

CERAMIC TECH CHAT

Episode 25

Title – “The Ceramic and Glass Industry Foundation: Marcus Fish (E25)”

INTRO

De Guire: “I’m Eileen De Guire, and this is Ceramic Tech Chat.

From construction to communication to healthcare, materials shape every aspect of our lives. Yet the field of materials science, and especially the subfields of ceramics and glass, remain unknown to a vast number of people, and many only become aware of this discipline when they reach college or university.

As the current generation of materials scientists approaches retirement, it’s essential that a new generation be inspired to take up the reins. Fortunately, there are numerous organizations that are dedicated to teaching young students about materials science and inspiring their interest in this field.

The Ceramic and Glass Industry Foundation is one such organization. Today we talk with Marcus Fish, development director at the Ceramic and Glass Industry Foundation, on the history of the Foundation, its mission, and what projects and initiatives it supports in pursuit of this goal.”

(music)

SECTION 1

De Guire: “Can you tell us a little bit about the Ceramic and Glass Industry Foundation, its history, and what its mission is?”

Fish: “The American Ceramic Society’s been supporting ceramic education, obviously, since its start. As far back as the mid-1900s, the Board of The American Ceramic Society has been talking about the need to launch efforts to support ceramic education, whether that’s at the collegiate level but also bringing that education to younger people, so that we make sure we have enough people coming into the ceramic and glass materials community around the world to fill all the jobs that are in our great field.

So, in 2014, The American Ceramic Society launched the Ceramic and Glass Industry Foundation. And our mission is to attract, inspire, and support the next generation of ceramic and glass professionals. And we view that as professionals at every level in industry. Folks at the technician level, so maybe they don’t have a degree or maybe, you know, go to a community college or two-year technical school degree; engineers that

maybe have a four-year materials science degree; all the way on up to folks that are getting their Ph.D. and heavy into research in ceramics and glass.”

De Guire: “So other professional societies that are connected with materials science also have foundations. What makes ours different, and how challenging is it to work in the ceramic and glass space?”

Fish: “Thankfully there are other societies, other organizations that are helping to bring young people into materials science in general. You know, the ASM, their foundation does a great job of bringing students and teachers into understanding materials science. We are really the only organization, at least in the United States, that’s focused primarily on ceramic and glass materials science education. And that is a unique challenge one, because materials science historically has not been taught a whole lot in K through 12 education in the United States, and so we’re often introducing teachers and students to a topic that they’re not as familiar with.

Also, ceramic and glass materials, as your audience knows well, they are usually seen in more traditional ways by the general public. And so, when we first start talking with students and teachers, they think of the common uses of ceramic and glass materials, but they don’t yet know all the amazing ways that ceramics and glass make our modern world possible, and can, you know, potentially solve a lot of the challenges we face.”

De Guire: “Yeah, and you mentioned that outreaches kind of reaches several different points of entry for careers. K through 12, collegiate, people already in the workforce, and even the teachers. So, what are some of the strategies you use to reach out to these various groups? Because certainly one size would not fit all.”

Fish: “Yeah, that’s right. Over the course of the Foundation, we’ve launched a number of different program initiatives to try to do just that. To make sure we’re having an impact on those different kinds of groups and constituents that we’re trying to reach out to. So, a primary focus of our Foundation is middle school and high school students and their teachers. So student and educator outreach is probably the biggest part of what we’ve done and continue to do with the Foundation. Because we know that if we have an impact on teachers and we can help them understand how to teach ceramic and glass materials science in their classroom, they’re going to have a continuous impact on classrooms of students that we might only see one time in an event one year—and that would be pre-COVID-19 at this point—where we were at big events, where we might see a thousand students come pass the table in a day, they’re going to see thousands of students go through their classroom in their teaching career. And so, if we can get them on board with bringing that material to their students, we’re going to impact more young people.

