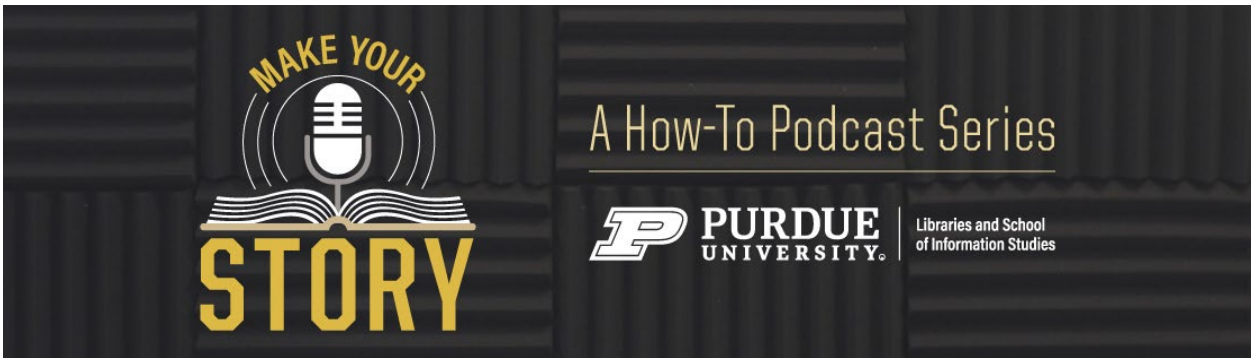

Make Your Story
Purdue Libraries and School of Information Studies

Season 2, Episode 4: Metal Jewelry Making at Purdue's Bechtel Innovation Design Center

SH: Sarah Huber
MC: Mark Crook

SH: Hello and welcome to our final episode of Purdue Libraries. Make Your Story. It's a podcast celebrating students' stories of making and creating new and exciting projects and innovations all across campus. My name is Sarah and I'm an associate professor of Library Science in the Purdue Libraries. And I'm your host for this final episode devoted to the Bechtel Innovation Design Center's (BIDC) Jewelry and Small Metal Casting Lab. Our guest is Mark Crook. Mark is going to talk with us about the BIDC and his role at the center. Thank you for joining us today.

MC: I'm, I'm glad to be here.

SH: Can you tell the listeners what the BIDC is and how you got involved with that? I'm kind of surprised at how few people know what the BIDC is. I think of it, it's three floors of making. It's huge. I think of it as, you know, one of the main activities on campus, but not as many people know about it as I would think they would.

MC: Yeah, it's definitely a very much a hidden gem. Um, even though like, you know, we're in a big glass building right in the middle of campus, most people walk by and don't know. The Bechtel Innovation Design Center is, um, really just a great on-campus makerspace where students can come in, um, and we have lots of TAs or they call us peer mentors, but they're all the same thing. We'll teach people whatever they need to know, teach them how to use the machines and what kind of manufacturing processes they can use to make whatever projects they wanna make.

SH: You have to fill out a form, not everybody can just walk into it, right?

MC: Yes, true. Okay. Yeah, so there's quite a bit of paperwork that you have to do to really get involved with the center. So, um, the first off, uh, we have a few safety tests and just member agreements. You know, we can make everyone happy on the safety side of things. When someone, if they want to make a, if they want to start a project, uh, what they can do is they can talk with a peer mentor and then the peer mentor and them can discuss, okay, what, what are we gonna need? You know, we're gonna need to use the TIG welder, we're gonna need to use the mill, uh, to get your project done. So once they've discussed that, they can go um, onto our website bidc.purdue (https://www.purdue.edu/bidc/). There's a whole get started page that sort of walks you through all the steps that you need to do.

One, you'd make a project in our project management system. So you'd come up with a name for your project, a brief description like I'm gonna be welding up a rocket. Once you've, you know, done that description, you just put in the tools that you'll need. And then once you do that, you'll submit that proposal is what we call it. And then a TA can approve that. And then once it's approved, you can just go on our schedule, prove a time that's not booked previously by another reservation, and then, uh, you're good to go. Once that's approved by a TA, then you can just come in on that time and we'll teach you how to use the machines. We'll do whatever you need to do to get your project down.

SH: That sounds less daunting than what I thought because I think of there being like a waiting line and it just being a really kind of big process. But that sounds very doable.

