, so this course trains those docents. We have over 100 active docents. They are knowledgeable in natural history, ecology, and many other fields, so they can guide you through the preserve and assist with research projects. My job involves a lot of logistics, but we also write many NSF proposals for funding outreach. Not surprisingly, research at R1 universities such as Stanford is prioritized, so there is always a push for funding research. Still, outreach is where we have to write a bit more to fund more outreach and education activities. So, with the team here, we are always finding ways to collaborate and write proposals. The favorite part of my job is that I get paid to be outside and teach people outside and have that hands-on experience with students or any other learner. The thing that surprises me the most is that no matter the background, anything that you present hands-on for the first time, something that students have not seen, allows me to see that light bulb "ah-ha" moment. But then, when I do this with communities that have not been exposed to outdoor education, the first thing they say is, "Do you get paid to do this?" I am very fortunate that I get to be in an outdoor learning space in nature.

Angelica Patterson Now, that is fantastic! Last Friday, a teacher actually told me, "Your job is awesome." Then they said, "You get to do this every day?" and I said, "I do, thank you." For the next set of questions, I would like to ask, do you consider your job and expertise to be exclusively in science? Do you think that your teaching, your research, or your role in project coordinating is equally relevant to the fields of environmental science, conservation, sustainability, and/or environmental justice? If so, how? You can comment on whether or not your expertise ties into more of an

[22] *Latino Outdoors homepage*. Latino Outdoors. (n.d.). Retrieved December 15, 2021, from https://latinooutdoors.org/

[23] *Society for Advancement of Chicanos, Hispanics, and Native Americans in Science homepage*. Society for Advancement of Chicanos, Hispanics, and Native Americans in Science (SACNAS). (n.d.). Retrieved December 15, 2021, from https://www.sacnas.org/

[24] Strategies for Ecology Education, Diversity, and Sustainability homepage. Strategies for Ecology Education, Diversity, and Sustainability (SEEDS). (n.d.). Retrieved December 15, 2021, from https://www.esa.org/seeds/

interdisciplinary focus and, if so, what are those allied fields outside of the science field? Tanisha, do you want to go first?

Tanisha M. Williams I would have to say I like to dabble between fields. I am active in science communication, which is still a part of science. I do some policy work as well, definitely touching on the education realm. The new plants and people project that I talked about is really opening my research into ethnobotany. I am learning a lot from anthropologists, Indigenous groups, and other scientists. I feel like this project is cross-cutting and opening up my research scope. When I did my work for my Ph.D. in South Africa, I was really focused on the plants themselves and only the plants. The genus I worked on has many beneficial plants, but I was not concentrating on those species. I was only focused on, "What is happening to the plants here?" I was looking at this work through an ecological lens. Now, I am broadening that scope of what is happening to the plants and incorporating what is happening to the people using these plants. I really like that link. What I do for my research—is it relevant to environmental science conservation and environmental justice? Most definitely, everything I do ties in some way to those fields. My biggest question is trying to understand how species are responding to climate change. I use plants as my study system because I really love plants. When I talk about climate change and how plants are responding to different audiences, I often bring in examples that make plants relatable and highlight their importance. I touch on how we are using plants and how people connect to plants that they often do not think about—how are you eating? How are you breathing? How are you wearing these clothes? Medicine, all these things. Many people forget that we are here because of the products that we get from plants. As I teach, I like to introduce my field with these points, highlight what we know scientifically, and then try to encourage people to care about the environment. We do not want to lose things here on Earth. We do not know how many pegs (species, ecosystems, etc.,) we are going to knock out of this system until the system is no more.

Suzanne Pierre Do I consider my expertise to be exclusively in STEM? If STEM includes all of the dimensions that Tanisha talked about, like education being a necessary part of STEM, mentorship being a part of STEM, and being a naturalist, then yes. All of those to me are parts of being involved in STEM and I do little bits of all of that. Primarily, I am a scientist, but I am not exclusively a scientist. I think my expertise also lies in noticing dimensions of STEM that are either not being communicated or could be exposed or explained in a new way, which I think is kind of related to science communication (sci-comm). I am not really involved in the broad-scale kind of sci-comm work like a lot of professionals who are really good at targeting a large body of people, really getting messages and facts across. I am kind of in the sci-comm area that is aligned with directives, such as, "Look at this thing that we could explore in a more creative or nuanced way that teaches us something about ourselves." I use science as this series of metaphors or series of processes that really exposes things about society.

Do I think my teaching, research, or role in project coordination is equally relevant to justice, science, conservation, or sustainability? My role involves a little bit of all of those things: teaching, research, and coordination—all of which go towards all of the things that have just been described. In a basic sense, my goal is to continue to do environmental research, but I want to restructure how science is experienced and done. Yes, I am doing environmental science, but I want to do it in a transformative way, and that is the grand experiment of my career. I am probably involved in conservation the least. The other things are more obvious. I am interested in sustainability and environmental justice. It speaks for itself if you look at the work that I have been doing. I think the reason that I am least involved in conservation is that conservation has been racially white-driven. It is driven by white populations and driven by those more resourced, but I hate the word "resourced" because it is this weird, disembodied thing. It is like, they are this group with more resources because they have taken resources, right? So, I think conservation is tied to expropriation in a way that does not interest me. It is really difficult, and maybe you all have feelings about this, but being in love with biology and ecology yet not actively doing conservation feels disingenuous sometimes because it is like, "Shouldn't my work be to protect the thing I love?" But I think the reason that my work is more towards science and justice is that the effort of conservation historically has circumvented how and why we arrived at having [conservation] problems, and who is most harmed by these problems. I trust that there are many, many "well-resourced" white people who will keep doing conservation, but there are so many fewer black women with Ph.D.'s who will do the other stuff. So that is what I do.

