[music]

Matthew: Yeah. I think the data, the technology and people, all like gears kind of working together and interacting with one another are setting the stage in this advanced digital manufacturing environment.

[music]

Mike: From the Center for Occupational Research and Development, welcome to Preparing Technicians for the Future of Work. I'm your host Mike Lesiecki. In each podcast we'll reach out to people who are actually on the front line of the future of work and hear what they have to say. That means interviews with industry, interviews with working technicians, forward thinkers in the field. We'll do some background research and we'll curate that research to make sure you have the most up to date and relevant information. And in every episode, we'll suggest action that you can take. We want to inspire you to take that action.

This podcast is brought to you by the Center for Occupational Research and Development, known as CORD, with financial support by a grant from the National Science Foundation's Advanced Technological Education program. Opinions expressed in the podcast do not necessarily represent those of the National Science Foundation. You can find out more about our project and our approach at PreparingTechnicians.org.

Our guest today is Matthew Carter. Dr. Carter is Vice President at Cook Medical. He's headquartered in North Carolina. Matthew, welcome. What does Cook Medical do? What do they make? And what is your role there?

Matthew: Well, thank you very much, Michael. We are a medical device manufacturer. We make medical devices. Our specific location is in North Carolina. Our company is headquartered in Indiana. In North Carolina, what we make primarily are devices for upper and lower GI. So, you need imaging in your GI tract to find stones, gallstones, or problems in the esophagus, or the stomach, or the liver. And we make devices that physicians use for those procedures. We have Designing all the way to Manufacture and Distribution.

Mike: You know, at Cook, is there such a thing as a typical technician? I mean, what does a technician do with these

devices? Their manufacture? Their testing? What do they need to be able to do?

Matthew: Well, that's a good question. You know, technicians (and I'll use the term "traditional"), in the traditional sense, a technician, especially in a manufacturing environment... I think of folks that have gone through generally two years of education, a community college education. They've got skills, hands on skills associated with—could be pneumatics or programming or hydraulics, CAD/CAM-types of things, mechanical, electrical, electronics...but all surrounding the manufacturing environment. So, we're talking about people that can design and build tools and fixtures, jigs—equipment that does some sort of step to help in the manufacturing of products. And, so, in the manufacturing environment, we're talking about a "typical technician" or a "traditional technician." They're doing those kinds of technical things in assisting and building tools. And things that help us assemble products.

Mike: Matthew, you don't do much in terms of high-volume manufacturing, or do you? Is it more one-offs or...? I'm trying to think, what does a technician need to know about material flow or logistics? I'm just curious about that.

Matthew: Well, there's the lower-volume manufacturing, you know, smaller batches, and work that comes in smaller batches. But then there's also the more continuous-flow type manufacturing where the volumes are higher, and you have a dedicated line that is manufacturing and assembling. I think it's important that the technician role is something that—although it could be different in different companies—by and large, if you have this technical person that understands equipment, and tools, and materials that go into it, you're going to want them to be a part of a cross functional team where they're understanding how the material is getting to the line.

And then how is that getting manufactured and how is that getting assembled? And when do you need it? And in what place do you need it? It could be a wide range of expectation. If you have more of a batch-processing line, maybe it's more appropriate to have the skill set of an individual who, you know, is more of a machining CAD/CAM-type background, where essentially what you're doing is designing a tool or a fixture that is assisting an operator

in assembly. Or measurement. A go/no-go gauge. A tool that helps you with threads, as opposed to the ergonomic issues you might have if you were doing it by hand.

Mike: Sure.

Matthew: Those kinds of things, positioning tools and positioning raw materials and things in a way that they can be assembled. If you go up to more continuous-flow type situation, where normally you have more automation, you have more where the equipment is running, and there's a person who is monitoring some outputs of that equipment, making sure that things are moving, like they're supposed to be.