MC: And the get started page makes things pretty simple. It's a very step-by-step. Like first join our Discord, which is how we do all of our communications. So that's a good that I brought that up. So Discord, um, like I said, I'm not very tech savvy, so I barely even know how to work Discord, but I do know it enough to help people with their stuff. So, uh, once you join the Discord, we have loads of different chats for different machines. Just you can ask general questions or ask more specific questions or even find specific TAs that work in the area that you're gonna be doing your project in. And projects can be across any area. We have lots of, do you want me to list all those?

SH: Yeah, what are the different areas? Yeah. Cause you named something I had never heard Of.

MC: Okay. Yeah. So first off, like what most people are in there for is just the metal shop work. So the metal shop, we have CNC lays, CNC mills, and these are all Haas equipment. Uh, we also have manual, uh, lays and manual -- -- mills. Um, we also have laser cutter, plasma art cutter and just band cells and all that stuff in the general shop. Then another area we have is called Hot Works. That's actually where I, I'm the supervisor of that as of this semester. Um, and in hot works we'd like to say we do all the things that are messy. They're gonna be hot burning things or throwing sparks. They sort of keep us in this nice confined environment. So we offer, um, the three main kinds of arc welding, which are MIG welding, TIG welding, and stick welding. We also have gas welding, which you use a torch and flammable gas to weld materials together.

Um, and that's also where we have the jewelry and the casting stuff and how it works as well. So we have a wide range of jewelry equipment. I tell people we can basically make whatever we can think of, um, and I'm sure we're, we're gonna get more into the jewelry stuff. So that's how works. Um, and then we have an area called printing and prototyping, which is on the second story of the building up top. Um, and printing and prototyping. We have just a regular standard laser cutter so we can do composites and like woods and fabrics and stuff with that. We also have a metal laser cutter, uh, which is really nice. It can really, it helps people make their projects much quicker with that. And the water jet, you can basically do any project out of sheet metal. We also have standard resin printers.

So we have the Form three B, which is a new sort of resin printer. I like to tell people, you know, 3D printing is really cool and I, I mean I love 3D printing, but I tell people, you know, 3D printing's like pretty good quality. And then we're looking at a resin printer and that's more like 4K quality, like really crisp, perfect lines. And so that resin printer, uh, we'll get into this more when we get into the casting, but we can do lots of different kinds of resins, which can be used for different things. We also have a nylon printer and some carbon fiber printers up there. We also have a woodworking lab. So in the woodworking lab we have all the general wood shop tools. So bandsaw table saw, joiner, a planner and all that stuff. So, and then our final area, we have electronics, which is in the basement. See electronics is just a nice electronics lab where people can come and work on their projects. We have standard, you know, soldering irons, multimeters and all the equipment they would need for that. Um, and yeah, that's basically all the labs in the center.

SH: Well, you left one out.

MC: Oh, and there's soft materials as well. I

SH: [Laughter] So, I like that one because I helped pick out the sewing machines for that one.

MC: Yes. And soft materials is great. So soft materials is another one. It's sort of hidden in the basement. It's, I sort of forgot that one cuz our people who run that also run wood shops that like emerge those together as an accident. But yes, soft materials is another one where people can come in and work on any of their soft materials projects. Uh, we have some nice sewing machines and a lot of stuff down there, honestly.

SH: Yeah, just visited it because I, I wanna do, and I'll talk a little later at the end of this, about the Knowledge Lab, the maker spaces mm-hmm. , uh, that we're doing this podcast in. I'm really interested in um, wearable electronics. Yeah. And we have a sewing section that's really taken off. Mm-hmm , I've been surprised at how many students are interested and you guys have such a incredibly developed electronics area. Mm-hmm . So I was just looking at what you guys had and, and visited and I was, yeah. I was impressed by the sewing area.

MC: Oh yeah. And it's really nice. And our um, TA who runs that, Alyssa, she's great. She, you know, lots of the people at the center. We love making things ourselves. So when people come

in with really cool projects like that, we just really love getting behind that cuz we're like, oh yeah, let's make this happen. How do you make this work? Yeah, exactly. And that happens all the time in the center.

SH: That gets us to your role there. Can you talk a little bit about peer mentors? Like how did you get involved with Do, were you just going there on a regular basis and then you were, like, hey I wanna be part of this team or?

