

YONGSHAN DING

September, 2024

CURRENT POSITION

Assistant Professor of Computer Science and of Applied Physics, Yale University

Yale University *Phone: 412.877.8966*
51 Prospect St, *Email: yongshan.ding@yale.edu*
New Haven, CT 06511 *Web: <https://www.yongshanding.com>*

RESEARCH AREAS

My research interests are in the areas of **computer architecture** and **algorithms**, particularly in the context of **quantum computing**. My work spans broadly in the theory and application of quantum error correction, efficient and reliable quantum memory, and optimizations at the quantum hardware/software interface.

EDUCATION

Ph.D., University of Chicago

Department of Computer Science

Chicago, IL

2016 - 2021

William Rainey Harper Dissertation Fellowship

Thesis: *Architecting Quantum Computing Systems in the Presence of Noise*

Advisor: Frederic T. Chong

B.Sc., Carnegie Mellon University

Dual degree in Physics and Computer Science

Pittsburgh, PA

2012 - 2016

University Honors, MCS and SCS College Honors

Thesis: *Quantum Algorithms on Boolean Matrix Product Verification*

Advisor: Ryan O'Donnell

PROFESSIONAL EXPERIENCE

Assistant Professor, Yale University, Computer Science Dept. , 2021 - Present	New Haven, CT
Assistant Professor (by courtesy), Yale University, Applied Physics Dept. , 2023 - Present	New Haven, CT
Visiting Scientist, Simons Institute for the Theory of Computing , Summer 2021, 2022	Berkeley, CA
Visiting Scholar, Massachusetts Institute of Technology, Phys. & Math. Dept. , 2020	Cambridge, MA
PhD Candidate, University of Chicago, Computer Science Dept. , 2016 - 2021	Chicago, IL
Undergraduate Researcher, Carnegie Mellon University, Comp. Sci. Dept. , 2015 - 2016	Pittsburgh, PA
Undergraduate Researcher, Carnegie Mellon University, Phys. Dept. , Summer 2014	Pittsburgh, PA

GRANTS, AWARDS AND HONORS

1. **Best Paper Award, QCE** 2024
for the paper *GraFeyn: Efficient Parallel Sparse Simulation of Quantum Circuits* with S. Westrick et al.

2. **NSF Faculty Early Career Development (CAREER) Award** (PI, \$807,813) 2024-2029
for the project *Applications and Architectures with Heterogeneous Superconducting Qubits*
3. **DARPA Grant in Advanced Research Concepts** (PI, \$145,576) 2023-2024
for the project *Enabling Noise-Resilient Quantum Speedup for Optimization Problems*
4. **NSF Grant in Foundations of Emerging Technologies** (Lead PI, \$900,000) 2023-2026
for the project *Design and Implementation of Quantum Databases* with Liang Jiang, Jakub Szefer
5. **Boehringer Ingelheim Grant** (PI, \$406,729) 2023-2026
for the project *Bring down the computational costs for simulations for drug design on fault-tolerant quantum computers*
6. **Rosenkranz Awards for Pedagogical Advancement** (PI, \$8,000) 2023-2025
Yale Poorvu Center
for the project *Getting Students Quantum-Ready via Auxiliary Learning Materials*
7. **Bell Labs Prize, Finalist** (5 out of 107 submissions from 25 countries) 2022
Nokia Bell Labs, with J. Szefer
8. **IEEE Micro Top Picks in Computer Architecture of 2020, Honorable Mention** 2021
for the paper *Systematic Crosstalk Mitigation for Superconducting Qubits via Frequency-Aware Compilation*
with P. Gokhale et al.
9. **IEEE Micro Top Picks in Computer Architecture of 2020, Honorable Mention** 2021
for the paper *SQUARE: Strategic Quantum Ancilla Reuse for Modular Quantum Programs via Cost-Effective Uncomputation* with X.-C. Wu et al.
10. **Siebel Scholar** (\$35,000) 2020-2021
Thomas and Stacey Siebel Foundation
11. **William Rainey Harper Dissertation Fellowship** (\$4,300) 2020-2021
University of Chicago
12. **Best Paper Award, QCE** 2019
for the paper *Minimizing State Preparations in Variational Quantum Eigensolver by Partitioning into Commuting Families* with P. Gokhale et al.
13. **Best Paper Award, IBM Q (First Place)** 2019
for the paper *Minimizing State Preparations in Variational Quantum Eigensolver by Partitioning into Commuting Families* with P. Gokhale et al.
14. **University Honors, SCS College Honors, MCS College Honors** 2016
Carnegie Mellon University
15. **College Dean's List, High Honors** 2012 - 2016
Carnegie Mellon University
16. **Mathematics Competition, Runner Up** 2016
for my undergrad thesis *Quantum Algorithms on Boolean Matrix Product Verification*
17. **Sigma Xi Poster Competition, Second Prize** 2015
for the paper *Analysis of Reconstructed J/ψ Meson Candidates in $p\bar{p}$ Collisions*