Angelica Patterson Yes, that is a great synopsis. Jorge, what are your thoughts?

Jorge Ramos I was trained very "STEM." When you get into this field, and your mentors are all research professors at universities, you are directly and indirectly told you are just going to be a scientist. I was always told not to do outreach because I was not going to be seen with credibility. It was ingrained in my head that I needed to be a pure scientist, where later I found out that I could not leave outreach out of my life. I could not leave mentoring or education out of my life. So, I did not pursue that traditional, expected path from my committee to join a tenure-track faculty job. It was interesting listening to Sue. Everything in my Ph.D. was Environmental Science. My first job was all conservation-oriented, protecting nature for humans. It was a nonprofit world, as with here at Stanford and with the Ecological Society of America (ESA).[25] I do pretty much all education, outreach, and mentoring. I have been a part of the ESA SEEDS program for 17 years and with SACNAS, for 18 years. I have always included authentic DEIJ (diversity, equity, inclusion, and justice) work by interacting with the people in our mentoring programs and talking about science. We did not call it DEIJ back then, we were already doing this work, but it did not have a name.

[25] *The Ecological Society of America homepage*. The Ecological Society of America. (n.d.). Retrieved December 15, 2021, from https://www.esa.org/

The weird one is sustainability for me. SEEDS and SACNAS made me realize what I was getting taught at school was all just polarized with whiteness. So SEEDS and SACNAS kept me grounded in a broader reality. I was at Arizona State University (ASU)[26] when the university created the first sustainability school in the USA. It came from an urban perspective and was mostly driven from a very homogenous perspective of wanting to put a name to practices that other people in the world have done, apply a theory behind it, create new terms, which then became money-oriented. Working at Jasper Ridge has made me see conservation as land management instead of the traditional view of conservation of the polar bear or the panda that we used to see as kids. The explorers of National Geographic photographed the snow leopard—that, for me, was conservation growing up. But now, being exposed to more people who have relationships to the land, we can ask how fires are impacting Latinx populations—a population that has the highest risk of fire exposure.[27] Conservation has become about land issues for me, which makes it more relatable to everyone because we all step on land. I do not mean that in a bad way—we walk the land. But sustainability has become a term and a concept that started a long time ago with community-based actions, by communities for communities, and now sometimes in these academic worlds, it has turned into something that is almost impossible to achieve. So sustainability is the one concept I still need to process, especially because Stanford is now creating a new school centered on sustainability, 15 years after ASU founded the first one in 2006. I am sometimes very conflicted with sustainability because I ask, "Is it a theory or is it applied?" The thing that makes me feel better about being here is that earlier this year we created an academic minor on environmental justice.[28] We wanted to make sure the environmental justice curricula were included. I worked with a great group of people led by Dr. Richard Nevle—we just launched it, and I was just notified that the first student declared environmental justice as their minor! We were very happy! This minor in environmental justice is the first one that focuses on history, how to work with communities, and how to translate it into practice.

Angelica Patterson I think you bring up such a great point, and I too feel that it is hard to disentangle our roles in all of these—science, conservation, sustainability, and justice, mostly because of who we are and our marginalized positions in this field. Whether or not I consider my job or expertise exclusively in science? No. Because I work with so many teachers and educators from different types of institutions that impact so many different types of students from different types of places

[26] Arizona State University Technology Office. (n.d.). *Arizona State University homepage*. Arizona State University. Retrieved December 15, 2021, from https://www.asu.edu/

[27] Choi, M. (2021, July 2). *The disproportionate fire risks in Latino communities*. POLITICO. Retrieved December 16, 2021, from https://www.politico.com/newsletters/morning-energy/2021/07/02/the-disproportionate-fire-risks-in-latino-communities-796288

[28] Dulisz, D., & Stanford University Bulletin. (n.d.). *Easys-Min Program: Stanford University Catalog*. EASYS-MIN Program | Stanford University Catalog. Retrieved December 16, 2021, from https://bulletin.stanford.edu/programs/EASYS-MIN

with different types of backgrounds and experiences. How you activate that enthusiasm in young minds comes in different ways. Whether through art, their music, humanities, writing, or purely in the lab or in the field. It is hard for me to see how all those experiences can be siloed. I probably have the least connection as well with sustainability because it seems like such a nebulous term now. What does that really mean, and who is it really for? As we get more people from different backgrounds involved and really evaluate what communities need to survive in this changing climate, we could better understand what that term means for different people in different places.

In my role, I definitely teach environmental science, and like you, Jorge, I understand conservation through land management, because I work in terrestrial forest ecosystems. A big conservation effort that we have is centered around wildlife and habitat connectivity and carbon sequestration in our forests. There is an exploration into whether or not Black Rock Forest could be a place that could be established as a carbon offset in the carbon credit sphere. I do get pulled into conversations through my work as a board member for a land trust. I get pulled into conversations around policy, and I do feel that fields that are deemed to be outside of science have become important and relevant. I do find myself being the one to remind policymakers or scientists to think about bringing in more diverse people into these conversations. Who is on this land? We cannot just think about the green spaces. We also need to think about the urban areas and the communities that are underserved. What grassroot efforts are being made in those communities? A social science part also comes through even though I am not formally trained as a social scientist, but I understand that these things cannot be ignored in these conversations. I definitely see myself as interdisciplinary in that aspect.