MC: Yeah, so that's a great question. So, um, I mean ever from a, like from since high school, you know, and before that I love making things. So as soon as I found out Bechtel existed, I had never even made a project there. I just immediately tried to become a staff member there. So I did all of the um, peer mentor work. So I'll explain that briefly. So how that process works is you'll, you come to the center and you'll be like okay, I want to be a peer mentor. What you gotta do for that is you have to do a, what we call an inner lab volunteering activity in each area. So the inner lab is like a really quick project that sort of just dips your toes in the water for what that area can do. So for example, my area, we teach people how to do the three main kinds of arc welding.

So MG welding, TIG welding and stick welding. And they sort of just get a, a brief little bit of that and then they can use the MG welder to write their name on a piece of metal and that's like their little take home thing. But lots of them have like little take home things. So in um, metal shop you will machine a block of steel and you just put Purdue on that. So they sort of teach you really, these are simple projects. They take about an hour or two. And so normally a volunteer would go around and they do each area's, you know, volunteering activity. And then once they've done that they can decide okay, I really like doing the metal shop project so I want to be a TA in metal shop. That's cool. That's great. And so once they've decided like what area they want to be in, then we will go into a lot more detail on everything they need to know to become a peer mentor. Cuz there's a lot of things that go on in the center. So the training is a really big part and that is always trying to be improved. Uh, especially in my area. I've been trying to improve that a lot cuz welding is a very technical and practice based skill. Lots of like the machines are difficult in their own aspect, but once you know how to program it, it will always just do whatever you tell programs wise.

SH:That's interesting.

MC: Yeah. But with welding it's difficult cuz you just gotta practice. That's what I tell people, you know, so all of this is very specialized equipment so it takes a lot of training once you've complete all the training, which is you know, a whole checklist of things you need to do and different projects and whatnot. Once you've done that, you'll sort of talk with the supervisor and they'll like, yeah, I really like not only that you have the skills that we're looking for but you're willing to learn more and you want to teach people right. Because having just someone who has the skills but doesn't wanna share those is not so good. And so that's why the supervisor sits down with 'em and say, yeah, you're a really good fit and I'd love to have you in my area. After that you get put on the schedule and we do all the paperwork and everything,

but that's how you get hired as a peer mentor. Okay. And the bigger your area is, like metal shop, we deal with a lot of expensive equipment and there's a lot of TAs so you have more of a hierarchy, um, and structure. Not just a supervisor but grad TAs and lots of other things to help make sure someone who has the knowledge to operate the machines is there at all time.

SH: And you specifically chose that welding area?

MC: Yes.

SH: And did you say you wanted to be in the jewelry part or?

MC: Yeah, so how that all came about is sort of funny. I originally definitely wanted to be a metal shop ta uh, but when I did the metal shop project, it wasn't really calling my name I guess you could say. And so when I did my welding one I really liked the welding ta I was with. Um, and I had actually learned how to TIG weld, uh, cuz I was on the first robotics team in high school and all throughout high school I was just in the shop all the time. I learned how to TIG weld from my shop teacher and then I was like, oh yeah, you know, I've TIG welded aluminum before. Um, which is relatively difficult. And so the hot works TA was already like, oh okay, sounds good. And he is like, you know, we were doing all the stuff for, and he mentioned, oh we also have jewelry stuff but our person just left so no one really knows how to do that.

I'm like -- -- , well that's funny cuz the shop teacher was married to the jewelry teacher. Oh. And when I was in his class he made me go up and do jewelry. Not made me, it's not like he forced me, but it actually turned out great cuz I really love jewelry. Mm-hmm . It's funny cuz in high school I made like one or two rings and like very simple basic stuff and then I just did projects. Like she just let me do whatever. So like I mirrored a double-sided ax, I made a chess set and I like mirrored all the pieces for that. So not a lot of jewelry that I did there in high school. Uh, so it was sort of funny cuz when this is all coming about I was like, oh yeah, I've done that a little bit. And so that's sort of how I got into the jewelry role and I really just took it from there. And so I've made, I mean probably 50 plus rings at this point and lots of other kinds of jewelry. And so I really honestly just love it every day I wake up I'm like somewhat considering just being a jeweler cause it's so much fun.