PUBLISHED BOOK

Quantum Computer Systems: Research for Noisy Intermediate-Scale Quantum Computers June 2020
Y. Ding and F. T. Chong

Springer Nature (previously Morgan & Claypool Publishers), DOI: 10.2200/S01014ED1V01Y202005CAC051
This book celebrates the remarkable progress that scientists across disciplines have made in the past decades and reveals what roles computer scientists and engineers can play to enable practical-scale quantum computing.

Original language: English (ISBN 978-3-031-00637-1, 1st ed. 2020)

Translation: Japanese (ISBN 978-4-274-23066-0, 1st ed. 2023)

PH.D. STUDENTS SUPERVISED

(AP: Applied Physics, CS: Computer Science)

Shifan Xu (AP, 2021 - present)
Dantong Li (CS, 2022 - present)
Ben Foxman (CS, 2023 - present)
Kun Liu (CS, 2023 - present)
Rohan Kumar (CS, 2023 - present)
Victor Zhou (CS, 2023 - present)

B.S. SENIOR THESIS SUPERVISED

Dikshant Dulal (2022 - 2023) (NUS-Yale)
Yasmina Abukhadra (2022 - 2023)

TEACHING

Instructor: Introduction to Quantum Computing (CPSC 447/547) Spring 22, Fall 22, Fall 23, Fall 24
Computer Science Department, **Yale University**

Instructor: Quantum Information Systems (CPSC 449/549) Spring 24
Computer Science Department, **Yale University**

Instructor: Quantum Computer Systems (CPSC 647) Fall 21
Computer Science Department, **Yale University**

Co-Instructor: Quantum Computing Systems Design Spring 21
MOOC at edX.org, **University of Chicago** (with F. T. Chong)

Guest Lecturer/Teaching Assistant: Quantum Information Science II (MIT 8.371) Spring 20
Department of Physics, **Massachusetts Institute of Technology** (with I. Chuang)

Co-Instructor: Novel Computing Architectures and Technologies (CMSC 33001-1) Fall 18
Computer Science Department, **University of Chicago** (with F. T. Chong)

Teaching Assistant: Honors Intro to Computer Science II (CMSC 16200) Winter 17, Winter 18, Winter 19
Computer Science Department, **University of Chicago**

Head Teaching Assistant: Parallel and Sequential Data Structures and Algorithms (15-210) Spring 15, Fall 15, Spring 16
Computer Science Department, **Carnegie Mellon University**

PROFESSIONAL SERVICE (Reviewed or edited 100+ articles since 2021)

Editorial Boards

- ACM Transactions on Quantum Computing (**TQC**), *Associate Editor*, 2022 - present
- Quantum Journal (**Quantum**), *Editor*, 2022 - present