How much do you prioritize and value mentoring and teaching students who are preparing for their own careers and lives? Do you prioritize or value this because it is your specific job duty or expectation, or is it also, or instead, a personal advocation or a bit of both? So maybe we will start with you, Sue.

Suzanne Pierre There is no part of my job that formally requires education or mentorship. In my position at the California Academy of Sciences, I am just a research scientist, and I have no service requirements, which is kind of awesome in a way. If I wanted to be more directly involved in teaching and mentorship, I would probably have gone the tenure-track route. There are a number of other reasons why I did not go that kind of faculty direction, but one aspect of it was that I wanted to be more flexible in how I teach, who I teach, and how I mentor. So, I have been able to make that more of a personally directed practice. But that is also very complicated because I prioritize it, and I see teaching and mentoring as deeply embedded in the process of shifting the culture of science and the practice of science. I see it as completely necessary to invest in early-career scientists and students. The other part of it is that I am really trying to create a disciplinary area that I wish existed

when I was a student. I think a lot about what kind of resources I would have wanted as a student, and I try to create those and make those available. I also dive into the process of having a nonprofit lab as well as a kind of institutional lab space. But I also think about the academic culture I would have wanted when I was younger, and the ways that I was not served by the academic institutions I attended. I am building a world that I wish existed for me. I am thinking a lot about and talking to students about what they need, constantly reflecting on their feedback about the intellectual space I am creating. It is a weird thing because I am not paid to do that yet. Maybe one day there will be compensation, but I am doing education and mentoring in that way.

Angelica Patterson That is great. Tanisha, what are your thoughts?

Tanisha M. Williams I do prioritize and really value mentoring and teaching students. It is a part of my job as a postdoc to mentor and teach students, and I enjoy it. It is really corny, but the students are our future. When I see them light up about new ideas, listen to them talk to each other about different scientific topics, things like that excite me. It gives me ideas as well, and it gives me hope. Although I am mentoring and teaching, they are also teaching me. It is a back-and-forth relationship; it is not a one-way street. So, I get a lot of energy out of talking to younger folks and hearing more from them. It is just wonderful to see that and to know no matter what form that you are doing it in, whether it is in academia or outside of academia, we are touching not only students' lives, but we are touching people's lives. These are people that we are giving a little bit of us (our knowledge, experience, compassion), a little bit of advice, a little bit of science that hopefully they carry on and pass on to the next person. I did not understand the connection until I really started to do it more on a daily basis. I am also thinking about what my mentors have done and are still doing for me. It makes me reflect on some of the really great mentors and teachers that I've had.

Angelica Patterson That is great. I definitely agree. I highly value and try to prioritize mentoring and teaching students about careers and the future—how to get involved and navigate this field in different ways. I have been prioritizing mentoring since I could officially do so, even before becoming a graduate student when I was working at Barnard College[29] as a research assistant. When students came into the lab, I would always ask them, "How are you feeling today? What challenges are you encountering? This is what I did to overcome feelings of imposter syndrome."

I started to do more peer mentoring as I got into graduate school in an effort to advocate for us as graduate students because we were not getting that mentorship and guidance that we thought we deserved. A cohort of us realized that there was a gap. Resources were not being provided to us as graduate students, and more

[29] *Barnard College homepage*. Barnard College in New York City. (n.d.). Retrieved December 15, 2021, from https://barnard.edu/

specifically, as Black, Indigenous, and People of Color (BIPOC) graduate students. That is when we started the Student of Color Alliance[30] at Columbia University, the first [of its kind] graduate student group officially recognized by the university. There was another graduate student group, Women in Science at Columbia,[31] for which I also became an active leader as Co-President. It was all about providing programming to help support us in every career stage of our life up to then and beyond.

Now, my work focuses on working with educators and sometimes with students in the field. I do find opportunities to interact with students one-on-one, and that is usually when I start to give talks about my research or my career journey. When I am invited to speak in classrooms or for seminars, I start getting emails from a student who wants to talk to me about, "How the heck did you graduate from this institution when you almost failed out of undergrad? How did you do that?" I am able to help them, and that is so inspiring because I wish I had that when I was going to college. Any opportunity I can get to mentor someone, is what I do, and what I lean upon. How about you, Jorge?

Jorge Ramos I make it part of my job, so I am actually really lucky because it is one of the things that I love to do. I have all my greetings and thank you cards on my desk. When students start gifting you things as a "Thank you" when you do not even expect it, all you do is cry—I do get teary. The first experience I had with authentic mentoring was when my mentor, who was a Latino geoscientist, Dr. Aaron Velasco, put a bunch of us undergraduate students on a bus to go to a SACNAS conference, from El Paso, Texas to Albuquerque, New Mexico because it was super close to us in distance. After we came back, two of us founded the SACNAS chapter at The University of Texas in El Paso. It was something we thought of in regards to how we can offer what we just experienced during the conference to everyone back on campus. Back then, SACNAS was a small national conference. Now it has grown to thousands of members and participants!

