# Keynote: Developing our Quantum Future

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## Abstract

In 1981, Richard Feynman proposed a device called a 'quantum computer' to take advantage of the laws of quantum physics to achieve computational speed-ups over classical methods. Quantum computing promises to revolutionize how and what we compute. Over the course of three decades, quantum algorithms have been developed that offer fast solutions to problems in a variety of fields including number theory, optimization, chemistry, physics, and materials science. Quantum devices have also significantly advanced such that components of a scalable quantum computer have been demonstrated; the promise of implementing quantum algorithms is in our near future. I will attempt to explain some of the mysteries of this disruptive, revolutionary computational paradigm and how it will transform our digital age.

## Biography

Named one of Business Insider's 39 most powerful engineers of 2018, Dr. Krysta M. Svore is the General Manager of Quantum Software at Microsoft where she leads the Quantum Architectures and Computation group. Her research focuses on the development and implementation of quantum algorithms, including the design of a scalable, fault-tolerant software architecture for translating a high-level quantum program into a low-level, device-specific quantum implementation. She has also developed techniques for protecting quantum computers from noise, including methods of quantum error correction, establishment of noise thresholds, and the development of improved decoders. She spent her early years at Microsoft developing machine-learning methods for web applications, including ranking, classification, and summarization algorithms. Her work in machine learning has expanded to include quantum algorithms for improve machine learning methods.

In addition to her work at Microsoft, Krysta has been named to the Defense Advanced Research Projects Agency (DARPA) Information Science and Technology (ISAT) Study Group for a three-year term. Dr. Svore was recently appointed as a member of the Advanced Scientific Computing Advisory Committee of the Department of Energy and chaired the 2017 Quantum Information Processing Conference. Svore received an ACM Best of 2013 Notable Article award. In 2010, she was a member of the winning team of the Yahoo! Learning to Rank Challenge. Dr. Svore is honored as a Kavli Fellow of the National Academy of Sciences. She is a Senior Member of the Association for Computing Machinery (ACM), serves as a representative for the Academic Alliance of the National Center for Women and Information Technology (NCWIT), and is an active member of the American Physical Society (APS). Dr. Svore has authored over 65 papers and has filed over 20 patents. She received her PhD in computer science with highest distinction from Columbia University and her BA from Princeton University in Mathematics with a minor in Computer Science and French. This quarter, she is teaching an undergraduate course on quantum computing at the University of Washington. She hopes to inspire young women around the world, to show them that technology is a field for everyone, and that they will be the ones to unlock technologies that will be ground-breaking and transformative. Krysta lives in Seattle, WA where she is raising her 1 year old daughter, Daisy.