Designing and Debugging with Electronic Textiles: Diversifying Participation and Deepening Learning in K-12 Computer Science Education (Invited Keynote)

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I. KEYNOTE ABSTRACT
We are witnessing a remarkable comeback of computer programming in schools. While computers seem to be accessible everywhere, particularly outside school, where children and youth are connecting to wider networks of other young users, their capacity to wield such devices critically, creatively, and selectively is decidedly less potent. Learning the language of computers introduces students to processes for thinking and solving problems and for engaging creatively and critically with digital media. Using the example of electronic textiles—computational artifacts in which circuits are stitched with conductive thread to connect microcontrollers and control sensors and actuators, I describe how we can broaden access, diversify representation, and deepen learning. More importantly, I illustrate how the introduction of crafting with computing in schools that serve marginalized populations can help diversify who makes and the kinds of artifacts that are being made, how projects can introduce more complex programming concepts and practices, and what kind of tools we can design to support novice programmers in coding and debugging hybrid artifacts.

II. ABOUT THE SPEAKER
Yasmin Kafai is a professor at the University of Pennsylvania. She is a learning designer and researcher of online tools, projects and communities to promote computational making, crafting, and creativity. With colleagues at MIT, she developed the programming language Scratch and researched applications and participation in clubs, classrooms, and online communities. With Jane Margolis and Joanne Goode, she developed electronic textile projects to introduce computing, crafting, and engineering to high school students and teachers as part of the nationwide "Exploring Computer Science" curriculum. She has written several books, among them "Connected Code: Why Children Need to Learn Programming," "Connected Gaming: What Making Videogames Can Teach Us About Learning and Literacy," and "Connected Play: Tweens in a Virtual World"—all published by MIT Press. Kafai earned a doctorate from Harvard University while working with Seymour Papert at the MIT Media Lab. She is a Fellow of the American Educational Research Association and the International Society for the Learning Sciences.

2019 IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)