But you’re right. As they exit out of 12th grade and go beyond that, we want to have opportunities for undergraduate students to learn more about ceramic and glass materials. So we have things like student exchanges and travel grant opportunities to get students to educational meetings that are out there, including ACerS’ own technical meetings that we have each year. We have student leadership development opportunities, especially through

the President's Council of Student Advisors, the PCSA. We support that organization, but also through Material Advantage and through Keramos, all of which are supported by the Ceramic and Glass Industry Foundation. We also have launched scholarships in the last year to try to help get more underrepresented students into our field.

And then as students progress, whether it's out of undergrad or their advanced degrees, we want to help them get jobs in our field. So we have a Ceramic and Glass Career Center. Our goal is to connect people that are looking for positions, for the great opportunities that there are in our field, and for industry folks that are looking for their next great candidate, they can find them through that. So we really are trying to provide programs and activities at every stage along that timeline to hopefully get students all the way from, you know, the first learning about it may be in grade school or middle school and, hopefully at the end of that, some of them will be working in our field in future years."

De Guire: "Great. Can you give us an example of what would be a kind of activity that would be targeted towards the K through 12 group?"

Fish: "Yeah, our primary tool for outreach to teachers, educators, and students in that K through 12 range is our Materials Science Classroom Kit. And that's a hands-on kit with nine different activities that cover the basic classes of materials science but with an emphasis on ceramic and glass materials. And it's something that when you put it in the hands of a teacher, they have a lot of materials that would be difficult for them to pull together on their own and costly. They may have to add a few low-cost items, for instance, like a box of borax when they're doing the glass bead on a wire lesson. But that's easy to source locally and it's not very expensive. But we provide the different wires and other things they need in there to finish that experiment. Or refractory brick. We have an experiment called 'Hot or Not' to demonstrate the importance of refractory materials. Your average teacher is not going to know where to find a refractory brick. And they're not available typically at, you know, Home Depot or something where they can go down the street and get one. But that's in the kit ready for them to use right away. So, we try to provide most of the materials they need, as well as a resource manual, we have online videos that go with that, so that teachers feel comfortable hopefully integrating ceramic glass materials science education into their regular curriculum.

And from that, this year we're launching some teacher training workshops to help take that kit and get it into the hands of teachers and give them hands-on training in a one-day workshop setting, where they can learn how to use the kit so they can right away make use of it in their classroom and integrate it into their curriculum, so that they know how to teach what is required in their state or national standards and how our kit fits into that. So we're starting that this year in Ohio, and those events are going to be taking place this summer and fall. And it's just a really great opportunity for teachers to get a quick introduction to it so they feel comfortable to start using it in their classrooms."

De Guire: "Sounds like a great opportunity for a K through 12 teacher to introduce or teach science with some real-world applications to reference. You can teach chemistry and

physics, but in the context of steelmaking, in the context of optical fiber communications, things that are relatable to a young mind.”

(music)

SECTION 2

De Guire: “Are there any special projects coming up?”

Fish: “Well, during COVID-19, certainly there were challenges there with doing hands-on activities or face-to-face activities with students. And so during that time, we launched a new initiative to try to provide more of our Materials Science Kits to teachers. And so we now have two different grant programs that we just launched at the beginning of this year. One is our kit grant program, and that is to encourage mainly educators, but really can be used by anybody, parents or folks in the community, and they can request a number of our Materials Science Kits along with supplemental funding to be used in a classroom or maybe in an after-school program or a community-based program to help teach students about material science in that way.

We also are relaunching our project grants, which is something that we had been doing for several years prior to COVID-19, and that’s an opportunity for organizations or individuals in the ceramic and glass materials community to submit an application for up to \$5,000 in funding for a project where it would help to expand materials science education or training for the next generation of ceramic and glass professional. So, we’re hoping that we’ll get some unique ideas that come through that. We’ve just launched that application process and it’s open through September of this year. But those are initiatives that we are really excited about because oftentimes folks have really great ideas and what they need is just a little bit of seed funding to get that off the ground, and the best of those are things that we then try to integrate into our own programs and the way we do things.”

De Guire: “So, how would somebody apply for a project like that, how are projects selected, and where does the funding come from?”

