Professor Wendy Mao with Yu Lin, PhD '13, now a staff scientist at SLAC. *(Photo credit: Linda Cicero/Stanford News Service)*

# Q&A: What does it mean to be Asian American in the geosciences?

Stanford Earth recently transitioned the Office of Multicultural Affairs (OMA) into its new Diversity, Equity, and Inclusion (DEI) initiative. As part an effort to celebrate and discuss identity, even diversity within broad categories such as Asian American, four Stanford Earth members share how their ethnic-cultural backgrounds have informed and impacted their careers.

BY ELENITA MAKANI NICHOLAS

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In the earlier days of her career, Wendy Mao, professor of geological sciences, remembers being told by a colleague that being Asian in STEM didn't count as diversity. "I wasn't sure how to take the comment, because at the time, there was only one other faculty member of Asian descent in the entire school," says Mao, who joined the **School of Earth, Energy & Environmental Sciences** faculty at Stanford in 2007.

## More than 20 cultures

Asian Americans are the fastest growing racial group in the United States, with more than 20 million individuals representing over 20 national cultures, **according to the Pew Research Center**. The **Census Bureau** defines a person of Asian background as having origins in East Asia, Southeast Asia, or the Indian subcontinent. Often Asian Americans are grouped in with Pacific Islanders, as denoted by the term AAPI, which would also include people whose heritage stems from Hawaii, Guam, Samoa, or other Pacific Islands.

## Geoscience lags behind

Although Asian Americans are well represented in STEM fields, like engineering or mathematics, those numbers don't translate in the geosciences. In a **2018 National Science Foundation survey** of PhD graduates, Asian Americans earned 16.1% of engineering doctorates and 13.3% in mathematics and computer science, while 5.5% of geoscience doctorates were awarded to U.S. citizens and permanent residents identifying with an Asian background. Despite overall population growth, **numbers of geoscience doctorates earned by Asian Americans have decreased since the mid-90s**.

The numbers at Stanford Earth are similar. According to the **Stanford IDEAL Dashboard**, in 2019–2020, individuals identifying as Asian counted for 6% of undergraduates, 6% of graduate students, and 6% of professoriate faculty. Notably these numbers do not include international students.

## Vastly different barriers

Given the sheer number of countries included in the umbrella terms Asian or AAPI – and the associated immigration pathways, economic standing, academic background, family and individual history – the barriers facing individuals in these categories are vastly different. These difficulties are compounded when you consider that the geosciences have been **dominated by those whose parents have advanced degrees**. For similar reasons, the geosciences also have low numbers of Latinx, African Americans, Native Americans, and other minority groups.

Many cultural and social factors can come into play when selecting what field to enter, especially for students from immigrant households who may seek out recognized professions and financial security, said Lupe Carrillo, director of Stanford Earth Diversity, Equity, and Inclusion. "As someone who grew up as a first-gen student in an immigrant household, I get that there is a real financial reason for pursuing

a field with a well-known career path," said Carrillo. "But that is just one version of what's possible for students coming from these backgrounds," Carrillo adds. "We have the opportunity to re-define what it means to pursue a successful career and also update the perception of what the Earth sciences are about and who is part of this growing community."

Stanford Earth recently transitioned the Office of Multicultural Affairs (OMA) into its **new Diversity, Equity, and Inclusion (DEI) initiative**. As part DEI's effort to both celebrate and discuss identity, four Stanford Earth members share how their ethnic-cultural backgrounds have informed and impacted their careers. Professor of Geological Sciences **Wendy Mao**, Assistant Professor of Earth System Science **Gabrielle Wong-Parodi**, visiting postdoc and alumnus **Daniel Ibarra**, BS '12, MS '14, PhD '18, and Earth System Science graduate student **Krishna Rao,** '23, discuss their hopes for the future of diversity in the geosciences.

## What ethnic or racial background do you identify with?

**MAO:** I am second-generation Chinese American. The area I grew up in, near Washington, D.C, has a large Asian American community, so I never really felt like being Chinese American made me that different.

**IBARRA:** I am a half Asian, half white, Filipino American geoscientist. What's clear to me is that as someone who is half Asian, half white, and having grown up in Hong Kong, I have the opportunity to move or adjust my identity with friends, colleagues, and collaborators depending on the situation.

**WONG-PARODI:** Ethnically, I identify as Chinese American and European American. My ethnicity is an important part of who I am, but it is only part of who I am. Often, people who don't know me very well think that I come from some other racial group than what I identify with.

**RAO:** Before coming to the USA, I was sure I was Asian. Now that I'm here, I identify more with my ethnicity – Indian. At Stanford, when I attended events tagged "Asian," I found South Asians like me among the minority, perhaps due to confusion related to race and ethnicity.

