



COLORING OUTSIDE THE LINES

Dr. Lisa White, Geology Guru:

A conversation about JEDI



LISA WHITE, 2015

Nina S. Roberts, PhD

INTRODUCTION

Are we amidst a new generation of racial re-awakening, an explosion of interest in racial diversity? Could that be more dangerous than a nuclear explosion? For example, this can be interpreted as Black, Indigenous, and other People of Color (BIPOC) being dissatisfied not only with the status quo, but also with leaders

who claim to be allies yet turn their backs when “push comes to shove” (e.g., with respect to organizational decisions, policy changes). Specifically, as we cultivate our Next Gen of scientists, students are hungry for knowledge that the paleontologist and educator

JEDI: Justice, Equity, Diversity, Inclusion

Dr. Lisa White imparts. As she's learned from, and contributed to, geoscience diversity throughout her career, she wonders if it's time to check the moral compass of our leaders and decision-makers across all natural resources and related science disciplines.

I believe the younger generation will see the hand-writing on the wall and many of them will seek the path that conveys the truth about any agency or academic institution they might be interested in working. Sometimes when the truth surfaces, it blinds us. How do we, as professionals and scholars, embrace and engage while all striving for the same goal of equity and inclusion? In the following conversation, Dr. White sheds some light on her illustrious career as one of the few African American women in the field of geosciences.

WHO IS DR. LISA WHITE?

Dr. Lisa White joined the **University of California Museum of Paleontology** (UCMP) in 2012 as director of education and outreach. She arrived at UCMP after 22 years at San Francisco State University as professor of geosciences, later associate dean of the Graduate Division, and finally associate dean of the College of Science and Engineering. Dr. White taught undergraduate classes in paleontology, historical geology, and oceanography, and guided research projects with graduate students in Miocene diatoms of the Monterey Formation of California, and fossil cold seep assemblages in the Franciscan Complex. An impressive array of topics, whereby her teaching, service, and research has also provided her with numerous honors and awards.

As Dr. White states in a feature article in **California Magazine** (2014), "my childhood home in San Francisco is a block away from the California Academy of Sciences in Golden Gate Park and I think frequent visits to the Cal Academy must have sparked an early interest in paleontology and geology. Directing the SF-ROCKS (Reaching Out to Communities and Kids with Science in San Francisco) program at SF State initiated ways of engaging diverse urban youth in field and laboratory experiences with the goal of generating similar interest and excitement in the geosciences." Dr. White is continuing those important efforts through national-level leadership training programs in diversity, access, and inclusion such as FIELD (Fieldwork Inspiring Expanded Leadership and Diversity) and VOICES (Voices of

Integrating Culture in the Earth Sciences). In the spirit of this month's theme issue, welcome to my conversation with the extraordinary Dr. Lisa White.



Nina: *Not only are you a woman pioneer in the field of geology with expertise in paleontology, as an African American you have a unique perspective. Coupling both of those essential identities, how do you navigate what still remains a predominantly white male domain throughout your career?*

Lisa: As I reflect on my career, I've been a professional for over 30 years so have grown more comfortable navigating these spaces even if I'm the only one. There hasn't been a situation that I haven't encountered over the years where I haven't always found a way to navigate through these spaces on whatever path I wanted to take. I don't know if I've had a single or clear formula for all of this. I think what's at the heart of my success is, for one, my passion for what I do. I discovered geology late in my undergraduate career. As I connected with the subject, and I learned more about what geologists do and experience professionally, it appealed to my sense of adventure and was such a different kind of science from what I knew as a pre-college student; I was fascinated.

At the time I made the pivotal decision to major in geology at San Francisco State I was part of a program with the USGS [US Geological Survey] in Menlo Park



JOSEPHINE WU, 2017



Dr. White educates student assistants at the University of California Museum of Paleontology, Berkeley, 2018. HELINA CHIN

that supported internship experiences for students of color. Even though I was often the “only one” and didn’t have a lot of role models in this science as I was getting my degree, I was definitely in an environment where I was with other aspiring scientists who were students of color so that helped me realize I wasn’t alone. During the program, I spent time with other students of color in this internship cohort and we all compared notes on what we heard, what someone said to us, degrees of doubt that people would express, and all the shade that got thrown our way! I was so young and enthusiastic I still kept on trying to navigate my way. It wasn’t until years later, with the weight of the burden, that I realized what I had put up with because I don’t think they, the culture of the USGS, were ready for all of us!

