ABSTRACT: Quantum computers will offer revolutionary improvements in computing power, a particularly urgent promise given that Moore’s law is at an end and we will soon be unable to shrink transistors any further to improve traditional silicon-based classical machines. However, due to random noise a host of other issues, actually building a large scale, working quantum computer is an extraordinarily difficult challenge. In this talk, I provide a non-expert introduction to quantum computing, outlining the reasons why quantum computers can outperform any classical algorithm, and also present the serious challenges which must be overcome to make them functional. I will particularly focus on solid state quantum computers, and describe the key role electrical engineering will play in ultimately making them a reality.

ABOUT THE AUTHOR: Eliot Kapit is a tenure track Associate Professor of Physics at CSM, which he joined in July 2018. Prior to that he was an Assistant Professor at Tulane University from 2015 - 2018; he obtained his PhD in theoretical physics from Cornell University in 2012 and had postdoctoral appointments at Oxford and the City University of New York before moving to Tulane. His research is focused on practical, near-term applications of quantum technology, including quantum computing and simulation, and he works in collaboration with scientists at U. Chicago, NIST and Google to realize his ideas.

electrical.mines.edu