

# Dr. Deborah Fields Releases High School E-Textiles Curriculum on Computer Science Education Week

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The [Exploring Computer Science \(ECS\)](#) high school curriculum has added a new electronic textiles unit, developed in part by Dr. Deborah Fields, to benefit high school students across the nation. Dr. Deborah Fields, an associate research professor in the Instructional Technology and Learning Sciences (ITLS) Department at Utah State, has spent the past four years working on this unit. Electronic textiles (e-textiles) involve sewing lights and microcontrollers with conductive thread into fabric-based creations.

This e-textiles unit makes its debut on [Computer Science Education Week](#) (December 3-9). Computer Science Education Week is a week devoted to promoting computer science education, including hosting events like “an hour of code.” According to the Computer Science Education Week website, only “35% of high schools teach computer science.” However, the ECS curriculum is helping to change that and the e-textiles unit further helps involve a diverse student base.



Dr. Deborah Fields

Dr. Fields spent a decade working on creating engaging, personalized activities that introduce coding, electronics, and crafts that go beyond traditional coding pursuits. In particular, Dr. Fields has spent the past four years developing, researching, and revising a curriculum for e-textiles. The e-textiles unit for ECS was a team effort, sponsored by the National Science Foundation, co-led by Dr. Fields and by Dr. Yasmin Kafai (University of Pennsylvania), Dr. Joanna Goode (University of Oregon), Dr. Jane Margolis (UCLA), and John Landa (Los Angeles Unified School District). “I’m especially grateful for the expertise of the teachers who were willing to work with us, try out our curriculum, and help us improve it,” Fields said.

The e-textiles activities and curriculum can be thought of as an alternative entry into computer science. Students sew lights into fabric and program the lights to blink; they can also program sound effects triggered by sensors. The artifacts students create are tangible, creative, and personal. Many add lights to shirts or sweatshirts; some create their own stuffed animals that respond to squeezing. Each artifact is unique and represents students’ personal interests and computational expertise.

Based on initial research, the curriculum has been a success. Students’ fascination, sense of competence, and feelings of personal creativity with computer science increased across the 15 classrooms that implemented the curriculum last year.

In addition, the team saw important learning gains in core computational concepts, circuitry, crafting, and computational communication. The e-textiles team of researchers and practitioners will be presenting their

research at conferences around the world this coming year.

Much of the work that set the stage for the e-textiles curriculum took place at Utah State with the Craft Technologies course that Dr. Fields developed. In fact, one former Craft Technologies student, [Janell Amely](#), provided the specialized illustrations for the unit as well as expert assistance co-developing the technical and software selection guides that accompany the curriculum. [Matthew Havertz](#), a current ITLS student, took on the role of creating the team's entry into the NSF STEM Video Challenge. Utah State colleagues Dr. Colby Tofel-Grehl, Dr. Kristin Searle, Dr. Breanne Litts, and Dr. Victor Lee also work with e-textiles and have, according to Dr. Fields, offered "tremendous supports."

Dr. Fields and her team have also made arrangements with [Adafruit](#), which has put together class and student kits that make it easier for teachers to purchase materials around the innovative e-textiles classroom projects. The Exploring Computer Science curriculum has been released in the nation's seven largest urban school districts as well as over 25 states and Puerto Rico. This e-textile curriculum unit will be presented to the world's largest meeting of computer science educators in March 2019.

Teachers can [download the e-textiles curriculum, tech guide, computer science standards, and a resource list here](#). Below is a video explaining the research and curriculum:

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