Nina: *I appreciate hearing all that as it relates to your increased comfort. As you know, I grew up mixed-race including upbringing in a half white world (given my father’s ethnic background) so you get used to navigating those spaces. The idea of you and other students of color, during that internship, sharing and comparing notes and experiences, it’s a great way to*

validate what’s going on; whereby I might ask myself, “Am I losing my mind or did that guy just say that!?”

Lisa: I also gained confidence coming from an academic family. My parents met at San Francisco State and although they stressed education, I never felt pressured to study one field or another. My first major was art and photography so it was helpful to me that I could explore a bit and discover a new discipline. Sure, at times during the course of my major study I felt like I had imposter syndrome and felt like I didn’t belong. I guess my coping mechanism was to put my head down and keep working; I received a lot of honors for what I was doing such as scholarships, recognition, people wanting to hold me up as an example of someone doing work that’s different from the norm. That further encouraged me to continue doing this. There were times I had to ignore what people were saying such as, “Why do you even want to pursue this? What are you going to do with that degree if you only study rocks?” It’s clear, even today, people fundamentally don’t always understand what it is we do, as some think Earth Sciences is one-dimensional.

Nina: *One of your earlier programs that I had the pleasure of experiencing as a field leader with you for a few years, was established during your tenure at SF State. SF-ROCKS (Reaching Out to Communities and Kids with Science in San Francisco) was an amazing program developed to bring geoscience education to high school students and teachers in San Francisco. That program, funded by the National Science Foundation (NSF), was a partnership between SF State University (SFSU), City College of SF, local high schools from the SF Unified School District, local community groups, and government agencies. That's an amazing collaboration! What inspired you to start that well-known Bay Area program? And, now that it no longer exists given your pursuit of other endeavors with UC Berkeley, what jumps out at you as one of your fondest memories?*

Lisa: During the years when I was a professor at SFSU, San Francisco is my home town as well so I would often respond to requests from SF Unified [School District] teachers to give presentations because I felt an immediate connection. I thought, "Oh these students are like me, they're urbanites! Yet here are opportunities to share with them what I love about this type of science; and there's such great geology in the city that I could easily draw from that to show excellent geology examples and talk with them about why it matters." I had done a fair amount of school visits, responding to requests for teacher materials, yet it wasn't very organized; so what began to happen was there was a convergence of things. The National Science Foundation was starting to solicit program proposals to further diversity in Geoscience; so, there were financial and other resource opportunities to develop programs to make a difference.

What I hear throughout my whole career is, "Oh, you're such a rare one, oh, you must be the only one (etc.)." It does get a little lonely, yet I was at the point where I was motivated to initiate some change but I knew I couldn't do it by myself.

There were also new national science standards for K-12 education that placed a lot of emphasis on Earth Science, Earth System Science, and the interdisciplinary aspects of geoscience that are important in many fundamental concepts in the sciences, broadly. There was a lot of energy around teaching things differently, using real examples, and partnering to develop teaching and learning materials that were more inquiry-based and very hands on. I was also fortunate to be a member of a faculty group in our department that was motivated to do this work. When you're a professional geoscientist and you care about diversity in our discipline, we're so used to hearing geoscience is the least diverse of all the STEM disciplines; maybe physics and mathematics are worse than us but compared to the life sciences we just don't seem to have a critical mass of students of color in this discipline. What I hear throughout my whole career is, "Oh, you're such a rare one, oh, you must be the only one (etc.)." It does get a little lonely, yet I was at the point where I was motivated to initiate some change but I knew I couldn't do it by myself. Knowing my fellow faculty members in the department at the time [late 1990s, early 2000s] were really motivated to develop a program, we had the right level of commitment and expertise to get SF ROCKS off the ground in 2001. At first it wasn't my idea to go that route with high school students but my colleagues in the department thought it was great and they recognized I could provide good leadership for this. Then it dawned on me, "Okay, I guess we're going to do this!"

