Steve Lewis 00:10
Welcome to Speaking of Mol Bio , a podcast series about molecular biology and its trending applications in life sciences. I'm Steve Lewis, and today I'm delighted to welcome Dr. Melissa Wu to the show. Melissa is the co-founder and CEO of Seeding Labs, a non-profit dedicated to increasing access to scientific technology in historically excluded communities around the world. In 2011,Thermo Fisher Scientific became Seeding Labs' first equipment and manufacturing partner. I love discussing our ongoing partnership with Melissa and learning all about Seeding Labs other great work. Thanks for joining us today, and we hope you enjoy the conversation.

Steve Lewis 00:57
Melissa, we're so excited to have you today on the episode, and I want to start off talking about who you are and how you founded Seeding Labs.

Melissa Wu, PhD 01:06
A little bit about who I am. In my role as CEO of Seeding Labs, I'm largely administrator and, but I see myself as a connector and relationship builder, and I come from, you know, training in my career as a scientist. I started doing scientific research in high school, I was lucky to have some connections and opportunities that brought me into scientific research there and continued doing research in undergraduate and went directly into my PhD. And through all of those experiences, and, you know, just living life, I really came to understand and believe in the power of science to transform our world. That's really an important thing to know about me. A second really important thing to know about me is that I'm a Taiwanese American. My parents immigrated to the U.S., and I was born here in the U.S.. And what that means for me is I grew up straddling different cultures and having the opportunity to see how people lived in different ways, people have different perspectives, and bringing that to the scientific research space, the importance of bringing together people of different perspectives to enrich how we address problems and even what problems we see.

Steve Lewis 02:42
So you mentioned the importance of having diverse perspectives in science and enabling opportunities for a breadth of different backgrounds and interests in science. So why don't you tell us a little bit about Seeding Labs?

Melissa Wu, PhD 02:59
Sure. So Seeding Labs comes out of the belief that science is transformative, but also understanding that globally science is not benefiting everyone. It's a unfortunate reality that most of the resources for science are concentrated in just 10 countries of the world. And what that means is that science as a tool is mostly driven to the priorities and the problems faced by people in those 10 countries. Seeding Labs really wants to change that, and so what we do is we mobilize resources for science to developing countries so that every community, every country, has access to this incredibly powerful tool and can use their experiences to find solutions for their communities.

Steve Lewis 04:06
And how does that work? Do you contact universities in developing countries specifically? Walk me through what that looks like and how Seeding Labs is involved?

Melissa Wu, PhD 04:16
So how Seeding Labs works, is we've got kind of two sides of this driving resources towards developing countries. So one is, who in developing countries are we drive are we driving resources towards? We work with universities and research institutes. We have an application process that is open, and they apply to us to gain access to our main resource, which is laboratory equipment and laboratory supplies. Now on the other side is, how do how does Seeding Labs actually increase access to these resources? We actually work with and have worked with over 200 companies that span equipment manufacturers, distributors and what we call end users. So those would be like pharmaceuticals, hospitals, universities in the global North to leverage their surplus and excess equipment, we bring it to a warehouse, and then we bring our two sides together. We have this inventory of laboratory equipment and supplies, and every institution that we partner with gains access to that inventory. They're able to select what they need, and then we ship it to them. The scale that we work on is sufficient to support a whole department or a whole research center, and that enables the institution to really build an environment, a strong environment, where they can outfit, you know, their teaching labs, where they can grow their research programs, rather than working on the individual level. And you know, we have seen that working at best level, not only increases outcomes in terms of education and research, but it actually builds sustainability, long term sustainability, into the institution. By working in this way, we've seen that they've been able to bring more resources, more funding, increase lab space, attract faculty and researchers to their institutions, so reversing brain drain, and so that's a really kind of key thing to understand about how Seeding Labs works.

Steve Lewis 06:44
Wow. And is that ever geographically constrained, or is that really all, all around and based on what seating labs can supply at the time?

Melissa Wu, PhD 06:56
Geographically, we're not really constrained. The only constraint is we do a logistical look into each new country, and existing countries, just to see if there are any logistical challenges that might make it difficult for us to work with any particular institution. And being based in the U.S., we are limited by sanctions and export rules and so, you know, there are, there are some places where legally, we just can't work. And so that's another geographic limitation. Otherwise, you know, we have worked South America, Central America, Central Asia, South Asia, Southeast Asia, and all over Africa as well, so pretty much all over the world.

