An Interview with Diane Miller

Diane Miller is Chief Program Officer at the Detroit Zoological Society. Prior to this role Diane was Director Community Science at the St. Louis Science Center and Director of the "YouthALIVE!" program at the California Science Center in Los Angeles. She was interviewed by CAISE Project Director Jamie Bell in July 2020 about her career in informal STEM education.

Please tell us about your early experiences with science and how they led to your career in informal STEM education.

All of the way through college until I got a job at the California Science Center in the 1990s I would say that I did not have a positive academic experience with STEM. I was fortunate growing up in Pittsburgh to be within walking distance of a cultural institution, the Carnegie Museum of Natural History, which had free admission at the time and was adjacent to the library, where I had access to free books, both which were important given our socioeconomic status. When my family moved to Philadelphia, I was invited to join a 4-H club, as they had established some clubs in the city. This was not about raising livestock but rather we homesteaded a corner that was covered in trash and glass. We cleaned it up and put in gardens.

That was my first direct STEM experience and it was more about being outside for the first time and doing things like that. I didn't really develop a comfort level with STEM yet, but I did learn how to make friends join a new community. Otherwise I only took science when required. I was a good student, so I could pick a class and do well. Later in high school in Los Angeles, I was eligible to take classes that prepared you for college, but I was discouraged from taking them and encouraged to take something like typing. But during that time, like now, most of the teachers were white, and they were racist.

Luckily, by the time I graduated I had already taken chemistry and biology and all the math I needed to get into college. And the only reason I went to college was -- in my house, everybody works. And when you're in school, that's your job. And when you get out of school, you get a job. I could not find a job so I went to college. I ended up majoring in English at California State College in Chico State, where I took two science classes, after which I decided I would never have to study science again.

Interesting! So how did science come back into the picture?

I went into retail after college in order to support myself. After working my way through college I just wanted a job. Once I had my daughter I no longer wanted to work in retail but I wanted that would allow me to spend more time with her. I found a part time job as a museum assistant at what was then the California Museum of Science and Industry. Because I had worked as an assistant store manager, I had gained organization and problem-solving skills.

Through a career access grant the museum received shortly afterward, I was recruited to join a program with four other science centers designed to support encouraging more people of color to join the field. That allowed me to go to the Association of Science and Technology Centers (ASTC) conference for the first time and come back with lots of ideas for educational programming. I started supervising afterschool programs and summer camps and learning more science on the job from PhDs on staff and the curricular materials that the museum had developed.

I called ASTC and asked about funding opportunities from ASTC and the Dewitt Wallace Reader's Digest fund and applied to the "Youth Achievement through Learning, Involvement, Volunteering, and Employment" (YouthALIVE!) program. Part of the solicitation mentioned applicants' need to provide support for young people to go to college. And I thought, wow, why would someone think it's their business to plan the future and get other people's kids into college? Why not give students quality experiences so they could make informed choices for themselves about their future?

Great, how did you approach that opportunity?

So I thought, well, the best thing I can do for ten-year-olds is to help them enjoy school. If I make it about them and their learning when they're in the fifth grade, they'll be more likely to look forward to the sixth grade, and when they're in the sixth grade, to look forward to the seventh grade, etc. Because if you can keep that going by the time they are in 12th grade they're looking forward to college. It's about being an informed decision-maker. By that time I had spent so much of my free time in the summer at cultural institutions I realized the role they had played in developing my own learning. I wrote the "YouthALIVE!" grant like I would a term paper and through my own outreach and talking to lots of parents in the community, I identified a community partner at the Avalon Gardens housing project in South Central LA.

Once we got the grant some of my colleagues at the time told me not to expect regular attendance. But from the very beginning the kids took it seriously and did not miss a day. Not only did the kids want to come, they'd be up really early waiting for the bus. One woman called me and said she had to tell her daughter, no, you can't get out before the sun even comes up and sit out waiting for the bus to come. And the "YouthALIVE!" program involved so much professional development and colleagues who had lots of experience growing youth programs in museums, so

I had lots of resources to draw from. I was having fun and learning. We started out making things like Oobleck and using all of the activities that the Science Center had in their basement. I would read about them, go get the supplies and then teach them the next day.

It made sense from the beginning to only explore things that people had questions about and was fun. And if the experiment didn't work, I'd say, you know, you can learn just as much from an experiment that didn't go as planned. One day one of the kids told me, "We know the reason why you picked us for this program," and I said, "Why?" And they said, "Because we weren't working up to our potential. And only smart kids can study science. And you picked us because we were smart." Those kids became really good students and some moved into a gifted program. I worked with them for six years.