It turned out to be a really pivotal experience for me, not only as the Principal Investigator and project lead, but also for many of the students that we encountered; there are a number of success stories. I'm still delighted by a student I first met when she was at Burton High School in Bayview and she became part of SF-ROCKS program in her freshman year. She gained research experience on campus at SF State, she participated in national parks trips and presented at professional meetings, etc. After she finished her H.S. diploma she came to SFSU as an undergrad. I then had the opportunity to directly mentor her and get her involved with SF-ROCKS as a mentor for other H.S. students. I supported her general interest in geosciences and she eventually went on to get her Ph.D. in geology at University of Texas at El Paso. Now she's a professional geo-

scientist who got her start with SF-ROCKS; we love those success stories!

The importance of the partners formed through SF-ROCKS also helped to later transform that program into **METALS** (Minority Education through Traveling and Learning in the Sciences), another NSF-funded initiative operating from 2011 to 2016. Together the two programs had a great 15-year run. Project METALS included universities outside the Bay Area, and the University of Texas at El Paso was

one partner. Two other partners were the University of New Orleans and Purdue University. Students got to meet professors from other universities and could get a sense of what other departments had to offer; this gave students who were interested in geology a lot more choices. As SF-ROCKS was thriving and expanding, I got to know other geoscience faculty who were also running high school programs out of different universities. We started to meet in the field and had an idea of taking our respective programs in a different direction and bringing them together.

BELOW: METALS students at Fort Point, Presidio of San Francisco, Golden Gate National Recreation Area, 2012. RIGHT: Dr. White with METALS students at Point Reyes National Seashore, 2012. METALS PROGRAM ARCHIVES



We developed a plan that would include field trips outside of our geographic areas, including national parks in the West where our student groups could meet. The point with that was to expand the network with students from various regional areas that might not have a chance to travel out of state or visit national parks, and we could plan do this together. I was able to solidify several collaborative partnerships, and METALS was born through this plan. Through this network we included faculty of color and both undergrad and graduate students of color, with lots of mentoring and learning about Earth Sciences in these really beautiful places.

Nina: *Okay, now here's an age-old question: rather than, "Why don't more Black people go to national parks?"—which is what I always hear—you likely get, "Why don't more Black people either like geology or participate in geology? And, have you shifted your reply in how you answer that question over time? I know I get stuck sometimes not wanting to provide a canned response yet ask myself where do I even start!?"*

Lisa: My usual response is, "It's no one thing!" There may be a number of factors that are closely tied to not knowing as much about our discipline as compared to the life sciences. When students are introduced to the sciences it's usually the classic disciplines like biology, mathematics, chemistry, and related. And, if they know scientists in their communities, or if they are familiar with these professionals in popular culture, those scientists are usually medical doctors or, in the area we live in, Silicon Valley, they're engineers or computer scientists.

So, one of the biggest factors is that we're competing with the other STEM fields because students have a lot of choices about what they study and major in for their degree programs. We have often not done a good job of selling what our discipline of geosciences is all about and what it is we do. If you combine that with the fact that Earth Science and geoscience are usually not taught in high school at a level where the class can be used as a laboratory course for college credit, nor is it offered at the advanced placement level, students who are college-bound and enjoy science are often less likely to take Earth Science because there are not a lot of standing Earth Sciences classes in high school at the advanced level. Now middle school is really rich in Earth Science and that's all great as students learn about fossils, geologic

time, rocks and minerals, and all that good stuff, but interest can be lost at the high school level.

To circle back, sometimes we just don't do a good job of promoting our field as we are competing with other sciences that students perceive as disciplines more likely to get them jobs. It's not always clear as there are a lot of misconceptions about what geoscientists do. Never does it occur to people that geoscience is connected to climate and environmental change, extreme weather, toxic waste, environmental justice, and many quality-of-life issues. Once we are more effectively able to share just how many directions and sub-disciplines there are in geoscience and how students can apply the degree and plan their career, then we'll be more successful.

With the programs that I've run like SF-ROCKS and METALS, along with leadership training in diversity, my colleagues and I want to shift the culture a bit. What often occurred early on with many diversity programs in geoscience is that we expected students to do their training exactly like we did. You know, take what would be considered classic geologic degree programs and not always seek opportunities across interdisciplinary boundaries, like with environmental science or climate science, so we end up expecting all students to have the same cookie-cutter degree, including a rigorous field camp course experience. For some students this didn't resonate with them; as a result, there have been shifts in departments and degree programs, nationally, to better reflect what the 21st-century geoscience degree should look like.