Those are a little bit of a spectrum from one side to the other, but they're different. But they do require the core technical knowledge and ability in one of these areas that we mentioned earlier. The higher level (what we're calling higher skill, maybe is the right way to say it), is usually more geared toward these pieces of equipment that are now doing a lot of the work and doing a lot of the measurement and collecting information that you're going to use.

Mike: Well, think about that, especially as you said, collecting information. You hear terms, like "going more digital" in a manufacturing environment. Or "more digital skills." As you think forward, beyond today, maybe say, the next two or three years, what sort of knowledge and skills and abilities, including those digital skills at this technician level, do you forecast? What do you see coming? And how do you know what's coming? I know that's somewhat of a complicated question.

Matthew: Yes. But I think of it in a traditional manufacturing. And if we consider, for example, as we were talking earlier, maybe there's companies, and they grow and change differently, right? But often you see companies that get started, and as they're growing, you do maybe start more with the batch manufacturing. You have a product that goes into the market. And it starts to saturate. Become more popular. I see it as: That's a manufacturing environment that you see traditional skilled technicians. Maybe you think of more in that role. But we're moving now toward advanced manufacturing environments. And what I'm terming advanced manufacturing environments, we're talking about measurement. Decision making. Data. You know, think of

things like vision systems. Robotics. 3D manufacturing. Printing things that are coming more online.

Mike: Right.

Matthew: And getting integrated. So, now you have, instead of sequential, and maybe equipment or tools that are in series, you start to see more of equipment and more sophisticated pieces of equipment that are now interacting with one another—the advanced manufacturing and digital manufacturing, as you mentioned.

Now, things are more connected. So, these data interactions, you get a lot more of the IF-THEN type situations with equipment, where IF this happens, the equipment decides, THEN I need to go do this. IF this happens, I'm going to do this. So, they start talking to one another and, along the lines of Internet of Things (which is bringing in this communication and data and digital manufacturing environments), interactions are increasing between data, technology, people—you know, they all have to interact. The pace of change now changes. It increases. It gets fast. Productivity demands, when you're in that environment, normally are increasing.

And certainly... We're a medical device manufacturer. I don't think it's different from any other industry. But the quality demands continue to increase. So, the consistency of what you manufacture is very important. But I think the data, the technology, and people, all like gears kind of working together and interacting with one another, are setting the stage in this advanced digital manufacturing environment.

Mike: Here's a follow-up question to that, as you think about this advanced manufacturing, as you described it. Does that mean you're going to need more of those highly-skilled, advanced-manufacturing technicians? Or fewer of them, as the automation takes over? Can you address that?

Matthew: I believe what we are going to see is that the environments do require more of the higher-skilled technician workforce. I believe strongly that, what that puts on the manufacturer is, we have to now really engage with the educators that are in our areas. Because we're going to have a big need, I believe, to be reskilling and upskilling our workforce. We have people that come into the

organization and there's a great deal of investment in the culture, and the systems, and the things that we do. And how we work together. And what the company—how it goes about performing different tasks. So, in these advanced manufacturing environments, upskilling and reskilling our employees are really important. The data knowledge and analysis that's needed. Advanced digital literacy, like, "What are you getting out of these equipment?" "Can you understand them?" The business knowledge and processes. Because it does kind of bring business aspects into it. So, I believe we're going to need more higher-skilled technicians. I believe a large percentage of that will come from companies that do well in upskilling and reskilling their current workforce, as well as adding new students and new folks that are coming into the workforce.

Mike: Sure. You mentioned educators. I know you yourself work a lot with educators and you're involved in and helping this advanced workforce preparation. What can we (I'll use the global "we" here—us educators in the United States)... In your view, what could we do better to prepare the workforce that comes to you? And here's the thing, Matthew, we'd like to make it so that you have to screen fewer job applicants to get the right candidate. If that's the goal, so to speak, what should educators do differently, do better, today? What's your view of that?

Matthew: Well, I suspect that the educators and their environment is tough like everywhere else. And that there's a certain amount of time required to educate students and have them ready to go into the workforce. So, I'm sure there's lots of pressures that come, too. 'Cause they're trying to balance the requirements of programs. And how do you change programs. I'm sure it's, like most places, a lot of, a lot of people involved and it takes time.

