Episode 134: Michelle Covi

# KL: Katie Linder

# MC: Michelle Covi

# KL: You’re listening to “Research in Action”: episode one hundred and thirty-four.

# [intro music]

# Segment 1:

# KL: Welcome to “Research in Action,” a weekly podcast about topics and issues related to research in higher education featuring experts across a range of disciplines. I’m your host, Dr. Katie Linder, research director at Oregon State University Ecampus, a national leader in online education. Along with every episode, we post show notes with links to resources mentioned in the episode, a full transcript, and an instructor guide for incorporating the episode into your courses. Visit our website at ecampus.oregonstate.edu/podcast to find all of these resources.

On today’s episode, I am joined by Dr. Michelle Covi, an assistant professor of practice at Old Dominion University in the Department of Ocean, Earth and Atmospheric Sciences and a Virginia Sea Grant extension partner. She conducts research and outreach activities for climate adaptation and coastal resilience efforts for Virginia with an emphasis on Hampton Roads.  Her research areas include sea level rise and resilience risk perception and communication, public participation in adaptation planning processes and engagement/outreach practices. She co-organizes the Hampton Roads Sea Level Rise/ Flooding Adaptation Forum, a quarterly meeting of adaptation stakeholders and co-chaired the Citizen Engagement Working Group of the Hampton Roads Intergovernmental Pilot Project She completed her doctorate in Coastal Resources Management at East Carolina University, where her focus was on sea level rise risk communication and policy. She has a Master’s degree in Marine Science from University of Georgia where she studied salt marsh ecology.

Thanks for joining me, Michelle.

**MC:** Thanks so much. So glad to be here.

**KL:** So I'm really interested in your research on sea level rise and I'm curious first what led you to research in this particular area?

**MC:** Well I started out doing research in salt marsh ecology and I was really interested in salt marshes but as I had done more research I came to understand that the sustainability of salt marshes and the management of salt marshes really didn't have so much to do with understanding their dynamics as understanding how people interact with them. And so one of the biggest threats to salt marshes is sea level rise and how humans interact between sea level rise and salt marshes. And therefore I started to look at how people looked at the perception of risk associated with sea level rise and that got me back into kind of an interdisciplinary approach to looking at sea level rise and its impacts on both the ecology and the coastal communities.

**KL:** Okay so I'm curious for people who may not know, can you describe a little bit about what salt marshes are where you typically find them?

**MC:** Right, so salt marshes are found on low lying coastal regions in the temperate zone so they are all along the East Coast and the Gulf of Mexico and the United States as well as smaller salt marshes are also found on the west coast but mainly between the zone where you would have mangroves which would be in sort of tropical or semi tropical areas and it has to be coasts that are sort of muddy rather than Rocky.

**KL:** Okay, so I think many of us have probably heard of sea level rise and that it's happening. I'm really curious though how do you measure it? This seems like something that might be kind of difficult to track.

**MC:** Well actually measuring water level is something that we have been doing in ports and cities you know for almost 100 years now and now primarily for navigation. So the National Oceanic and Atmospheric Administration has a series of water level measurements. This allows boats to come in and out and their interactions with bridges and things like that depending on what the water level is according to the tides. So that's the main way that sea level is measured in real time now is with these tide gauges. The tide gauges, however, weren't designed to measure sea level rise long term because they move with land movement as well. So now we also have satellites since the 1990s satellites have been have been developed. That data has been developed to look also at sea level rise. So, and then, if we want to look at sea level rise over geological time then you have to use different kinds of proxies and look at the locations of, you know, fossils and those kinds of things. But in real time the way we measure sea level right now is with the tide gauges.

**KL:** Okay, so I'm curious if you can talk a little bit about why sea level rise matters and this is something that you know you mentioned with kind of navigation being a key issue that we need to kind of keep an eye on this. What are some of the other things that it's impacting maybe other environmental factors or other reasons why this is really important for us to be looking at?