Conference Committees

- ACM/IEEE International Symposium on Computer Architecture (**ISCA**) 2024
- Architectural Support for Programming Languages and Operating Systems (**ASPLOS**) 2022, 2023, 2024
- ACM/IEEE International Symposium on Microarchitecture (**MICRO**) 2022, 2023
- Design Automation Conference (**DAC**) 2023
- IEEE International Conference on Quantum Computing and Engineering (**QCE**) 2021, 2022
- International Conference on Parallel Architectures and Compilation Techniques (**PACT**) 2022
- IEEE International Symposium on Workload Characterization (**IISWC**) 2021

Journal Refereeing

- Nature
- Nature Physics
- Nature Communications
- IOP Quantum Science and Technology (QST)
- Quantum Journal (Quantum)
- Physical Review X Quantum (PRX Quantum)
- Physical Review Letters (PRL)
- Physical Review A (PRA)
- Physical Review Research (PRResearch)
- Nature Partner Journals (NPJ Quantum Information)
- Journal of Parallel and Distributed Computing
- IEEE Computer Architecture Letters (CAL)
- IEEE Micro

Grant Refereeing/Committee

- *Selection Committee* for Natural Sciences and Engineering Research Council (**NSERC, Canada**)
- *Reviewer* for Dutch Research Council (**NWO, The Netherlands**)
- *Reviewer* for European Research Council (**ERC, European Union**)

Other Committees

- *Selection Committee* for IEEE Micro Top Picks from the Computer Architecture Conferences (**Top Picks**) 2023
- *External Review Committee* for ACM/IEEE International Symposium on Computer Architecture (**ISCA**) 2023

REFEREED PUBLICATIONS ¹

1. **GraFeyn: Efficient Parallel Sparse Simulation of Quantum Circuits** September 2024
 S. Westrick, P. Liu, B. Kang, C. McDonald, M. Rainey, M. Xu, J. Arora, Y. Ding, and U. Acar
 In IEEE Intl. Conference on Quantum Computing and Engineering (**QCE**).
 Award: **QCE Best Paper Award**

¹Acceptance rates noted when available

2. **Protecting Quantum Computers with a Trusted Controller** September 2024
T. Trochatos, C. Xu, S. Deshpande, Y. Lu, Y. Ding, and J. Szefer
In IEEE Intl. Conference on Quantum Computing and Engineering (**QCE**).
3. **Dynamic Pulse Switching for Protection of Quantum Computation on Untrusted Clouds** May 2024
T. Trochatos, S. Deshpande, C. Xu, Y. Lu, Y. Ding, and J. Szefer
In Proceedings of Intl. Symposium on Hardware Oriented Security and Trust (**HOST**).
4. **NAPA: intermediate-level variational native-pulse ansatz for variational quantum algorithms** January 2024
Z. Liang, J. Cheng, H. Ren, H. Wang, F. Hua, Z. Song, Y. Ding, F. T. Chong, S. Han, X. Qian and Y. Shi
In IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems.
5. **Systems Architecture for Quantum Random Access Memory** October 2023
S. Xu, C. T. Hann, B. Foxman, S. M. Girvin, and Y. Ding
In Proceedings of 56th Intl. Symposium on Microarchitecture (**MICRO**). Acceptance rate: 101/424 \approx 24%.
6. **Design of Quantum Computer Antivirus** May 2023
S. Deshpande, C. Xu, T. Trochatos, H. Wang, F. Erata, S. Han, Y. Ding, and J. Szefer
In Proceedings of Intl. Symposium on Hardware Oriented Security and Trust (**HOST**).
7. **Quantum Computing: Progress and Innovation** January 2023
G. Byrd, and Y. Ding
IEEE Computer: Outlook 2023 (**Computer**). Invited article.
- 2022**
8. **TorchQuantum Case Study for Robust Quantum Circuits** October 2022
H. Wang, Z. Liang, J. Gu, Z. Li, Y. Ding, W. Jiang, Y. Shi, D. Z. Pan, F. T. Chong, S. Han
International Conference on Computer-Aided Design (**ICCAD**).
9. **Variational Quantum Pulse Learning** September 2022
Z. Liang, H. Wang, J. Cheng, Y. Ding, H. Ren, Z. Gao, X. Qian, S. Han, W. Jiang, and Y. Shi
In IEEE Intl. Conference on Quantum Computing and Engineering (**QCE**).
10. **QOC: Quantum On-Chip Training with Parameter Shift and Gradient Pruning** July 2022
H. Wang, Z. Li, J. Gu, Y. Ding, D. Pan, and S. Han
In proc. of 59th Design Automation Conference (**DAC**). Acceptance rate: 23%.
11. **QuantumNAT: Quantum Noise-Aware Training with Noise Injection, Quantization and Normalization** July 2022
H. Wang, J. Gu, Y. Ding, Z. Li, F. T. Chong, D. Pan, and S. Han
In proc. of 59th Design Automation Conference (**DAC**). Acceptance rate: 23%.
12. **QuantumNAS: Noise-Adaptive Search for Robust Quantum Circuits** February 2022
H. Wang, Y. Ding, J. Gu, Y. Lin, D. Pan, F. T. Chong, and S. Han
In proc. of 28th Intl. Symposium on High-Performance Computer Architecture (**HPCA**). Acceptance rate: 80/262 \approx 30%.