Ever since then, I realized that without mentoring, navigating academia is hard. I realized that during my career, and even now at Stanford, I aim to be a mentor. I do not get to supervise students directly. I do not have a lab, so officially, sort of similar to what Sue was mentioning, I voluntarily mentor within these organizations even though it is not in my job description. I do that because it is fresh in our memories, the lows and the failures that the Principal Investigators (PIs) do have, intentionally or not, because of the system that they are in. I try to fill in those gaps immediately: "You have no idea how to submit your first abstract, so let me help you with that." Angie has seen some of the emails that I have received from some students: "Jorge, no one had mentioned this to me," and they were seniors about to

[30] *Columbia Students of Color Alliance homepage*. Columbia students of Color Alliance. (n.d.). Retrieved December 15, 2021, from https://blogs.cuit.columbia.edu/columbiasoca/

[31] *Women in Science at Columbia homepage*. Women in Science at Columbia. (n.d.). Retrieved December 15, 2021, from https://www.womeninscienceatcolumbia.org/

graduate. These are all students of color. I mentor students in these chapters on how to write fellowships and scholarships because I remember how unhelpful and unequal the system was. Some advising can still be brutally exclusive and people that have previous knowledge or support groups are able to succeed. I do that very intentionally, and I love doing it and teaching in informal spaces, like at Jasper Ridge. Also, because very few people in academia have nonprofit career experience in the past, I also mentor students to see different career pathways. I chose not to be in traditional academia for my career path. They are like, "Oh, well, you have an alternative." It is not an alternative. I am happy. I chose this, and this is my way of life. So, I prioritize it. It is a personal mission of mine. I still get mentored on how to mentor by other colleagues that are great mentors. Some students teach me how to mentor. I think mentoring is beautiful, and it makes my days, weeks, months, and years.

Angelica Patterson That is great. How does your research or teaching philosophy intersect with issues in sustainability and/or environmental justice? How have you been engaged in these issues personally or professionally? Using your professional knowledge and lived experiences, have you engaged students or public audiences to take interest and/or action in environmental research or activism, and if so, how? I know it is a loaded question. Maybe, Jorge, you can go ahead?

Jorge Ramos One of the main things I always do, and I have learned through working with Latino Outdoors is how to be a better teacher. Since I teach outdoors, I always have to prioritize that sense of belonging, that sense of comfortability, and that sense of it being safe outdoors. Those are the first ways in which I teach, and have pursued teaching as I strive to improve my teaching. I like to think that the field removes so many other barriers like the walls, the classroom, the power person in front and the sitting down in the back row, the front rows like the overachievers, hand raising—all of that. We have removed that by being outdoors. But then the outdoors brings other aspects like first-timers, or uncertainty, or stereotypes. I actively like to switch that, so I have to be always very conscious. And it is always just listening. Listening also means observing the students—which ones do not even want to go off the trail or which ones are always clenching their arms. You have to observe to understand.

Because our course is a natural history course, my other co-instructor, another Mexican ecologist, and I were very aware of these interactions of the students with each other and with the environment. Maybe it is because we are also outsiders in many ways here in the USA and at Stanford. We bring a lot of the history and the human component to our teaching. We always start with bringing an archaeologist to share the story of Jasper Ridge in the past and its relationship in the present with the Muwekma Ohlone tribe. We always invite our students to attend a Muwekma Ohlone tribal event, so they can see that they are just like us. There is no need to exoticize them. Our archaeologist always says that if we really want to learn from them, we should just attend their public events and participate. They wear tennis

shoes, just like us. She is always promoting that we read, "Changing the Narrative about Native Americans: A Guide for Allies,"[32] in order for students to remove any misconceptions, false or harmful content about Native Americans. We try to bring the human element into our course. This leads us to a nice segue to environmental justice. Just bringing the human into nature brings in the ideology of justice because we share it. I think that is one of the ways that we do it in teaching.

Having more diverse organizations, like SEEDS, SACNAS, AISES,[33] Latino Outdoors, the Native American Cultural Center,[34] organize and attend more events here at Jasper Ridge, allows people to see what is inside the Jasper Ridge fence. Some members of these groups had only heard of Jasper Ridge but they thought they could never visit because they saw it as an exclusive location. We had to explain why this is a private preserve. It is all of these concepts of a barrier, the concepts of needing permission to be here, the concept of who is on this side of the fence, do the staff or the docents represent the diversity of the Bay Area? For environmental justice, we try to answer what it means in this space, in the history of this space, and then how do we train the future generation of docents that are going to be explaining to guests: Why is there a fence? Who had land ownership? What is the history here? We train our docents and provide them with materials so that they can share a correct and respectful representation of the history of Jasper Ridge. I do not teach environmental justice courses, and I do not have the theory and deep history knowledge of environmental justice. I do actions here at Jasper Ridge, and maybe I will even take courses in the Environmental Justice minor to learn more about it.

Angelica Patterson Great. Tanisha, do you want to go next?

Tanisha M. Williams Yes, I think I am with Jorge, where I do not teach or research environmental justice or sustainability. I am doing it in a more active way like you were talking about by bringing a human focus to the environment—like, who is currently on the landscape, who was on the landscape, who was taken off the landscape, and how do we teach these different concepts. That is an aspect of environmental and social justice that I have been trying to bring into the classroom as I develop teaching materials for my courses in climate change and ecology. With Jorge, Sue, and Angie, what you all have touched on—I want to explore what I wanted to learn when I was in school, what I wanted to see, and so I am trying to bring a little bit of that into this white academic structure that I am in right now. I want to bring in some of those issues of justice that touch on social justice and bring in the environment.