So, the things that I think about—I'll use the term cross-cutting skills but, if you have a well-rounded person that comes into the workforce out of a program... You know, you're thinking about critical thinking. We're interested in problem solving. Collaboration.

More and more, cross-functional collaboration is so important. As companies are more global, you have team members that aren't in the same room. They aren't in the same building. They aren't in the same country. So, being

Preparing Technicians for the Future of Work Podcast   **Page 6**
Episode 16, *Cross-Cutting Skills in Advanced Manufacturing for*
Medical Devices

able to collaborate. Being able to "message sent, message heard"—making sure those are aligned. Teamwork.

Certainly the technical skills we've talked about. But I believe that there could be an opportunity for students that come into the workforce to have an advantage, if those folks can show that they have some understanding and they've done some activities throughout their programs where they do understand there's a business element. They understand that they need to be able to display information to a group of people often not in the same place. That they can understand quickly and easily.

So, could an educator maybe embed in their current programs... (So, they don't have to go through, you know, lots and lots and lots of headaches trying to change a major program. That's a big deal.) But can you, when you are going through a program, can you take a course or some coursework that you are providing and leading, and maybe embed in there some opportunities for them in projects to have to work with one another? To have to present information? To have to gather some data?

And at least have some basic understanding that there's two sides, generally, that you're trying to balance. You're trying to balance the consistency and the technical piece of what you're doing. It's easy to get really in deep depth of that and be focused completely on it, but then balance it with the business side of "Was it worth three years to make something perfect?" Or "Do I spend a year on it, and I have the controls that are necessary for what I'm making?" So, those are different. And that's a critical-thinking skill: that you really need to know both sides a little bit, just to understand hey, there is a business side to what we do!

There's also the marriage of that and the communication. I believe the communication is going to be more and more a part of what we do. If we take the current environment with COVID-19, we have a lot of people that are working off site. Where people, that they're splitting time because of safety concerns. And things like that.

Mike: Right.

Matthew: There's still a requirement to get a lot of work done, right? And you have to be able to communicate and interact with people. And in different ways.

Mike: Those are good points. You know, you just mentioned the pandemic. We're talking in the summer of 2020 in the midst of things. As you mentioned, we heard a lot about "remote work." Is that happening in this sense, at Cook... And now, I don't mean Zoom. I don't mean working from home about Zoom. But I mean, do any of your technicians...Are they operating equipment remotely? Are they managing processes remotely in that sense? Are they logging in through VPNs to access data? In that sense, is Cook seeing a trend, in that sense, for remote?

Matthew: Yes. There will continue to be the trend in that way. I believe we are seeing it. We have equipment where you log in remotely and you can monitor data. I think, if anything, the pandemic may expedite that kind of work in companies.

Most companies have plans in place. We have a catastrophe plan if you have a hurricane or a tornado... And "How are you going to have the lines back up?" "How are you going to have access to generators?" The things that you normally need.

Mike: Right.

Matthew: But I don't know that companies that have done well in being able to take a large percentage of their workforce (potentially) and have them contribute off site. I'm not sure most companies were prepared in the time that the pandemic came. Literally, within a few weeks...

Mike: Sure.

Matthew: ...the pandemic went across the globe. And so, it's forced companies to more quickly be able to say, "Wow. We need to be able to do this." And I'm sure most people go through the headaches that come with it, but when executive orders come out and things like that, and all of a sudden you can't come to work! And it spurs you to do things maybe more quickly than you would in a normal environment when you have a committee that's going through and trying to figure out the rules and stuff like that. All of a sudden, those kinds of things really get sped up!

