

Cheng XU Ph.D.

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Senior software developer with proved experience in designing and implementing various high-performance, secure database and blockchain systems. Strong expertise in database, blockchain, cryptography, and information security with top-notch coding skills and open source project maintenance experience.

PROFESSIONAL EXPERIENCE	Fortinet Senior Software Developer	Burnaby, BC, Canada <i>Dec 2021 – Present</i>
	Simon Fraser University Visiting Post-doctoral Research Fellow	Burnaby, BC, Canada <i>Mar 2020 – Present</i>
	<ul style="list-style-type: none">• Advisor: Prof. Jian Pei• Designed novel techniques to build future generation high-performance blockchain systems.• Developed a blockchain prototype in Rust (https://github.com/hkbudb/slimchain) to demonstrate the effectiveness of the novel design.	
	Hong Kong Baptist University Ph.D. Candidate Senior Research Assistant / Post-doctoral Research Fellow	Hong Kong <i>Nov 2014 – Feb 2019</i> <i>Dec 2018 – Apr 2021</i>
	<ul style="list-style-type: none">• Advisor: Prof. Jianliang Xu• Designed novel algorithms and indexes for cloud-based query services to support efficient verifiable query processing in a wide range of enterprise systems.• Developed novel techniques to enable integrity assured search in blockchain databases.• Resulted to several research papers published in top-tier journals and conferences.	
	Syracuse University Visiting Scholar	Syracuse, NY, USA <i>Sep 2017 – Dec 2017</i>
	<ul style="list-style-type: none">• Advisor: Dr. Yuzhe Tang• Designed and implemented a memory-access pattern secure software system on Intel SGX.• Developed a dynamic program partitioning framework to support implementing a variety of external oblivious algorithms and achieving cache-miss obliviousness.	
	Homebrew https://brew.sh Core Maintainer	Hong Kong <i>Feb 2015 – Feb 2017</i>
	<ul style="list-style-type: none">• Acted as one of the core maintainers for the open source project Homebrew, which is the most popular package manager on macOS.• Implemented several major features and improvements including better tap system, core/formulae split, sandbox system, portable Ruby, and many bug fixes.	
	Hong Kong Baptist University Ph.D. in Computer Science Dissertation: Authenticated Query Processing in the Cloud Advisor: Prof. Jianliang Xu	Hong Kong <i>Nov 2014 – May 2019</i>
	Huazhong University of Science and Technology Bachelor of Engineering in Electronics & Information Engineering	Wuhan, China <i>Sep 2009 – Jun 2014</i>
SKILLS	Programming C/C++, Rust, Java, Python, Ruby, Matlab, \LaTeX , Bash, Javascript Tools Vim, Tmux, Git, macOS, Linux Languages English, Mandarin	

RESEARCH INTERESTS

- Authenticated query processing for outsourcing cloud computing.
- Searchable blockchain with integrity assurance.
- Privacy preserving query processing and access control.

SELECTED PUBLICATIONS

Complete List: Google Scholar [DKG_JaAAAAAJ] · DBLP [Xu_0004:Cheng]