Fish: “Yep, our website, foundation.ceramics.org/grants, is the page for both of those grant applications and all that is online. The selection criteria is all outlined there, but our primary focus is that we want to select folks that are going to use those kits to help expand outreach in materials science. So, everything from, you know, we have some great ideas that teachers have brought to us in these past few months. There’s a teacher in Colorado that they were building a new school building for their school. And so, he proposed that they could do a really great hands-on project of learning all about materials, especially ceramic and glass materials, in the construction of their new building. So they did one of the lessons from our kit, which was about composite materials and making concrete pucks and testing their strength, and he applied that directly to this new building project. And so students got a really great understanding. I’m sure they’ll never forget some of those things about that building that are being, you know, as the concrete is being poured, they had just tested their own pucks and the strength of them. Those kinds of innovative ideas

we love to see. But even if it's just a teacher who maybe has been to our workshop and decided, 'Wow I love this kit. I'd love more teachers in my district to use it,' they could apply for a number of kits along with supplemental funding for the materials they need to purchase, so that maybe every teacher in their district, every school in their district would have one of our kits available to them.

So, the bar for approval is fairly low on the kit grant process because of generous donors, organizations, and individuals who believe in what we're doing and contribute to the Foundation, we're able to provide Materials Science Classroom Kits at no cost to teachers. And folks can also buy them, they are available for purchase, but when it's an educator, we all know that educators often spend a lot of their own money on resources to make their classes better for students. And we want, if they're going to teach materials science in their classroom, we want to do everything we can to get Materials Science Classroom Kits and all kinds of other resources in their hands to help them do that.

On the project grants side, because that that could be a project, it could be any amount, but up to \$5,000 per project. We have a grant review committee that's made up of volunteers and Board members of the Ceramic and Glass Industry Foundation. And so as those grants are received, they have a rubric that they use to judge those and rank them and select those that one, meet the mission of our Foundation, we want to make sure that the primary focus of these projects is outreach and sharing that materials science, ceramic and glass material science education with that next generation of the folks that will be in our field. But again, we're looking for unique projects, and this year with the International Year of Glass being declared by the UN, we are taking a special focus to those projects that are about glass science because we're trying to focus on that as much as we can with the groundswell of activity that's happening all over the world with glass science and the International Year of Glass."

De Guire: "Yeah, that sounds like a really exciting opportunity for students, for sure, and teachers to engage with students. One other question occurs to me, and that is how has industry responded to the mission and outreach CGIF is doing?"

Fish: "The response of the ceramic and glass materials community, especially our industry folks, has been tremendous. I think if you go to our website, foundation.ceramics.org, and you can take a look at the 'About us' page, you'll see the representation on our Board of Trustees for the Foundation is very heavily folks from industry. And really the full breadth of the industry, not just the type of ceramic and glass materials they use or what part of the industry they're in. But small, medium, and large-sized companies are all represented there. So I think from the volunteer aspect of those that are involved on our Board or volunteer for the outreach activities that we have available, we have a tremendous response for our industry. Because they know what we're doing is so needed. They're the ones who are having difficulty filling the jobs that they have available for ceramic and glass professionals, and they're looking at, just like a lot of other industries, that ceramic and glass materials community has a graying workforce. We have a lot of needs to fill in the coming years and not enough young people in the pipeline in the ceramic and glass fields specifically to fill those. So, they've shown great support in volunteerism and also

in financial support. We've had again tremendous support from various organizations and individuals in the ceramic and glass materials community that really have made everything our Foundation does possible.

We also, obviously, I think everyone knows that we're a child organization of The American Ceramic Society. So The American Ceramic Society is our parent organization, and they continue to provide a tremendous amount of support in every way and one of those is financial. And through the members of The American Ceramic Society and all the industry partners that are involved at every level, that trickles down to making the Foundation successful.

So, we couldn't do what we're doing without that input from industry, and it's such a vital part of making us successful. We are hoping to expand that more in the future, especially in the realm of internships and job placements and shadowing and mentoring. Sharing more about what folks in our industry do so that teachers and students, as they're forming ideas in their mind of what they want to do, students think about, 'What do I want my career to be?' Most students can't tell you what folks in our industry do. So we want to start to illuminate that for them more so that they can understand at younger ages what are the amazing things people in the ceramic and glass materials community do so that they get that idea, 'I want to do that too,' and they want to be the folks changing the world with ceramic and glass materials."