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[32] Campisteguy, M. E., Heilbronner, J. M., & Nakamura-Rybak, C. (2018, June). *Changing the narrative about Native Americans: A guide for allies*. Publications. Retrieved December 16, 2021, from https://rnt.firstnations.org/wp-content/uploads/2018/06/MessageGuide-Allies-screen.pdf

[33] *AISES homepage*. AISES. (2021, November 17). Retrieved December 16, 2021, from https://www.aises.org/

[34] *Native American Cultural Center homepage*. Native American Cultural Center. (n.d.). Retrieved December 15, 2021, from https://nacc.stanford.edu/

Our communities already had and have all of this knowledge. We have had knowledge of the land, ecology, biology, medicine, and anything you can think of; we already had these connections. We already had the knowledge, but it was not seen in this western world as knowledge. Because of the dismissal of knowledge systems not known or understood by the western world, I am now digging in archives to bring this historical knowledge to the forefront. I want to make sure that my students are learning this science along with the other things they are required to learn. This inclusion or highlighting of historical and current knowledge systems and science from Indigenous and other underrepresented groups is how I am bringing environmental justice into my research and teaching.

For the last question, I have been doing science communication, science policy, and science outreach since high school. I was in a science camp because I was a nerd all the way back. We would do different outreach activities at the local farmer's markets. I was doing science communication to my great-grandmother, explaining how I built a robot in summer camp and why it is lighting up. I have been doing this work for a while because I think it is so cool and awesome. I want other people to think it is awesome and cool and learn a little bit and have fun with science as well. Where else do you get paid to ask questions and design experiments to answer those questions!? Black Botanists Week has been huge for public awareness of me and my work, although I have been doing it for a while. The organization has helped put the issues I am passionate about and move them to the forefront. I have been able to work as an activist, touch on injustices, highlight unknown people in botany, and highlight people's research that would not get any shine. They are doing incredible work, but they just are not highlighted like their white peers. This is something that Black Botanists Week tries to focus on. We are highlighting Black people in this space. And we also try to reach out to Black, Indigenous, and People of Color (BIPOC). I know we are seen as for "Black people only," but we always do try to have a day to highlight BIPOC members. We want to amplify underrepresented groups in botanical sciences. I know we are moving away from the use of BIPOC, but however we define it, we want to say yes, Black people, Indigenous people, and People of Color have their struggles, and yes we all have our individual struggles (that impact us and our communities differently), but we can come together and say, "Hey, we're struggling together. Let's lift each other up."

Angelica Patterson I agree. I think it is funny that when I wrote this question, I was trying to answer it. Now, I have the terms to describe what is going on, but I feel like it has been a process over the last several years to decolonize my teaching and thinking because we have been trained that way. From the materials that we were taught and knowing that the teaching was not quite right, I had to decolonize the way I thought about science, teaching science, and engaging with my students. I am in the process of re-learning how to diversify the curriculum using my lived experiences. It helps to be able to have conversations with people from my community, who look like me, who have gone through similar training, seeing how they teach and how they do research. That is why I am so glad that all of you are here because you do it in very different and creative ways.

With my job, now, I have the chance to incorporate a lot of creative curricula—not only having teachers teach their students about forest ecology, or botany, or whatever is in the forest but to have them think about an additional layer of the land that we are on and the history of the land. Black Rock Forest is so rich in how the land was used and who occupied the space before European settlers, the Lenape Indians. Thinking of ways to incorporate that type of history into students' experiences and learning about where they are studying is super important. I am hopeful that with this creative programming and curriculum, I can engage students from underserved communities that are right next door to Black Rock Forest and get them enthusiastic about learning about what is in their backyard. I can inspire them to be stewards of the land that they are occupying right now. Hopefully, that will transform into more activism and passion for the larger issues of climate change and other environmental issues that are happening right in their backyard. I think I will end with that. Sue?

Suzanne Pierre Both my research and teaching philosophies or core values are informed by environmental justice, which I think is inherently tied to sustainability. The reason that my research, science, and teaching philosophies are oriented towards environmental justice is that I not only have this deeper feeling of being interested in the environment, alongside having the wonderful experience of nature and loving biology for what it is, but I feel like the environment is really just a reflection of what society is doing and societies are always enacting harm. I was aware of that as an undergraduate, and initially, I was more on the environmental policy and environmental humanities side of things. But I do not really think that the things that we think we know about the environment are fully representative of what is really happening. Look at the people doing the research, and look at who came up with the questions and the methods. I was not a "STEM person" at that time, but I was very scared. Then, I thought, I am going to declare my major to be science-focused. The personal context of it is, if we do not get involved in the process of knowledge-making as non-European and non-white people, then our stories are absent.