What kinds of things were you observing during that experience?

All through that time I noticed the difference between well-resourced and low-resourced schools. It was in the behavior of the young people and the way the staff interacted with them. Staff interacting with kids of color from low resource schools were very concerned about discipline. You know, "Get in line", "No loud talking". And when I tried to do an activity with them, if I gave them an example, they imitated it. So if I drew a picture, 95% of them drew the exact same picture I did. Then I get kids from well-resourced schools who would build on it, have fun, and come up with some incredible examples of things I wouldn't have thought of.

So I started looking at people's behavior and wondering, "What is the explanation for this?, Who was paying attention to and addressing it?" I would be starving for that information. The "YouthALIVE!" professional development sessions helped me make sense of these kinds of things through exposure to the thinking of scholars like James Gabarino who studied the impact of risk on learning. And I began to think about the developmental needs of young people and how to create the conditions for developing a sense of wonder. I started doing a lot more conference presentations near the end of that time and was offered the position of Director of Community Science at the St. Louis Science Center. That was a term that I didn't completely understand then but over time began to notice that public science meant the traditional audience, who were white, and community science was just another word for people of color, specifically Black people in St. Louis at that time.

And was this when you started the Youth Exploring the Science (YES) program?

So when I first got there, my job was to just build relationships with the African-American community. This was important to the leadership of the St. Louis Science Center. While the Science Center is in the middle of a low income African-American community, at the time they estimated that three or four percent of the people who visited were from the African-American community. I just started going out to different community groups like Girls, Inc and the Boys & Girls Club introducing myself, and exploring what a relationship might look like. That led to the YES program and my first NSF grant (Design It!) where I worked with Bernie Zubrowski and five

science centers where kids [ages] 6-10 explored one physical science phenomenon for six weeks. After that I received another "YouthALIVE!" grant and started working with kids that were part of the Design It! work. That was how I could continue to learn and push on what I was doing and how I was doing it. I started the program with 15 students and when I left we had just gone up to 300. We would bring in 50 new students a year and they would stay in the program for four years.

The science center was connected to a middle school and several warehouses. So we rented one of the warehouses and that's where I did my program. I made myself an office and it also became an informal classroom. As the program continued to grow I went up to the middle school and they allowed us to teach classes in the middle school in the summer. So during the school year, we worked in the warehouse and in the summer, we taught classes at the middle school.

As the program grew and matured, it got more attention and one of the Science Center board members went to Jack Taylor, who owned Enterprise Rent a Car, and asked for a couple of million dollars to rehab another building into a community center. He funded what became our own building about a quarter of a mile from the science center, which was great. It was on the busiest intersection in the city, which meant kids could get there by public transportation. All through this period, the support of the "YouthALIVE!" network of colleagues was key for professional learning.

Was your charge to broaden participation in STEM?

Part of my job was to find ways and incentives to increase the participation of the African-American community. So it was sort of a secondary goal for me, if young people from the community were part of the science center. That in itself I felt would bring more African-American people to the science center. But the thing I did to increase participation of underrepresented audiences -- not just African-Americans -- was to create community science day.

The community would come and share whatever was important to them. If we studied catapults, we would have competitions with catapults. At the same time, we invited scientists and science students who were in college and we made it into a sort of festival. We did one on health and we called it "Bring Your Loved One to the Doctor Day". And we partnered with fraternities and sororities to help get out their communities and find people who are not going to get their blood pressure checked, because hypertension is a silent killer in the African-American community. We brought health professionals to the science center so that people could get their blood pressure checked and discuss what it means if they have high blood sugar or high blood pressure, and things like that. We also created events like "Bring a Book, Get a Book". We went to libraries and asked us to give all the books they were going to discard. Then we went to schools and created this free program like the little library. Kids could come in and just pick books and take them.

What were some of the things you learned from running these events?

It was important that these events became regular, not episodic, because I have found that

people will go to cultural institutions when they have a comfort level with them. And maybe they didn't learn that in a cultural institution. But when you think about our culture, for white America everything is reinforced. So you don't have to learn how to act at a ballet, because you know what to do when you get to the ballet, or to a play, or to a science center, or to a supermarket, or a restaurant -- all those behaviors are very white and reinforced. And when you're white you are comfortable even in a new place i.e. you know you're going to figure it out and be OK. So I wanted the African-American public to come enough times, so that they could take ownership and know that they knew what to do.