Steve Lewis 07:51
That's amazing. Is there any specific focus area? We obviously are the Speaking of Mol Bio podcast, so are these instruments like thermal cyclers or other things?

Melissa Wu, PhD 08:03
As a whole, Seeding Labs focuses on instruments that you know academic labs that are using biology or chemistry techniques would be using. That being said, molecular biology is in really, really high demand. It's one of the highest areas of demand. So we're always, I mean, on behalf of our partners looking for molecular biology equipment. Everything from, you know, the basic instruments that you

mentioned, PCR machines, electrophoresis, UV spectrophotometers, to the, you know, newest instruments, the things that facilitate omics, you know, genomics, research, sequencing, all of that.

Steve Lewis 08:56
Do you, as Seeding Labs and Melissa, keep up with the projects and institutions that ultimately get funded from what you do?

Melissa Wu, PhD 09:06
We do. We like to stay in touch with our partners for as long as possible, for a couple of reasons. I mean, one, we really look at it as setting up a collaboration, a long term relationship, where, if we have the opportunity to continue to provide support, either informally, like helping make connections, or formally by following up with additional shipments of equipment or other kinds of resources, we want to be able to do that because, you know, we're entering into a relationship, not a transaction. But the other, other piece of it is it's really critical for us to understand that what we're doing, we're doing it in the right way, and we continue to have impact. And so we really appreciate when our partners will come back to us over time and share what the outcomes have been for them. And it's incredible to hear and to understand just how this one thing, bringing equipment into an institution, making it, access to laboratory equipment easier can do so much for an institution.

Steve Lewis 10:27
What's your favorite impact story that Seeding Labs has had?

Melissa Wu, PhD 10:31
There are a lot of favorite impact stories, but I will share a recent one from Malawi. So we supported the Malawi University of Science and Technology, and it's a really unique institution. It's a young University. They were chartered by the government, I think, in 2014 or 2016 as the fourth public university in the country. And they created this university because they saw a gap in their educational system, there were no universities focused on science and technology, and so they brought that in. Now, when they started the institution, they didn't quite have the funding to build all the buildings and outfit everything. So the head of the Department of Biology at the time, Dr. Gama Bandawe, put an application to us to help support their teaching labs, and in particular, he had particular interest in the medical microbiology students. So we supported them in 2018, and he just came back to us last year to tell us what's happened. Now I call out the medical microbiology students because this is a new discipline. There's two sides of this being a new discipline. One Dr. Bandawe told them, like, hey, look, we are creating this degree program because there is a huge need in the country for medical microbiologists, but you guys are going to be creating those jobs. It's inspiring to me, because it's, it's a big, it's a big thing. It's a big undertaking. But what is really cool about the story is they actually got to see it happen. So they entered the program with the understanding that they would have to create jobs for themselves. And as I said, Dr. Bandawe came back last year, and he told us that these students are now, and have now created the first 21 microbiology labs that are directly in hospitals in the country. So prior to this, their hospitals did not have microbiology labs, and now these students, who are specialized for medical microbiology, are creating these labs, increasing capacity for, you know, the health system. They are creating new jobs. You know, I just it's just incredible to see in such a short timeframe how these

students in this program is really changing opportunities for people, you know, in the whole nation of Malawi.

Steve Lewis 13:31
That's incredible. And I know that especially when it comes to the life sciences and academia, you have education and workforce development being such a high priority. That must have been really great to hear about, and only a six-year turnaround time.

Melissa Wu, PhD 13:49
Yeah, it's really incredible. I mean, the other thing that Dr. Bandawe shares with us is when he goes and visits, you know, lots of labs across the country, the National Lab, you know, military hospital labs. They're all staffed by his former students. It is really incredible to see in such a short time, this change.

Steve Lewis 14:12
I think it's a really interesting model that, that you have, and especially, I think having the co-development or co-creation aspect related to working with institutions, but really highlighting and championing is such a such a unique, unique approach, and in that Malawi example, you really got to see how just one person's understanding of the support that Seeding Labs can provide, can ultimately even help at the government level in achieving some of their goals as well. Now you had a great example for molecular micro. Do you have any examples related to molecular biology and maybe PCR?