SH: I went and visited your space the other day just to get some pictures and saw some of the rings, which were really cool. Mm-hmm , but I don't know what the materials, like what metals are typically being used in that space.

MC: Like as far as welding goes or as far as jewelry goes?

SH: The jewelry making.

MC: Yeah, so with jewelry we mainly work with copper based allos. So um, copper based allos are, you know, just pure copper, which is that um, really lovely like reddish orangeish color. Okay.

SH: That's probably what I saw. I was like it's gold. Yeah.

MC: Yeah. And then there's, and then there's an alloy of copper, which is copper and zinc and that's called brass. Okay. And so brass is a really common material and that's a gold color. And then we also have a nickel alloy which is nickel and copper and that makes a silver color. And so those are the kind of metals we work with. Copper based alloys are relatively cheap and affordable, but they will tarnish or turn your skin green. But I've got other methods for fixing that and with that, so like with the casting stuff, we've really, I've explored like all these different kinds of alloys that we can do. And so we've gotten into some more zinc based alloys. Zinc is a silvery colored metal and it's relatively cheap as well. So that's nice. We have a little bit of sterling silver so if we have someone that works really hard on their project, we can do a sterling silver ring and and lots of other things like that.

But we are able to make basically any color and with a copper-based alloy. Um, so there's this technique called flame painting, which is really, really fun. I have a few pictures of ones that are like, they're very vibrant colors so Okay. With flame painting, coppers are really reactive metal. So depending on the temperature it reaches, its color will change anywhere from oranges, blues, greens, yellows, purples, pinks. It's very cool. So if we cast a copper or make any copper ring, we can change it to all of those colors depending on what student wants. Um, so that is what I really love about jewelry is like endless possibilities and….

SH: It sounds a bit unpredictable.

MC: Oh yeah. So.

SH: Like that and that could be the fun part of it.

MC: Yeah, it can be really unpredictable or if you practice a lot you can make it very predictable in very precise detail.

SH: And that’s what the coolness, that challenge.

MC: Exactly. Yeah. Yeah. Um, like the flame painting is probably one of the most difficult things I've ever done. Mainly because it's a technique that's not like widely practiced. So there's not a lot of research and resources available. It's a lot of just like a handful of YouTube videos that were like not the best quality but you're like, it seems like what they're doing is working. So after a while I figured it out and if I'm teaching someone it's much easier for them to pick it up. But.

SH: Is that a couple questions coming to me.

MC: Yeah.

SH: Do you know where that originated?

MC: Yeah, so it actually originated uh, at the Ozark um, folk school or folk festival. I don't, I don't know what it is but…

SH: I know whay you're talking about.

MC: Um, so they have a little booth so if you guys wanna look this up I would highly recommend it. It's called, they're called the Copper Colorists. So these are the guy's that um, he was a coppersmith for a while and every time he would solder, which solder is just using a lower temperature metal, um, to join two pieces of copper together whenever you would solder, um, he would notice these colors in a circle around the area he soldered cuz he would use his torch which would heat up the copper and make these colors. Right. Well one day he figured out if he used a reducing flame, which is one that I like to tell people. It craves oxygen, it wants more oxygen. He could use it like an eraser and he could erase parts of these oxides and create patterns. And so then he, after lots of practice he practiced with 15,000 butterflies. So if you go on his website, he's got a whole gallery of all this stuff and it is just crazy. You're talking about a master at work. So he's been doing it, him and his wife have been doing it for the last 30, 30 years at this Folk Center. And they just sell all their work there. They've got a whole shop and they teach people how to do it every year. They have a whole training class and everything. They even have a book as well.

SH: Are materials free for students or are they purchasing?

MC: Absolutely. So everything at the Center, if we can make it free. So we have a very like a decent sized stockroom and we have a large uh, amount of donated materials. So if we have the stuff you need for your project in the center, it's free for you, no questions asked. Cool. Um, but other than that, like lots of times say someone's making a big metal desk or something, they might need to go to the Home Depot and spend 50 to a hundred bucks on the steel for their desk. But all in all your time is really what's your project's gonna cost, you know, which is really lovely. Like you don't have to pay for the TAs, you don't have to pay for the materials. Like in jewelry people don't pay for anything unless they wanna make like a gold ring or something cuz gold is very expensive and I have no gold to give them. But um, other than that it's all free.