And part of this I learned from the students when I first got there. When I found out that the Junior League gave small grants, I asked those first 15 students, "For what do we want to write a grant?". They said that they enjoyed the science center, and they never knew it was free, and that they wanted to let homeless families know this. Their reasoning was that the center was very relaxing, and if anybody needs to relax, it's homeless families. So we wrote a grant to pay for buses and lunches, to take people to different cultural institutions, not just the science center. But the students didn't want them all going through like a big tour group. They said, "That's embarrassing". So we divided them up by families with one teen attached to each family so nobody stood out as a group of homeless people.

It's great to hear how you have continued to learn from and co-create with the participants in the programs you have led.

I have learned so much from the kids in my programs over the years and surfaced things in my practice that were below my level of consciousness. When I was living in LA I went to the zoo a lot and had a membership. So I took the kids in the program to the zoo and when we got back I said let's write a thank you letter to the zoo because they let us all in for free. And the kids said, "We hated the zoo." And I was thinking I was there with you and we had a great time. But I learned you never disagree with their reported experience but you say, "Help me understand." They said, "First of all, there were no Black people at the zoo." Partially based on my sense of my own social class at the time, I didn't always notice that. So I'm trying to think whether there were other African- American visitors, and I don't really know. But the kids seem to think we were the only African-American people at the zoo that day. And the people who met us, who worked at the zoo, the people who sold things at the zoo, the train driver, they were all white. The kids said, "They were staring at us because they didn't want us there." Oh, I see. I realized I wouldn't notice that even based on who I am now, or who I was then. So these are the things you have to notice, think about, discuss, and be very transparent [about].

I had just bought a geography book that came with this inflatable globe and stickers. On the way to the zoo I gave the globe and stickers to the kids and told them when you find an animal, put the sticker on the globe. So we show up with our globe. We were supposed to arrive at the back entrance because we were getting in for free and the first staff we encountered there said you can't bring a ball to a zoo because it might get into an animal's habitat. They told us that if we promise that an adult will hold onto the ball and you will not let it get into a habitat, that we

could keep the ball. But afterwards the kids' said, "They wouldn't let us in the front door and they let us keep the ball because they were afraid of us."

We kept going to natural cultural places and they would become comfortable. And it happened, these kids from public housing started asking to go hiking and to do things like that. I had to take into account that these kids from South Central LA, weren't me wandering all over Pittsburgh as a kid. They may not have left the housing project other than to go to school. And so a theme in all of my work became what are the necessary conditions for different people to become comfortable in a science center? This is something I was always trying to decode.

It sounds like that work expanded and manifested in innovative ways in St. Louis?

Yes, and 17 years later the YES program lives on. It has financial and community support and the organization realizes that the program is one of the key reasons why people fund a free science center. In addition to the Taylor Center, they have an acre of land that Anheuser-Busch donated where the program participants practice urban gardening similar to what I did in Philadelphia in 4-H as a kid.

And now you are at the Detroit Zoological Society where you are in charge of programming for people of all ages.

Yes, we have dedicated programming for two-year old's, called Zoo Tots, to seniors. We think about programming in terms of abilities. We ask, "What does a person need to know? and What skill do they need to have in order to be successful in this program?". We have a program for all ages and we try to meet the needs of lots of different abilities, experience, and knowledge levels, e.g. we have a group of adults who are dealing with Alzheimer's.

Given the variety of programmatic leadership roles you have held and your lived experience as a Person of Color in this field, what are your observations about our progress around diversity, equity, access and inclusion? Have you seen movement?

My first honest reaction is that I do not. I think the way we think about race and systemic racism is still too superficial. It was when I came into the field and it still is. I think it's a hard conversation and so it's not often discussed at a sufficient level of depth. And when you look at who mostly works in cultural institutions, it hasn't changed enough. Most people of color in the field know each other and we compare notes when we meet at conferences. But it hasn't changed as far as employment and strategy, and more programs than not are one-offs. You know, that's where the career access program I mentioned earlier wasn't a leadership program, actually. The goal of that grant was that there weren't many people of color working at science centers. And one of the reasons was that people get jobs based on their sphere. And if Black people don't know Black people who work at science centers….

Are there any bright spots lately where you've seen, potential or hope where somebody or something feels like it's going in the right direction?

I went to the #InclusiveSciComm symposium last year and I felt like I was out talking to people about a topic that's important to me. We pushed each other to think and talk about important topics including race. When I was going through the poster sessions I stopped and talked to a young Asian-American man whose interesting project was focused on training young educators of color in the Bay Area about health issues. And while he is telling me about different aspects of the work he says. "But there's a part of this project that makes me very uncomfortable." And I asked what that was. He said, "I feel like in order for students to participate in this, I must teach them to code switch, and I'm not comfortable with that." And I haven't been able to get that out of my head. I began wondering, "Have I been teaching my students to code switch this whole time?" For now, I would say that I am not code switching. I grew up in a family where this is just me. In all of my work I have tried to help my programs' participants thrive through communication that is appropriate for the contexts they find themselves in. Is that code-switching, or just appropriate behavior? But it also raises the question of what a truly inclusive workplace would look like.