2021

13. **TILT: Achieving Higher Fidelity on a Trapped-Ion Linear-Tape Quantum Computing Architecture** February 2021
X.-C. Wu, D. Debroy, Y. Ding, J. M. Baker, Y. Alexeev, K. R. Brown, and F. T. Chong
In Proceedings of 27th Intl. Symposium on High-Performance Computer Architecture (**HPCA**). Acceptance rate: 62/258 \approx 24%.

2020

14. **$O(N^3)$ Measurement Cost for Variational Quantum Eigensolver on Molecular Hamiltonians** November 2020
P. Gokhale, O. Angiuli, Y. Ding, K. Gui, T. Tomesh, M. Suchara, M. Martonosi, and F. T. Chong
In IEEE Transactions on Quantum Engineering (**TQE**)
15. **Systematic Crosstalk Mitigation for Superconducting Qubits via Frequency-Aware Compilation** October 2020
Y. Ding, P. Gokhale, S. F. Lin, R. Rines, T. Propson, and F. T. Chong
In Proceedings of 53rd Intl. Symposium on Microarchitecture (**MICRO**). Acceptance rate: 82/424 \approx 19%.
Award: **IEEE Micro Top Picks, Honorable Mention**
16. **Minimizing State Preparations in Variational Quantum Eigensolver by Partitioning into Commuting Families** October 2020
P. Gokhale, O. Angiuli, Y. Ding, K. Gui, T. Tomesh, M. Suchara, M. Martonosi, and F. T. Chong
In IEEE Intl. Conference on Quantum Computing and Engineering (**QCE**)
Award: **QCE Best Paper Award and IBM Q Best Paper Award, First Prize**
17. **Resource-Efficient Quantum Computing by Breaking Abstractions** June 2020
Y. Shi, P. Gokhale, P. Murali, J. M. Baker, C. Duckering, Y. Ding, N. C. Brown, C. Chamberland, A. Javadi-Abhari, A. Cross, D. I. Schuster, K. R. Brown, M. Martonosi, and F. T. Chong
In Proceedings of the IEEE. Invited Paper. (**IEEE**)
18. **SQUARE: Strategic Quantum Ancilla Reuse for Modular Quantum Programs via Cost-Effective Uncomputation** May 2020
Y. Ding, X.-C. Wu, A. Holmes, A. Wiseth, D. Franklin, M. Martonosi, and F. T. Chong
In Proceedings of 47th Intl. Symposium on Computer Architecture (**ISCA**). Acceptance rate: 77/421 \approx 18%.
Award: **IEEE Micro Top Picks, Honorable Mention**
19. **NISQ+: Boosting Quantum Computing Power by Approximating Quantum Error Correction** May 2020
A. Holmes, M. R. Jokar, G. Pasandi, Y. Ding, M. Pedram, and F. T. Chong
In Proceedings of 47th Intl. Symposium on Computer Architecture (**ISCA**). Acceptance rate: 77/421 \approx 18%.

