

An Interview with Smirla Ramos-Montañez

[Smirla Ramos-Montañez](#) was interviewed by [Kelly Riedinger](#), Senior Researcher at Oregon State University's Center for Research on Lifelong STEM Learning. Dr. Ramos-Montañez is a bilingual (Spanish/English) and bicultural (Puerto Rican/American) researcher and evaluator focusing on culturally responsive studies related to informal STEM learning. Dr. Riedinger conducted the interview as a member of the Center for Advancement of Informal Science Education (CAISE) task force on evaluation and measurement.



What led you to studying identity and including that concept in your work?

I am fairly new to the field. I went to school to be a microbiologist. I had been working as a postdoctoral fellow in a Microbiology lab in the University of Washington in Seattle and in 2014, I was making a big transition when I moved from Seattle to Portland. I was thinking about what I wanted to do with my professional life. I was really missing having contact with people. Thinking about my research, I wanted to have more of a direct impact. I knew that maybe 20 years from now, somebody might find something that might be interesting, that might lead somebody to work on medicines or cures for different diseases but it was not satisfying. That's when I discovered the field of informal science education, which I didn't even know existed. I was super excited. I jumped right in. I started working at the [Oregon Museum of Science and Industry](#) (OMSI) and then I was pretty lucky because I immediately joined a variety of research projects. I was doing both research and evaluation.

One research project was called [Designing Our World](#) (NSF #[1322306](#)) and it was about engineering, and it had this STEM identity component to it. It changed my life. I started thinking and reflecting about my own identity as a first-generation college student. I was the first in my family to go onto higher education. First in my family to even think about getting a PhD. I grew up in Puerto Rico and here I am a person of color coming to the United States to work on a PhD. [My experience and the project] helped me to think about the participants that were in the program and how their experience in the program was very similar to experiences that I've had. And I think I was able to contribute a different sort of lens to the project and the research. We looked at the data that we were collecting and conducted the analysis in Spanish, as opposed to through a translation. To be able to not lose that context when we

were studying identity was so important. From there on, I became interested in questions like: How do we conceptualize identity? What are some of the important aspects that we need to consider? What's the experience for students of color engaging with STEM? That's what sort of started the process. I was pretty lucky that I came in at the beginning of the project. It was a five-year project, so as the project grew I felt I also grew leaps and bounds over that period of time.

I had been thinking a lot about conducting research within the education system and with families. However, it often takes a very deficit perspective. In some ways we are trained as researchers to talk only about problems and frame our work as interventions that might fix someone's perceived deficits. It's a very limited and constrained view of individuals and communities. I think for me, my work has highlighted that we need to use a more [asset-based perspective](#). So what does an asset-based approach to research look like? What do we have to do to make this shift? Often learning experiences prescribe the way that people engage with STEM. When we talk about achievement gaps, we describe "leaky pipelines" especially for people of color. But we kind of fail at talking about the different ways that people engage with STEM in their lives and how systems should change based on how people currently engage. I think the work that I want to put forward now is trying to dive into those narratives of engagement for people of color. How can we help change unjust systems and transform education? Rather than say this is why we need these programs -- because there's an achievement gap -- we need to talk about how families and youth are engaging with programs in a way that empowers and uses their strengths and assets.

How do you define asset-based and deficit perspectives in your identity work?

I think in a deficit perspective, we normally talk about the things that people are lacking or skills that they don't have that prevent or create a barrier for them to engage with STEM. We talk about test scores being low, a lack of math engagement, and missing or underdeveloped math skills. We don't really talk about the strengths that people and communities possess and how we can continue building upon those. It is often the case that families engage with and have a wealth of experience related to math but it is not recognized as formal or academic math. Family members might work in construction, they sew or they garden. All of these are funds of knowledge. They are skill sets that they have that they're bringing into the education system. It's our job and responsibility to bring awareness to these funds of knowledge and engage individuals in a way that we can continue building on their strengths.

