

# Saad Quader

---

**CONTACT INFO** Phone: (+1)8606179869 Blog: [saadquader.com](http://saadquader.com)  
Email: [saad.quader@uconn.edu](mailto:saad.quader@uconn.edu) Github: [github.com/saad0105050](https://github.com/saad0105050)  
LinkedIn: [linkedin.com/in/saadquader](https://www.linkedin.com/in/saadquader)  
Google Scholar: [bit.ly/saad-quader-gscholar](https://bit.ly/saad-quader-gscholar)

**EDUCATION** **University of Connecticut**, Storrs, CT, U.S.  
*Ph.D. in Computer Science & Engineering* May 2021  
Dissertation: *Designing Secure Proof-of-Stake Blockchains*  
Major Adviser: Dr. Alexander Russell  
*M.S. in Computer Science & Engineering* July 2013  
**Bangladesh University of Engineering & Technology**, Dhaka, Bangladesh  
*B.Sc. in Computer Science & Engineering* July 2007

**RESEARCH INTERESTS** Secure decentralized protocols such as Proof-of-Stake (PoS) blockchains. Broadly interested in distributed systems, randomized algorithms, and theoretical computer science.

**INDUSTRY EXPERIENCE** **Google**, Sunnyvale, CA March 2021–Present  
*Software Engineer III*

- Working on distributed computing applications related to large-scale data storage, analysis, and transfer.

**MathWorks**, Natick, MA August 2020–March 2021  
*Senior Software Engineer, Code Generation & Execution (CGXE)*

- Developed a caching feature for Simulink® custom code parser (in C++); it improves the response time by eliminating redundant parsing

*Software Engineering Intern, Stateflow* May 2015–Aug 2015

- Wrote a MATLAB code generator for a graphical state-machine editor (C, C++)

**IOHK Research**, Edinburgh, UK January 2017–July 2020  
*Research collaborator*

- Analyzed the security of Proof-of-Stake (PoS) blockchains in the eventual consensus model
- We proved that the block confirmation time in eventual consensus PoS blockchains is, in fact, an order of magnitude faster than previous bounds.

**Bentley Systems**, Watertown, CT May 2013–August 2013  
*Research Intern, High-Performance Computing*

- Used GPU to get 4x speed-up for an existing simulation program (C, C++, OpenCL)

**Sentinel Solutions**, Dhaka, Bangladesh  
*Co-founder & Team Lead, Web Apps*

January 2008–July 2010

- Built many web app prototypes in PHP/JavaScript; designed unified APIs/UIs for different HTTP clients to quickly develop and deploy the same app on different platforms

**ReliSource Technologies**, Dhaka, Bangladesh  
*Software Engineer, Game Development Team*

July 2007–January 2008

- Replaced the existing Win32 UI of a complex, mature C++ codebase with cross-platform *wxWidgets*; finished refactoring in 3 weeks although the estimated time was 4 weeks
- Designed a plugin architecture for adding features; it reduced the development time by 75%

## SOFTWARE PROJECTS

Repositories: [github.com/saad0105050](https://github.com/saad0105050) and [github.uconn.edu/saq10002](https://github.uconn.edu/saq10002)

1. The *fork framework*, a Python codebase to model abstract proof-of-stake blockchain executions in the visual demonstration of the Ouroboros protocol.
2. *Forkable strings*, a C++ program to calculate the probability that a transaction is not settled in a proof-of-stake blockchain.
3. A *linked-list allocator* for porting an existing linked-list-based C code to GPU.
4. A *simple alternative* to the `std::bitset` class in C++; it bypasses the restriction that the size of an `std::bitset` object was required to be a compile-time constant.
5. *Betweenness centrality* algorithms on GPU, written in NVIDIA CUDA C.

## TEACHING

### **University of Connecticut**

Teaching Assistant/Lab Instructor

1. Fall 2016, Teaching Assistant, CSE4702, Intro to Modern Cryptography
2. Spring 2015, Recitation Instructor, CSE2500, Discrete Systems
3. Fall 2014, Lab Instructor, CSE1729, Intro to Principles of Programming
4. Fall 2012–13, Lab Instructor, CSE2100, Data Structures
5. Spring 2011–14, Lab Instructor, CSE1102, Object Oriented Programming
6. Fall 2010–11, Lab Instructor, CSE1010, Intro to Programming for Engineers

## Guest Lectures

1. *Proving NP-Completeness*  
Spring 2018, CSE5506, Graduate Computational Complexity
2. *Tail bounds*  
Spring 2014, CSE5506, Graduate Computational Complexity
3. *Implications and Equivalence*  
Spring 2015, CSE2500, Undergraduate Discrete Systems

## AWARDS

1. *Taylor L. Booth Fellowship*, the highest honor for doctoral students in computer science, University of Connecticut (2020)
2. *Donald Knuth's fabled hexadecimal dollar check* from the Bank of San Serriffe (2011)
3. *Winner, Team Trivia Contest*, Dept. of CSE, University of Connecticut (2018, 2013)

