

Intro 00:00:01 Inventors and their inventions. Welcome to Radio Cade—a podcast from the Cade Museum for Creativity and Invention in Gainesville, Florida. The museum is named after James Robert Cade, who invented Gatorade in 1965. My name is Richard Miles. We'll introduce you to inventors and the things that motivate them, we'll learn about their personal stories, how their inventions work and how their ideas get from the laboratory to the marketplace.

James Di Virgilio 00:00:37 Welcome to Radio Cade, I'm your host James Di Virgilio. And my guest today is Raha Saremi, and she is the founder and CEO of EcoaTEX—a very interesting company that may change how the entire world handles textiles and manufacturing. Very fascinating stuff. Very interesting stuff, very environmentally friendly stuff. Welcome to the show, Raha.

Raha Saremi 00:01:00 Hi, thank you so much.

James Di Virgilio 00:01:02 So let's talk first about exactly what you're working on. I kind of teed it up there, but tell us the project you're working on now.

Raha Saremi 00:01:09 Yeah. So EcoaTEX is a startup company working on developing sustainable textile technologies. One of the projects that we are currently working on is sustainable coating, dyeing, and finishing of textiles. The way it works right now, the conventional textile dyeing is the method using huge amount of water and releasing large volume of base water to the environment as well as large amount of toxic chemicals and fixing agents. So, in our method, we remove all these toxic chemicals from the process and we use 90% less water and friendly, environmentally friendly chemicals in our process. And the good thing about our method is, you don't need to have any specific type of equipment in order to use method, you, we can just modify and adjust the existing textile manufacturing equipment and use it with our technology. That's one of the technologies that we currently working on. As well, we are on sustainable biobase leather, environmentally friendly fibers. We are trying to find alternative and synthetic fibers. So, anything sustainable, environmentally friendly, regarding textiles, we are working on it.

James Di Virgilio 00:02:36 And let's talk about textiles in general and let's make it simple. If I go buy a pair of jeans. For them to get the color they get, how does that even work? How do blue jeans become blue?

Raha Saremi 00:02:47 To make a blue jean, they need a lot of water plus dye and chemicals because if you use dye in textiles, it's not going to make your gene blue, you need to use a lot of other fixing agents to help the chemistry of the process to work. So that's the problem. And also, a lot of water, you need to have huge amount of water to make one pair of jeans. That's the problem with the textile industry. And then after dyeing it, you dunno what to do with the wastewater, from the process. So, they just release it in the environment. In some countries in Asia, where most manufacturers are located, there is no efficient method or cost effective that can remove this plastic chemicals or color from the environment, from the water, the moment you release them to the environment. So, it's really hard and cost a lot of money.

James Di Virgilio 00:03:49 Now, how much pollution are we talking about? Is the textile industry one of the greatest polluters in the world? What's the level here of pollution going on from textile dyeing and manufacturing?

Raha Saremi 00:04:00 Yes, it's the second polluter after the oil industry. So, we are talking about huge amount of water and air pollution.

James Di Virgilio 00:04:09 So for everyone to have these colors of pants and clothing and things they enjoy, there's a tremendous amount of pollution going on. And now you're looking at a way to improve this in an eco-friendly way. Now, I know you had mentioned that I think your solution uses 90% less water, and we're gonna walk through how this works, but right off the top, is your product, is what you're doing, is the quality the same? I think that's what most people would imagine is a lot of times you think of something eco-friendly and you say, well, perhaps it's environmentally friendly, but what I'm gonna get is not nearly as good. Are you able to dye, essentially, that same blue jean? We just talked about at the same level of quality as what's happening now.

Raha Saremi 00:04:44 Yes. The good thing, an advantage of our process is you don't lose any quality. So, we are also trying to improve it even more. Right now, we get comparable results. We don't just dye indigo for blue jeans. We can also dye different colors, red, green, reactive dye, dispersed dyes, with our method. What we are trying to do is even improve the qualities, because if you improve the color performance and color session, meaning that after you wash your jeans, you don't release any dye to the water, to the drain, that's the perfect thing to do. Because if the color performance goes high, it means that you don't lose any dye after washing. That's the reason we are trying to even improve the color performance, more than 80%. And we use 90%, less water as well as chemicals with the same result. So, you don't lose any quality.

James Di Virgilio 00:05:47 You lose no quality. So, I'm imagining now I'm a large textile manufacturer. And what you're telling me essentially is I can produce the same exact quality garments and clothing with the same dye saturation as I would before. And I can save a significant amount, as far as pollution goes into the environment. Now cost wise, is this gonna cost me a lot more to use your solution versus what I'm doing now?

Raha Saremi 00:06:10 So we did some cost analysis, but obviously in a very small scale and it should not increase the cost, but we haven't done larger scale production yet. So, we did some small scale production and we are trying to do pilot right now, but we haven't done cost analysis for a larger scale production. But assuming you save a lot of water and energy in the process, as well as chemicals. So, I think you, you should not expect to have costs going up compared to the method that you are currently using.