In [STEM education], we're used to the deficit perspective. When we're writing grant proposals or thinking about writing a journal article, we work hard to communicate a need, not strengths. We want to state, why is it that we need this money or why our work is important. We've been trained to use a deficit perspective. I think we need to question our approach and be aware that in fact there are serious problems but also there is a lot of strength, resilience and assets in communities that haven't been tapped into or built-on because we always talk about problems. Our work should affirm communities' strengths and build on them.

What is your working definition of identity?

In our work, we've taken a situated perspective on identity. What that means for us is that we think about identity as actively negotiated in a variety of social interactions and contexts. I think we have added this concept of [activity frames](#) or situation definitions to it so that we can understand and talk about what are the complex social interactions, cultural aspects and historical contexts where the negotiation is taking place. We specifically look at the way that youth between the ages of 9 and 14 are constantly negotiating their identity within the context that they're in. How can that process be influenced by their interactions with other people, adults or peers? In other words we think about youths' identity as emerging from an ongoing process of performance, recognition and positioning by others during social interactions.

Can you give an example of activity frames?

Our conceptualization of identity is fairly similar to what others in the field are currently using. I think what we're bringing in is that we're trying to look at that identity in a different context that might not be what context other people are focusing on. We are focusing on informal engineering education programs to explore how youth are negotiating their identity within that context. I would say that when we talk about STEM identity, a lot of people are using science and in many cases they tend to think that identity equals STEM identity. And for us, it's really important that we look at the way that youth engage in other domains that are part of STEM and that we look at it outside of the formal classroom.

I think while the conceptualization is similar, bringing in activity frames and thinking about the context allows us to describe some of the complexities surrounding and shaping identity development. The term activity frames has been known as situation definitions in the social linguistic background. It refers to the emergent understanding or expectation about the nature and goals of an interaction within a specific situation or context. For example, if I'm here with you at this interview, I understand that this is a professional interview that will be published and accessed by a variety of informal education professionals. Therefore I'm going to behave in a way that fits my understanding of a professional interview. If we were meeting outside for a picnic and it was a more social interaction, then there are certain things that are definitely more acceptable in that situation versus a professional meeting. We know that when kids are part of different programs or when youth are attending after school programs, there are a lot of ideas about what the activities they are engaging with are about and what the things are that are happening in an after school setting. We know maybe there's a little bit more access or we behave differently after school but the experience is still within the school. Are we supposed to raise our hands? How do we understand the activity? Is it going to be a collaboration or is it going to be competitive? Am I going to raise my hand to contribute to the opportunities that I'm presented with? Or am I just going to blurt out whatever I think? We know that the negotiation of those understandings impacts the way that youth negotiate their identity.

How do you distinguish or not between a [STEM interest](#) and a [STEM identity](#)?

This is an interesting question because I think sometimes there can be some real clarity between interest and identity, and sometimes the situation becomes kind of hairy because you can see connections between identity, interest, engagement, motivation, self-efficacy, and how all of these things are feeding into each other. It can be hard to separate. I feel like in order for identity negotiation to take place, there has to be an interest -- at least an initial one -- in engaging with the context that we're studying. I think that interest is part of identity, it can definitely shape identity. But identity is a bigger construct that includes self-efficacy, awareness, knowledge, and engagement. I think that there are identity aspects probably tied closely to interest but we're not designing studies exploring the direct link between interest and identity. We know that they're related, and that relationship can be hard to tease apart. I think in projects where we're looking at interest, identity plays into it. For example, in [Head Start in Engineering](#) (NSF #1515628) we are trying to better understand the ways that families develop interests in engineering, how that interest persists and evolves and how we can support it within different systems or structures. In this project we are not researching identity but have been able to observe that families in the program start seeing themselves as individuals that engage with engineering in their daily lives and that awareness contributes to their interest in the program and engineering.

How does your work, and the projects you've worked on, build off or extend other people's work on identity?

Our work aligns and extends [Heidi Carlone](#) and Angela Johnson's work. I've learned so much from all of the work that they have done. When we started looking at identity, we started with the model that they had put together with where they looked at performance, competence and recognition. That was the foundation for us to think about identity. And then we've continued to expand from there. We recognize that identity is formed and negotiated in specific contexts, that expectations related to goals and meanings within those contexts are going to influence the way that identity is constrained or afforded within that setting. We know that certain situations are going to make that process of identity negotiation more salient.

