Yunong Shi

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EDUCATION

The University of Chicago, Chicago, IL
Ph.D, Physics, advisor: Fred T. Chong — Expected June, 2020

University of Illinois, Urbana-Champaign, Urbana, IL
B.S., Applied Mathematics — June, 2013

EXPERIENCE

QISE-NET fellow — **Aug 18 - Sep 19**
IBM T.J Watson Center
Quantum compilation optimizations; Fault-tolerant protocols for bosonic qubit architectures; Automated program verification.

W.J Cody fellow — **June, 17 - Sep 17**
Argonne National laboratory
Use formal verification and model checking to facilitate the safe migration of large numerical software to new super computing architectures.

SOFTWARE

CertiQ Designed and implemented most of CertiQ, the first verification framework for a realistic quantum compiler. CertiQ is mostly-automated and largely extensible.

Qiskit Terra Designed and implemented the commutation analysis and optimization pass in the Qiskit Terra compiler.

ScaffCC Designed and implemented the circuit optimization module, the QAOA library and a new backend that directly compiles to control pulses in the hardware.

PUBLICATIONS

- **Y. Shi**, P. Gokhale, P. Murali, J. Baker, C. Duckering, Y. Ding,C. Chamberland, A.W. Cross, D.I. Schuster, K.R. Brown, M.R. Martonosi, D. Franklin, F.T. Chong, "Greater Quantum Efficiency by Breaking Abstractions", PIEEE special issue (**To appear**), January, 2019.
- **Y. Shi**, X. Li, R. Tao, A. Javadi-Abhari, A. Cross, F. Chong, R. Gu, "Contract-based Verification of a Realistic Quantum Compiler", *submitted to ASPLOS 2020* (**manuscript**), 2019.
- **Y. Shi**, C. Chamberland, A.W. Cross, "Fault-tolerant Preparation of Approximated GKP states", *New Journal of Physics*, 21(9), 093007. (**NJP**). September, 2019.
- **Y. Shi**, N. Leung, P. Gokhale, Z. Rossi, D.I. Schuster, H. Hoffmann, F.T. Chong, "Optimized Compilation of Aggregated Instructions for Realistic Quantum Computers", *International Symposium on Architectural Support for Programming Languages and Operating Systems (***ASPLOS)**. April, 2019.
- P. Gokhale, Y. Ding, T. Propson, C. Winkler, N Leung, **Y. Shi**, D.I. Schuster, H. Hoffmann, F.T. Chong, "Partial Compilation of Variational Algorithms for Noisy Intermediate-Scale Quantum Machines", *International Symposium on Microarchitecture* (**MICRO**). October, 2019.

TEACHING EXPERIENCE

Phys 121 General physics, Phys 131 Mechanics, Phys 133 Wave Heat Optics, Phys 250 General Relativity, Phys 254 Computational physics