Indeed. To switch gears to the COVID-19 crisis for a moment, it and the systemic racism crisis have resurfaced deep inequities in our society. They have also impacted cultural institutions and informal learning settings in profound and varied ways. What have you been observing and what do you think we have to learn?

I think we really have to think of these crises as opportunities and to rethink what we are doing and how we do it. So when you think about systemic racism, right at the very core is our education system. It's one of the key contributors to many of the problems going on in this country. Now you've shut schools down and you sent kids home, and some kids have computers and some kids don't. But here in Detroit, it turns out it doesn't cost that much to give every single student a computer and a WiFi connection. But is that going to solve the problem?

So rather than saying that we have an education problem because some kids get to go to school, and some kids don't, why don't we say, if we're going to be doing this virtual learning, we have an opportunity to look at what kids need to be successful. Then we can bring those resources to them from anywhere in the world. We can help them construct a meaningful education that fits them, instead of giving people more of what they had in the past. But you can't just give someone a computer who has had no access to technology and expect them to maximize it.

How are you thinking about this in your current work?

At the Zoo we are currently working with out-of-school time educators to conduct workshops that explore the developmental needs of young kids, how learning happens in out-of-school time. We want to identify the resources that exist and where there are gaps. So again, I look at the pandemic as an opportunity to do what we do in a different way. To really look at what the

barriers are and how we can create new, robust learning environments where people thrive. But access to information is one thing that I think we could and should address in a new way, because we have multiple communities.

When I was in St. Louis, I introduced [Khan Academy](#) to my program participants because they needed all those classes to get into college. One kid came to me and he said, "You know, the good thing about this is, I don't have to depend on my teacher's communication style to pass this class." And now there are so many more options for online learning.

Shifting to systemic racism in particular, as an informal STEM learning resource center, we have been asking ourselves what our role is in acknowledging and addressing the current social justice crisis, and whose voices are we going to lift up and call on at this moment. What have you been thinking about, is the role of a zoo or informal science education?

That's a hard question. I wonder if we have the ability and the will to be honest and have authentic conversations. And would that make a change? I would say that the people I know are wanting to have these hard conversations but I don't know about the general public. Somedays I am very optimistic. The recent removal of, and controversy around, Confederate statues. We should be having the conversation about Confederates as traitors. That should have been in the history books. It's never discussed.

And why do we have this one narrative about slavery? There were millions of slaves. Why don't we know some of these conversations? We wouldn't even need to eliminate certain things, if people knew the whole story, I think we would make different choices. For cultural institutions to acknowledge and discuss that a natural history museum and a zoo once had people in them as exhibits. Another example is that a local art museum here acquired a Gauguin painting of a young Tahitian girl. A staff member went to the leadership with the complaint that the label that accompanied the painting did not acknowledge Gauguin's well-documented exploitation and abuse of the women he painted there. The museum responded by adding a sentence to the label. We need to open these conversations up about uncomfortable truths.

And it's not about blaming, but that everybody should know that people make mistakes. Someone once said, "You know better, you do better." What better places to have these conversations than in cultural institutions and places of learning? But we need more than little bits of information. When you think about natural history museums and about classification in general it really supported racism. It was often about white people putting out this array of stuff and making some things more important than others. Some things are at the top and somethings are at the bottom. These are the types of decolonizing conversations that we need to have.

Right. I hear you saying that this is a perfect moment, especially in the sector that you've been working in for a long time, i.e. cultural institutions, when they can be a forum for that and to actually pause. That is, to not do business as usual as if STEM, or art, has no cultural baggage or history?

Well, it's like that exhibit Mathematica, the one by Ray and Charles Eames, that traveled around. Someone once said to me, "Well, one thing you can say about this exhibit, there's no racism in it." And I said, "Look at that wall of famous mathematicians." You have these big portraits of people like Newton and others. But look at the beginning wall where it talks about the origins of mathematics, and there are no people. Instead there's a symbol that represents Egypt, the size of a postage stamp. I said, "That's racism." You have minimized the contributions that these Western people built their knowledge on. And you start with their knowledge. So we need to look at every one of those things and look at how we continue the false narrative.

Do you think there's the potential for us as a professional field, on the other side of this, with more awareness and better practice? It seems like it is a rare moment that may not come again.

