

Scientists push against barriers to diversity in the field sciences

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Ecologist Gillian Bowser (*right*) identifies butterflies with students during a biodiversity survey at Bandelier National Monument in New Mexico.

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By John Pickrell Mar. 11, 2020 , 2:00 PM

Christopher Schmitt is an anthropologist and biologist at Boston University who studies vervet monkeys. He is also a gay man, a fact that can make fieldwork in remote locations more complicated. “Often when I’m in the field and not sure how my being gay will be received, I take a ‘don’t ask, don’t tell’ stance,” he says. “Basically, I would confide in folks ... I was sure were gay-friendly, but be ‘single and too busy to date’ with folks I wasn’t sure about.”

Now an assistant professor, Schmitt recounts one experience he had as a student at a tropical field station. “A field manager I was ‘out’ to let me know that they weren’t sure whether men would be comfortable being housed with me if they knew or found out [I was gay].” The result was that Schmitt ended up alone in “pretty poor accommodations” that were in the process of being torn down. “Fortunately, a week or two later, when a straight male researcher friend of mine staying in the nicer accommodations realized what was happening, he invited me to room with him,” he says. “This solved the problem nicely, as it quickly relieved the field manager of their concerns without necessitating a confrontation on anyone’s part.”

Schmitt says he understands the field manager’s dilemma, but he adds that the situation illustrates the kind of problems gay scientists can encounter in field environments. “Losing access to the field station would have been disastrous at that stage of my career,” he says.

LGBTQ scientists aren't the only people who face challenges during field expeditions. Women, people with disabilities, racial and ethnic minorities, and members of other underrepresented groups also recount times when they've been made to feel uncomfortable.

Part of the problem is that field environments are often still perceived to be the domain of rugged, heterosexual, white men. They're also different from standard academic environments because there's more of an opportunity for casual socializing. Team members often cook together, or gather around a campfire, at the end of the workday. That can be valuable time for students and colleagues to unwind and bond.

But there is a darker side. "There's a culture of drinking in geology, paleontology, and geosciences in general," says Wendy Smythe, a geoscientist and assistant professor at the University of Minnesota, Duluth. "This often leads to aggressive behaviors towards women and sexual violence, which has only just begun to be addressed."

Smythe—a Native American who goes by the Haida name K'ah Skaahluwaa when she's in her hometown of Hydaburg, Alaska—recounts a geology professor from her student days, who singled out women to harass with chauvinistic comments. Sometimes, he'd ask, "Can you understand what I'm saying?"—which Smythe took to mean that he didn't think female students were intelligent enough to comprehend the subject matter.

Field environments are often infused with "a stereotypical male-dominated, alcohol-driven, get-it-done-at-all-costs culture," she says. "Unfortunately, this ideology fails to acknowledge women, people with different abilities, and students who may have come from communities where addictive behaviors are rampant."

Paleontology is "poisoned by an air of macho science," says Riley Black, a science writer and amateur paleontologist who is transgender and frequently participates as a volunteer on fossil digs led by academic scientists in the western United States. "Explaining why 'tranny' is a word to be avoided, or why it's no one's business but mine what bathroom I use, gets exhausting." Black, who began to describe herself as genderfluid in 2017 and transition in early 2019, is more careful than she used to be when deciding which fossil hunting crews to go out with. "Given that many field camps are dominated by men, it's very easy for trans people to feel isolated, misgendered, and unsafe in remote places."

"I've been on expeditions where it has definitely been a very blokey atmosphere and you do sort of withdraw socially," adds Alex Bond, a conservationist and a curator in charge of birds at The Natural History Museum in London, who is gay. "And if you don't socialize, that's seen as negative and can have an impact professionally."

Similar issues face scientists and students in oceanography and other marine disciplines. "In the U.S., ocean research was born out of naval research, which means men overwhelmingly guided the research and access to ships," says Lisa White, who has a background in oceanography and paleontology and is the assistant director of education at the Museum of

Paleontology at the University of California, Berkeley. “Gender diversity remains low and, while things are improving, many underrepresented scientists have found ships to be hostile working environments,” she says.

All of this adds to the problem the geosciences and other field disciplines have in attracting people from diverse backgrounds, Smythe says. In 2018, for instance, only 16% of geology Ph.D.s and 13% of ecology Ph.D.s awarded by U.S. institutions went to scientists who identify as a racial or ethnic minority—statistics that are much lower than for the physical (21%) and life (28%) sciences on the whole. “While there is acknowledgment that the lack of diversity in field sciences is a serious issue, there is also a lack of desire to remedy this problem in a sincere and meaningful way,” Smythe says.

Dangerous situations

Beyond cultural issues, in some cases it may even be dangerous for scientists from underrepresented groups to collect data in remote locations.

“A lot of fieldwork occurs in countries where being gay is either illegal—which is 70-odd countries—or where, socially, it can be very challenging,” says Bond. “I don’t do fieldwork in a lot of places where I’d absolutely love to go, because the legal environment makes it unsafe.”

Even some countries that have legalized same sex marriage—such as Australia, Canada, and the United States—have extensive nonurban areas “where queer people might face discrimination or things might turn ugly very quickly,” he says.

Black felt unsafe during a fossil dig in Nevada last year when a local rancher’s monologue “veered off into a politically charged rant against Democrats, Muslims, and others, including the use of a slur against queer people.” The rancher then boasted that he was a “deadeye” marksman. Black says the expedition leaders justified humoring the man in order to maintain relations with local people. “The situation was incredibly uncomfortable.”