**MC:** Right, well you know sea level rise really matters in a lot of our coastal cities because it's affecting people. It is a huge factor in contributing to flooding in many of our coastal cities. They are experiencing sort of what they call, “sunny day flooding.” So these are tidal flood events. When we have these high tides that impact roads and bridges, and all kinds of different areas and potentially homes, the homes tend to be impacted more when we have a storm. So any time there's a storm coming through a coastal community with that higher sea level that means that, particularly here where I am in Hampton Roads, we've got a very high water table. We have a storm waters system that is designed to drain at a lower level of sea level than we have now because we have a 400 year old city. So over that time as sea level rise is changing basically our storm drainage system is no longer working so if we've got heavy precipitation things just can't drain the way they used to. So in Miami, for example, they're putting in huge pumps to pump the water back off their roads and out of their city because of sea level rise. So it’s affecting people, but it also affects the environment. It reduces areas of salt marsh especially in those places where salt marshes cannot migrate because there's something behind them there's a slope or there's development behind them and it can potentially also affect drinking water sources through intrusion into the aquifers and it can affect things like agricultural fields which could also get salt inundation which means they would no longer be productive.

**KL:** Okay, so I think a lot of us have probably heard about sea level rise in the kind of larger context of global warming, but I'm wondering if you can talk about some of the factors that we know are maybe impacting sea level rise. I mean, is it truly just the global warming phenomenon or are there other kinds of things that are causing this to happen?

**MC:** Well sure so, global warming is the big factor when seas are warmer, which you know 90 percent of the heat of the earth has been absorbed by the ocean. So when those seas are warmer that contributes to a greater volume of the ocean. Plus we have a greater volume because of all the ice sheets and glaciers any ice that's on land that has that has contributed to greater volume in the ocean. But we also have these hotspots of sea level rise. So depending on the relationship between the water and the land places where the land is sinking have greater you know relative sea level rise in their particular region. In Hampton Roads in Virginia, our urban area has the highest rate of sea level rise on the East Coast. So that's because we've got a factor of land sinking that's greater than other areas on the East Coast and then the third contribution to its currents, and so currents can also affect how much the sea level rises and we've got the effect of the Gulf Stream. So when the Gulf Stream slows because Virginia is in close proximity to the Gulf Stream, we also have a resulting rise on our shores of sea level. So it kind of goes down a little bit offshore and it comes up closer to closer on land.

**KL:** So I'm really curious, Michelle, what are some other kind of, I guess we could call them hot topics in sea level rise research? What are the areas that are really getting a lot of attention in terms of trying to figure out either the why of this happening or maybe what to do because it is happening? What are those areas that are pretty popular in the field right now?

**MC:** Right, so the big question in the in the why area is about the currents and how much that contributes to sea level rise. And, in fact, that's the one of the biggest topics that scientists are looking at is how much it will rise in the future.

**MC:** So trying to model what the future rise will be so that in turn our cities are using that information to plan for the future. They're looking at what do we need to do in these areas that are already getting risk of flooding now. How do we continue to live in those areas? How do we look at how we live in the future in those areas? How do we use our lands that we have already invested so much infrastructure in to be able to live there and then also on the other side you know what does it look like for our estuaries? What does it look like for our seafood industries and for other areas that are going to be affected by sea level rise? Sea level rise in that case is only one effect of climate change. There are other you know other impacts that they need to look at. It's a pretty complex picture.

**KL:** It sounds incredibly complex. Okay so, we're going to take a brief break when we come back we're going to learn a little bit more about Michelle's work on sea level rise. Risk preparation. Back in a moment.

**KL:** The “Research in Action” podcast is just one of many projects we work on here at the Oregon State University E-campus research unit. A project I'm particularly excited about is our OSU E-campus Research Fellows Program, which funds research for Oregon State faculty that is actionable, impacts student learning online, and encourages the development of a robust research pipeline on online teaching and learning at OSU. Recently our first cohort released a series of white papers on methods and designed for distance education research. See the white papers at Ecampus.Oregonstate.edu/white-papers.

# Segment 2:

**KL:** Michelle, a big part of your work has also been looking at preparation for sea level rise and especially because you were mentioning how much this can impact humans. Can you talk a little bit about what your work in this area includes?