I think we've continued to develop those ideas and we've brought in other ways to help us look at that process. We took the Carlone and Johnson model and expanded that to build our own model, called the [identity frame model](#). We've brought in this concept of activity frames and thinking about how we're using those to explore expectations for the activities and the goals and what it means for youth. In that sense, I think their work was really foundational. And we've continued to think about what that process looks like, especially in an informal engineering context.

In what ways do you think identity matters for science learning?

I think about this in different aspects of my professional career. I work for [TERC](#) but I also am a

biology professor. I think that identity is a critical component of interest, [engagement](#) and learning. And I've been thinking, what does that really mean?

In order for people to develop their identity, they have to engage in a variety of activities. They have to build their capital. And I think that for me as a professor, when a student comes into the classroom, I want them to think of themselves as somebody that can do science or engage with science. Not that they have to be a scientist because I don't think that has to be the be-all and end-all goal for people. Especially when we think about STEM engagement, the most common argument we make is around careers especially for underrepresented groups. It's a valid argument but I don't think everybody has to be a scientist. I think allowing students to see themselves as people that are confident and can engage with science is most important. And so I think, what are the ways that I can do that in my classroom?

In terms of research, when I wear my researcher hat, I have to be able to describe the way that youth and families are engaging with STEM so that we are aware of what that looks like and we can understand how we can build environments that can support that engagement. I think that identity is an important part of science learning. One goal is for science to be accessible. We want to support empowerment -- that belief that anyone can do STEM or STEM is something that I can engage with -- so that they can expand their capital and they can learn about it.

When I use the term capital, it's about building a series of experiences that I can access and that can provide me some benefit in the future. I'm interacting with people and I'm learning as I go. And those are things that I'm taking with me. I'm building my capital and my capital might be in different aspects, like it might be cultural capital or it can be funds of knowledge. It's all part of those experiences. When we talk about underrepresented groups, the argument is that we have to "help" people build capital because they may or may not have access to the same things that their peers have access to. Again, sometimes we can take a deficit perspective but I think that it's important for people to build experiences that they can access and they can leverage as they move forward.

How are you currently measuring and assessing identity in your work? How similar or different is your approach to others in the field?

I would say that we have been using a grounded theory approach. We have focused on developing a framework that can help us account for the complexity of moment by moment interactions in whatever STEM learning context we are looking at. But that also acknowledges both agency and the structural aspects of those interactions relative to identity. We have used in-depth qualitative studies and we started developing a set of codes that we would apply to our data. For a lot of our work, we video record the interactions the kids are having in the program that we're studying. Then we create a coding framework that applies "micro codes" that look at specific behaviors that are happening moment to moment for each youth. For youth that are working together, we know that we're going to have to watch that video over and over to apply those codes for each youth because there's no way that we can capture everything that's

happening at once. We apply those micro codes and then we apply this other layer of macro codes. That allows us to look at full video segments and think about what's happening at a broader scale, in terms of engagement or in terms of behaviors. We take all of that and we write summaries. These descriptions of the sessions allow us to know exactly what's happening at that particular program activity. And then we write some narrative style profiles for each of the youth, so that we can describe what their identity negotiation looked like at a particular session. And then taking all of those sessions that they participated in and describing a bigger picture of engagement for them during that time. It's a lot of work and time. But the good thing about it is that we are immersed and become very close to the data. Then we're able to see emerging themes from the data. It's powerful to see these moment by moment interactions create a broader picture of engagement and identity negotiation. It has been beneficial to focus on that micro analysis.

We haven't had the opportunity necessarily to explore identity negotiation patterns over time. We have a good and in-depth view of what it looks like for a youth to engage in this program in terms of identity for six weeks or up to three months. However we don't know what impact that particular moment had across their long term identity or what patterns remain, what changed and what identity looks like over time, which I think is really critical. And it's something that we're hoping we could do with other work where we can do longitudinal studies.

