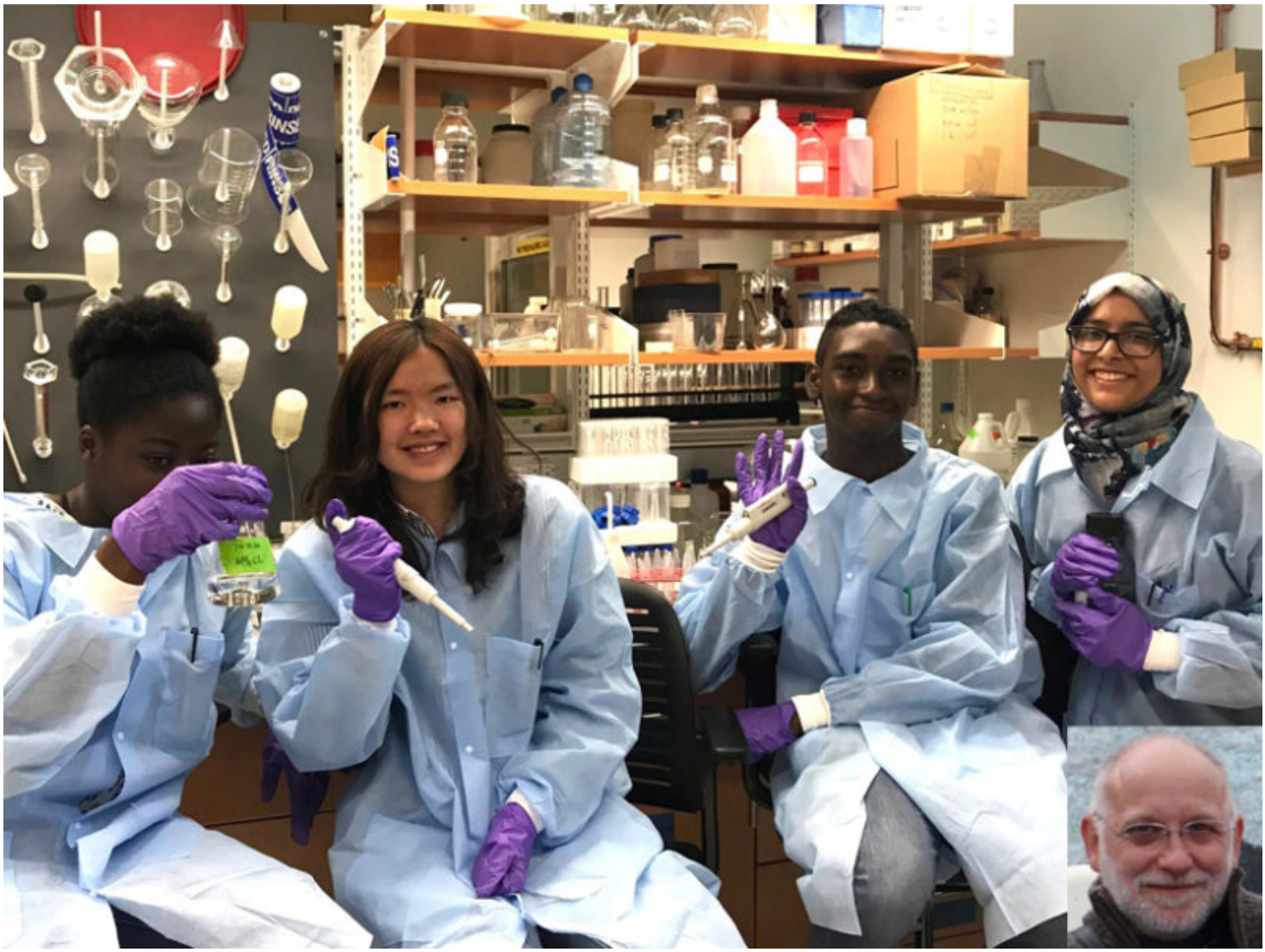
Promoting Racial Diversity in Geoscience Through Transparency

Geoscience is notoriously lacking in diversity. Institutions can change this by making recruitment and selection processes transparent and by actively engaging minority students.



Students participating in Lamont-Doherty Earth Observatory's Secondary School Field Research Program (SSFRP) analyze water samples from Piermont Marsh, along the Hudson River in New York, in Lamont's marine microbiology laboratory. The inset shows Robert Newton, senior research scientist and SSFRP program director. Credit: main: Robert Newton; inset: Alice Newton

By Kuheli Dutt 3 December 2019

This article is part 2 of a series produced in collaboration with AGU's Diversity and Inclusion Advisory Committee (https://www.agu.org/Learn-About-AGU/About-AGU/Governance/Committees/Diversity-Committee) to highlight perspectives from underrepresented communities in the geosciences. Read the introduction here (https://eos.org/agu-news/why-diversity-matters-to-agu) along with part 1 (https://eos.org/opinions/creating-spaces-for-geoscientists-with-disabilities-to-thrive), part 3 (https://eos.org/opinions/laying-proper-foundations-for-diversity-in-the-geosciences), and part 4 (https://eos.org/opinions/understanding-our-environment-requires-an-indigenous-worldview). Attendees of AGU's Fall Meeting 2019 can also use this field guide to Ethics, Diversity, and Inclusion events (https://www.agu.org/Fall-Meeting/pages/ethics-diversity-and-inclusion-field-guide).