**MC:** Well, what I've been focusing on primarily is working with what we call our stakeholders and these are the people that are actually doing the work of preparing our communities for sea level rise and what's happening in the future. And so part of what we've been doing is looking at what's called risk perception. So trying to understand how different groups of people are viewing the topic and then looking at how we can best communicate this topic of sea level rise you know to those different audiences, to the different people that are either making decisions about what a particular city does or what a community does or maybe they're a business owner and they're making decisions on individual basis or maybe they're just living in the area and they want to make decisions about how they prepare for living in this area. So we look at kind of do people feel like they are vulnerable to this issue of sea level rise and flooding? And then we've been looking at how they can become more involved. How can they become, for instance, residents or individual building owners or property owners become involved in the decision making process so that the whole region as a group, not just the government gets ahead of folks, but how can we all move together towards that idea. And we use this term called resilience, that's sort of the key term that is used in this work to kind of talk about not only their vulnerability and ability to bounce back after a storm or to bounce back after this is part of the ongoing adaptation to higher water levels, but also looking at all the social components so that the community is able to respond.

**KL:** So you've mentioned, Michelle, just a few of the stakeholder groups that are included in some of these conversations but it seems like there are lots of different audiences that you're trying to communicate with in terms of this the sea level rise risk preparation. What are some of the strategies you're using to translate research findings to these different audiences, especially if they're coming with maybe different concerns you know or different needs in terms of that resilience and bouncing back whether they're a business owner or a homeowner in the area? What are some strategies you're using to talk with them about what you know about sea level rise?

**MC:** So one of the things that has been most successful has been to engage with the we have sort of like a community of practice of folks that are working in the cities engineers we have provide sort of a forum for them to communicate and that's been the easiest that's been sort of the low hanging fruit we've been doing that for over five years where we get together quarterly and we look at what's the hot topic and how do we learn from other places like Miami or New York City or New Orleans that are there dealing with these issues. But then when we start to look, when we have started to dig deeper, more recently in how do we talk to, for instance residents like just regular people that are living in the community. One of the things we've tried is what we call a gamified approach. And so we've tried to have some public meetings and we say “hey come out and talk about what's going on in your community.” We'll, we've sort of devised some activities and these activities have served two purposes: One is to get their perception. So we've asked some questions and we do these on you know iPad's and try to make it more fun. But we ask them questions about, you know, do you feel like you can put these things in order of which one is the worst kind of flooding that you perceive. So we try to do it in sort of more of a game format for communicating with residents and that has two impacts. One is that it may bring out people that may not normally come you know to talk about you know planning or something in their community, but also it tends to diffuse people that come in that are angry about something that you know have an axe to grind at a particular meeting. So that's been a really successful approach for us. And with businesses, one of the business sectors that we have targeted have been tourism businesses because they're very dependent on weather and these you know storm events and things like that. So that's been a little bit easier to talk to them because they see their vulnerability. And what we've talked about mostly with them is you know preparing their buildings make sure they have their communications systems in place and then also Business Resilience making sure they've got business continuity. We hope to move them past that into more planning for the future. But right now we've had to focus mainly on responding you know to storms with that particular sector. So we're working on it.

**KL:** So I know you've started to engage some students in this work with sea level rise preparation. Can you talk a little bit about that?

**MC:** Well okay so two types of students I’ll kind of divide that into you know the college students in universities, we're trying to get them involved as kind of getting them trained to be solving this problem. So we've worked somewhat with architecture and engineering students so that early on in their career like this is their first step. They're exposed to these issues which are brand new. You know their colleagues that are 10 years into their career haven't encountered these things. And so when we have talked to them about what are we going to design in these areas that will have this flooding in the future? You know when they graduate all the professional, the engineering firms and so forth or architecture firms look at them and say “oh my gosh you're already talking about that, we need you to come and work at our firm.” So we've been trying to introduce that in at the college level and have the students really think about what kinds of solutions and maybe get outside the box for some of those solutions. But I've also been working with one of my partners that's an environmental organization that's been working with kids that are in elementary school, middle school, and high school, and trying to introduce these ideas to them about what the future is going to be in these kinds of cities that are close to the coast and trying to get them to understand the issues. And then we want to get them engaged in solutions and a lot of that has to do with absorbing water when we have big rainfalls because again our storm water pipes are not necessarily going to be able to absorb that and run that off. We really need it to absorb into the green space and so maybe that will be greening the cities more, look at ways that they can maybe restore shorelines so that we get some protective factors along our shorelines as well. So we've been engaging at many different levels, the use at many different levels.

