FANGYU GAI

fangyugai.me

EDUCATION

University of British Columbia   *Sep. 2018 - Sep. 2022 (expected)*
Ph.D. in Electrical Engineering   *Kelowna & Vancouver, Canada*
Doctoral Student member of Blockchain@UBC
Advisor: Chen Feng
Dissertation (tentative): Dissecting the Performance of BFT in the Era of Blockchain

National University of Defense Technology   *Sep. 2015 - Dec. 2017*
M.A.Sc. in Computer Science   *Changsha, China*
Advisor: Xinwen Jiang
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
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

Alibaba DAMO Academy   *Apr. 2021 - Present*
Research 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 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 Intern & Developer. 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.
· Research on layer-two solutions for Ethereum.

TECHNICAL STRENGTHS

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

LANGUAGES

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

SELECTED PUBLICATION

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, Wenyuan 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 $WG_{7.3}$ 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*.