Please give some examples of macro and micro codes that you use in your work.

In terms of micro codes, we're looking at identity bids. When a youth does something, they're often claiming something about their identity. We are highlighting when those actions take place, and then we look at the response from peers and youth to that particular bid, recognition by others. Was it supportive? Was it negative? Was it a neutral reaction to that particular claim? We sometimes can't tell exactly but it's allowed us to explore that idea. The other micro codes that we looked at were youth response to failure. We identified it as a critical moment for identity negotiation, where now all of a sudden there's a lot more identity work happening when they encounter failure. What's their response to that? Are they productive in response to failure? Where are they continuing to engage? Are they just giving up? Are they putting the blame of the failure on a peer, on themselves, on the activity? We want to try to describe how they engage in the activity in terms of identity. For macro codes we are thinking about general engagement. Were they being responsive? Were they actively participating at that particular time? How was their overall engagement?

What advice would you give practitioners who are trying to integrate your findings about identity into their work?

We've been thinking a lot about this connection between research and practice. I think many people want to make their research more accessible to practitioners. We were lucky to be working with a program team and creating those programs alongside the research so we had the

opportunity to really think about what that looks like. If I put on my educator hat, when researchers bring out findings, it can be really abstract. So in my work, I think about how I can take those abstract concepts and turn them into more concrete and actual strategies that I can employ. For us what was really important was thinking about reflective practice. That would be my biggest suggestion to practitioners out there, just realizing the power of reflective practice.

For us to do that, what we ended up creating was [a practitioner tool](#) for reflection. In that tool, we explain some of the concepts that we thought were important for identity negotiation based on our research. We've created a one-page summary of concepts and we decided to work with practitioners to illustrate that with examples. So we included some transcripts from our research. And we work with practitioners to go through those transcripts and practice noticing. That's the first step. What's an [activity frame](#)? And then second, what does it look like? Here you have a transcript. Let's read it and discuss it and think about what are the activity frames that are coming up in this transcript. So I think start slow, think about noticing things first. Once you notice those things, then we can move on to thinking about exactly how it is that we want the programs to go. What are the activity frames that we want to be part of that particular program and what might be some indicators that we want to use to determine if our goals are being met? For example, if you want to frame your activity as collaborative, you want everybody in the activity to think that they have to work together. It's not a competition. Then what are some of the indicators that might come up? Well, you might see people using "we" language, instead of "me" or "I". You might see people sharing their materials rather than trying to compete to get the best materials. I think starting with learning to notice is important. And then we can build on what it is that we want to happen within the space that we have control of.

How would you situate your work in the current field of identity research in informal science education?

I think our work fits in with a lot of the current understanding of the [situated identity](#) construct. We are trying to make it a little bit more concrete, like we're bringing in ideas to explain some of the complexities around looking at identity and it's situated context. And so it's been really important for us to bring this situation definition or activity frame lens into it to think about the complexities that are happening in the programs. To do that we added examples of what that looks like in an informal science learning context. I think that we are connecting to a lot of what others are putting out there. People are interested in looking at informal science education because it definitely is a very different context from formal education. People that engage with informal science education have more choice about what they do and what they engage with. It's a context that I think is really important and sheds some light on how STEM identity is formed.

How do you think the COVID19 pandemic will or will not change your research?

It's an interesting time right now. We're all being overwhelmed by distance learning at the moment. It's been really challenging to work through what that looks like. And it looks so

different across the nation. A [Spencer Foundation](#) proposal that I put together was specifically trying to understand this. What are the strengths and the challenges of immigrant Spanish speaking families with young children? I think we are really missing some perspective. And distance learning has prescribed these ways that we're supposed to engage with education, which I think, are not based on thinking about what families are bringing or valuing the learning that happens at home versus at school.