In recent years, the push for diversity and inclusion in science, technology, engineering, and mathematics (STEM) has gained national attention. Yet there is a tenacious perception among many in the scientific community of a trade-off between increased diversity and excellence in these fields. The experience of Columbia University's Lamont-Doherty Earth Observatory with its postdoctoral fellowship awards process proves otherwise.

Promoting diversity is especially important for a field like geoscience (https://eos.org/articles/geosciences-make-modest-gains-but-still-struggle-with-diversity), which has not seen any change in racial diversity (https://www.nature.com/articles/s41561-018-0116-6?WT.feed_name=subjects_atmospheric-science) in the past 40 years and in which 88% of doctoral degrees (https://www.census.gov/library/publications/2010/compendia/statab/130ed.html) are awarded to whites, with only 6% awarded to underrepresented minorities (blacks, Hispanics/Latinx, Native Americans). Geoscience is central to our understanding of many important issues, including climate change—one of the defining challenges of our generation—and if we cannot recruit

Perspectives on Diversity

- Why Diversity Matters to AGU (https://eos.org/agu-news/why-diversity-matters-to-agu)
- Creating Spaces for Geoscientists with Disabilities to Thrive (https://eos.org/opinions/creating-spaces-for-geoscientists-with-disabilities-to-thrive)
- Promoting Racial Diversity in Geoscience Through Transparency (https://eos.org/opinions/promoting-racial-diversity-in-geoscience-through-transparency)
- Laying Proper Foundations for Diversity in the Geosciences (https://eos.org/opinions/laying-proper-foundations-for-diversity-in-the-geosciences)
- Understanding Our Environment Requires an Indigenous Worldview (https://eos.org/opinions/understanding-our-environment-requires-an-indigenous-worldview)
- Transcending Science: Can Artists Help Scientists Save the World? (https://eos.org/opinions/transcending-science-can-artists-help-scientists-save-the-world)
- Shining a Spotlight on LGBTQ+ Visibility in STEM (https://eos.org/articles/shining-a-spotlight-on-lgbtq-visibility-in-stem)

diverse talent, we will simply not find the best solutions.

Moreover, the demographic composition of the scientists working on these issues affects what research is done and how it is conveyed to the public, which influence how—or, indeed, *if*—solutions are implemented in policy. Geoscience thus requires effective strategies to increase diversity, such as transparent recruitment procedures and investments in STEM pipeline programs.

Transparency in Recruiting

The selection process for the postdoctoral fellowship is unique at Lamont in its high degree of transparency and inclusivity. The outcome of the process reinforces the notion that diversity and excellence are synonymous.

Lamont offers a prestigious and highly selective institutional Lamont Postdoctoral Fellowship (https://www.ldeo.columbia.edu/about-ldeo/office-director/postdoctoral-fellowship-earth-environmental-and-ocean-sciences), which is a 2-year fellowship offering competitive salaries and research allowances to recipients. The selection process, characterized by community-wide involvement, is unique at Lamont in its high degree of transparency and inclusivity. The outcome of the process reinforces the notion that diversity and excellence are synonymous.

As part of the selection process for the fellowship, all application materials are accessible to the scientific community at Lamont—including all ranks of research professors, research scientists, tenure-track faculty, and postdoctoral researchers—who are invited to comment and provide feedback. These comments are, in turn, also visible to the scientific community. This level of transparency mitigates the extent to which potential biases, either witting or unwitting, can creep into the evaluation and selection process.

The two main criteria used in evaluating candidates are “scientific excellence” and “fit at Lamont,” the latter being necessary to ensure that applicants’ research interests align with our ongoing research foci. There is an official selection committee, comprising individuals across the five research divisions at Lamont, with committee members typically serving 2–3 years. As with all scientific searches at Lamont, there is also a diversity advocate (me) on the search committee.

After considering application materials and community feedback, the committee makes a first cut and identifies the top 40 candidates. The scientific community is then asked to comment further on those candidates. After careful deliberation and scrutiny, the committee collectively arrives at a ranked top 10 list, and fellowship offers are made. Usually, two to four fellowships are awarded each year, with more awarded if multiple principal investigators (PIs) agree to share funding costs for top candidates. The ranked top 10 list is also shared with all research divisions in case PIs have funds to hire someone lower

on the list as a regular postdoctoral researcher (as opposed to a fellowship recipient). Given that the top 10 are selected from 100–125 applicants, all these applicants are considered top-notch.