**KL:** So I'm really curious, Michelle, how your work in this area of preparation connects to larger discussions, maybe politically or otherwise of climate change. And I'm kind of curious if people are still encountering kind of skepticism as you're working with these audiences or if people have pretty much accepted you know this is a thing and it is happening and they need to be preparing for it. Can you talk a little bit about that?

**MC:** Well I always say that as it concerns sea level rise and flooding in Hampton Roads, we don't really have political divisions. It's something that we're seeing and we're having to deal with on a daily and monthly basis, I’ll say monthly maybe not daily, monthly basis. We will have these events in which the streets flood and so getting resources to the community to deal with that is sort of across the political spectrum but then the thing connecting that directly to sea level to climate change is a little bit different. So we try to make sure we know the audiences we're talking to and sometimes we won't even say anything about climate change and other times people will say “well how does this you know connect to the larger issue of climate change?”, and then we'll talk about that. And certainly when we work with the K12 students we do talk about you know using or trying to reduce greenhouse gases and trying to get the big picture. It sort of depends upon the audiences. You know we do have this issue of subsidence of land sinking in the region. So for people that we do encounter that are skeptical they usually aren’t skeptical about sea level rise even if they're skeptical about climate change because there is still the subsidence and they seem to be able to accept that the subsidence is a contributor to climate change. so they do at the end of the day, when we talk about actions we want to take that are to adapt to sea level rise then we don't really have a problem because the we don't have a problem talking about that because the problem of flooding is so apparent.

**KL:** Well this is really fascinating Michelle, this combination of science and community engagement. We're going to take another brief break when we come back we'll hear a little bit more from Michelle. Back in a moment.

# Segment 3:

**KL:** Michelle as you describe this work it sounds highly interdisciplinary and especially the work around resilience. Can you talk a little bit about the different disciplines that you've been engaging with, whether that's through kind of formal research, partnerships, or the students that you've been working with? What are the kinds of disciplines that are interested in this work?

**MC:** So many of my projects and my closest research partners are across four different colleges even at my university, so coming with a science background I work very closely with one of my colleagues in the business school that's in the school of public service where they train people that work in government. We have an engineer, she's an expert in engineering management and construction and green infrastructure that we work with all the time. One of our colleagues is in communications. So it's key. I've talked already about you know some of the key issues in communication that we're interested in and then many of my colleagues within my department are physical oceanographers, we've got biological oceanographers, we work with people in health because there's so much threat to human health. For example sea level rise can cause air quality issues within a building. As you get you know, things get wet and moldy and we talk to people in social justice that are interested in social justice issues. So some of those folks that are in sociology and they are interested in how different populations will be more affected or less affected by these issues all over the board. We've got we've got lots of different disciplines, I already mentioned architects, planners, we have folks you know in law that look at policy issues and how what are some of the things that are constraining municipalities, localities from being able to act in trying to become more resilient. So we've got a huge number of disciplines that are working together and trying to really uncover some of the opportunities. And that's where our research kind of uncovers those opportunities. And then the practitioners that we relate to very closely put those into practice.

**KL:** Okay so I'm curious with all of these different disciplines, I mean are these people kind of just finding, how are they finding each other? I mean are they coming to you because you know you are working in this area or are you going to them to try to form these partnerships or are these just kind of coalescing around the particular theme of sea level rise risk. I mean how are some of these partnerships coming together?

