

# Qiushi Wei (she/her)

*Ph.D. in Computer Science*

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## EXECUTIVE SUMMARY

I hold a Ph.D. in Computer Science from Colorado School of Mines and officially graduated in December 2025. I am actively looking for an assistant professor position at a research-intensive institute in 2026. I have published peer-reviewed papers across various areas, including Networks, Payment Channel Networks, Sharding Systems, Blockchains, Security and Satellite Networks, with some of these works appearing in prestigious conferences such as **IEEE INFOCOM**, **IEEE ICC**, **IEEE ICDCS**, and **IEEE ICMLA**. I have received **INFOCOM** and **ICNP** travel grants for my research, where I gained valuable insights into research presentation, explored potential collaborations, and deepened my understanding of the fundraising process from various sources, all of which will serve as a strong foundation for my future career. I have worked as a Teaching Assistant at Mines across many semesters. With support from the National Science Foundation (NSF), which cultivates the early-career research community to confront emerging challenges, I have been shaping research agendas in blockchains, networking, cybersecurity, and distributed systems.

## RESEARCH INTERESTS

- Systems** Computer Networking, Blockchain and Payment Channel Network, Cybersecurity, Edge Computing, Internet-of-Things (IoT), Quantum Computing, Satellite Networks
- Theories** Applied Cryptography, Universal Compatibility Framework, Game Theory, Optimization, Approximation Algorithms, Resource Allocation, Robust Design

## EDUCATION

**2021–2025 M.S. and Ph.D. in Computer Science, Colorado School of Mines.**

Advisor Dr. Dejun (DJ) Yang — ✉ [djyang@mines.edu](mailto:djyang@mines.edu) — 🌐 [people.mines.edu/djyang/](https://people.mines.edu/djyang/)

**2018–2021 M.S. in Applied Chemistry, Colorado School of Mines.**

**2015–2018 M.S. in Chemistry and Physics of Polymers (Material), South China University of Technology.**

**2011–2015 B.S. in Chemistry (Education), Hubei University.**

## RESEARCH EXPERIENCES

**2021–2025 Research Assistant, Colorado School of Mines, Advisor: Dr. Dejun (DJ) Yang**

**Project Topic Design a sharding protocol integrated with multiparty virtual payment channels**

- Proposed a secure, decentralized mechanism for cross-shard transactions by replacing single-point intermediaries.
- Leveraged dynamically formed multiparty virtual payment channel for maximum channel capacity.
- Supported transactions involving multiple senders and receivers.

**Project Topic** **Designed an innovative distributed sharding protocol for blockchains**

- Proposed a novel sharding protocol that leverages payment channels for efficient cross-shard transactions in sharded blockchains, further improving the scalability of blockchains and realizing distributed storage of blockchains.
- Utilized the threshold signature scheme to sign messages in batches to improve the transaction throughput.
- Developed an atomicity mechanism of cross-shard transactions, achieving constant communication complexity  $O(1)$  between shards and reducing over 40% latency compared to state-of-the-art protocols.

**Project Topic** **Designed an optimal virtual payment channel (VPC) construction protocol**

- Designed a new metric for evaluating both the number of intermediaries and the capacity of the constructed VPCs.
- Investigated a recursive VPC construction protocol based on the smallest architecture: one-intermediary two-end party VPC.
- Achieved the optimization of the VPC construction through a game-theory algorithm for multiple pairs of users.

**Project Topic** **Designed an innovative rebalancing protocol for payment channel networks**

- Invented a distributed balance-aware routing protocol, which reaches high throughput while considering the channel balance.
- Modified the original HTLC to provide efficiency and adapt it to balance-aware routing to guarantee atomicity.
- Achieved nearly 100% success ratio and 100% success volume based on real banking transaction history.

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## INTERNSHIPS

**2023 Spring** Undergraduate Mentor of **Google** CSR Program, *Colorado School of Mines*:

- Analyzed and summarized common rebalancing routing protocols with the undergraduate students.
- Developed new rebalancing protocols to replenish payment channels based on the circle-based rebalancing protocol.

**2018 Fall -** Undergraduate Lab Mentor, *Colorado School of Mines*:

- 2019 Spring**
- Supervised and trained undergraduate students in a chemistry lab.
  - Supervised laboratory safety procedures, guided experimental design, and ensured adherence to proper research practices.