SH: Can you talk a little bit about organizing that space, that jewelry making space and you know, the state it was in when you came there? Was there any kind of research or anything that you did that went into fine tuning That?

MC: I would say like the biggest educational resource that exists is YouTube. And so I go to YouTube for everything. So that's how I figured out how to do the flame painting cuz someone, I don't even remember how I found out it existed, but once I found out it existed I was like addicted, like I gotta figure out how to do this. And so that's where I found a handful of videos of people doing it eventually figured it out. Um, but with all of this um, jewelry stuff, all of my researchers on YouTube also looking up articles. I also have a book. Um, I brought it with me, I

can bring that out later. Um, but as soon as I was hired as a peer mentor, I went online and I was like, you know, jewelry textbooks and I found one for seven bucks on like a used bookstore website. And so I got that and it's like all the basics of jewelry making and so I used a lot of that and so that's really how I've developed my skills in like anything else, it's just a lot of practice. So when I first got there we really didn't have a lot of like good tooling and it was all just like there was a jewelry bench but everything was just like thrown on it and like, unless you were the one person who did that, you don't know where anything was. So I've been doing a lot of organization and bought a lot of trays and we've moved things around a lot. So it's not just usable for me who uses it a lot but usable for someone who doesn't know where things are. Recently in hot work since I've become the supervisor, been working hard to make what we call the SOP, which is the standard operating procedures. And so that's just gonna go step by step with pictures. My little tips and tricks, what I've struggled with all those things go into the book and that's a physical copy and it's also online and on the website. Um, so people, you know, it's an educational resource so people can look at that. And so that way when I'm -- -- not there or even if I'm still working at the center but I'm not on shift, then they can just look at the book and reference that. And so all this research that I've done, like lots of YouTube, I take like real diligent notes cuz otherwise I'll just forget all that is really how I've just developed the jewelry at the center. But it's a lot of people come in and they wanna make things that I've never made before and it's like hey listen, I've never made this but we're gonna try together and we'll definitely figure it out. And so that's how we get better together. And so that's what I love about the Center is cuz you know, I only have like one or two projects I want to do, you know, every once in a while, depending on how busy I am, I mean I could do infinite projects but time is of the essence. But when other people have done the projects and the planning, you just have to help them make it. And so you can learn a lot from that.

SH: What did we do before YouTube videos? Like how did we learn anything before YouTube?

MC: It’s just so great cuz like I can watch a video and like it took this dude, I mean he's been doing it for 30 years of flame painting, right? And I've been doing jewelry for like, you know, a year now-ish. And so like I was able to watch a few YouTube videos and figure out this thing that I never otherwise would've even known existed. Like yeah I sold her things together but I never once have been like, oh I wonder if I can get these colors real specific in like a pattern and paint them on a butterfly. But Right. You watch a YouTube video and you figure it out. And so another resource, you guys should definitely check this out. So Terry Cochrem is a master jeweler in Australia and so he has a YouTube channel called the Jewelers Hub and all of his content is free and he's a phenomenal educator. I've learned so much from Terry. He's just a total god honestly, if you just look him up, you'll look at him and be like, yeah that dude knows what he's doing. Um, but he explains everything in such great detail. Like, um, he had a hour and a half long YouTube video on how to make a silver wedding band very, you know, a wedding band goes over all the basic concepts of jewelry making especially when you're making rings. And so I like, you know, when I started watching I was like, oh it's an hour and a half, I'm not gonna watch the whole thing. And then an hour and a half goes by and I'm like, oh wow. I probably had many other things I needed to do but I, I loved every second of it. Terry's voice is so soothing and he just does it so well what you mean and it's funny watching people on

YouTube cuz they make it look easy, right? Yeah. And that's like the goal we're all trying to get to the place where like people are like, oh wow, you made that look easy and it's actually really difficult but that's what practice is all about so mm-hmm , um, I've learned a lot from Terry for sure.

SH: Was there any student project that really surprised you? Like wow, I don't know how we're gonna do this but we figured it out.

