Yale

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Subject: Nomination Letter for Best Scientific Cybersecurity Paper

Dear Colleagues,

It is my pleasure to nominate the work "Securing Reset Operations in NISQ Quantum Computers" by Mi and colleagues for the NSA's Best Science of Cybersecurity paper competition. Their work marks a significant advancement in the area of quantum computer security and was presented at the Conference on Computer and Communications Security (CCS) in November 2022.

The creation of a secure reset operation by Mi and colleagues, which makes it possible for qubits to be re-initialized considerably more quickly than thermalization and permits quicker quantum processing, is one of the main contributions of the paper. The foundation of their strategy is the well-known confusion principle, which successfully confuses potential enemies by introducing a random sequence of reset operations. This novel approach is both straightforward and efficient, and it doesn't call for any hardware changes to the current quantum computers, making it an immediate and workable answer. The research of Mi et al. sheds important light on the security of quantum computers and paves the way for reliable and secure quantum computing infrastructures.

Thank you for considering this novel research paper on security of quantum computers for the Best Science of Cybersecurity competition.

Sincerely,

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About the letter writer

Yongshan Ding is an Assistant Professor of Computer Science, a member of the Yale Quantum Institute (YQI) and a member of the Computer Systems Lab (CSL) at Yale University. He leads the Quantum Computer Systems group to work on a broad set of problems related to algorithms and computer architecture in quantum computing. Ding completed his Ph.D. from the University of Chicago. He is a recipient of the William Rainey Harper Dissertation Fellowship, one of UChicago's highest honors, and the Siebel Scholarship. Prior to that, he received his B.Sc. degrees in Computer Science and Physics from Carnegie Mellon University. Ding is the lead author of a textbook, Quantum Computer Systems, in Morgan-Claypool Publisher's Synthesis Lectures in Computer Architecture. He also co-created a Massive Open Online Course on quantum computer systems design.