2019

20. **Partial Compilation of Variational Algorithms for Noisy Intermediate-Scale Quantum Machines** October 2019
P. Gokhale, Y. Ding, T. Propson, C. Winkler, N. Leung, Y. Shi, D. I. Schuster, H. Hoffmann, and F. T. Chong
In Proceedings of 52nd Intl. Symposium on Microarchitecture (**MICRO**). Acceptance rate: 80/345 \approx 23%.

21. **Resource Optimized Quantum Architectures for Surface Code Implementations of Magic-State Distillation** February 2019
A. Holmes, Y. Ding, A. Javadi-Abhari, D. Franklin, M. Martonosi, and F. T. Chong
Microprocessors and Microsystems (**MICPRO**)

2018

22. **Magic-State Functional Units: Mapping and Scheduling Multi-Level Distillation Circuits for Fault-Tolerant Quantum Architectures** October 2018
Y. Ding, A. Holmes, A. Javadi-Abhari, D. Franklin, M. Martonosi, and F. T. Chong
In Proceedings of the 51st Intl. Symposium on Microarchitecture (**MICRO**). Acceptance rate: 74/351≈21%.

23. **Charm: A Language for Closed-form High-level Architecture Modeling** June 2018
W. Cui, Y. Ding, D. Dangwal, A. Holmes, J. McMahan, A. Javadi-Abhari, G. Tzimpragos, F. T. Chong, and T. Sherwood
In Proceedings of the 45th Intl. Symposium on Computer Architecture (**ISCA**). Acceptance rate: 64/373≈17%.

DISSERTATION AND OTHER ARTICLES

1. **Architecting Quantum Computer Systems in the Presence of Noise** August 2021
Y. Ding (Advisor: F. T. Chong)
UChicago PhD Dissertation
2. **Putting Qubits to Work – Quantum Memory Management** July 2020
Y. Ding, F. T. Chong
ACM SIGARCH
3. **The Case for Quantum Computing** January 2019
F. T. Chong, K. R. Brown, Y. Ding
ACM SIGARCH
4. **Quantum Algorithms on Boolean Matrix Product Verification** May 2016
Y. Ding (Advisor: R. O'Donnell)
CMU Undergraduate Thesis
Award: **Mathematics Competition, Runner Up**
5. **Analysis of Reconstructed J/ψ Meson Candidates in $p\bar{p}$ Collisions** August 2014
Y. Ding (Advisor: J. Russ)
Award: **Sigma Xi Poster Competition, Second Prize**

PATENT

- **System and Method of Partial Compilation with Variational Algorithms for Quantum Computers**
US Patent Number 11886379
F. T. Chong, P. Gokhale, Y. Ding and T. Propson Filed 2020, Granted 2024

1. **Quantum Computing at the Noise Resilient Scale** 2024
 Invited talk, in reverse chronological order.
 - Cisco Seminar talk (Virtual; August 2024) Host: Peng Zhao
 - Columbia Computer Science Colloquium Talk, New York, NY (July 2024) Host: Henry Yuen
 - JPMC Seminar talk (Virtual; June 2024) Host: Zichang He
 - NSF workshop on Quantum System Software Stack, Alexandria, VA (June 2024) Host: Vipin Chaudhary

2. **Application Specific Quantum Error Correction: Challenges and Opportunities** 2023 - 2024
 Invited talks, in reverse chronological order.
 - UCSD Computer Architecture Seminar, La Jolla, CA (April 2024) Host: Yufei Ding
 - MIT Optics and Quantum Electronics Seminar, Cambridge, MA (December 2023) Host: Dirk Englund
 - Princeton Quantum Technology Conference (**PQTC**), Princeton, NJ (October 2023) Host: Jeff Thompson

3. **Quantum Error Mitigation and Near-Term Applications** July 2022
 Invited workshop talk at the Software Stack Design for Quantum workshop of Design Automation Conference (**DAC 59**), San Francisco, CA Host: Xin-Chuan Wu