I think there is if we have the will. I think it only takes will. Otherwise I think we have everything we need. We go back and we have this circle of learning and creating new knowledge. And there's lots of ways to do that, right? But, if we are going to broaden the participation of underrepresented individuals and groups in our field, we can't bring them in and beat them up at the same time. I've been to meetings where people were in tears about how they were being treated at their cultural institution. And it's good to see that people are feeling more empowered to speak out about the aggressions that they have experienced.

You have mentioned some people and resources that you've relied on in your own professional practice and learning that have been touch points or influences. Is there anyone or anything else that you found helpful or comforting over the years?

One of the things I would like to explore further is designing programming that draws on the "situated learning" research of Lave and Wenger. To me, it's about that intersection we have with each other. For example, if you have all these kids living in the Hill District of Pittsburgh and they never get to interact with or go through the Carnegie Natural History Museum, they're not going to think about it. Joe Polman and I wrote an article together on thinking differently about cultural institutions. We asked what science culture looks like inside these places. And we used the example of the YES program in St. Louis, which was about having people try on identities without ever giving up their original identity. You have to create a safe place where, as a young person, you can ask questions, organize information, do these experiments, and apply your new knowledge.

Currently I keep in touch with a variety of colleagues but I would also say that I'm more

overwhelmed than I've ever been in my career. Especially with these two crises coming together and being in Detroit away from my daughter and grandson. And so sometimes I can't gauge my reaction, like if it's over the top or just too subtle or whatever. And so I'm in this unfamiliar place where I feel like I'm sometimes hesitant to reach out to others.

"Overwhelmed" is a word that we have heard a lot from leadership across our field. Dealing with safety, the economic impacts and the resulting reductions in staff. Some institutions have opened and then had to close again. I understand that the Detroit Zoo has been reopened since June 8th?

We started with 1,000 people a day, now we have been getting as many as 3,500 people a day. We've also had a [Virtual Ventures](#) series of activities running through the summer for online learning. We're very large, we're on 125 acres and we are doing timed tickets. We have expanded individual habitats, e.g. the gorillas have four acres, the polar bears four-and-a-half and the wolves two acres.

People seem to appreciate walking around the zoo and report that they feel safe here. Most appreciate the mask wearing although in Michigan you are allowed to take it off, if you're outside. But we have staff posted around the zoo so that if you walk up to tigers for example, and a group of people get in front of you, they remind you to put it back on. And we haven't had any incidents like you've been reading where people are doing stupid stuff. They may bicker about it but we haven't had to ask anyone to leave.

Does the zoo have plans to do any programming around anti-racism?

We have been meeting about putting a responsive version of our diversity statement at the entrance. In the past we have people coming on site and posting racist things like how to join the Klan in the restrooms. But Michigan also varies widely in terms of diversity and politics and we are 810 miles from urban Detroit. Like others, we are still navigating our responses to evolving events in ways that we hope will make all of our community feel welcome and safe. We are looking at all of our operations and procedures to see if there are areas we need to make changes.

Any additional thoughts about how the field overall can be more equity-centered and broaden the participation?

Well, when you think about it, people of color and people with different abilities are such a huge population. If we really want change, we need more people to care and participate. We need opportunities to spend time together and get to know each other. And there are lots of examples of excellence and they don't get duplicated as often as they could, you know?

In my work with youth, I have always tried to provide borders for thresholding new experiences. You can't just engage a conservation scientist and invite program participants to go out in the field with them. There are so many ways you can set people up for failing. I always tell people one

of the reasons I still have such discomfort with anything outdoors, any sports, is that spending two weeks in the Poconos mountains at a summer camp as a young person was not enough to help me develop that.

This idea of borders has been a theme throughout our conversation today.

I didn't come up with that term. I learned it from working with Joe Polman. In the cultural institutions I have worked in I have tried to create a borderland where you can try things on. So you try on camping, but you don't have to become a camper. You try on what it's like to be smart. You try on what it's like to be playful or curious, what it's like to be a good employee. You try OUT these behaviors and you go in and out of the circles.

At the zoo one of the things we've been very conscious about is we weren't as intentional as we could be about the images that we were showing in our work in science. We have a whole literature section where we read children's books about nature and animals. And so we started looking for books written by African-Americans or other people of color. There are very few. So another thing that we're doing whenever we highlight the work of say, a conservationist in the Amazon on our website, we also show the young people who live in that area who are working with them. So it's not just the white scientists going into that area who get credit, but as many of the local people who live in that area as well. We bring those images to the forefront.

Thank you so very much for speaking with us. It has been a pleasure and privilege to learn more about your work and your thinking.

You're welcome and thank you. I enjoyed this because I guess maybe I did need to talk and express some things that I have been thinking and feeling.