CIRRUS (FANGYU) GAI

greferry@gmail.com

EMPLOYMENT

Babylon Labs *Aug. 2024 - Present*
Staff Research Engineer, full-time *Remote*

BabylonChain *May 2022 - Present*
Senior Research Engineer, full-time *Remote*

Alibaba DAMO Academy *Apr. 2021 - Apr. 2022*
Research & Development Intern, full-time *Hangzhou, China*

Hangzhou Qulian Technology *Sep. 2020 - Apr. 2021*
Research & Development Intern, full-time *Hangzhou, China*

Dapper Labs *June 2019 - Mar. 2020*
Research & Development Intern, part-time *Vancouver, Canada*

EDUCATION

University of British Columbia *Sep. 2018 - Sep. 2022*
Ph.D. in Electrical Engineering *Kelowna & Vancouver, Canada*
Doctoral Student member of Blockchain@UBC
Advisor: Chen Feng, also closely working with Ivan Beschastnikh
Dissertation: On the Performance of Byzantine Fault-tolerant Consensus in the Blockchain Era

National University of Defense Technology *Sep. 2015 - Dec. 2017*
M.Sc. in Computer Science *Changsha, China*
Advisor: Xinwen Jiang, Peidong Zhu
Dissertation: Research on Trust Management for Internet of Things

Beijing Institute of Technology *Sep. 2011 - June 2015*
B.Eng. in Software Engineering *Beijing, China*
Advisor: Zhiqiang Li, Hongchen Guo
Dissertation: Enhance Adaboost Algorithm by Integrating LDA Topic Model
Ranking: 2nd out of 39 in the direction of Information Security

RESEARCH INTERESTS

Blockchain, Databases, Distributed Systems, Internet of Things

EXPERIENCE

Babylon Labs *Aug. 2024 - Present*
Staff Research Engineer *remote*

- Research and development of the Babylon node and auxiliary programs.
  Website: https://babylonlabs.io.
  Project link: https://github.com/babylonlabs-io.

BabylonChain *May 2022 - Present*
Senior Research Engineer *remote*

Alibaba DAMO Academy *Apr. 2021 - Apr. 2022*
Research & Development Intern. Mentor: Sheng Wang. *Hangzhou, China*

· Research on scaling BFT consensus protocols by designing a robust shared mempool.
Project link: https://github.com/gitferry/bamboo-stratus.
· Research on enhancing the centralized ledger database (LedgerDB) with ubiquitous verification abilities.
Project link: https://www.alibabacloud.com/product/ledgerdb.

Hangzhou Qulian Technology *Sep. 2020 - Apr. 2021*
Research & Development Intern. Mentor: Hao Duan. *Hangzhou, China*

· Research on the performance of state-of-the-art BFT protocols for permissioned blockchains.
Project link: https://github.com/gitferry/bamboo.
· Re-designed and implemented some of the core components (e.g., Raft and Mempool) of the consensus services in Hyperchain.

Dapper Labs *June 2019 - Mar. 2020*
Research & Development Intern. Mentor: Alexander Hentschel. *Vancouver, Canada*

· Explored the wide design space of blockchain consensus protocols, e.g., HotStuff, Algorand.
· Built demos of the HotStuff BFT protocol and evaluated its performance.
· Participated in building the consensus node of the Flow blockchain.
Project link: https://github.com/onflow/flow-go.

University of British Columbia *Winter 2018 & Winter 2020*
Teaching & Research Assistant *Vancouver, Canada*

· ENGR 453: Internet of Things.
· ENGR 464: Distributed Ledger Technologies with Engineering Applications.