1. H. Wang, C. Xu, C. Zhang, J. Xu, Z. Peng, and J. Pei, "vChain+: Optimizing verifiable blockchain boolean range queries," in *Proceedings of the 38th IEEE International Conference on Data Engineering (ICDE '22)*, Kuala Lumpur, Malaysia, May 2022, Full Paper.
2. C. Xu[†], C. Zhang[†], J. Xu, and J. Pei, "SlimChain: Scaling blockchain transactions through off-chain storage and parallel processing," *Proceedings of the VLDB Endowment (PVLDB)*, vol. 14, no. 11, pp. 2314–2326, Jul. 2021, Full Paper.
3. Z. Peng, C. Xu, H. Wang, J. Huang, J. Xu, and X. Chu, "P²B-Trace: Privacy-preserving blockchain-based contact tracing to combat pandemics," in *Proceedings of the 2021 ACM SIGMOD International Conference on Management of Data (SIGMOD '21)*, Xi'an, Shaanxi, China, Jun. 2021, pp. 2389–2393, Short Paper.
4. C. Zhang[†], C. Xu[†], H. Wang, J. Xu, and B. Choi, "Authenticated keyword search in scalable hybrid-storage blockchains," in *Proceedings of the 37th IEEE International Conference on Data Engineering (ICDE '21)*, Chania, Crete, Greece, Apr. 2021, pp. 996–1007, Full Paper.
5. K. Li, Y. Tang, J. Chen, Z. Yuan, C. Xu, and J. Xu, "Cost-effective data feeds to blockchains via workload-adaptive data replication," in *Proceedings of the 21st International Middleware Conference (Middleware '20)*, Delft, Netherlands, Dec. 2020, pp. 371–385, Full Paper.
6. H. Wang, C. Xu, C. Zhang, and J. Xu, "vChain: A blockchain system ensuring query integrity," in *Proceedings of the 2020 ACM SIGMOD International Conference on Management of Data (SIGMOD '20)*, Portland, OR, USA, Jun. 2020, pp. 2693–2696, Demo Paper.
7. C. Xu, C. Zhang, and J. Xu, "vChain: Enabling verifiable boolean range queries over blockchain databases," in *Proceedings of the 2019 ACM SIGMOD International Conference on Management of Data (SIGMOD '19)*, Amsterdam, Netherlands, Jun. 2019, pp. 141–158, Full Paper.
8. C. Zhang, C. Xu, J. Xu, Y. Tang, and B. Choi, "GEM²-Tree: A gas-efficient structure for authenticated range queries in blockchain," in *Proceedings of the 35th IEEE International Conference on Data Engineering (ICDE '19)*, Macau SAR, China, Apr. 2019, pp. 842–853, Full Paper.
9. C. Zhang, C. Xu, J. Xu, and B. Choi, "Distributed kNN query authentication," in *Proceedings of the 19th IEEE International Conference on Mobile Data Management (MDM '18)*, Aalborg, Denmark, Jun. 2018, pp. 167–176, Full Paper.
10. C. Xu, J. Xu, H. Hu, and M. H. Au, "When query authentication meets fine-grained access control: A zero-knowledge approach," in *Proceedings of the 2018 ACM SIGMOD International Conference on Management of Data (SIGMOD '18)*, Houston, TX, USA, Jun. 2018, pp. 147–162, Full Paper.
11. C. Xu, Q. Chen, H. Hu, J. Xu, and X. Hei, "Authenticating aggregate queries over set-valued data with confidentiality," *IEEE Transactions on Knowledge and Data Engineering (TKDE)*, vol. 30, no. 4, pp. 630–644, Apr. 2018, Full Paper.
12. Q. Zhu, H. Hu, C. Xu, J. Xu, and W.-C. Lee, "Geo-social group queries with minimum acquaintance constraints," *The VLDB Journal (VLDBJ)*, vol. 26, no. 5, pp. 709–727, Jul. 2017, Full Paper.

[†]These authors contributed equally.

TALKS

1. Blockchain Privacy Preserving Techniques, *The 36th CCF National Database Conference*, Jinan, China, Oct. 2019.
2. Towards Searchable and Verifiable Blockchain, *1st Workshop on Blockchain and Data Management at 35th IEEE International Conference on Data Engineering*, Macau, Apr. 2019.
3. When Query Authentication Meets Fine-Grained Access Control: A Zero-Knowledge Approach, *2018 ACM SIGMOD International Conference on Management of Data*, Houston, USA, Jun. 2018.

AWARDS

- SIGMOD Travel Award, ACM 2018
- Department RPg Performance Award, Hong Kong Baptist University 2018, 2019
- Postgraduate Research Symposium Best Research Performance Award & Best Poster Award, Hong Kong Baptist University 2018
- Yakun Scholarship Scheme for Mainland Postgraduate Students, Hong Kong Baptist University 2018