**Episode 47: The harmony of art and science**

[intro clip]

Hello, my name is Susan Washko, and welcome to Making Waves, brought you by the Society for Freshwater Science.

Science is a process. Following the scientific method, scientists work their way from a question about something to evidence supporting a potential answer. Scientists are often viewed as serious people with one-track minds. Artists are often seen as the foil to scientists, having crazy work dynamics and doing whatever they want. However, I think scientists and artists are more similar than people realize. Science requires creativity— how do you answer a question that you didn’t know you would encounter? A problem no one has tackled before? Can I fix that piece of equipment, or invent a new piece of equipment that will work better? Can I design a new way to test this theory? Both scientists and artists experience a profound inspiration to create, whether it’s a work of art or a research project (or something that can be viewed as both). With these similarities in mind, I reached out to a scientist who is also an artist, as well as an artist that works with scientists, to pick their brains about how science and art go hand in hand, and what results from science-art collaborations.

My guests for this episode are aquatic ecologist /slash/ documentary filmmaker Jeremy Monroe and interdisciplinary artist and educator Ellie Irons.

**1) So, first question-- tell us a little about yourself and your work how you found a pathway to art and science.**

**Jeremy:** Yeah, so my name is Jeremy Monroe, I run an organization called Freshwaters Illustrated, we have this mission of raising public awareness of freshwater life, science, and conservation. We do that mostly through documentary films, but also through photography and other kind of visual communication. So yeah for me, growing up, art was probably the thing that was more natural to me. I was a kid that was just always drawing, I loved animals and the natural world and I had my little catalogs of animals and I was usually drawing animals. I found my way to fishing, luckily, and that’s how I found my way to water. And so, I became this really obsessed fishing kid and when I wasn’t fishing, I was usually drawing a picture of a fish, or drawing these little underwater sorts of cross-sections of what was going on in the lakes that I was fishing, and just trying to imagine that world. It was probably fishing that sort of led me to science. When I was little my mom would take me to places like fish hatcheries here and there and I would see these people that worked in the field and they would tell me that they went to school for fishery biology or aquatic biology. So, I was able to, you know, probably as young as eleven or twelve, see that there was sort of careers in this and you needed to sort of go on this science path to get there. And of course, once I was in college studying fish biology, I saw this broader world of aquatic entomology, and that’s what I went on to study in graduate school and worked on in my master’s and my thesis work. And it was actually in the midst of that, of my master’s work, when I was studying these aquatic insects in Rocky Mountain streams, that my advisor at the time, LeRoy Poff, got an underwater camera for our lab. That was kind of just an awakening for me. I started to just find this visual means of expression and this fun tool that had an immediate use for my science. I could show people what a mayfly larva looked like, or a caddisfly larva, and show these kind of obscure creatures that I was studying. And it was probably in the middle of writing my thesis when I started to really sort of see the power of that and how much I enjoyed it, and started to kind of wonder if I should, you know, change the course of my career a little bit. It was after grad school that I really tried to make this career that I’m now in, which is the natural history, the science, and the conservation of freshwater ecosystems.

**Ellie:** I’m an artist and educator, I’ve been working at the intersection of urban ecology and artistic practice for maybe 10 years or so. I’m also a PhD student at Rensselaer Polytechnic Institute in upstate New York in artistic practice where I’m looking at the intersection of socially engaged art and urban ecology. In terms of how I came to be interested in the intersection of art and science – I’ve always had a kind of attentiveness to the natural world. I like to say that some of my earliest visual influences were actually field guides, like bird books and plant ID [identification] guides, and I always wanted to learn how to do watercolors like that, I was really struck by them. I studied environmental science as an undergrad, but also painting, and it took me a long time to understand how I could combine those two. I was kind of painting in one place and kind of keeping my science in another place. It wasn’t until I started making my own watercolor paints out of wild urban plants that I really felt like I was able to connect the two. That happened maybe six years ago, maybe that’s like eight years now... I call it my Feral and Invasive Pigments project and basically it involves foraging, the berries and petals and leaves and various colored parts of wild urban plants and processing them into watercolor paint. And then I also teach others how to do the same through walks and workshops, and that’s the socially engaged part of my artistic practice, is teaching and learning alongside others and including the plants and the urban ecosystems that I’ve learned so much about. It’s kind of collaborators and mentors in that process.

**2) What is your view of how science and art are connected?**

**Jeremy:** I guess from where I’m at now I see them as probably more connected than I used to think of them, and probably how most of us tend to think of them. I think some of the divides that we might see, or the gaps between art and science, are in some ways artifacts of how we sort of built our disciplines and our professional pathways. For me it’s kind of interesting, you can look back at the DaVincis and the Audubons and the Rachel Carsons to see that art and science can be very easily, naturally, and pretty amazingly combined in a way that reaches a lot of people. For scientists, I think that art offers this complementary and, in some ways, really liberating way to express your interests, your passions, the things you’ve learned, and even some of those things that don’t always get expressed in science, like our values, our spirituality, our morality. And so, I think art is really neat for scientists and it’s a great outlet to find ways to express things that sometimes get a little bit ignored or neglected in our science.

