Department of Physics
Arizona State University

STUDENT'S CHOICE COLLOQUIUM

Thursday, February 8, 2024

Refreshments at 3:15pm in PSF 101
Colloquium from 3:30pm - 4:30pm outside PSF 101

The Future of Quantum Supremacy Experiments

Professor Scott Aaronson

The University of Texas at Austin

Abstract:

I'll advocate a research agenda for designing quantum computations that are

(1) feasible on near-term, non-error-corrected, "NISQ" devices,
(2) hard to simulate classically, and
(3) easy to verify classically,

where right now we only have any two of the three. The agenda involves understanding the structure of otherwise-random quantum circuits that have been postselected to have the behavior that we want (such as producing verifiable outputs), and includes concrete open problems on which progress seems feasible.

I'll also discuss a new proposal of "quantum information supremacy," which aims to demonstrate by a direct experiment the dimensionality of tensor product Hilbert space (rather than computational hardness) and which seems to be experimentally feasible today.

Biography:

Scott Aaronson is Schlumberger Chair of Computer Science at the University of Texas at Austin, and founding director of its Quantum Information Center, currently on leave at OpenAI to work on theoretical foundations of AI safety. He received his bachelor's from Cornell University and his PhD from UC Berkeley. Before coming to UT Austin, he spent nine years as a professor in Electrical Engineering and Computer Science at MIT. Aaronson's research in theoretical computer science has focused mainly on the capabilities and limits of quantum computers. His first book, Quantum Computing Since Democritus, was published in 2013 by Cambridge University Press. He received the National Science Foundation's Alan T. Waterman Award, the United States PECASE Award, the Tomassoni-Chisesi Prize in Physics, and the ACM Prize in Computing, and is a Fellow of the ACM and the AAAS.

Host: William Munizzi and Prof. Cindy Keeler
View our Spring 2024 Physics Colloquium schedule at https://physics.asu.edu/colloquia