Melissa Wu, PhD 14:57
Absolutely. So one of the stories. Stories that I'd like to share is some incredible work being done in Benin, led by this researcher named Enoch Achigandaco. And his area of specialization is the plant sciences, and he's really on a mission to support farmers across Africa. Support their ability to grow indigenous crops, what had been labeled in the scientific research community as “orphan crops.” And they're orphans not because not a lot of people are using and consuming them, but orphans, because there's not a lot of research done in those areas. Enoch applied to us on behalf of their plant sciences department to add molecular biology research, a genetics component, to the work that they're doing so that they could improve the productivity and the yield of the various crops that they're working on. And one of them, which is, which is kind of, I don't know, people might just remember a couple years ago, there was a it was really popular, this food called the miracle berry. I don't know if you remember this. We had some miracle berry parties where you eat it and it changes your taste receptor,

Steve Lewis 16:33
Your taste buds. I think I do remember.

Melissa Wu, PhD 16:35
… and then, you know, a lot of bitter foods all of a sudden taste or sour foods, all of a sudden, tasted sweet. So you could eat it, and then you could, like, bite into a lemon and be able to, you know, eat it like candy, I guess. So that's actually one of the local crops in Benin, the miracle berry. And you know, they're trying to understand if there's applications for that, for diabetes, for treatment of diabetes.

Steve Lewis 17:04
How interesting.

Melissa Wu, PhD 17:04
And so being able to add a genetic component so that you can both understand the impacts, but of the foods, but also, you know, engineer the foods to be able to work better, either in certain conditions, you know, be more resilient to climate change, or kind of direct the plant to have, you know, stronger attributes in a certain way, all of that's facilitated through equipment that we sent Enoch, including a PCR machine.

Jordan Ruggieri 17:43
Hey, Speaking of Mol Bio listeners, if you're fascinated by the power of digital PCR and how it's transforming molecular biology, we've got a new podcast you won't want to miss.

Christina Bouwens 17:53
That's right. We're Christina Bowens,

Jordan Ruggieri 17:56
and Jordan Ruggeri,

Christina Bouwens 17:57
Together, we host Absolute Gene-ius, the podcast exploring all things digital, PCR. Its applications, its innovations, and the scientists pushing its boundaries.

Jordan Ruggieri 18:06
Whether you're into bioproduction, cell and gene therapy, oncology research or just love geeking out on the science of absolute quantification. Absolute Gene-ius has something for you.

Christina Bouwens 18:17
So after this episode, come join us. Listen to Absolute Gene-ius wherever you get your podcasts or visit thermo fisher.com/absolute-geneius to learn more.

Jordan Ruggieri 18:24
Absolute Gene-ius. Bringing you absolute quantification and absolutely great conversations.

Steve Lewis 18:35
Now, I imagine there's a component to Seeding Labs about how your procurement works that sure listeners would love to learn a little bit about.

Melissa Wu, PhD 18:47
Yes, there is a lot to how we work together with different kinds of companies to bring in equipment. You know, one of the things that is really great for supporting our molecular biology supply is actually a partnership that we have with Thermo Fisher, where they've created a trade-in program and users here in the U.S. who have older model PCR machines can trade up to a newer model and Thermo Fisher

refurbishes their older model, packages up with some consumables and supplies and then sends it to Seeding Labs for us to support researchers with. So, it's fun for us when we can, you know, work together with companies in ways that are creative, in ways that help align, you know, a lot of different objectives. Um, and, you know, increase participation, you know, not with just the company, but with customers who are, ultimately, you know, part of the global peer network, and bring more people into supporting our mission and supporting the work of scientists in under-resourced countries.

Steve Lewis 20:26
That's a really great program that our business unit is a part of, and we also look at it from the angle of sustainability and longevity for these instruments as well, so they don't maybe end up in landfills as quickly, for example. I imagine it's probably not just Thermo Fisher Scientific who is involved in working with Seeding Labs. Do you have a lot of different partners?

Melissa Wu, PhD 20:53
Yeah, Seeding Labs, and I'm really grateful that we have been able to engage partners all across the spectrum. We work with reagent manufacturers, with pharmaceuticals, with CROs, of course equipment manufacturers and distributors and universities. We also are really grateful to work with different kinds of foundations, corporate foundations, family foundations that, you know, underwrite the work that we do as well as so many individuals who are contributing to our work. All of these together, you know, make it possible for us to leverage resources and you know, as I said earlier, create this global supply chain that drives resources towards universities and research institutes.

