institute for pure & applied mathematics

Bridging the Gap Between NISQ and FTQC

February 17 - 20, 2026

Scientific Overview

Increasingly sophisticated experimental demonstrations of the primitives associated with fault-tolerant quantum computation (FTQC) have made it clear that the field is beginning to move out of the noisy intermediate-scale quantum (NISQ) era first described by Preskill in 2018. The evident technical challenges of continuing to scale quantum computers are further complicated by the sometimes conflicting approaches associated with these two paradigms. Everything from software, to error suppression, to algorithm development, and prospective applications, seems to have distinct NISQ and FTQC perspectives. To continue towards the goal of utility-scale quantum computation, it will be essential to bridge this dichotomy.

This workshop aims to understand the current state of the art in this period of transition and how to best prepare for early fault-tolerant quantum computers and beyond. Experts in a wide range of topics, including (but not limited to) quantum algorithms and applications, quantum architecture and error correction, and quantum hardware will be invited to contribute their perspective on the latest challenges facing the field. We will focus particularly on the role that pure and applied mathematics can play in bridging the NISQ-FTQC gap, and better understanding when utility-scale quantum computation will be possible.

Participation

Additional information about this workshop including links to register and to apply for funding, can be found on the webpage listed below. Encouraging the careers of women and minority mathematicians and scientists is an important component of IPAM's mission, and we welcome their applications.

Organizers

Andrew Baczewski (Sandia National Laboratories)
Katerina Gratsea (University of Wisconsin)
Peter Johnson (Apollo Quantum)
Ciaran Ryan-Anderson (Quantinuum)

Speakers

Juan-Miguel Arrazola (Xanadu Quantum Technologies)
Andrew Baczewski (Sandia National Laboratories)
Nicole Bellonzi (Apollo Quantum)
Michael Beverland (IBM)
Dripto Debroy (Google)
Katerina Gratsea (Technical University of Catalonia)
Itay Hen (USC)
Artur Izmaylov (University of Toronto)
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For more information, visit the program webpage:
www.ipam.ucla.edu/BNF2026