

# FANGYU GAI

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## EDUCATION

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### University of British Columbia

Ph.D. in Electrical Engineering

Doctoral Student member of Blockchain@UBC

Advisor: Chen Feng

Dissertation (tentative): Dissecting the Performance of BFT in the Era of Blockchain

*Sep. 2018 - Sep. 2022 (expected)*

*Kelowna & Vancouver, Canada*

### National University of Defense Technology

M.A.Sc. in Computer Science

Advisor: Xinwen Jiang

Dissertation: Research on Trust Management for Internet of Things

*Sep. 2015 - Dec. 2017*

*Changsha, China*

### Beijing Institute of Technology

B.Eng. in Software Engineering

Advisor: Zhiqiang Li

Dissertation: Enhance Adaboost Algorithm by Integrating LDA Topic Model

*Ranking: 2nd out of 39 in the direction of Information Security*

*Sep. 2011 - June 2015*

*Beijing, China*

## RESEARCH INTERESTS

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Blockchain, Databases, Distributed Systems, Internet of Things

## EXPERIENCE

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### Alibaba DAMO Academy

*Research Intern. Mentor: Sheng Wang.*

*Apr. 2021 - Present*

*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

*Research Intern. Mentor: Hao Duan.*

*Sep. 2020 - Apr. 2021*

*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

*Research Intern & Developer. Mentor: Alexander Hentschel.*

*June 2019 - Mar. 2020*

*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

*Teaching & Research Assistant*

*Winter 2018 & Winter 2020*

*Vancouver, Canada*

- ENGR 453: Internet of Things.

- ENGR 464: Distributed Ledger Technologies with Engineering Applications.
- Research on layer-two solutions for Ethereum.

## TECHNICAL STRENGTHS

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<b>Computer Languages</b>	Golang, C++, Objective-C, Python, Javascript
<b>Protocols &amp; Blockchain Platform</b>	Bitcoin, Ethereum, HotStuff, Algorand, Tendermint, etcd
<b>Tools</b>	Vim, git, Markdown, L <sup>A</sup> T <sub>E</sub> X

## LANGUAGES

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

## SELECTED PUBLICATION

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### Pre-prints

- P4 **Fangyu Gai**, Jianyu Niu, Ivan Beschastnikh, Chen Feng, and Sheng Wang, “Scaling Blockchain Consensus via a Shared Mempool” submitted to *VLDB 2022*.
- P3 **Fangyu Gai**, Jianyu Niu, Seyed Ali Tabatabaee, Chen Feng, and Mohammad Mussadiq Jalalzai, “A Secure Sidechain for Decentralized Trading in Internet of Things” submitted to *IEEE IoT Journal*.
- P2 Jianyu Niu, **Fangyu Gai**, and Chen Feng, “Crystal: Enhance Blockchain Mining Transparency with Quorum Certificat” submitted to *IEEE TDSC*.
- P1 Mohammad Jalalzai, Jianyu Niu, Chen Feng, and **Fangyu Gai**, “Fast-Hotstuff: A Fast and Resilient Hotstuff Protocol” submitted to *IEEE TDSC*.

### Conference Papers

- C8 Xinying Yang, Sheng Wang, Feifei Li, Yuan Zhang, Wenyan Yan, **Fangyu Gai**, Benquan Yu, Likai Feng, Qun Gao, and Yize Li, “Ubiquitous Verification in Centralized Ledger Database” in *Proc. IEEE ICDE, 2022*.
- 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)*.
- 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*.
- 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*.
- C4 Jiangyu Niu, **Fangyu Gai**, Mohammad Mussadiq Jalalzai, and Chen Feng, “On the Performance of Pipeline HotStuff” in *Proc. IEEE INFOCOM, 2021*.
- C3 Jianyu Niu, Ziyu Wang, **Fangyu Gai**, and Chen Feng, “Incentive Analysis of Bitcoin-NG, Revisited” in *Proc. IFIP WG7.3 Performance, 2020*.
- 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*.
- C1 Dongxing Li, Wei Peng, Wenping Deng, **Fangyu Gai**, “A Blockchain-Based Authentication and Security Mechanism for IoT” in *Proc. ICCCN, 2018*.

### Journal Papers

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