Steve Lewis 21:58
And on the note of supply chain prior to the recording starting, you had mentioned a really interesting mechanism about how you actually ship the instrumentation. Can you tell us about that?

Melissa Wu, PhD 22:11
Yeah, so everything goes into a 20-foot shipping container. We say that a lot. And it gets, it gets, you know, packaged in, we ship via ocean freight. There's some fun times just internally looking at shipping lanes, and there's some tools that you can look at to see the ships cross the ocean. And you know, the nice thing about working in 20-foot shipping container is that everything is secured in that from leaving our warehouse to entering the university. And so we don't, we're have to worry about things getting mixed up. And we have, with this model, we have never lost a shipment.

Steve Lewis 22:58
That's great. Does that mean that there's a ultimately, like a sweet spot of support that you look to give as an organization, maybe, like a certain number of instruments or something like that?

Melissa Wu, PhD 23:11
Well, yeah, the sweet spot is, is typically what fits into the 20-foot shipping container. So as I said, every institution selects what they need, but there's a, you know, there's, there's kind of a balance between, you know, how much equipment do we select, how much consumables, and, you know, how many big things we select. You know what fits into a 20-foot shipping container that might be about, you know, 10 ultra-low freezers. So most institutions are going to do a mix, right and not just pick 10 of

that. So it's a balance. And you know, our programs and logistics team helps our, helps our partners kind of manage that, and it's rare for us to actually run into that volume constraint.

Steve Lewis 24:17
One thing you mentioned in that response is you've mentioned benchtop equipment, like thermal cyclers, but that was the first time maybe I knew about freezers even shipping. Are there really any limits to what Seeding Labs can send?

Melissa Wu, PhD 24:33
There are not really limits to what we can send. Although we do, you know, we specialize, I would say. We specialize in equipment that is used by a research lab using biology or chemistry. But that could mean anything from, you know, your workhorse, pipettor, to a fume hood. So there are other kinds of limitations that are important for us. We don't accept equipment that is obsolete. If labs here in the U.S. aren't using it, it's really not going to be helpful for labs in any other place. If you know the equipment isn't fully functional, unfortunately, we don't, Seeding Labs, have the capacity to refurbish it. We have a quality control process, but we'll take out equipment that isn't fully functional. If it is too specialized and customized to just like a niche research area, you know, we won't accept it unless we know that we have an upcoming partner that is likely to need it. And then the other kind of limitation we have is what people will donate. You know, certainly there are some kinds of instruments that are, say, very, very expensive.

Steve Lewis 26:01
Scanning electron microscope, right?

Melissa Wu, PhD 26:05
Yes, scanning electron microscope, that is a perfect example. So, you know, for two reasons, those are really hard for us to increase access for from a, you know, a user institution, they're going to use that scanning electron microscope until it is really not usable anymore, because, you know, they don't want to make that big investment again. And for, you know, manufacturers of scanning electron microscopes, it just doesn't make a lot of business sense often for them to donate that. So one of the current goals of Seeding Labs, because we want to increase access to these instruments. They're so critical. They open up so many different kinds of avenues of research that you just can't do without these instruments, is we are trying to raise funding so that we can, you know, purchase, you know, refurbished or, you know, because we have such great relationships with manufacturers that understand the need and the opportunity, you know, maybe access different kinds of discounts. So you know that that's a that's a big goal of Seeding Labs, as we are looking at increasing access to instrumentation in general.

Steve Lewis 27:20
Now, little bit of a thought exercise. What does Seeding Labs look like in 10 years? What are your hopes and visions for it?