MC: Well, so like with the casting stuff there's been some cool projects cuz the casting stuff recently got started like this semester. And so we had someone they wanted to make a really dimensionally accurate part and it was much larger than we could actually facilitate with um, how big our like casting setup is. Uh, cuz ours is meant for more small metal parts. Um, and so this is actually a part that was going in like a model airplane, uh, like a quarter scale model airplane. And so we actually cast four different parts and then our plan is to weld them together. And so this is still in the works, the project's not done yet, but it's, it's really fun um, seeing that to come to fruition cuz like those are the things that are possible cuz the casting is really fun cuz I like to tell people over winter break I sort of had casting fever, um, and I like went around my house finding any plastic object.

So do you, I can explain the lost wax casting process?

SH: Yeah, yeah that'd be great.

MC: Yeah. So how we do casting at the center is primarily we take a wax model. So I've got chunks of wax, I've got ring blanks which are, you know, just round cylinders with holes in them. And so basically you just carve away with our wax carving tools and you can do any intricate design. And so wax carving is crazy because it will pick up every detail. I joke with people like if you scratch it, it's gonna show up in the cast and I've had many rings where I work on 'em and I can't even tell the defects until we cast it and then I can see all these defects and most of the time at that point if you can't see 'em in the wax it's easy to sand them off and once we've cast the ring, uh, so it's not a big deal but it is sort of crazy how detailed this can get. So wax is our primary method where we can make the models and you can create rings and pendants and earrings and anything you can think of really. Um, but another way you can do it is any object that can be consumed in the kiln. So the kiln will go through a bunch of different cycles and so it will go up to uh, 1,350 degrees. So if anything will be incinerated at the temperature we can use that as a model. So an example would be like Lego bricks. I've done lots of Lego bricks and cuz all that is just plastic and so it's easy to it, it'll just incinerate out of there. And so it's really crazy cuz our Lego bricks, you can read the Lego like logo on the top of the nubs of each of the bricks they stack together. That's how precise we're talking with lost wax casting.

SH: Wow.

MC: Right. We cast a Lego brick and you can read the cereal number, it will fit together with other Legos. And so over winter break I was just like going around, I was like going through the Monopoly set, like getting some of the plastic houses out of that.

SH: I saw the Monopoly. Um, yeah there was one Monopoly piece on your workbench.

MC: Exactly because there's like a game like Monopoly city, which my family is played zero times cuz we got like three monopoly games. So I like robbed half of the pieces from there cuz there's like skyscrapers and houses and windmills and stuff. And so all that stuff like those are really how I do my test pieces cuz there is so much that goes into the casting stuff, you know, you gotta think, oh what temperature is the flask at? Which the flask is what holds the model. So how the basic process works is once you've made your wax model, you have your plastic model, you can take that and we'll put it on what we call a screw tree. So this tree will contain other models and we'll connect them all with wax wires and they'll all meet in the center almost like connecting to a tree trunk.

So they'll branch off and then we, that goes on a rubber base, we put a metal cylinder around it and then we mix up some investment which is special casting plaster that is meant to handle the heat and we pour that in there and that's a liquid right? And after two hours we will, we'll vacuum out all the bubbles and then let that cure for two hours. After two hours we can throw it in the kiln and it'll be in there for like 14 hours going through different burnout cycles. So at different temperatures for different times. And then after that we've incinerated all the models so that plaster is holding in perfect detail what we had previously put in and then we can put it into our vacuum casting setup. And so the plaster is actually sort of porous like a sponge, right? And so we can pull a vacuum through and that helps the molten model completely fill the molds cuz it's under a vacuum. It's big sucked into the molds. And then I tell people molten metal is like a sponge so when it's molten it's soaking up all the gases in the environment. And so as that metal cools it's gonna eject those gases. And so if we, the vacuum helps to pull those bubbles away from the surface of the metal, otherwise we might have lots of little dips and pits from all the bubbles that have solidified in the surface. So the vacuum helps every model come out perfect really. Well there's a whole lot to it, the temperature you pour the metal at and how many models you have and what size they are and all that. So, uh, the casting is so much wrong cuz it is like limit limitless possibilities. And another thing we've been working on is in printing and prototyping, I was talking about the resin printer. Well we have a special castable resin that we can use. So we can print these models on the resin printer. And then those are able to be burnt out and we can cast them. So that means we are now able to make things on the computer, print them out on the printer and then cast them.

SH: So precise.

MC: So precise.

SH: You’re able to punch in all those measurements and numbers exactly, get it just perfect.