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Geoscience educators and graduate students during a field course in San Diego, California, 2019. **LISA WHITE**

That is helping to attract a broader and greater range of students who have experiences interacting with the Earth across cultures. The way many geosciences' programs were structured, historically, it just didn't seem to fit. The field is continuing to grow and change, yet when K-12 students are only introduced to the "pure STEM disciplines," they are basically just not likely to know about geoscience opportunities. So, all that works against us. You noticed I didn't say, "Oh, we don't like the outdoors" as a reason why there aren't more Black people in geoscience, because that's old and outdated! I just think "Come on, we love to go to the parks, we love nature, you can't tell us we don't! It's not all about backpacking and camping!" There are multiple ways to experience the outdoors and connect with nature; we shouldn't expect that everyone does this the same way.

Nina: *Let's talk about trends. You've been doing this work for a long time, so tell me what you're observing around workforce enhancement. Think about the idea of diversifying the geology workforce; what would you say are top-of-mind reasons explaining the lack of representation, still, in this and related sciences? Do you feel there is progress or not, and why?*

Lisa: One of the things I'm noticing that may produce different outcomes when it comes to diversifying the field is shifting away from the deficit model. For example, people assume students of color, under-represented students we might want to recruit for the field, are missing something: "They didn't go to a good high school; they didn't have a lot of basic science; they weren't introduced to geoscience, etc. so let's fix them, let's shape them in a way that requires the training exactly like a lot of professionals have had." There's a mindset that there's only one way to train people, to carry out a degree plan, and you have sink or swim with various classes. It's very negative and we're always trying to fix what's "wrong." There's been a shift away from that to new emphasis on changing the culture in science. Maybe we need to adjust the water that the fish is in; don't assume the fish (students) are sick because it's something they've done that's external to the water (our departments or the discipline). Stop assuming everything is wrong with the students; maybe it's the water (the discipline) that we are putting these fish into. We have to ask ourselves just what are we doing in degree programs to improve teaching and learning about geosciences in the 21st century that could be more appealing to students.

We need to recognize you can't throw a student into a discipline when they may not have an immediate connection to it and expect them to sink or swim. What about the kind of mentoring and guidance we offer? Do we listen to what students might be interested in that helps them find the connections? I think departments across the nation, and certainly with the work I do with colleagues, are now more focused on what departments can do to shape programs and be more appealing to a greater variety of students across cultures.

Nina: *Shifting away from the deficit model, as you say, do you find professionals and agencies are more genuine in their recruitment efforts towards diversifying the workforce as well? Have they moved to more of an asset model in reaching students of color?*

Lisa: I am noticing more attention on learning science and better understanding classroom practices. There are many different ways to learn and teach, including using local environments and place-based examples to make real environmental connections. A series of shifts that has momentum is professionals being more willing to shape and revise programs based on what students are interested in and also are open to reframing what the expectations are in a degree program. Placing emphasis on real skill development is key. For instance, working with real data, visualizing Earth phenomena, and encouraging good science communication (writing, speaking) along with other fundamental skills are crucial.

Nina: *You got me thinking about the interpersonal versus technical skills that transcends all disciplines.*

These days, many students are coming into this field with their own interests in the environment and ways they relate to outdoor spaces; we should recognize and value that and try to learn something from them and be willing to listen to questions they have about their observations in their own environment.

What is in the immediate control of teachers is usually in the forefront, such as what's in my curriculum and how will I do things in the classroom or the field. And there are also questions around how I can I be a better instructor, be a better listener, or what can I do differently to relate to my students? People need to take all this to a new level; we need a stronger, deeper, more authentic relationship with the students we're trying to recruit. They have the skills you need and want, or can cultivate, so what is the barrier to or fear of developing that relationship when instructors begin to realize they may have to do things differently!?