Our stories are tied to the justice question of the harm we have been incurring for years. That influences the questions in my research, but it also influences my teaching. My teaching philosophy, with what Jorge said earlier, is the feeling of belonging, and the feeling of comfort, and the sense that you deserve to be somewhere, and that you are at home wherever you go. That is the opposite feeling that I think science has given marginalized people forever, which is that you do not belong here spatially, intellectually, or culturally. My work in environmental justice is not necessarily identifying where contaminants exist in a particular location or measuring some public health parameter. My work with justice is finding out the things that we do not know about global change and global oppression. Justice is knowledge-making and who gets to do it. That is part of my work as well. My professional knowledge is my lived experience, and my lived experience is what connects me to

people like you. I never filter out the ways that my personal experience in science has made me who I am, and that just further allows me to engage with students and the public, because it humanizes me. I want to show up in every space as my full self, and my actual full self is simultaneously an activist and researcher.

Jorge Ramos I want to give credit to what you said about the comfortable space and sense of belonging. I said that I learned it through Latino Outdoors, not through academia, which is a community grassroots organization. I am validating your point that back in our day of graduate school, we did not get taught these things, so it was my participation in that group that taught me that, and now I am able to implement that here at Jasper Ridge.

Angelica Patterson This question actually got me thinking also about influencing and engaging students or public audiences to take interest in activism. I have never been one to engage in activism, in the sense of marching in the streets. I have done it in the past, but time escapes me and I feel there are other ways to engage in activism. That got me thinking of the definition of activism: what does it mean to be an activist? Are there different ways you can engage people to make a change without the traditional sense of what I think activism is? It can mean different things to other people. Am I an environmental activist? Do I influence others to become environmental activists? I am not sure because I would have to define what it is. But I do know that I advocate a lot and now speak up in white-led spaces. I make sure to make my voice heard. I make sure to include people who should be stakeholders in these conversations, which are usually from marginalized groups. Whether it is a personal or professional connection, I will be sure to bring somebody to a meeting or will I encourage you to bring someone or encourage someone to bring somebody else who should be sitting at the table. My activism is to inspire Black, Brown, Indigenous, and People of Color to engage in science and to become leaders in science. When "they" want experts in the field, the people we have encouraged can be ready, equipped, and confident to be that voice of "the expert" who can contribute to the conversation.

Tanisha M. Williams As you were talking, I got flashbacks of my life and my activism route, such as what I thought activism was as growing up in Washington, DC. I thought it was that you had to march and be on the street, which we need, but there are so many different roles to being an activist. I went to California State University, Los Angeles,[35] which is a Latino-serving institution, and immediately got involved with Students for Quality Education.[36] This organization was for

[35] *California State University, Los Angeles homepage*. California State University, Los Angeles. (2021, December 24). Retrieved December 16, 2021, from https://www.calstatela.edu/

[36] *California State University Students for Quality Education homepage*. California State University Students for Quality Education. (2018, December 18). Retrieved December 16, 2021, from http://csusqe.org/

undocumented students and helped students gain their undergraduate education. We spent most of our time dealing with racist and restrictive legislation but were also marching on the streets and working in the neighborhood. My master's advisor asked if I wanted to change my major. This was a turning point for me. I wanted to finish what I started out to do (get my science education) and also help in the struggle when I could. I feel like my activism has kind of changed, just like you said Angie, from marching on the streets and signing petitions, unless I feel the petition is going to get some traction and will do what it says it is going to do. It has changed to talking to younger people about science, talking to younger people about unlearning certain things and the system, giving them resources about different, diverse scientists, and about different groups of people who have made our society a better place. I see my activism not only to Black, Brown, Indigenous, and People of Color but also to my white students. Wake up, it is not only Darwin! There are real people behind that white face, so I make sure that they are aware of those people, too. Everyone needs to unlearn this system, and everyone needs to be an active participant in making sure we get what all of us are fighting for. Making sure we get environmental justice, social justice, human justice, all of these things are interlinked.

A lot of people of color, myself included, have been saying that we are just scientists, but by being the color we are, from the cultures we are from, and having the experiences we have, we are not just scientists. We are actually doing justice work just by showing up. Someone told me a long time ago that being a Black woman in this career, you are justice, you are showing up and doing what you need to do. Not to say we should just stop there. But what we are doing right now is huge, and then to turn back around and give back to the next person, and not only just one person, but all of these people that we have been mentioning that we are mentoring. We are trying to build up the next generation. I also feel that social media is helping me reach more people. I am not only at my university or within my neighborhood doing activism, but I am talking to people from all over the world. In 2020, the amount of students that I talked to from all over the world, such as in Africa and South America, who reached out and wanted to talk to me about my pathway, different experiences that I have had in science, or just, in general, has been phenomenal. Being able to just talk to people about my story, telling them that this is what I did, but there are so many ways to succeed, and letting them know that whatever they do next, I support them, and they can always use me as a resource.

Angelica Patterson Can you comment on whether you or your students gain a more authentic connection and scientific understanding about research or scientific concepts, if and when a sustainability or environmental justice lens is applied. Jorge, could you start us off?

Jorge Ramos Yes, because it comes more from the heart when they see that you care and you share your story. It is almost like you can do it too and you will not be

alone because I did it and I can help you to do it. When we get our feedback on teaching evaluations, the Latinx students say that they never thought they were going to get taught by two Mexicans at Stanford. They are just blown away that they can speak Spanish in the field with us. We give them the advantage of, for example, knowing this scientific name if you are a bilingual Spanish speaker. They have an advantage immediately over someone else, to show that they should be proud of being bilingual and that they are able to learn something faster and better. The students in our Stanford SEEDS chapter developed a whole virtual environmental justice and climate change curriculum to teach high school students enrolled in an alternative/continuation public high school in Redwood City.[37] They used sea-level rise and maps to show how their communities in East Palo Alto were more in danger than other parts of the Bay Area. It is the one area getting pushed by the housing crisis, the one getting pushed by sea-level rise, and it is a community that has almost been forgotten and ignored by many powerful and big institutions and corporations nearby. It was really obvious to see that the SEEDS students from marginalized communities took pride in developing a curriculum for other marginalized communities because it is easier for them to teach something because they care about it, they know it, and they live it.