**2014 Fall** High School Teacher Intern, *Wuhan Middle No.15 School*:

- Taught high school chemistry and improved leadership and communication skills with students by troubleshooting.
- Evaluated student performance and communicated with students in weekly class meetings for mentorship.

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## PUBLICATIONS

**Conferences** Published papers with 85+ citations (according to [Google Scholar](#) as of Jan, 2026).

- C.4 **Qiushi Wei**, Ruozhou Yu, Xiaojian Wang, Dejun Yang, and Guoliang Xue, “ShardTree: An Efficient Cross-Shard Protocol through Multi-party Virtual Payment Channel,” Accepted by IEEE International Conference on Computer Communications (**INFOCOM**), 2026.
- C.3 Zhennan Shi, **Qiushi Wei**, “Learning Robust Simplex Sparse Representation Using Alternating Linearized Minimization Method,” IEEE International Conference on Machine Learning and Applications (**ICMLA**), 2025.
- C.3 Xiaojian Wang, Ruozhou Yu, Dejun Yang, Guoliang Xue, **Qiushi Wei**, Huayue Gu and Zhouyu Li, “Space Booking: Enabling Performance-Critical Applications in Broadband Satellite Networks,” IEEE International Conference on Distributed Computing Systems (**ICDCS**), 2025.
- C.2 **Qiushi Wei**, Yuhui Zhang, Dejun Yang, and Guoliang Xue. “BAR: A Balance-aware Routing Protocol in Payment Channel Networks,” IEEE International Conference on Communications (**ICC**), 2025.
- C.1 **Qiushi Wei**, Dejun Yang, Ruozhou Yu, and Guoliang Xue. “Thor: A Virtual Payment Channel Network Construction Protocol over Cryptocurrencies,” International Conference on Computer Communications (**INFOCOM**), 2024.

### Selected Journals

- J.2 **Qiushi Wei**, James M Crawford, Colin A Wolden, Moises A Carreon, “ZIF-21 crystals: its morphology control and potential as an adsorbent for ammonia capture,” *The Journal of Physical Chemistry C*, vol. 126, no. 30, pp. 12951–12957, 2022.
- J.1 **Qiushi Wei**, Jolie M Lucero, James M Crawford, J Douglas Way, Colin A Wolden, Moises A Carreon, “Ammonia separation from N<sub>2</sub> and H<sub>2</sub> over LTA zeolitic imidazolate framework membranes,” *Journal of Membrane Science*, vol. 623, 119078, 2021.
- J.6 **Qiushi Wei**, Jiewei Chen, Feng Xue, Enyong Ding, “Green synthesis of mesoporous flower-like TiO<sub>2</sub>/graphite nanosheets (TGNS) prepared by high-pressure homogenization (HPH),” *New Journal of Chemistry*, vol. 42, no. 3, pp. 1779–1786, 2018.

### Under Review

- U.2 **Qiushi Wei**, Ruozhou Yu, Xiaojian Wang, Dejun Yang, and Guoliang Xue, “ShardBridge: Enabling Efficient Cross-Shard Transactions via Payment Channels,” Under review, 2026.

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## TEACHING EXPERIENCES

### 2018–2023 Teaching Assistant at Colorado School of Mines

- CSCI 358: *Discrete Math*, Spring 2023
- CHGN 121: *General Chemistry Lab*, Fall 2018, Spring 2019
- CHGN 122: *Physical Chemistry Lab*, Fall 2019

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## HONORS AND AWARDS

- 2018–2025** Colorado School of Mines Graduate Research/Teaching Assistantship
- 2022, 2024** INFOCOM Student Travel Grant
- 2022** ICNP Student Travel Grant
- 2015–2018** South China University of Technology Excellent Graduate Student Scholarship
- 2012** Hubei University Excellent Student Scholarship

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## PROFESSIONAL SERVICES

- Reviewer** IEEE TIFS, IEEE INFOCOM, IEEE IOT-J, IEEE TNSE, IEEE TMC
- Organizer** 2014–2015 English Broadcast Station at Hubei University
- Memberships** IEEE and IEEE ComSoc Student Member, ACM Student Member
- Activity** Poster presentations at the Computing Mines Affiliates Partnership Program (C-MAPP) Award Event in 2024

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## REFERENCES

**As Attached and/or Available Upon Request**