4. **Software and Algorithmic Approaches to Quantum Noise Mitigation: An Overview** July 2022
 Invited talk at Quantum Computer Systems Lecture Series by University of Notre Dame and MIT (Virtual) Host: Zhiding Liang and Hanrui Wang

5. **Searching and Training Parametrized Quantum Circuits in the Presence of Noise** November 2021
 Invited seminar talk at Challenge Institute for Quantum Computation (**CIQC**) and Center for Quantum Coherent Science (CQCS) Colloquium at UC Berkeley (Virtual) Host: John Kubiatowicz

6. **Architecting Quantum Computer Systems in the Presence of Noise** Spring 2021
 Invited seminar talks, in reverse chronological order. (Virtual)
 - University of Michigan Host: Ron Dreslinski
 - University of Illinois, Urbana-Champaign Host: Chris Fletcher
 - University of Washington Host: Georg Seelig
 - Yale University Host: Lin Zhong
 - ETH Zürich, Switzerland Host: Kenny Paterson
 - University of Maryland, College Park Host: Xiaodi Wu
 - Stony Brook University Host: C.R. Ramakrishnan
 - University of Pennsylvania Host: Steve Zdancewic
 - North Carolina State University Host: Frank Mueller
 - University of Pittsburgh Host: Xulong Tang
 - University of Notre Dame Host: Peter Kogge
 - Tufts University Host: Peter Love
 - Pennsylvania State University Host: Anand Sivasubramaniam

7. **Systematic Crosstalk Mitigation** November 2020
 Invited seminar talk at Quantum Information Science and Engineering Seminar Series, Chicago Quantum Exchange (**CQE**), Chicago, IL. (Virtual) Host: Gabrielle Roberts

- | | |
|--|-------------------------------------|
| 8. Systematic Crosstalk Mitigation
Invited seminar talk at AQT, Lawrence Berkeley National Lab (LBNL), Berkeley, CA. (Virtual) | October 2020
Host: Costin Iancu |
| 9. Systematic Crosstalk Mitigation
Conference Talk at MICRO '20 , Athens, Greece. (Virtual) | October 2020
Host: Yipeng Huang |
| 10. Systematic Crosstalk Mitigation
Invited seminar talk at QIP Club, Chicago Quantum Exchange (CQE), Chicago, IL. (Virtual) | September 2020
Host: Kevin Gui |
| 11. Strategic Quantum Ancilla Reuse
Conference talk at ISCA '20 , Valencia, Spain. (Virtual) | June 2020
Host: Moin Qureshi |
| 12. Magic State Distillation and Arbitrary-Angle Magic States
Invited talk at QIP meeting, MIT , Cambridge, MA. | March 2020
Host: Aram Harrow |
| 13. Architecting Quantum Computing Systems
Invited talk at Quanta meeting, MIT , Cambridge, MA. | January 2020
Host: Isaac Chuang |
| 14. Architecting our way up the quantum ladder: from NISQ to FT quantum computers
Invited seminar talk at NC State , Raleigh, NC. | March 2019
Host: Frank Mueller |
| 15. Magic-state functional units
Conference talk at MICRO '18 , Fukuoka, Japan. | October 2018
Host: Masaaki Kondo |