MC: And, and it's cool cuz this is like what the real jewelers do, right? You go to a jewelry store and you see they have their forever diamond series, right? and so all these rings, you know, lots of them have been cast casting is a great process cuz if you're duplicating a ring, um, there's many ways to duplicate a model, but you can put all these identical rings on one screw tree and then you can cast 'em all at once. So I can cast a few hundred rings at a time if I were an industrial casting facility, but like in mine I could cast like easily 40 of the same ring. It's deceivingly difficult to make a really high quality wax model just because like it's easy to cover the wax but it takes a lot of time to get it, you know, where everything is perfectly smooth and exactly how you want it. So depending on the style of ring you're making, I always tell people, you know, go for the more organic kind of things where like you're not going for anything specific. It's more like a texture versus if you're trying to like write letters or something like that. It's easy for people to see that you didn't get get it quite right. But if you're doing sort of a rough texture and it's sort of like a random kind of thing then that it's exactly how you tried it . Yeah. And so that's why I tell people all the time, that's a lot of what jewelry is like, depends what you're going for, but at the end of the day it's how you want to make it. So you know, they're not gonna know if that's not exactly what you meant.

SH: No. You can tell 'em exactly what you want.

MC: Yeah.

SH: Is there one colossal fail? Like is there one thing that went terribly wrong? It sounds like you can kinda like fix many things and just take it from a different perspective.

MC: Yeah.

SH: But if there was one thing that was like, I learned a lot from it, but it just, it like? No.

MC: Um, so, uh, with the casting, um, most of the time they've been successes and so, um, but there has been a few, so you know, the manufacturer for the plaster mm-hmm. , um, they, they tell you, okay, you can get your models an inch away from the top and the bottom of the flask and a quarter inch away from the sides. Now I love to push this limit, so I'll put like 12 plus models on one tree and this goes into a cylinder that's, um, three and a quarter inch in diameter and four inches tall. So it's not that big. So, um, getting these spruce to line up perfectly where everything like fits really well can sometimes be difficult. So one time I did this model and I'll screw these trees up, if it's a complex one, like with 12 or plus models, it'll take me like two or three hours because you're connecting all these little wax wires and then putting them on the tree. Speaker 2 00:27:24 It's, it's quite a lot of work. But I had this one and I had like these 12 models and at the top I had a horse, which is like this little plastic horse we got at Walmart . Um, and so this horse was sitting at the very top. When these plastic models are in the kiln, uh, before they melt, they actually expand a little bit. So my plaster is meant, it's called plastic cast and it's meant for this specific thing where the caleal resins and the plastics will expand. So it, it's able to handle that well. The horse was just a little too close to the top, uh, and he busts his, busted his head through the top of the mold as it's in this burnout process.

And so as you can imagine, since we're using a vacuum, it's gonna suck everything right through that little hole that his head poked in the top. And so I, this is the first time I like I anticipated this would happen eventually, but I was like, I open it up and normally when I'm casting I'm teaching other people how to do it or my friends, uh, who also work at the center of there cuz it's just a fun time. You're pouring molten metal into it. And so we were all around and I pull it out, I'm like, oh no guys, there's a hole there. I guarantee all the metal goes straight through the bottom. And we're like, but I've like spent three hours screwing this up so I'm just gonna hope that it works. But at this point there's no way to plug the hole. The flask is at like 1000 degrees Fahrenheit and your metal's at like 2000 degrees Fahrenheit. And so we put it in the vacuum and sure enough we poured the metal down and just like, you know, going down the toilet, all of it went straight down and I was like, uh, so disappointing cuz I had so many models on there. Luckily not many people's actual projects more so just like test pieces. But it was like, it was really sad cuz it's like, it's sad. I knew it would do it, but there's nothing you can do. But that was the only one so far that we've had completely failed like that. So That's good.

SH: Yeah. It's really good. [Laughter] Well, thank you so much for joining us today. This I've really enjoyed it. Learned a ton. I wanna make jewelry now myself, like.

MC: Yeah, it's pretty fun.

SH: I'm a maker too. I just, you talking about it, I'm thinking about what's a, what's that kind of textured ring that I could make? Cuz I like the idea of a texture. Actually more than something smooth.

This is our final episode of the season. Thank you for joining us for all four episodes and we will be back next year with some more stories of making across campus. You can find us on our website at lib ib.purdue.edu/maker podcast. All right. Until next year.