



## IMPROVE YOUR DIGITAL SKILLS AT HOME



*Interview with Meredith Portsmore, Director of the Tufts Center for Engineering Educational Outreach & research professor, Tufts University, Massachusetts, U.S.A.*

[Tufts Center for Engineering Education and Outreach](#) (CEEEO) is a leader in the research and development of engineering-based learning experiences that help prepare the next generation of problem-solvers. As an interdisciplinary center of engineering and education researchers and practitioners, Tufts CEEEO produces knowledge about engineering-based teaching, learning, and technology through research.

Tufts CEEEO transforms that knowledge into practice in the form of products, curricula, activities, and classes for educators and learners from kindergarten through college.

We were fortunate enough to catch up with the director of the CEEEO, Meredith Portsmore, to discuss how to improve your digital knowledge and STEM skills while learning at home, and how educators can facilitate digital upskilling for their students even as they teach remotely.

**Arduino Education:** Hi, Meredith. Firstly, can you tell us how you got into remote teaching?

**Meredith Portsmore:** Tufts CEEEO has done in-person workshops and classes for educators for years. There were two main motivators for going online - travel and time. As we traveled around the world for different conferences and events, we met so many great folks who wanted to participate in our workshops but couldn't make the



trip to Massachusetts. We started our remote graduate certificate program to be able to work with folks across the country and around the world. In terms of time, we know that teachers are really busy individuals and the flexibility of remote learning makes it possible for a deep learning experience to fit into the time they have available. This is true for the folks we work with who live down the street from Tufts as well as those who are around the globe. All of those led to the [Teacher Engineering Education Program](#) which is a four-course graduate certificate in engineering education offered completely online.

*AE:* What's your advice for students learning from home, especially in subjects that would usually involve getting hands-on, like electronics?

*MP:* Even though you are online, you still need to make space and time for learning. In terms of space, think about where you are going to keep and work on your hands-on projects. You need to keep your materials in a place where they are safe and accessible. Remember you will also have to have a place to store projects as you work on them. Time-wise, even though remote learning can be done in your pajamas at any time, you do have to make time to do it. Set a schedule for when you'll do it. It's even better if you have a friend or classmate working at the same time to keep you on track. Open up a video chat to talk about what you are building or coding.

*AE:* What advice would you give to educators who are remote teaching STEM subjects?

*MP:* First of all, we should acknowledge that this is really challenging. All of us who teach STEM are used to being able to sit down and look at a student's project. We are used to being able to show them ideas. Online can be tough but it's also an opportunity to break the teacher as the one who knows all. In my online classes, I try and have multiple sources of help for students and encourage them to share everything about their project. They post pictures, photos and code from their projects. They look at each other's work, I look at their work and we have teaching assistants who can look at their work. It's more about getting everybody across the finish line of a project.

*AE:* If you were a student or teacher using time at home to learn new digital skills, what would they be and why?

*MP:* The great thing about STEM projects is they can be multi-age. I have two sons, 7 and 12 years old, and we have been doing a lot of making and coding together. It's something I haven't always made time for, but while we've been at home it's been a great way to work and spend time as a family. We've been having different theme nights (movie night, game night, etc.), and then we started a "making" night. We've been playing with different hardware like [Arduino](#) and LEGO, and software like [Scratch](#) and [Python](#). We made a robot that could turn a tablet round so we could video chat with family at dinner and turn the tablet to face different people at our table. I really want my kids to learn computational thinking and coding but also think it's fun. In her book, Marina Bers, a professor of computer science at Tufts, talks about [Coding as a](#)



[Playground](#) and I think that is so exactly right. These are all tools that enable you to do things you need or want. I want all kids, especially mine, to be able to see challenges in the world and have a great toolbox of digital and physical tools to use to create solutions.

*AE:* Can you share any advice with educators on how to get started assessing their students' skills development if they're getting hands-on with STEM subjects at home?

*MP:* When I teach, I always work backwards. What do I want my students to be able to do in the end? For my elementary teachers in our TEEP program I want them to be able to design a robotic fish feeder for a client. I break the elements of that into smaller challenges (building, gears, sensors, and coding) as well as design process elements (problem-scoping, planning, evaluating ideas). For me, assessment is really an accumulation of the evidence I want to see in my students' thinking. I also don't want assessment to get in the way of their learning. Some assignments aren't formally assessed so students feel comfortable taking risks and asking questions. I also use assessment as a guide for my instruction. Some topics are more challenging than others so as those bubble up in smaller projects I might do an extra instructional piece around that. For example, some folks in my teacher education classes are brand new to coding, so we might spend some extra time on how a piece of code works.

I'm always looking for my students' reasoning and thinking. I don't use quizzes or tests online because that just tells me facts you remember. I do a lot of writing that we assess with rubrics. I also build in a lot of drafts and iteration because I really want to see how my students take feedback and use it to make improvements.

*AE:* Do you have any assessment tools you recommend?

*MP:* The online tools I love aren't so much assessment tools but more ways to facilitate collaboration and sharing. I use [Torsh](#) with my teachers to discuss videos of students doing STEM online. It's great because it allows us to be looking at a video together. Tufts CEEO faculty member Ethan Danahy also developed a tool called [Visual Classrooms](#) that lets instructors pose rich questions for students to respond to online or in-person.

*AE:* Thanks, Merredith!

You can find more information about TUFTS CEEO online learning opportunities for the summer, including an Arduino online workshop [here](#).

If you want to get your students started with hands-on STEM learning at home, try the brand new Arduino Student Kit, which has everything one student needs to get started with the basics of electronics and coding.

To purchase the Arduino Student Kit, you can [find your country's distributor](#), or [visit our online store](#).