Melissa Wu, PhD 27:31
In 10 years, I see a lot of things happening for Seeding Labs. So I mentioned earlier in our conversation how our instrumental access program, you know, we're unable to access certain kinds of instrumentation. So I want to expand that, you know, create a capacity within our organization through funding to open up access to the most you know, sophisticated and complex instruments. Another piece of it is that we know that while equipment is an important resource, and access to it creates a lot of things. It's not the only resource that scientists need. And our community has recognized that Seeding Labs has a really unique network that spans the global South and the global North. People have shared with us that, you know, many of the institutions we work are quite rural, and so even connecting across their own country, much less to scientists and other countries, is difficult. And so we want to create some programming where we can connect scientists, particularly in the global South, so that they can exchange ideas, have mentoring conversations, enrich the research culture, uh, share not just knowledge on techniques and what the latest science is, but also, how are you bringing that science out into your community? All right, how are you integrating it into local cultures, where not every culture has trust in science? So how do you build that trust with the work that you're doing at the university and the local population? So our community of scientists have asked for that, and that's a big goal of ours, to be able to bridge and make those connections. And then the last piece is we are, you know, the largest organization that we see working in this space, in terms of equipment and driving equipment resources. We have a unique position where we're able to interact with, you know, all of the companies that that are part of our network, with different kinds of funders, with governments, and I see a role for Seeding Labs to really change the global system and serve as a platform for scientists working in the global South, advocating for, you know, for what they need. And advocating for a change in how companies work, how foundations work, how governments are working, and looking at, how are we investing in science globally? How are we distributing resources? How are we connecting the global scientific network? So, Seeding Labs in 10 years, we are creating more access to equipment. We're creating connections, and we're advocating for systemic change, for more equitable science across the world that benefits every person.

Steve Lewis 31:18
That's fantastic and for the final question we always ask is, across everything that we've discussed today, is there anything we may not have touched on that you'd like to highlight for our listeners?

Melissa Wu, PhD 31:31
There's one thing that I want to highlight, and we've talked a lot about how what Seeding Labs does is changing the research ecosystem and working at an institutional level. So what I want to share is another piece of what a difference it has made on individuals. And there's three words that I have heard our partners say. Seeding Labs and the work we do has brought confidence, courage and agency to the individuals, the scientists, the students who are dedicated and committed to using science but facing incredible barriers to pursuing that work. Having one, access to these resources, but two, the belief of all of these people that are part of making Seeding Labs happen, you know, people across the world, people who don't know who they are, having all of us believe in their work has brought them confidence, courage and agency. And so, you know, I want to leave people with that note that even though we're working on a systemic level, it really is making impact on an individual level too.

Steve Lewis 33:18
This has been a really just fantastic overall conversation and learn so much about the impact that Seeding Labs is having today and the vision for many years to come. For any of our listeners who might want to get involved, what are, what are some of the ways they can maybe contact your organization or support in their own way?

Melissa Wu, PhD 33:41
Thanks Steve for asking that. So one thing is, please check out our website. It's HTTPS, we've got the secure version, seeding lab, So, S, E, E, D, I, N, G, L, A, B, S.org, and there you can see some of the impact stories, some of the details of you know what's happened, but there's also a partnerships page, a get involved page, and you can contact us through that. You can sign up for newsletters. You can contact us directly if you have access to equipment that you can donate. If you're in a position to make a personal donation, we would be so grateful for that. And if you're in a position to, you know, drive some other resources, connected to a corporate foundation, connected to other people, please help bridge that connection to Seeding Labs. You can email us at giving@seedinglabs.org or use the contact page on our website. We're still a very small organization, and one of the biggest things that helps is just sharing word that Seeding Labs exists. So you can help raise awareness, follow us on social media, share our work, sign up for a newsletter and send our newsletter to a friend to raise awareness and help power our work through donations of equipment and funds.

Steve Lewis 35:26
Lot of great ways for our listeners to get involved. And friendly reminder too, in our listeners notes for this episode, you can actually get involved with the thermal cycler trade-in program directly through Thermo Fisher Scientific. So if you're interested and you are looking to maybe upgrade an instrument, maybe consider getting it to Seeding Labs in one of the many ways that Melissa just highlighted. This has been a fantastic episode that I really enjoy getting to learn a little bit more about Seeding Labs and all of the impact at the institutional and individual level that you're having today, I can't wait to see what the years to come bring for you and for your organization.

Melissa Wu, PhD 36:13
Thanks so much, Steve, for bringing me on and giving Seeding Labs a opportunity to amplify and share our work. I really appreciate it.

Steve Lewis 36:25
That was Dr Melissa Wu, co-founder and CEO of seeding labs in Boston, Massachusetts. Speaking of Mol Bio is produced by Matt Ferris, Sarah Briganti, and Matthew Stock. Join us next time for more fascinating discussion about the wide world of molecular biology. Until then, cheers and good science.