## PUBLICATIONS

*In*  
*ICDCS 2020*

1. *Consistency of Proof-of-Stake Blockchains with Concurrent Honest Slot Leaders*. Aggelos Kiayias, Saad Quader, and Alexander Russell. In Proceedings of the 40th IEEE International Conference on Distributed Computing Systems (ICDCS 2020), Singapore. <https://ia.cr/2020/041>

*In*  
*SODA 2020*

2. *The Combinatorics of the Longest-Chain Rule: Linear Consistency in Proof-of-Stake Blockchains*. Erica Blum, Aggelos Kiayias, Cristopher Moore, Saad Quader, and Alex Russell. In Proceedings of the 14th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA 2020), Salt Lake City, U.S. <https://ia.cr/2017/241>

*In*  
*CCCG 2019*

3. *Graph Realization on a Random Embedding*. Saad Quader and Alexander Russell. In Proceedings of the 31st Canadian Conference on Computational Geometry (CCCG 2019), Edmonton, Canada. arXiv e-print 1804.08680. <https://arxiv.org/abs/1804.08680>
4. *Heterogeneous Computing Paradigm for Parallel Water Distribution System Analysis*. Zheng Wu and Saad Quader. In Proceedings of the 11th International Conference on Hydroinformatics (HIC 2014), New York City, U.S.

*In*  
*Nature Methods*  
*# Citations: 237*

5. *pLogo: a Probabilistic Approach to Visualizing Sequence Motifs*. Joseph O'Shea, Michael F Chou, Saad A Quader, James K Ryan, George M Church, and Daniel Schwartz. In Nature Methods 10.12 (2013): 1211. <https://www.nature.com/articles/nmeth.2646>
6. *An Interactive and Probabilistic Strategy for Visualizing Linear Biological Sequence Motifs*. Daniel Schwartz, Joseph P. O'Shea, Saad A. Quader, Ahmet C. Mingir, George M. Church, and Michael F. Chou. 2013. In The FASEB Journal 27:1\_supplement, 810.8–810.8.
7. *Effect of Positional Dependence and Alignment Strategy on Modeling Transcription Factor Binding Sites*. Saad Quader and Chun-Hsi Huang. 2012. In BMC Research Notes, 5(1), 340. (2012)

In  
Brief. Bioinform.  
# Citations: 167

8. *Biological Network Motif Detection: Principles and Practice*. Elisabeth Wong, Brittany Baur, Saad Quader, and Chun-Hsi Huang. 2011. In *Briefings in Bioinformatics*, 13(2) (2011), 202–215. <https://academic.oup.com/bib/article/13/2/202/253539>
9. *ML-Consensus: A General Consensus Model for Variable-length Transcription Factor Binding Sites*. Saad Quader, Nathan Snyder, Kevin Su, Ericka Mochan, and Chun-Hsi Huang. In *Proceedings of the 9th European Conference on Evolutionary Computation, Machine Learning and Data Mining in Bioinformatics 2011 (EVOBIO 2011)*, Torino, Italy. In *Lecture Notes in Computer Science*, vol 6623. (pp. 25–36). Springer, Berlin, Heidelberg.
10. *Some New Equiprojective Polyhedra*. Saad Quader, Nabila Rahman, and Masud Hasan. In *Proceedings of the 9th International Conference on Computer and Information Technology (ICCIT 2006)*
11. *A New Approach to File Encryption and Compression*. Saad Quader and Anupam Bhattacharjee. In *Proceedings of the 8th International Conference on Computer and Information Technology (ICCIT 2005)*

MANUSCRIPTS  
& PREPRINTS

1. *Small support uncertainty principles on  $\mathbb{Z}_p$  over finite fields*. Saad Quader, Alexander Russell, and Ravi Sundaram. 2018. <https://arxiv.org/abs/1906.05179>
2. *A Comparative Study of Betweenness Centrality Algorithms on GPU*. Saad Quader and Chun-Hsi Huang. 2014. <https://arxiv.org/abs/1409.7764>

INVITED TALKS

1. *Mitigating the Grinding Attack on PoS Blockchains*  
IOHK Research Seminar, IOHK, January 2021
2. *The Combinatorics of the Longest-Chain Rule in Proof-of-Stake Blockchains*  
SODA 2020, Salt Lake City, U.S.A, January 2020
3. *Consistency Violations in Proof-of-Stake Blockchains*  
University of Connecticut CSE Security Seminar, November 2019
4. *Coin-flipping in Proof-of-Stake Blockchains*  
University of Connecticut CSE Security Seminar, October 2018
5. *Proof of Stake Blockchains*  
University of Connecticut CSE Security Seminar, April 2018
6. *Realizing Graphs on Random Points*  
Fall Workshop on Comp. Geometry, Stony Brook University, November 2017

SERVICES

Reviewer, IEEE TIFS