I think we're starting to understand a little bit more about what learning looks like within this context. I'm wondering what it looks like in terms of identity. I think it's important to consider individual identities but also the family as a unit. That has sparked some thoughts about how I approach identity because usually we have been looking at an individual's identity but now we're spending so much time in groups and there's so much influence in a family unit. What does that look like across time? We haven't looked at that before. If we're looking at the family as a unit, as a family system, it's critical to understand how those relationships and interactions can shape identity development. Right now because of COVID we're going to be in situations where we are around family or a group so much more of the time. I think my identity, or the way that I act with my family, is probably very different from the way that I act with a group of professionals or the way that I act with my students. There's just a lot more at play at the moment.

How would you say that current social justice demonstrations have influenced your work and thinking? How do you move forward in the future with identity work with social justice in mind?

Changing the system. There's prescribed ways that we want people to engage with content and build their identities within different spaces. I think that now we're thinking more deeply about what those systems look like and how we can disrupt them or rebuild them in ways that we don't ask people to compromise who they are in order to gain access or engage with the world. In our work, we're really interested in equity and diversity and inclusion. I would say we always try to make this central to the work so we've been thinking about this for a long time. It's hard work to do and I question myself all the time, my intentions and outcomes of the work. Currently I'm excited about the multiple perspectives that are coming out, the communities that are sharing their experiences and I would like to contribute to disrupting unjust systems.

I always think about empowering the families and youth that we work with. I think through our work, we're trying to show narratives of engagement. The way that they engage with the content to amplify their voices and their experiences. My hope is that now we can think a little bit more about the importance of bringing community in and starting from a community space, rather than us thinking about what our research questions are in a silo. We continue to think about community-based participatory research or in bringing in and really working closely with communities to establish their priorities, what they want to do. So the research can start from that place rather than us coming with a specific set of questions and things that we want to do and then work with communities to answer those. I think the field has to be responsive to

understanding what are the needs and what are the strengths of those communities that we want to work with. That means letting problems emerge from the community rather than saying this is a problem we're going to fix. That takes a lot of work and it takes a lot of time. Academia sometimes does not let us start from that place. But I think we need to continue to push and start from there because we want the research to have an impact and to support empowerment. We don't want to come and tell the community here are the things that you need to fix and we're here to help you fix it. That's a totally wrong perspective to have. And it might be unintentional but it still happens. I think that it's a prime time right now to really think about community-based participatory research and working closely with our communities to see what it is that they want and what they need. It takes a lot of relationship building to get to that place but it's worth it.

One thing that I've noticed recently is this idea of [STEM ecosystems](#) and thinking more about the systems that are around that can support identity development. What are the connections that we can make across the context where people are engaging to support STEM identity development? I think there's a lot of work that people are trying to do in that area. And for me, it's really important to think about the questions that people are bringing up rather than what researchers are prescribing? How can we help change that consistent deficit narrative that's happening? And what does that look like for STEM identity?

I think that we've always talked about reform but continued to work within the system in place. I think right now the question is, how can we change the system rather than keep working within it? I want to be optimistic about it. We're kind of primed to do some of that work if we really put in the effort and the time to do it. Our work can empower people and create space to talk about narratives of engagement rather than another deficit approach.

Are there tools for practitioners that you would recommend?

Yes, the [STEM identity tool](#). It's really nice because it brings this abstract sort of concept of activity frames into a way that, you know, I think practitioners can apply to their practice. By the end of [engagement with the tool], you have a more concrete idea of what it is. In the work that we have been publishing, we've been focusing on using transcripts from the research to illustrate our work. It has been helpful, but even then, it can be challenging to think about and can be confused with planning goals for the activity. I think it is related, of course, if you want the activity to be collaborative, that should be your goal. But it's understanding that even though that's my goal and I create the activity with that purpose, the people that are participating in the activity might have a different understanding, maybe completely opposite of what I intended my activity to be. The tool takes you through a couple of examples and then it lets you think now of what you want.

I've used the tool myself as a professor in my discussion-based classes. I've used it to think about, well, these are the things that I want my discussions to cover, and this is how I want my discussions to go. Now, what are the things that I'm listening to and what are the indicators that tell me how discussions are going with my students? I think the tool can span multiple disciplines.