OTHER TALKS AND PRESENTATIONS

- | | |
|---|---------------|
| 1. ILP-Based Scheduling for Linear-Tape Model Trapped-Ion Quantum Computers
Poster talk at SC '19 conference, Denver, CO. (With X.-C. Wu) | November 2019 |
| 2. Improved Noise Simulation via Clifford+C3 Sampling
Poster talk at QEC 19 conference, London, UK. (With A. Holmes) | July 2019 |
| 3. Significance and Challenges in Quantum Computing Education
Invited as one of the three panelists at WCAE '19 workshop, Phoenix, AZ. (With Ronald Barnes and Aviral Shrivastava) | June 2019 |
| 4. Partial Compilation of Variational Algorithms
Poster talk at MICRO '19 conference, Columbus, OH. (With P. Gokhale) | October 2019 |
| 5. Dynamic Memory Manager for Quantum Programs with Nested Parallelism
Poster talk at STAQ meeting, Durham, NC. | December 2018 |
| 6. Magic-State Functional Units
Talk at EPiQC monthly meeting, Chicago, IL. (With A. Holmes) | October 2018 |
| 7. Resource Optimized Quantum Architectures for Surface Code Error Correction
Master examination at University of Chicago, Chicago, IL. (With A. Holmes) | October 2018 |
| 8. Optimizing Rotation Gate Generation on Quantum Machines
Poster talk at GCASR '18 , Chicago, IL. (With M. Fensterstock) | April 2018 |

9. **On Quantum Algorithms for Boolean Matrix Product Verification** May 2016
Talk at SCS Honors Undergraduate Thesis Research at Carnegie Mellon University, Pittsburgh, PA
10. **On Quantum Algorithms for Boolean Matrix Product Verification** May 2016
Poster talk at Meeting-of-Minds Research Symposium, Carnegie Mellon University, Pittsburgh, PA
11. **Analysis of Reconstructed J/Psi Meson Candidates in Proton Anti-Proton Collisions** May 2015
Poster talk at Meeting-of-Minds Research Symposium, Carnegie Mellon University, Pittsburgh, PA

PROFESSIONAL MEMBERSHIPS

- IEEE Member
- ACM Member, ACM SIGARCH
- APS Member, Division of Quantum Information (DQI)

PRESS

1. **A technique for making quantum computing more resilient to noise, which boosts performance** (Link)
Phys.org March 2022
2. **Three EPIQC Papers Chosen By IEEE Micro for Annual Top Picks Awards** (Link)
UChicago May 2021
3. **Quantum computer systems interview** (Link)
ODBMS.org November 2020
4. **New textbook advances ‘quantum computer systems design’ to get the most out of quantum hardware** (Link)
ScienceX July 2020
5. **New Book – Quantum Computer Systems** (Link)
ACM SIGARCH July 2020
6. **IBM Quantum Award Winners Announced** (Link)
IBM Research March 2020
7. **Research by University of Chicago PhD Student and EPIQC Wins IBM Q Best Paper** (Link)
HPCWire March 2020
8. **New Compiler Makes Quantum Computers Two Times Faster** (Link)
Phys.org October 2019
9. **UChicago-Developed Compiler Makes Quantum Computers 2x Faster** (Link)
UChicago October 2019

SOFTWARE PROJECTS

1. **TorchQuantum: Quantum ML System** (Link) February 2022
H. Wang, Y. Ding, J. Gu, Z. Li, Y. Lin, D. Z. Pan, F. T. Chong, S. Han

2. **FastSC: Frequency-Aware Synthesis Toolbox for Superconducting Quantum Computers (Link)** August 2020
Y. Ding, P. Gokhale, S. F. Lin, R. Rines, T. Propson, and F. T. Chong

3. **ScaffCC: Scaffold Compiler Collection (Link)** June 2018
A. Javadi-Abhari, A. Holmes, S. Patil, J. Heckey, D. Kudrow, P. Gokhale, D. Noursi, L. Ehudin, Y. Ding, X.-C. Wu, Y. Shi, M. Martonosi, and F. T. Chong

4. **A Scalable Storage Framework with Intermittent Cloud Resources** Autumn 2016
University of Chicago, Intermittent Cloud Computing (CMSC 33001)

5. **VecAndroid: An Android API for SIMD parallelism on ARM processors (Link)** Spring 2016
Y. Ding, and J. Song. Carnegie Mellon University, Parallel Computer Architecture and Programming (15-418)

6. **A Multilevel Classification Approach on CIFAR-10 Data** Fall 2014
Carnegie Mellon University, Introduction to Machine Learning (10-601)

7. **Fulfilly: A Time-Management and Productivity Software** Spring 2013
Carnegie Mellon University, Fundamentals of Programming (15-112)