**MC:** Well we really reach out through our university we've got a unit called the ODU Resilience Collaborative and so we actually intentionally have had networking events and really invited people in, you know invited people to lunch, you know on different topics. So that's been one way that we've found these different collaborators but also we've reached outside the university, I'm part of the Virginia Sea Grant Consortium. So I've been a part of working with people across disciplines because I'm sort of the Resilience person for Sea grants, so that's where I can access people that are involved in agriculture or especially in the law and policy arena. So we work across disciplines within that area because we're engaging with people, and a lot of times when we go out to these communities as part of our outreach they will tell us what the problem that they’re having is, and what the is the discipline that they need, What is the information that they need? So we'll go back to our university and we'll network around and say “well does anybody know an economist that can help this town with this particular issue of how to finance you know this project or how their waterfront financing might work or something like that?” So to some extent because we're so open to asking the questions that need research and where can we really make a difference that leads us to a number of different disciplines.

**KL:** Okay so I know that interdisciplinary research is not always all sunshine and rainbows especially because you're bringing together these different research cultures and I'm wondering if you can talk a little bit about maybe some strategies for dealing with maybe challenges that are coming out of having these different research cultures come together especially since you've named so many different research cultures that you're starting to work with. What are some of the things that you've encountered and what strategies do you have for maybe overcoming some of those challenges?

**MC:** Well one of the problems is sometimes you have different ways of casting. So you use different language and you have different ways that you might write a research question. And so the way that we've kind of gone around that strategy have been to have multiple research questions that are related and then you can address those in a number of different methods and work as a team to kind of slice up the problem almost like a pie to see you know here's the approach that will work to look at this particular issue. And one of the other challenges is of course that getting rewarded for doing interdisciplinary work and often that hasn’t in the past been as rewarded by a particular discipline. They would rather see you know they would rather see you go into a deep dive within their discipline rather than working across disciplines and you know for instance with publishing they would they have different kinds of journals than the way multidisciplinary work might be positioned to go into a different kind of journal that they may not get credit for. So what we've tried to do is to have as many different ways of getting at that so maybe the person that would write would be a lead author and they would focus the work into that journal but you could take a different slice and go into a different way of writing up that that work as well. So those are some of the different techniques. Finding a common language, it just has to do with defining your terms and making sure you don't go necessarily down a rabbit hole with everybody else you can go by yourself but at least when you come back to talk with everyone else you need to make sure that you speak in language that everybody can understand.

**KL:** So Michelle I also know that you have made your own kind of interdisciplinary transition incorporating more of the social sciences your kind of original discipline that is more science based. Can you talk a little bit about that? What has it been like to start to think about different methodologies, different kinds of research questions, and to kind of reframe some of your work from that social science perspective?

**MC:** Yes well, as I said in my experience in looking at how to understand going towards solutions and in salt marshes, I came to understand that you really had to understand the people. And so it’s been interesting to build the toolbox and look at rather what is the unit of measurement? In science many times you’re using some kind of instrument, you’re using anything from a ruler to a very advanced sensor that’s going to make all of these measurements of different, whether you’re looking at chemistry or I was looking at animals and so I was measuring many aspects of these tiny crustaceans. So you’re always doing these kinds of measurements. While in social science, especially the kind of qualitative social science that I do, the measurements are different, the instrument that you use is the researchers themselves, so people coming from a science background, sometimes they are very skeptical about whether that instrument is getting it right so you have different techniques that you use to kind of make sure that you are checking yourself against reality. You can do things like coding transcripts and then having someone else read them and see if they code them the same way. So you have to use a different suite of tools and you have to at some extent trust yourself and make sure you keep stepping back and make sure you keep your objective about the data. I have found it very rewarding you’re getting more on the ground answers and in depth answers that can sort of lead to in many cases direct action. That actionable information that can be used to help address the original issue that your research question was about.

**KL:** Well Michelle this has been really fascinating, thank you so much for coming on the show and sharing about your experience researching sea level rise.

**MC:** Well thank you so much for inviting me.

**KL:** Thanks also to our listeners for joining us for this week’s episode of Research in Action. I’m Katie Linder and we’ll be back next week with a new episode.

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