Prejudice and racism can also make fieldwork dangerous for African American scientists, says Gillian Bowser, a research scientist at Colorado State University in Fort Collins. She conducts much of her field research in Brazil and Peru, but she was previously a wildlife biologist for the U.S. National Park Service, working in parks such as Yellowstone. “In the U.S.—in many rural areas—we have nondiverse communities that may not be welcoming,” notes Bowser, who is African American. “When you’re the only African American floating around and you walk into a gas station and it’s full of Confederate flags, I don’t feel safe.”

Barriers to entry

Other hurdles to diversity efforts come into play before students even enter graduate school. At the undergraduate level, students from underrepresented groups may be turned off from field disciplines because they feel as though they have little in common with the people who work in the field, as well as the places where the work gets done.

“Being in the geosciences is hard because I love my winged-eyeliner and I’ve never once stepped foot in a Patagonia [store],” Dione Rossiter—executive director of the Science at Cal program at the University of California, Berkeley, who is mixed race and holds a Ph.D. in atmospheric and climate science—wrote in a [Facebook post](#) in October. She argued that minority groups can feel excluded from the geosciences because of differences in culture, personality, economic background, and prior opportunities to experience the outdoors. For some students, a Patagonia T-shirt may cost the same amount as their food budget for the month, she wrote. “So being surrounded by people wearing and talking about head-to-toe North Face and Patagonia gear ... is isolating, to say the least.”

White, who is African American, adds that students who grew up in urban environments may not have spent much time in outdoor areas, such as national parks. “When you look at brochures for geology and paleontology majors, they show an outcrop—some beautiful place. But they’re the kind of places that many people don’t live and can’t relate to.” She adds that there’s a need to move away from the idea that earth science is only about studying remote corners of the world.

Bowser agrees, saying that some students arrive at her campus near the Rocky Mountains expecting that they’ll be required to “go out and live with the bears, not shower for 3 weeks, grow a long beard, and carry a 50-pound pack.” Bowser—a pollination researcher who grew up in Brooklyn, New York—views that stereotype as misleading because the reality is that ecological research can be conducted anywhere. “I need to solve pollinator issues in my local city park as well as Rocky Mountain National Park,” she says. But if students think that they don’t look like a stereotypical ecologist—or aren’t interested in working in remote field locations—“then you create an artificial barrier.”

One way to make minority students feel engaged and comfortable in field environments is to tell stories of people of color who lived in and passed through those places, she adds. Bowser makes a point of telling her students about Native American heritage and African American fur trappers, for example. “Embracing diversity means that ecology has cultural elements,” she says.

The same stereotypes make things difficult for students with disabilities, says Christopher Atchison, an associate professor of geoscience education at the University of Cincinnati in Ohio, who is the director of the International Association for Geoscience Diversity, a nonprofit organization that advocates for geoscientists with disabilities. “The biggest problem faced is the stereotype that to be a geoscientist one must be physically able to work in the natural, often unpredictable elements of the field,” says Atchison, who adds that it’s relatively easy to create accessible field courses; it just requires creativity and flexibility.

Instructors, for instance, could create “virtual field trips” using technologies such as Google Earth and drones—an approach that was advocated in a [commentary](#) published by *Nature Reviews Earth and Environment* in January. “A common concern is that these techniques are not as ‘good’ as traditional methodologies, or that they may be used to fully replace outdoor fieldwork,” the authors—all geoscientists—wrote. “We encourage geoscientists to instead view them as supplemental, with the ability to fulfil the role of outdoor fieldwork for students for whom fieldwork is unreasonable.”

Pushing for change

Atchison, Bowser, Smythe, and White have banded together, along with five other scientists, to tackle problems related to the lack of diversity in their respective fields. In 2017, they received funding from the U.S. National Science Foundation to develop strategies for making fieldwork more accessible and culturally sensitive.

The co-leaders bring a diversity of perspectives to the table, and they’ve been brainstorming potential solutions to the problems that they’ve witnessed firsthand. The initiative—called the [FIELD project](#), which stands for “Fieldwork Inspiring Expanded Leadership and Diversity”—has run workshops or smaller focus groups at conferences, such as at last year’s Ecological Society of America meeting, to teach principal investigators (PIs) about positive changes they can make.

One goal of the trainings is to bring to the attention of PIs how language choices can make people feel uncomfortable, White says.

For example, Bond recounts one ornithological expedition where team members were lifting giant shipping bags on and off their research vessel by a crane. “For about 2 weeks, these were called fag bags.” The term wasn’t meant to be derogatory, and Bond doesn’t know where it came from. But “for me, that word is never positive. And I had to step up to the expedition leader and say: ‘Can we please call these something else?’” he says. “Thankfully, they did.”

Bond says that some PIs are “completely oblivious to some of the challenges that crop up frequently.” That’s why it’s important to speak up—and for PIs to listen when team members voice concerns. “When someone points out something that’s making them uncomfortable, it’s about being open enough to say: ‘Gosh, I never thought about that, but I understand how this might be affecting you. I will change my language or speak to the person who’s making you uncomfortable.’”

White says that the FIELD project focus groups and workshops also teach PIs about bystander intervention, how to assess the culture and traditions of fieldwork, and how to develop clear codes of conduct for behavior in the field.

While the workshops attempt to educate PIs on issues facing students from underrepresented groups and to suggest solutions, “this single experience in no way remedies this problem,” says Smythe. “Learning about diversity, equity, and inclusion is a lifelong learning process.”

It’s also hard to ensure that the lessons are reaching everyone who needs to hear them. “There’s still a huge imbalance of power, and the marginalized people often carry the weight of trying to get the wider community to listen and learn,” says Black, who has noticed that many of the paleontologists who should attend workshops or diversity luncheons at conferences are not those actually participating. “If it’s only people like me talking to other people like me, nothing will change.”