TECHNICAL STRENGTHS

Computer Languages	Golang, C++, Objective-C, Python, Javascript
Protocols & Blockchain Platform	Bitcoin, Cosmos, Ethereum, CometBFT, HotStuff, etcd
Tools	Vim, git, Markdown, LaTeX

LANGUAGES

Mandarin (Native), English (Professional), Japanese (Basic)

SELECTED PUBLICATION

Conference Papers

C10 Ertem Nusret Tas, David Tse, **Fangyu Gai**, Sreeram Kannan, Mohammad Ali Maddah-Ali, Fisher Yu, "Bitcoin-Enhanced Proof-of-Stake Security: Possibilities and Impossibilities" in *Proc. IEEE S&P, 2023.* **CCF-A**.

C9 **Fangyu Gai**, Jianyu Niu, Ivan Beschastnikh, Chen Feng, Sheng Wang, "Scaling Blockchain Consensus via a Robust Shared Mempool" in *Proc. IEEE ICDE, 2023.* **CCF-A**.

C8 Xinying Yang, Sheng Wang, Feifei Li, Yuan Zhang, Wenyuan Yan, **Fangyu Gai**, Benquan Yu, Likai Feng, Qun Gao, and Yize Li, "Ubiquitous Verification in Centralized Ledger Database" in *Proc. IEEE ICDE, 2022.* **CCF-A**.

C7 Hanzheng Lyu, Jianyu Niu, **Fangyu Gai**, and Chen Feng, "Publish or Perish: Defending Withholding Attack in Dfinity Consensus" in *Proc. IEEE MSN, 2021* (**best paper award**). **CCF-C**.

C6 **Fangyu Gai**, Jianyu Niu, Seyed Ali Tabatabaee, Chen Feng, and Mohammad Mussadiq Jalalzai, "Cumulus: A Secure BFT-based Sidechain for Off-chain Scaling" in *Proc. IEEE IWQoS, 2021.* **CCF-B**.

C5 **Fangyu Gai**, Ali Farahbakhsh, Jianyu Niu, Chen Feng, Ivan Beschastnikh, and Hao Duan, "Dissecting the Performance of Chained-BFT" in *Proc. IEEE ICDCS, 2021.* **CCF-B**.

C4 Jiangyu Niu, **Fangyu Gai**, Mohammad Mussadiq Jalalzai, and Chen Feng, "On the Performance of Pipeline HotStuff" in *Proc. IEEE INFOCOM, 2021.* **CCF-A**.

C3 Jianyu Niu, Ziyu Wang, **Fangyu Gai**, and Chen Feng, "Incentive Analysis of Bitcoin-NG, Revisited" in *Proc. IFIP* $WG_{7.3}$ *Performance, 2020.* **CCF-B**.

C2 **Fangyu Gai**, Baosheng Wang, Wenping Deng, and Wei Peng, "Proof of Reputation: A Reputation-Based Consensus Protocol for Peer-to-Peer Network" in *Proc. DASFAA, 2018.* **CCF-B**.

C1 Dongxing Li, Wei Peng, Wenping Deng, **Fangyu Gai**, "A Blockchain-Based Authentication and Security Mechanism for IoT" in *Proc. ICCCN, 2018.* **CCF-C**.

Journal Papers

J4 Mohammad Jalalzai, Jianyu Niu, Chen Feng, and **Fangyu Gai**, "Fast-Hotstuff: A Fast and Resilient Hotstuff Protocol" in *IEEE TDSC, 2024.* **CCF-A**.

J3 **Fangyu Gai**, Jianyu Niu, Seyed Ali Tabatabaee, Chen Feng, and Mohammad Mussadiq Jalalzai, "A Secure Sidechain for Decentralized Trading in Internet of Things" in *IEEE IoT Journal, 2024.* **JCR-Q1**.

J2 Jianyu Niu, **Fangyu Gai**, and Chen Feng, "Crystal: Enhance Blockchain Mining Transparency with Quorum Certificat" in *IEEE TDSC, 2023.* **CCF-A**.

J1 Jianyu Niu, Ziyu Wang, **Fangyu Gai**, and Chen Feng, "Incentive Analysis of Bitcoin-NG, Revisited" in *PEVA, 2020.* **CCF-B**.