Lisa: These days, many students are coming into this field with their own interests in the environment and ways they relate to outdoor spaces; we should recognize and value that and try to learn something from them and be willing to listen to questions they have about their observations in their own environment. There have definitely been big shifts in what curricula look like in degree programs and shifts in different kinds of classes; there are such interesting applications to the degree, such as some students go into journalism, even, with a degree in this field! There are many career options, beyond traditional ones, for what direction students could pursue in the geosciences, so we continue to do a better job with that.

Nina: *You have a broad, impressive collection of publications so far in your career. What would you like to write about that you have not had an opportunity to complete yet?*

Lisa: Since I've been in my current position as director of education at the Museum of Paleontology at UC Berkeley, the focus of my job is increasing broader impacts, collaborative partnerships, and outreach and public programs. Since those aspects are the central part of my job, this has given me more opportunities to publish in these areas. What are some ways museums and universities can utilize the research that we do and the collections that we have to excite young people and the public about what we do? How can we make the research that we have and the way that we store it (databases), more accessible? Earlier in my career when I was more active in research science, I'm a micro-paleontologist by training, I used to work onboard ships where we've looked at small fossils that are buried in deep ocean sediment. I'm also interested in the areas on land where marine sediments are

exposed so I've studied all that as well. There were many years where I was publishing in my discipline of micro-paleontology and sedimentary geology.

I've now fully embraced opportunities to try and understand what influences a person's decisions about the discipline they select, and what can departments do to better recognize when students have potential in geosciences or find out what they are interested in and help them find the right program. For example, I want to know what professional societies can do to support all this. What can professional geoscientists inside and outside of academia do to lead programs that truly make a difference in diversifying our discipline? What does it mean to train professionals in leadership skills in ways that shape programs to bring underrepresented students to the field? That is more of the direction I'm heading these days. Let's invest in making a change in who pursues geoscience rather than place the blame or burden on the students to come find this discipline with outdated ways of teaching and learning. Let's shape degree programs to showcase the rich

applications of geoscience work across environments and cultures!

Nina: *We often hear “start ‘em young”—which I agree is true. In a 2019 interview with The New York Times, you mention most public high schools, especially in urban environments, do not have the resources to organize outdoor field trips introducing students to the earth sciences. You have observed that students of color tend to be more familiar with medicine, engineering, computer science, and other STEM fields that lead more directly to job opportunities. Do you have a sense of what K–12 schools might also be doing to change this phenomenon?*

Lisa: There are studies that suggest if you can't keep students on a science track, you've lost them by middle school. Unless students are really motivated or have great classroom experiences, for instance, then it's hard to hold their attention. I'm all for *start them young*, get them excited early, build that confidence, and increase their connection with

Dr. Nina S. Roberts with Dr. White (kneeling, lower left) and METALS students at the Egg Mountain dinosaur site, Montana, 2015. METALS PROGRAM ARCHIVES



science. I'm a believer that, in general, almost all kids love science! You know, who doesn't love dinosaurs or isn't fascinated playing outside and being inquisitive about nature?! What's more critical is not how to interest them in science at a young age but how to *keep* their interest. That is, the perception that science gets boring is real to some students or just seems like too much textbook. Depending on the level of resources at a particular school, they can't always do outside programs that are hands-on in the natural environment. Geoscience requires resource dedication and specialized materials to teach at the level that is more likely to produce future scientists. Again, it's less about getting them interested and teaching them young, then it is about sustaining that interest. There are still so many gaps about how students are taught science and what the expectations are grade-to-grade; even despite national science standards, things really break down, depending on the school district, of course.

Nina: *Last, what advice would you give to younger women of color who might be considering a degree and career in geology or natural sciences, broadly?*

Lisa: This does not exist for white women as much; they have certainly broken through some of that proverbial glass ceiling. When you look at undergraduate degree program enrollment, the women almost always outnumber the men. For example, we see 60/40 women to men or even 70/30 in some cases. White women are finding the major, that's for sure. Even so, there is attrition, women not earning advanced degrees, and not becoming members of faculty on par with percentages of women who start out in the major. The last is a problem in terms of where women go once they get their degree; are they really able to assume leadership positions?