Angelica Patterson Sue, do you have thoughts on that?

Suzanne Pierre Students come into these environmental science and earth science courses with an underlying knowledge of ecological problems that they are going to be exposed to as well as a latent awareness that these problems do not come from nowhere. They do not solely come from burning fossil fuels. There is more to it than that. Students are not actually presented with that bigger picture, so in a way, I feel like we lose so many students who are not from white or wealthy backgrounds. They feel that others do not have the whole picture because what they are taught does not really address their diasporic, generational, and lived experiences in their communities. It feels incomplete, and without the justice lens or the role of social processes in what we teach in the basic science courses, the students feel that they are being lied to. For first-generation college students or those from communities that do not send a lot of students to college or graduate school, there is a whole bunch of people supporting them in arriving at that university. However, if the work that they are doing does not either directly serve their family or, more generally, serve the community, oftentimes it feels like there is a lot of conflict around what they are doing here and who it is for. I think that one day in some beautiful future,

[37] Stanford University. (n.d.). *2021 Jasper Ridge Environmental Education scholar award winners: Sydney Lee Schmitter and Sriram R Narasimhan*. Jasper Ridge Biological Preserve News. Retrieved December 16, 2021, from https://jrbp.stanford.edu/news/2021-jasper-ridge-environmental-education-scholar-award-winners-sydney-lee-schmitter--and-sriram

all people can study whatever they want, regardless of its connection to justice—they can just do it because of their inherent interest. But that is not the reality. The reality is that we are humans, and we are deeply tied to who we are and who we love. The way that we present basic science, research, or concepts, if it is not tied to those realities, we are doing a disservice.

Angelica Patterson That's fantastic, I totally agree. Tanisha, do you have anything to add?

Tanisha M. Williams In the past, it was alright to not even worry about justice and just teach a white-washed version of science. Now and in the future, with the movements that are happening, people are feeling more empowered to advocate for themselves, their communities, their families, and the issues that are important to them. The system is not going to be able to teach environmental science, environmental justice, and sustainability as it has been doing. I am really excited to see this change in how people want to learn, what they want to learn, and how they want to learn the truth and the facts. Students are definitely gaining more of an authentic connection to science because we are actually teaching the truth, and the truth incorporates the environment, the truth incorporates humans, the truth incorporates injustice, inequalities, and disadvantages. It is all connected and people want to learn the truth.

Angelica Patterson Absolutely, and I too feel that it is all about context. If you are being impacted by your family, historically, and thinking about the future, your future family, descendants, and how you will be affected by the climate change crisis, you are going to want to be empowered to do something about it. I was first introduced to the field of environmental justice when I took a class at Cornell University.[38] I read some work by Robert D. Bullard, who is termed the "Father of Environmental Justice." He had written the book, *Dumping in Dixie: Race, Class, and Environmental Quality*[39] about the grassroots "Not in My Backyard" movement around the dumping of chemicals and pollution. People in the community who were getting sick and dying because of these environmental disasters stood up for themselves and spoke up about this injustice and actually made some change. When you can connect those types of experiences, like what is actually happening in other people's backyards and what is happening in your backyard that is affecting you personally, it is hard not to do something about it. So a key motivator is for students to be able to understand how environmental injustice is affecting their experiences so that they can be the ones to do something about it. If they feel they cannot do something about it, they should feel supported and empowered to get the necessary

[38] Cornell University Office of Web Communications. (n.d.). *Cornell University homepage*. Cornell University. Retrieved December 16, 2021, from https://www.cornell.edu/

[39] Bullard, R. D. (1994). *Dumping in Dixie: Race, class, and environmental quality*. Westview Press.

education, experience, collaborations, and partnerships to be able to make a change in their community.

You are all active advocates for diversifying the environmental science field while creating spaces that are inclusive, equitable, and accessible for scientists who have traditionally been excluded from this field. In what ways have you made the environmental field diverse, equitable, accessible, and inclusive? What challenges have you encountered along the way and how have you resolved them? Jorge, would you like to begin discussing this question?

Jorge Ramos I think it was Sue who made me think about how unfiltered we are now. I used to be very afraid of being gay and proud, or if I should do outreach or not. I used to be very afraid of telling people that I did not pursue getting a tenure-track position. Did I fail? But now, I am very out and proud about outreach and being gay and Latinx. Showcasing that to any collaborator from the first moment, to students and to faculty, I am not afraid anymore. I give thanks to the communities that supported me, right now: SACNAS and SEEDS. When I came out, some mentors were like "Jorge, we knew. We were just waiting for you." They kept wanting me to write proposals with them, and they kept wanting to hang out with me. By showing that in my space, in my office, in my teaching, and in my research, or just when I talk to you, I hope I will work towards making it more diverse, inclusive, and accessible.