**Ellie:** I definitely do view art and science as intimately connected. I can say that of course because I practice both and see similarities, but also I have to acknowledge that the bifurcation of the two is a relatively recent phenomenon, at least in the course of human history, and certainly kind of a more western and academic practice to pull them apart and put them in separate sides of college campuses. I think that’s part of what made it hard for me to connect them initially, but the more I’ve learned about art and science and their histories, the more I’ve come to see the ways that they’re similar. You know, in urban ecology, and in the kind of artistic practice I do, it’s really essential that you develop these kinds of arts of noticing, of being open, of expanding your ability to see what you wouldn’t usually see and simultaneously zeroing in on that thing to give it more attention. So for me, it’s really coming to notice *how* wild urban plants are able to thrive in sidewalk cracks that I might ordinarily, were I not honed in on this topic, you know, step on and walk right past, and how that actually has a lot of implications for how well we can all live together in cities—humans and nonhumans across the board. And I think that urban ecologists who I’ve spent time with also are sensitized that way; we both are working hard to overcome our society’s tendency towards plant blindness—the idea that you see everything else first and then the plants, because they’re perceived as static and still. This is something that isn’t a new phenomenon, but rather is kind of a returning to ways of knowing that might have been much more common globalization, industrialization, colonization. So for me, alongside learning from urban ecologists, and environmental science scholars, and keep looking at the environmental humanities as I work on my artistic practice, there’s also been a lot to learn from traditional ecological knowledge practices and different indigenous cosmologies that have continued practicing this kind of arts of noticing or ways of attuning to landscapes in ways that could benefit, I think, the way that science is practiced. I guess as an artist combining these two methodologies, I view that as part of my role, to kind of bring things together that might not be really obvious candidates for sitting together. You can put them together in ways that might cause friction, or tension, or confusion, but also generate what I think can be exciting results, exciting data.

**3) I’m sure you both know about sci-art, but for those in our audience for whom the term is new, sci-art is a movement aimed at joining science and art to advance our knowledge, innovation, problem-solving, and public awareness. What would you like to see freshwater sci-art collaborations achieve in the future?**

**Ellie:** Oh wow, yeah, freshwater and art and science collaborations, I see as being really important moving forward. I personally work a lot more closely with plants, but we know that those are entangled with and connected to freshwater ecosystems. I’m also aware of a lot of amazing collaborations happening right now that I’d like to see get more attention moving forward, thinking in particular the New York City context of walking the edge, which is a collaborative platform where scholars and artists and scientists and archaeologists and folks working across disciplines and from many different backgrounds are giving tours of the edge of New York City’s changing waterfront, in the context of climate change. Of course I’m also really aware of the issues around water protection and indigenous access to clean, safe water, and I think that there’s been some good work in that area and I would love to see, moving forward, a lot of solidarity from people working in the art-science field towards how indigenous communities are approaching the protection of water. So that’s an area that I’ll be paying attention to. I also think that there’s some really interesting species-oriented work going on. That’s something that I’m quite interested in, in terms of how we think about not just the megafauna that inhabit our freshwater ecosystems that are non-human but also the bacteria, the creatures in the benthic layer, the way that they contribute to freshwater ecosystems and the way that they rely on them and how that’s entangled with human health. So, I think there’s a lot of possibilities for fruitful exchange moving forward.

**Jeremy:** It’s really encouraging for me to see younger generations of scientists, and even artists. I think some of those sort of divides and barriers, they’re traversing those a little bit more easily and naturally. I think things like social media give us a little bit more of a free form way to express things, in different ways that may naturally combine art and science. It’s neat to see more things like workshops, and sessions at conferences, and galleries and showcases that are explicitly doing this combination of science and art, and programs that really intermingle scientists with artists. I would still love to see kind of more integration or opportunity in our academic programs, that let, you know, young, aspiring scientists see that there are productive and fun and meaningful ways to bring in your artistic side, whatever that is (music, or poetry, or photography, or painting). And that can be part of your job, or part of your work, or, at a minimum, a way to blow off steam and express those things that you may not, that are maybe getting a little bit suppressed in your science work, or while you’re sort of swimming through analyses and spreadsheets. I would like to see some of the academic programs offer more sort of sub tracks in artistic expression, visual communication, music, and for us to continue to celebrate those scientists that do that really effectively. And I think that we can look back and see that some of our greatest, most celebrated scientists kind of did these things naturally, of what we’re now calling sci-art, and of course science communication. So yeah, I hope we see a lot more of it in the future and a little bit more of a reflection of it in academic programs and curricula.