De Guire: "I think that's great. I think that a lot of people don't discover materials science and engineering until they're in college, and then they go searching for a major and start to ask, 'Well, what is that all about?' And when you think about it, at least at certain generations, you know, kids would tinker with their dads on cars and find their way to mechanical engineering, or maybe work on ham radios or something and find their way to electrical engineering. But almost nobody tinkers with the glass furnace out in the backyard with their mom or their dad and find their way to materials science and engineering. So, the pathway of discovery is just a little bit more obscure unless there are guideposts along the way. And the Foundation seems to be doing a great job doing that."

(music)

BREAK

De Guire: "The Ceramic and Glass Industry Foundation supports the giving of Materials Science Classroom Kits to teachers through generous donations by individuals and industry sponsors. You can support the next generation of materials scientists by donating to the Foundation at foundation.ceramics.org/give."

SECTION 3

De Guire: "So the long-term goal is pretty clear: develop and retain the workforce. That's what success looks like. But in the shorter term, how do you measure success with the Foundation and the programs that you've got in place?"

Fish: “Yeah, you know, in terms of the vision of the Foundation, our vision is to be a global leader in igniting student interest in ceramic and glass careers to help solve grand challenges facing humanity. And that’s a big and lofty vision. That’s what visions are supposed to be. But I think the reality of what that looks like in success in the next three to five years is more young people understanding that materials play a key role in solving the greatest challenges we face in the world. Whatever you’re looking at in terms of those challenges. Be that clean water. You know, one in three people in the world does not have access to clean water. Ceramic materials can be a great solution, whether it’s a stopgap solution or an ultimate solution, to solve some of those things. The green energy goals that we have, most of those sciences involve a lot of ceramic glass materials in those solutions.

You know, I’m not a scientist, I try to put it in simple terms when I’m explaining it to young people. But most, as it’s explained to me, most of the problems we face in the world have theoretical solutions, but the missing gap is the right material to make that possible. And, in many cases, that’s likely to be a ceramic and glass material because of their unique qualities. So, I think in the short term, seeing students understand that and that they start to have a vision of wanting to work with materials to know that going into materials science means that you can be part of creating products and creating solutions that will have a positive impact on our world. That’s what students are looking for today. They’re looking for where is the impact. They know they need to make an income and they have to do all those things as well, but we hear so much that they want to be involved in solving some of these big challenges facing the world, and ceramic and glass materials are a key way that they can get involved in that.”

De Guire: “Oh yes, for sure. Just based on what you’ve observed as you’ve worked with teachers and students over these last couple of years, how early this that awareness of grand challenges and the desire to help solve them seem to emerge?”

Fish: “I mean, certainly, today more than ever, students as they’re beginning their education, they are learning about those challenges. I think, thankfully, more than ever, we’re illuminating for students the challenges that people face around the world today, and the humanitarian challenges that they’re facing because of our connected world, one that we can see immediate news about a natural disaster that’s happening or something that’s taking place. I think our students are more aware today than they’ve ever been before of challenges facing our world. So, I think they’re thinking of that sooner than they ever have been in the past. So getting them to understand that if they want to be solving these challenges, that the materials science field and the ceramic and glass material science community are leading the way in many of those solutions. I think that’s a great connection to make for students at the youngest of ages.”

De Guire: Thanks for that insight. What is the Foundation doing to raise awareness of its mission and its activities? You’ve got a lot going on. You have a kind of global aspiration.”