James Di Virgilio 00:06:46 Okay? So, in theory, we have something here that you've created. That could be a solution to many problems. If I'm a textile manufacturer, it's going to wind up, not costing me anything extra. I can tell the community I live in, I'm no longer going to be polluting to the significant level I am. Mm-hmm <affirmative>. I can tell my customers down the line that we're doing this with an environmentally friendly solution. So, all these things sound obviously amazing. The question now becomes is this close to getting to market? Are you able to take this out right now and sell this? Where are you in that process?

Raha Saremi 00:07:16 So, the textile industry is very old and they have been using the same old method for many, many years. We talked to many textile manufacturers, but to get them to the point that they want to try something new is hard. It's a different industry. That's one problem. They are very suspicious of any changes they want to do in their process or in their manufacturing methods, because

they think it works for them, right? But it's not working for the environment, for consumers because most of these chemicals are also not good for human health. So, they can develop allergies, they may develop cancers in some people. So, it's not working for us, but it's working for them. It's hard, but we started the conversation and we have a couple of big manufacturers that are supporting us. And we are planning to do collaboration with them. Also, brands—brands are also very important. They don't manufacture themselves, but they work with the manufacturers to bring the product to the market. So, they are also important parts of these equations. And they have couple of brands that are also supporting us and working with us. So in terms of how fast we can bring this to the market, it's gonna take some time, because as I mentioned, industry is a very old industry that using the same method as 50 years ago or even more, so it's hard to make changes, but it's happening.

James Di Virgilio 00:08:57 Okay. It's happening. So, you're working on it, obviously the solution, again, sounds great. It ticks every single box. So, are we years away from this? Are we three years away, two years away? Like ideally when would I be able to come on this podcast and say, hey, the garment that you just purchased was used with an environmentally friendly set up, how far away are we from that?

Raha Saremi 00:09:16 We think a couple of years, maybe less than three, and that's our plan.

James Di Virgilio 00:09:21 Okay. And then speaking of that plan, what would be the hurdle that would not allow that to come to fruition? Again, on the face of it, it seems like this is doing everything better than what's happening now without really any additional cost. What would prevent this from becoming something that used?

Raha Saremi 00:09:36 The problem we are facing right now is many textile manufacturers move to other countries from the U.S. And you cannot find many of them still working in the U.S. And that's the biggest problem we have. Because if we want to develop these and make these here in the U.S. first, and then expand internationally. We found a couple of fixed manufacturers here and we approach them, we talk to them, we are planning to start working with them, but there are a couple of problems here. One is like, obviously convince them that no, you should try this process, let's start working together. Second is funding. Getting funding is very time consuming. It's like you go through different proposal writing and then approval going to the process, getting the money. And then also the third problem is COVID. Before COVID we thought that right now we have our pilot going and we are moving to larger scale production, but it's not happening right now.

Raha Saremi 00:10:46 So these are a couple of problems we are facing, but we are very hopeful because the process works, the method works, we are getting really good results. And we are also doing what I call, dye and have functionalities at the same time. Now, what I mean by that is we are also trying to add functionalities to our dye. Meaning you can die a garment as well as if you want to have anti-wrinkle properties or antibacteria, you can do it at the same time. That's why I call it sustainable textile coating, dyeing and finishing because it can save you time. And also, (inaudible) because you do all these advanced steps. While you are dyeing your garment, you can also add functionalities to the process. So that's also something that I think after COVID many people are interested to have like more antibacterial and microbial properties in medical textiles and some other textile products.

James Di Virgilio 00:11:53 Now, Raha, it sounds to me like you've obviously thought of nearly everything when it comes to this textile manufacturing process, environmentally friendliness, how did

this idea come about? And how did you become so interested in doing something environmentally friendly in the textile world?

Raha Saremi 00:12:09 So when I got my master's degree in textile technology, I went to the industry to work. I started my internship in textile manufacture. Before that, everything was in the books, in university workshops. And at that moment, when I entered textile manufacturers, like everything changed, I was like, did I just study to make this? Textile manufacturers are a very dirty, old places. And when you look at that, you are like, what's happening. Why is this process so dirty and not nice? So, after that I decided this is not for me. I'm just gonna go continue my PhD, do more research and work in the lab. Maybe we can change it step by step. I know it's not gonna happen overnight. So that was the reason I decided to pursue my PhD and then work on sustainable textiles and environmentally friendly textile technologies. And then when I started my PhD, with my advisors, we decided to work on sustainable textile dyeing and finishing, because majority of textile toxicity and also pollution comes from dyes and finish.