**4) Can you give us an example of a sci-art project that was really meaningful to you?**

**Jeremy:** Well I guess in our work, the one that’s probably still most meaningful for me is the first project we did, the first big project, which was a film called *River Webs*. It was all about stream food webs and a biography of a scientist and a group of scientists really, that did a lot of neat work to describe this more beautiful and far-reaching river food web. For me, that was right after I finished a master’s in studying aquatic insects, and so it was a way for me to pour that passion that I had into a project, and those same insects I was studying in graduate school, I got to, in a way, sort of glorify in this film that really showed how important they are, how beautiful they are, how amazing they are. And that film was also, you know, a really challenging film to make. It was an hour-long film, there was lots of fundraising, I was trying to build a non-profit and learn how to write grants, learn how to make films. So, it was sort of a film school and a non-profit sort of startup school all rolled into one project. And that was 2008 when I think that was released, but it’s nice to hear that I still get responses and people still use that in their courses, and folks that saw that at some point in their coursework and said it was something that helped them see maybe how science is done or get something out of it. For me, it still stands as proof that what we do is something that the world needs and kind of keeps us going on to the next project and trying to do it as well as we can.

**Ellie:** Wow, yeah, there’s a lot of really inspiring sci-art out there. In terms of my own work, I’m thinking a lot about land use, and specifically land use in an urban context, so going back aways, probably much before the term ‘sci-art’ was coined. I like to look at Agnes Denes’ wheatfield project, which happened back in the 1980s, where she converted a landfill where they were creating fill to expand New York City and create Battery Park and the very southern tip of Manhattan into a wheatfield for a season. Really striking and amazing images if you look it up. And I think that might not strike you as the exact type of sci-art, what comes to mind when we think about sci-art now, but I think that kind of foundation is what continues to inspire a lot of us now, who work with land and plants. I am working on a project called The Lawn Re-Disturbance Laboratory that in some ways responds to her project, it’s in the long line of artists who have taken the American lawn to task. And we’re looking at 1x1 meter plots and uprooting them to start fresh from the plants that live in the soil seed bank. You can learn more about that project at lawnlab.org. It involves collecting data, both in a traditional sense about plant species and the way that they live in these recovered meter-by-meter lawn plots, but also kind of multisensorial data about how it feels to be around a plot that’s been so-called ‘rewilded’ versus one that’s continued to be mowed and maintained as a lawn. So, I think there’s a long legacy, and hopefully long into the future, to continue projects that kind of combine ecology and land use in an urban setting.

**5) Here’s a fun question to leave our listeners feeling exhilarated by the freshwaters around them: what body of freshwater inspires you the most?**

**Ellie:** In terms of a body of freshwater that inspires me, oh, there have been so many. I love freshwater—marshes, lakes streams... I grew up in the Sierra Nevada with snowmelt streams, I’m thinking of those streams right now as we get reports of the red glowing-ash skies out that way. But I think right now, given my hyper-local focus on my own research, I have to say the Hudson River, it’s the river that’s got my attention right now. I live up at its northernmost tip of its estuary, up in Troy, New York. This is where it hits the Mohican River and also the jumping off point of the Erie Canal. It also was and continues to be a really significant place for a range of indigenous communities who came to gather around the connection between the Mohawk and the Hudson. And, also, a really important consequential location for the beginning of the industrial revolution, there’s a lot of manufacturing and shipping happening here. So, you can really see the layers of those impacts in the landscape as we begin to reflect now on what the future will look like as climate change and western industrialized/post-industrialized impacts continue to make themselves felt. The upper end of the Hudson here is actually, or the upper end of the estuary, is actually a superfund site. It’s got a lot of PCB’s [polychlorinated biphenyls, industrial coolant chemicals] in the layer of sediment on the bottom, and it also flows in both directions, because when the tide is going out it pulls the water down, but because it’s at the tip of the estuary, it flows upriver when the tide is coming in. Which is really amazing because we’re quite far from the Atlantic [ocean] up here.

**Jeremy:** Well, that’s a great question and a tough question. I live in Oregon, now, and I love the water that’s here in the Pacific Northwest. There’s a lot of it, and it’s not hard to find. I live right along the Willamette River, which is kind of my daily river, and I run past it and dip my feet in it all the time, and I snorkel in it whenever I can. That’s my most familiar river that I’m in touch with. I love the Rocky Mountain streams that I studied and that I grew up with in college. I was inspired to get into fishing, and I learned to fish, on lakes in Minnesota, which is a wonderful place to fall in love with water. But the best answer I’ve heard to this question, and I’m going to quote an old friend, Ed Scott, who said, you know, “My favorite river is the next one.” To me that means, you know, keeping your mind open to almost wherever you go, and wherever I go, whatever assumption you have about what you might see, when you get down on your knees and put your hands in the water, and then lean down and put your face underwater, you’re always amazed. And that could be in the middle of Nebraska, or Florida, or Texas, or Alaska. So everywhere I’ve gone, I’m amazed by what lives in water, and whether you expect it or not, it always overwhelms me. So yeah, I look forward to the next stream, or wetland, or lake that I’ll get to go to.

**Susan:** Talking to these two artistic scientists /slash/ scientific artists has made me really want to get creative. There are so many magnificent creatures and processes happening in freshwater ecosystems, maybe we scientists can learn to express our admiration through art, reaching other folks and inspiring them to love and protect freshwater ecosystems too. Thanks for joining us, this is *Making Waves*.

[outro clip]