Wendy Mao, professor of geological sciences, conducts experiments at high pressure and variable temperature to mimic conditions inside Earth and planetary interiors. *(Photo credit: Holly Hernandez)*

## Share a formative story related to your ethnic or racial identity.

**IBARRA:** Lechon (roasted pig) is a national dish in the Philippines and I have distinct memories of sharing lechon with cousins, aunts, uncles, and my Lolo (grandpa) and Lola (grandma). It's a whole roasted pig and used generally for larger celebrations like holidays, birthdays, anniversaries, etc. Given its importance to my family and my culture, I had a lechon-centered celebration for my PhD defense.

**WONG-PARODI:** My mom is one of eight children, all of whom now live in the States but were born in mainland China. I have vivid memories of going to visit the gravesite of my Gong Gong (grandfather) and Pau Pau (grandmother) to pay our respects at Chinese New Year. In addition to the requisite flowers, we often brought a feast with us. A roasted pig, oranges, candies, all laid out in front of the headstone, along with incense sticks and a fireproof container full of collected ashes of "money" that we would burn with lighters so as to ensure that my grandparents would have money to spend wherever they were in the afterlife. This was by no means a quiet or solemn affair, and as we were each taking our turn paying our respects, the rest of the crowd would be joking, laughing, and telling stories about my Gong Gong and Pau Pau. This was central to how I think about family and tradition. It is big, messy, joyous, and essential for being human and grounded.

**RAO:** One of the reasons I chose to come to the USA for graduate studies is the exposure it provides to different communities from all around the world. Interestingly, I was exposed not only to the views of other cultures, I also was exposed to the diversity that comes out of my own country. Only after coming to the United States did I realize how ethnically and racially diverse India is.

Daniel Ibarra, visiting postdoc and alumnus BS '12, MS '14, PhD '18, is an isotope geochemist focused on Earth surface and terrestrial paleoclimate questions related to the water and carbon cycles.

## How does your identity intersect with your research, your workplace, your field?

**WONG-PARODI:** I don't try to pretend that it's always easy to balance work and life, but it is essential to put family, health, and happiness first. I talk with my colleagues and students about the challenges of being a woman, an Asian American of mixed heritage, a mother, and an academic.

**IBARRA:** I make an effort to ask others about their identities. Providing a way to have these discussions, perhaps by starting with how you introduce yourself, is a way to ensure everyone feels comfortable fully bringing their identity into the sciences. When working collaboratively, everyone brings a piece of their expertise and identity to come up with a scientific interpretation/solution.

**RAO:** Science in the USA is relatively well funded, but that is not the case in most of the developing world. Consequently, in my research on developing methods to track forest health, I constantly find myself asking how can this method be modified to make it low cost or make it scalable so that everyone, irrespective of their economic prosperity, can benefit from it. That is one reason I use a lot of remote sensing in my work. Although most of the public satellites are designed and launched by the developed countries, they tend to make the data free for

Gabrielle Wong-Parodi, an assistant professor of

everyone – letting all nations benefit from them.

Gabrielle Wong-Parodi, an assistant professor of Earth system science, applies behavioral decision research methods to address challenges associated with global environmental change.

## Any last thoughts on diversity for today's upcoming and existing geoscientists?

**RAO:** Let's not avoid geosciences due to stereotypes or social norms. If you have a passion to learn about our planet, please pursue geosciences. If you know someone who does, please encourage them to pursue it. Our Earth is filled with tremendous diversity. If everyone follows their passion, it will help make the geosciences diverse too.

**MAO:** It seems that younger people are very enlightened and progressive when it comes to thinking about diversity. I have personally learned a lot hearing the perspectives of the students in our department about diversity. They are very passionate about demanding real change and not accepting the status quo, and we should make room to hear their voices.

**WONG-PARODI:** It is essential that research is grounded in the real, lived experience of the people most vulnerable to the adverse impacts resulting from global environmental change. I encourage you to think about how your work or research could benefit from engagement with the diversity around you, especially those populations you seek to inform with the knowledge you create.

**IBARRA:** If we can make the geosciences a more diverse place, there will hopefully be more diverse viewpoints, meaning more potential interpretations of data/models, which might lead to more initial conflict, particularly in subfields dominated by a homogeneous group of voices resistant to change. However, with persistence, I believe what this will mean in the long run is a greater rate of scientific advancement.

Krishna Rao, a PhD student in Earth system science, develops methods to track forest health using remote sensing.

This story is part of the #StanfordEarthCelebrates series hosted by Stanford Earth Diversity, Equity and Inclusion.

## Media Contacts

Elenita Makani Nicholas

SCHOOL OF EARTH, ENERGY & ENVIRONMENTAL SCIENCES

elenitanicholas@stanford.edu

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