

Nomination Statement for paper “**Securing Reset Operations in NISQ Quantum Computers**”.

I want to nominate the groundbreaking work by Mi and colleagues for the NSA’s Best Science of Cybersecurity paper competition. Their research, which was published at the Conference on Computer and Communications Security (CCS) in November 2022, represents a significant milestone in the field of quantum computer security.

As the emergence of quantum computing continues to transform scientific research, drug discovery, finance, machine learning, and many other fields, it is imperative to address the unique security challenges posed by these new types of computers. Mi et al.'s work provides critical insights into the security of quantum computers, paving the way for secure and robust quantum computing infrastructures.

One of the key contributions of Mi et al.'s work is the development of a secure reset operation, which enables qubits to be re-initialized much faster than thermalization, thus, allowing for faster quantum computation. Their approach is based on the well-established principle of the confusion, which effectively confuses potential adversaries by introducing a randomized sequence of reset operations. This innovative solution is both simple and effective, and requires no hardware modifications to existing quantum computers, making it a practical solution that can be adopted today.

The potential economic benefits and security implications of this work are significant, as quantum computing continues to grow into a multi-billion-dollar industry. Mi et al.'s paper represents a major step forward in the field of quantum computer security, and their approach to secure reset will undoubtedly pave the way for further advances in the field. I strongly believe that this work deserves recognition and commendation, and I hope the NSA considers it for the Best Science of Cybersecurity paper competition.

Nominated Paper Title:

Securing Reset Operations in NISQ Quantum Computers

Nominated Paper URL:

<https://caslab.csl.yale.edu/publications/mi2022securing.pdf>

Venue Previously Published:

Conference on Computer and Communications Security (CCS), November 2022

Keywords:

Quantum computers, cybersecurity

Prof. Wenjie Xiong

Virginia Tech