From 2009 to 2019, roughly one third of the 46 Lamont fellowships awarded went to recipients who are racial/ethnic minorities, and roughly half went to women. This group of past and present fellowship holders represents *significantly* more diversity than any other scientific cohort at Lamont. Anecdotally, this group also has greater LGBTQ+ representation than others, although we do not collect data on sexual identity. Most, if not all, Lamont fellowship recipients have gone on to highly successful scientific careers, reinforcing the excellence of this diverse cohort.

The postdoctoral fellowship search process at Lamont highlights two valuable lessons: First, the best talent is also the most diverse talent, and second, to attract the best talent, recruitment procedures should be transparent.

Improving Minority Representation

We need to make geoscience more accessible to minorities. This is where investments in pipeline programs come in.

Racial diversity in the Lamont fellowship has been represented mostly by individuals of Asian or Hispanic/Latinx background, whereas there has been little to no representation from other minority groups. For many underrepresented minorities, geoscience is neither as familiar nor as accessible a scientific discipline as, say, medical sciences. And current practices for recruiting minority geoscientists often involve "poaching" candidates from other institutions rather than committing to broadening participation by underrepresented groups across all institutions. For this reason, we need to make geoscience more accessible to minorities to broaden the pool of potential minority geoscientists. This is where investments in pipeline programs come in.

One such program at Lamont is the Secondary School Field Research Program (https://www.ldeo.columbia.edu/SSFRP) (SSFRP), which is funded by a mix of National Science Foundation awards, private foundation grants, and individual donations. The SSFRP, which began in 2005 and now hosts 60–65 students annually, is a paid summer internship program. Of these students, 80%–85% identify as black, Latinx, or South Asian, and about 60% of them are female. An overwhelming majority, roughly 80%, are from Title I (https://www2.ed.gov/programs/titleiparta/index.html) and/or Title III (https://ncela.ed.gov/title-iii-grant-faqs) schools. The program's key features include (1) an immersive experience for students, who work full time on Lamont research projects with relatively little classroom instruction; (2) team-oriented work, which establishes a rich social setting for students' interpersonal development; and (3) a layered mentoring environment with peer, near-peer, and hierarchical mentoring available in both group and individual settings. Efforts are made to integrate the young

investigators into the Lamont community, including through an end-of-summer symposium that's open to the entire Lamont community; one-on-one mentor lunches, usually with early-career scientists; and presentations by Lamont scientists to the students. The program is highly successful, with all students going on to college, and nearly half declaring STEM majors. If every geoscience institution committed to such programming, we could be looking at a richer, significantly diversified demographic landscape in geoscience in as little as a single generation.

Institutions should also actively promote and attend STEM conferences targeting underrepresented minorities, such as the annual meeting (https://www.sacnas.org/2019/10/16/save-the-date-2020-sacnas-conference/) of the Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS). This is perhaps the largest minority STEM conference in the United States, with approximately 5,000 attendees, predominantly students and postdocs, many of them first generation. Further, given the climate crisis (https://eos.org/articles/climate-summit-delivers-some-measures-but-doesnt-go-far-enough), there is now a designated "Climate Change Track" in the SACNAS scientific schedule, with sessions devoted to climate change topics. Geoscience institutions should tap into this group to recruit minority students and postdocs.

A Welcoming Environment

As important as it is to recruit minority scientists, it is equally important to ensure a welcoming climate for them within geoscience institutions and meetings. Over the years, I have heard disturbing accounts about the experiences of minorities, including of microaggressions, hostility, and profiling. Recently, I was profiled at a geoscience conference, where a security guard denied me entry to a meeting room for a scheduled meeting with colleagues (while other conference attendees were clearly being admitted). My colleagues, the security guard, and the attendees being admitted to the venue were all white, as were an overwhelming majority of conference attendees.

In the bigger scheme of things, my experience was relatively trivial, yet the incident left a bad aftertaste and negatively influenced my experience at the conference. The reality is that microaggressions—based on race, ethnicity, gender, sexual identity, and other characteristics—are common for many minority individuals.

The Path to Diversity in Geoscience

Geoscience institutions need to create welcoming spaces for minorities, especially since microaggressions send messages that certain people don't belong.

There are three main steps that geoscience institutions must take if they are serious about promoting racial diversity. One, they need to make their search and recruitment procedures transparent. Two, they

need to get out of the “poaching” mindset and commit to making actual contributions to racial diversity in geoscience by truly broadening participation. And three, they need to create welcoming spaces for minorities, especially since microaggressions send messages that certain people don’t belong.

With a more diverse talent pool, we will have student bodies and a professional workforce with a broader base of experience, which affects not only what teamwork looks like in our labs but also what problems are prioritized, the array of solutions proposed, and how we partner with communities on the important societal aspects of our work. Ensuring racial diversity is a challenging task, but with sustained efforts and commitment, we can engage the best and most diverse talent to tackle the pressing issues of our time.

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