However, the newest challenge I have encountered is the hierarchy in academia. There are many levels in academia. Now, having graduated and being on this side of the university, there are many barriers that as a staff member, make it difficult to change the system where students think we can. I have been called out by some students that have not been on this side who say, "You're already in a position of power. You've failed us." I do not fight back with them, but I do say that I am trying my best, but it is hard as a staff member in a heavily hierarchical institution. There is so much work to be done. It is not by accident that a lot of members from marginalized communities left and ended up in outreach, education, or ended up in staff positions. I do not think it is just by chance or just an accident that we ended up there. Within my power from within my position, I will make it very, very inclusive and diverse because I am not afraid anymore.

Angelica Patterson I love that, yes. Ending in hopefulness, absolutely. Tanisha, do you want to go next?

Tanisha M. Williams What I have actively done is outreach, and just like Jorge, I have been doing outreach for a long time. Because I like to talk and I love new experiences, I find it easy to connect with people. When I got into research, we were extracting information, yet we did not do anything to give back to this community. Yes, our research was being published, but those publications do not help the communities in which we found some of the plants. So, I made sure that with every trip that I took, internationally or locally, I spent time with students and communities to

help offer what I could, by mentoring, tutoring, or planting vegetable and fruit gardens. My outreach efforts are not only working with students and working with children, but I really like policy. I am from Washington, D.C., so politics is in my blood. I am up in senators', congressmen's, and congresswomen's offices. I am talking to them and saying, "The National Science Foundation (NSF) needs money and these are the projects from your state that were funded. You are not only helping the scientific community, but these are the people, your constituents, that you are helping." I went to so many people's offices that they started to come to visit me at the University of Connecticut. I love that type of work because it makes me feel like I can change this larger system a little. If I can get policymakers to sign a bill saying that they are going to commit more money to NSF, that is real change.

Moving to some of the challenges that I see, with Black Botanists Week, for example, we have been staying online because of the pandemic. I do not want it to be solely online. I do not want our only connection to be through social media. I want this movement to actually get offline eventually. It is just something that I worry about with some of the movements that are going on. I want to make sure that we get offline and we do things in person. In the way you are saying Jorge, for Latino Outdoors, not only do I want us to do things to uplift each other, like offline and meet one-on-one, take it a little bit further. How can we actually change the system? How does Black Botanists Week, the Critical Ecology Lab, Latino Outdoors, we, with all of our expertise, all of our passions, change this system? Even just a little. I do not have any the answers, or how to resolve it yet, but the first thing is getting offline and talking to people offline and joining forces as well. We are specialized in different fields, but we should come together. I know it does not always work, but there are certain issues that we can all come together on.

Angelica Patterson That's fantastic. And Sue, do you have anything to contribute to this one?

Suzanne Pierre A lot of these questions have centered around the ways that the work we are all doing is about inclusivity and equity. It is so important to me to go back to this idea of the narratives of science and the story that we tell about global change. Supporting that story that is woven into the stories of our diasporas and the processes that shape those diasporas and really explaining those stories through some type of scientific method is the place that I think my advocacy has always been centered. Doing that work of giving examples of basic research, developing tools, and developing methods is my activism. I want to make space for other people to then pick those tools up, pick those frameworks up, and apply them to their work. Activism is not just direct action; it is also practice. It is the way that we make our path in the world. Even if the Critical Ecology Lab is just one organization taking these steps and making these methodological arguments for why justice is inherently a part of global change, anybody who observes it gets to say, "Someone thought about this and someone put effort towards this." That is being a part of a

conversation so that is the way I do activism. I think that has natural connections to policy because science informs policy and if we don't have certain answers in science, there will not be a political outcome from it. That is the link that I aim to serve.

I get so many people who reach out and just say, "I'm so delighted to see a brown woman in soil science or in ecology." I am sure you all get those comments as well. It starts with relationships, and just by being present in a very white space, I can form relationships with people who need that connection. Activism, in my expansive view of it, is also about transforming ourselves and you all have touched on that. But one of the ways that I think my self-transformation needs to happen and continues to happen is related to the presence of so much hurt around these topics. There is so much alienation, there is so much pain. Even though we are advancing in our careers, we are becoming mentors and leaders, and we still carry that. Building relationships with young people and other non-white scientists is a sort of therapy. That is world-building and that is transformation. Relationships that all of you have touched on have been a form of activism for me.

Angelica Patterson Absolutely, and I love that you stated relationships and world-building, especially doing work for ourselves. As we all mentioned, us being here is transformative for young people who see somebody like them represented in this field. However, the challenge for us and for me, in particular, is community building. I am so glad that we are on this call and talking about it, and we have yet to meet in person, but at least we have the space to be able to communicate, bounce ideas, resonate our thoughts, conflicting ideas, and concepts of whatever comes into mind with each other. After this phone call, I am going to go back to my place of work and where I live, and it is predominantly white. It is a white space, and I am the only one. I have been the only one, since grade school, growing up in northeastern Pennsylvania. I think the challenge lies in how we, as early-career scientists of color, build our community to have it be stronger. There are groups, such as Black in Geosciences,[40] SEEDS, and SACNAS. But when it comes to postgraduate students, I do not see much of that community. If we can create a stronger support network for all of us and uplift each other along the way, we could really make some changes. With that, I am going to end this, and I want to say thank you all for being part of this conversation. I am so honored to be able to talk to you and meet you and have you be a part of this project.

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