Raha Saremi 00:13:26 That's the part that manufacturing of yarn fabrics. They also have some waste, but when it comes to dye and finish, the majority of chemicals, toxicity, everything come to a play. So that's why we decided to start with that. But then when we developed that technology, with the help of my advisors and some of the researchers in the lab, we thought that we needed to bring this to the market. Because are so many research going on in, uh, academia, but a few of them gets to the market. They are mostly for publications, patents, brand funding, but not commercialization. So, we decided to start EcoaTEX and then I continued getting funding and working on that, trying to bring that to the market. And then I started thinking, how about micro plastics? How about (inaudible) is everywhere. We need also to have sustainable fibers, comparable properties to (inaudible) so that was the reason I started thinking of all these ideas and trying to make sustainable textile technologies. Another textile which is not environmentally friendly also, you know, hurting animals, is leather. The process of making leather also is very dirty. So that's another project that we are planning to work, and we are getting some good data.

James Di Virgilio 00:14:55 That's fantastic. And that leads me to this question. Let's look back at the childhood version of yourself. Were you dreaming of working in the textile world and the environmentally friendly world? Or what was your upbringing like? And what'd you go to school and how did that influence what got you doing what you're doing today?

Raha Saremi 00:15:10 Yeah. So, when I was very young, my dad was an engineer. I always wanted to be an engineer to make stuff. When I decided to go to a school, I just wanted to go for engineering degree. I did not know anything about textiles when I got accepted, I was like, okay, this is engineering, I'm going to make a stuff it's regarding textiles. Textile is nice. So yeah, I loved it. But after finishing my school and entering the industry, everything changed for me. So, then I decided to do more than just be an engineer in textile industry. So that was the reason (inaudible).

James Di Virgilio 00:15:55 And what do you think led to you having this entrepreneurial problem-solving solution-oriented mindset? Of course, the engineering background is a problem-solving background, but your background, obviously you came right from a foreign country. You came to America, you've pursued education, you're continual tackling these problems. What do you think led to you taking on all of these different challenges, whether it be different languages or the textile industry,

et cetera, what do you think inspired you and has given you this passion to kind of continue learning and overcoming all these different challenges that one has to face to reach where you are?

Raha Saremi 00:16:27 Yes. I always try to convince others and to do something other than I was a very child, very young, but most of the time when they were not listening to me, I was trying to do it on my own. So that was the reason I started this journey. First. I was an engineer. Then I decided to become a scientist. And then after I, we developed this process, my team member, my advisor, we were accepted for National Science Foundation, our core program. And then during that program, they gave us funding to go and try to, to fix our manufacturers. When we did that, I knew that before that the textile industry is very old and it's very resistant to change, but after we talked to so many experts and people from textile industry, I was like, yeah, I think we should just start our own, you know, company.

Raha Saremi 00:17:24 I should go to business. I think I should start making it. And then maybe after we do that, they see that we have something, so they start working with us and interesting thing. I went to get also my MBA degree because everybody was like, oh, you are a scientist, you don't know about business. Business is very complicated. Commercialization process is very complicated. It's not like you make something in the lab and you, now you want to bring it to the market, change all the conventional methods and everything. And then I started my MBA degree and I'm getting my degree is coming far. So, I was very, always trying to get what I wanted and I was very persistent. So...

James Di Virgilio 00:18:10 So what words of wisdom then do you have for others that maybe following in your footsteps and all sorts of fields from the things that you have learned thus far in your life?

Raha Saremi 00:18:19 Just try to come back with either ways, just try, don't get this discouraged. It's hard to make change. And it's in the business as they are for many years, it's going to be harder, but if you make something, just don't get discouraged if people tell you it's really hard, it's very hard to make it happen. Just find a way, if it requires you to go get another degree, like me, maybe do that too.

James Di Virgilio 00:18:49 That's a great view. You have to be resilient. You have to obviously overcome challenges and hurdles. And I can tell you from having interviewed countless people on this very program, that every single one of them is gonna have similar advice when it comes to overcoming difficulties or challenges or hearing the word "No". And if you believe in something and (mm-hmm), <affirmative>, it makes sense and it can work. Of course, you have to carry on and persevere. Well, this has been great chatting with you Raha. Thank you so much for coming and our guest today, our featured guest today, again, was Raha Saremi. She is the founder and CEO of EcoaTEX. And hopefully in the next few years, Raha will hear about you on a big scale as you disrupt and revolutionize the textile industry. But thank you for joining the program today.

Raha Saremi 00:19:29 Thank you for your time.

James Di Virgilio 00:19:30 On behalf of Radio Cade, I'm James Di Vigilio and we'll see you next time.

Outro 00:19:36 Radio Cade is produced by the Cade Museum for Creativity and Invention located in Gainesville, Florida. This podcast episode's host was James Di Vigilio and Ellie Thom coordinates inventor interviews, podcasts are recorded at Heartwood Soundstage and edited and mixed by Bob McPeek. The Radio Cade theme song was produced and performed by Traci Collins and features violinist Jacob Lawson.