Mike: Yeah, I know what you mean. I'm just thinking from the educator's standpoint... Many educators back in that time

Preparing Technicians for the Future of Work Podcast   **Page 8**
Episode 16, *Cross-Cutting Skills in Advanced Manufacturing for*
Medical Devices

(let's call it March), they were notified, "Oh, by the way, all of your courses are going online next week." And they're thinking, wait a minute…" So, there's some parallels there with education and industry, as well.

Well, Matthew, I was reading a quote of yours. And it says, "We're looking for high-functioning technicians. And they're hard to find." Is that true? Are you having trouble finding the right folks in your workforce?

Matthew: Well, I think that there are highly skilled technicians that have the overall ability to do the things we're talking about. Certainly, you can find students that come out of these programs that fit your organization. They're a cultural fit. And they have the training and background and ability to come in and contribute and start doing what you want them to do.

But I believe it's rare to find that human being that, not only has the ability to do technically multiple things (maybe not so specific in just machining, or just electronics), but they have the ability to design a piece of equipment. They have the ability to communicate and lead a project. Where they're communicating with suppliers that are sending parts that are going to send the equipment. They have the ability to communicate with the design team that's designing this piece of equipment that it's going to be used on. And they need to understand exactly the specifics and details of what does this equipment need to do? How accurate does it need to measure? How often do the parts need to be completed? So, that person that has the skill set—to do project management, contribute, communicate, and technically do multiple things—I believe is very hard to find. I think that those folks are special.

And, generally speaking, I think that those people are getting upskilled within an organization over some period of time. But you have a program in place and maybe you have one or two of these people. So, it's very important in my mind, at a manager level, the ability to say, okay, this person is special. I am going to have someone that's learning from them over some period of time, probably years, because those are really special skills.

Mike: That's a great point. You know, Matthew, we really appreciate today your perspective (Sort of a high level perspective in a way, right?) from a company that's really

working in the area of advanced manufacturing. You painted a great picture of what a technician's role will be in a highly advanced manufacturing environment.

I liked your comments about things like, "There's equipment that has built-in measurement. Built-in decision rules. The technician works with data more and more." I just think the way you talked about the future for these people, just makes a lot of sense to us.

And also, I enjoyed your advice to educators—potentially embedding these cross-functional and communication skills into their programs. You know, in the education world, it's not so easy, as you mentioned, to change a program, or even a whole course. But you can change parts of courses. You can update. In fact, that's what you're expected to do. So, I think that's good advice for our educators that are listening to this podcast, as well as our industry colleagues who work with those educators. So, Matthew, thanks for your perspectives on that. I appreciate it very much.

Matthew: Well, thank you for having me, Michael.

Mike: Good. Thanks again.

That's it for today, listeners! In today's podcast, we heard how vitally important it is for technicians to work with data. And to be able to work in cross-functional teams. Matthew said a technician has to be able to gather data, be able to present information, and be able to balance the technical aspects of a project with business considerations as well.

So, here's your task for today. Let's take Matthew's suggestions. Create, not just a student project team, but make it a cross-functional team. If your program is in automation, make contact with other faculty at your school and departments like IT or Biotech, and form a joint project-based team. And that might even be easier today in the world of online and Zoom interactions. But here's the important thing: Ask an industry partner to serve as an advisor with a specific idea of integrating the business aspects—the business implications—into the project. By doing this, you're going to be preparing them for today and tomorrow.

```
As always find our podcast on PreparingTechnicians.org, or
subscribe on Apple Podcast or Google Play. A rating and
review as always appreciated. Our series is produced by
John Chamberlain at CORD. Thank you, John. The project is
led by the Principal Investigator, Ann-Claire Anderson.
Thank you Ann-Claire, and thank you, our listeners, for
Preparing Technicians for the Future of Work.
```

[music]

Please include the following citation when citing or using content from this podcast:

Lesiecki, Michael (Host). Preparing Technicians for the Future of Work Podcast: Episode 16, *Cross-Cutting Skills in Advanced Manufacturing for Medical Devices* (audio podcast, transcript). Center for Occupational Research and Development, Waco, TX. August 2020. Retrieved from http://www.preparingtechnicians.org/