For women of color there could be a whole range of challenges that make them feel less welcome, even if they see a lot of women, maybe they can't always relate to other women in the discipline. If you're from a different racial background, you can't assume just because you have a lot of women in a specific department, for example, that you're going to feel comfortable, too. I think we must continue to listen to what women of color are interested in, and what their experiences are, when they enter the discipline. There's a lot of isolation, unfortunately,

and not everyone is your ally, sadly, even if they are of the same gender. I heard a presentation recently by a Latina faculty member who shared what it was like to be "the only one" in undergrad and graduate school, and on her currently faculty as well. She said the extent of the micro-aggressions, or even all-out aggressions, were part of her everyday experience. From jokes about being Mexican and working in the field, to jokes about what language she spoke at home or work. Despite being in an environment where you think your colleagues would be welcoming, peoples' attitudes really come out. There's still an incredible amount of bias and expectations that everyone will look the same or behave the same, and constant questioning such as, "Why are you here?" or, "Why aren't you like us?" There continues to be old guard expectations about how you interact and behave, or what the culture of the workplace is, for instance, so that continues to be hard for many women of color, and I don't blame them.

Nina: *Some of what I hear you're saying, from an advice standpoint, is let younger women of color pursuing geosciences know they need to be aware and realize these factors are real whether in the field or in higher ed. You're saying find your allies, be conscientious and determine how you can best succeed and navigate all this, and find the best mentors. Open your eyes and don't be naïve.*

Lisa: That's right. There is a greater awareness, especially with this last year and a half putting a spotlight on systemic racism and injustice. And it's important to also recognize to what degree universities continue to just make it difficult for under-represented students to succeed. They expect everyone to be the same, or respond the same way to teaching and learning methods. We are not

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always willing to admit the way we've traditionally taught and offered [geosciences] programs doesn't always resonate with all students. The attitudes of faculty or people in positions of authority often miss the talents of students or judge them in ways that undermine student success. Faculty need to examine and talk more about all that and what happens at universities when students come in with high aspirations and with profiles suggesting they'll be successful; there needs to be more attitudinal shifts among the gatekeepers because they perpetuate the stereotypes of what is a successful student profile. There are many opportunities to train professionals about how to improve leadership, provide more or new guidance, and to be the supportive mentor they have the potential to be. We're trying to do some of that with our current VOICES project.



CONCLUDING THOUGHTS

Dr. Lisa White was a pleasure to interview. Her career shows that she's committed to diversifying varying levels of participation in the geosciences. In the beginning she was more focused on direct student experiences, especially at the pre-college level, and getting them familiar with geoscience. Now when she reflects on the suite of programs she leads or co-leads at UC Berkeley, it is a spectrum ranging from leadership training for professionals that may want to develop their own SF-ROCKS or METALS program, to what does it mean to shape and create a program of their own for students who might not be anything

like them. She seeks to elevate the competencies of professionals to think more deeply about how they can engage under-represented students and mentor them, ensuring their success in Earth Sciences. Her active involvement in the field also has steered her to partake in activities leading to institutional change and working with professional societies knowing they have a role to play as well. As her own journey continues, her abilities have increased as someone who's been at this for decades. Dr. White is anxious to continue sharing this evolution, including her own attitude about diversifying this field and shifting expectations of geosciences professionals, broadly. She is exhausted and energized at the same time, and notes with laughter, "I appreciate diversity work but I also just love my science—sometimes I'd rather be out on a ship!"

One of our nation's legendary leaders, Frederick Douglass, an American social reformer, Abolitionist, orator, writer, and statesman, once said:

If there is no struggle there is no progress. Those who profess to favor freedom and yet depreciate agitation, are men who want crops without plowing up the ground, they want rain without thunder and lightning. They want the ocean without the awful roar of its many waters. This struggle may be a physical one, and it may be both moral and physical, but it must be a struggle. Power concedes nothing without a demand. It never did & never will.

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[Ed. note: *Coloring Outside the Lines* author Nina S. Roberts will be taking a leave from the column during the rest of 2022. We look forward to having her hopeful return to writing this column next year.]

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On the cover of this issue

The precipitous rock spires of Meteora World Heritage Site in Greece have a complex geological history. Over the centuries a number of Eastern Orthodox monasteries were built atop them, and today's World Heritage Site recognizes this cultural history as part of the overall geoheritage. | [STATHIS FLOROS](#)