Fish: “Are our primary way of sharing our message right now is through our website, foundation.ceramics.org. And that’s kind of our primary clearinghouse of our educational

materials for teachers and news about what activities we're involved with, where folks can access our grant opportunities and hear about what things were funding. But we are trying to do as much as we can with the limited resources we have in terms of staffing. So our Foundation staff primarily is myself and one program coordinator, Amanda Engen, and our hope is in the near future to be able to expand our staff to provide more resources of folks that can help share those stories. Because sharing the stories of success of programs that we've helped to fund I think is inspiring to others and gives others ideas of ways that maybe in their own community, in their own backyard, they could launch new programs and ideas. Whether it's using our Materials Science Classroom Kit or something completely different, that's inspirational to a lot of people to hear about the success of others. Also hearing about why our volunteers and our donors support the Foundation and that it's important to them is inspiring to others to follow suit. And so we're trying to do a better job of telling those stories and sharing them.

One step in that direction, we've got some summer interns this summer that are working a lot on our communication side. And so hopefully over the next six to 12 months you'll see a lot of the output of having those additional hands on deck here that can help share some of the more of those stories and let folks know about all that we're doing.

In terms of social media, we tried to also share what we're doing on our LinkedIn page. That's been the primary social media outlet for the Foundation. And so folks can get connected to what we're doing there and also see regular updates of our programs and the projects that we're supporting and new initiatives that we launch."

De Guire: "So how can listeners get more involved in the Foundation? What are the opportunities that are available, and how would they start to access those?"

Fish: "One big way for folks to get involved with the Foundation is as a volunteer. And that can be at things like outreach events that we sponsor, where we often go to science activities, big science events when they're held in person. And we always need folks that are knowledgeable about ceramic and glass materials to be a part of that, to be excited and let students and educators know as they're coming up to our booth about ceramic and glass materials, to demonstrate lessons from our kits, so that folks can see firsthand how amazing those materials are. So getting involved in volunteering hands-on is one big way.

Getting involved in volunteering, serving on either our Board of Trustees or one of our committees, is something that we love to have folks, especially in an industry, be involved with because their input on how we should be going about the efforts of the Foundation are vital to us being successful since we are the Ceramic and Glass Industry Foundation. A big part of that goal is to make sure we've got a pipeline of young people going into industry. So, getting involvement by industry members. Not just in volunteering in-person hands-on but volunteering in the leadership and guidance of the strategy of how we carry out our mission is really important.

And then the other really big way is financial support. So whether you're just an individual or whether you represent an organization that has the ability to sponsor one of

our activities or donate to support the Foundation, all of the money that is donated in support of the Ceramic and Glass Industry Foundation is used to further our programs, and that's because of the support that we have from The American Ceramic Society and others to support the cost of the Foundation. But that means that anybody who gives in support of the Foundation, they know their money is being used directly in that outreach effort to get more young people in our field to attract, inspire, and support that next generation of ceramic and glass professionals.”

De Guire: “As a donor myself, I have to admit that that really was important to me. That every cent that I gave would go straight into advancing the mission and helping the industry. So, thank you for that. Any final thoughts? Anything you'd like our listeners to know?”

Fish: “I just want to encourage everybody to get involved at whatever level they can in helping the next generation learn about materials science and especially ceramic and glass materials science. Certainly the Ceramic and Glass Industry Foundation and The American Ceramic Society have lots of ways to jump in and get involved right away. You can go to our website at foundation.ceramics.org and you can find out about the activities that we have going on in our kit grants there. You can share those with folks in your community, teachers and others that could make use of them. You can also support us financially there. There's a giving link on our website where you can make a donation. But even if it's not with our organization, there are other organizations out there that are helping to bring materials science education to classrooms in the U.S. and around the world. And I would just encourage your listeners to get involved. To take the passion they have for ceramic and glass materials science and bring that to the next generation.”

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CONCLUSION

De Guire: “As the Ceramic and Glass Industry Foundation approaches its 10-year anniversary, its ability to inspire and train the next generation of materials scientists continues to grow thanks to the continuous support of the ceramic and glass community.

I'm Eileen De Guire, and this is Ceramic Tech Chat.”

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“Visit our website at ceramics.org for this episode's show notes and to learn more about the Ceramic and Glass Industry Foundation. Ceramic Tech Chat is produced by Lisa McDonald and copyrighted by The American Ceramic Society.

Until next time, I'm Eileen De Guire, and thank you for joining us.”