

# Cheng XU

DLB 625, Department of Computer Science  
Hong Kong Baptist University, Hong Kong  
✉ chengxu@comp.hkbu.edu.hk  
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**RESEARCH INTERESTS** I am interested in Databases, Cryptography, Information Security and Privacy-Aware Computing. My current focuses include:

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

**PROFESSIONAL EXPERIENCE** **Simon Fraser University** Burnaby, BC, Canada  
**Visiting Scholar** Mar 2020 – Present

- Advisor: Prof. Jian Pei
- Designing novel techniques to build future generation high performance blockchain systems.
- Developing a prototype to demonstrate the effectiveness of the proposed system.

**Hong Kong Baptist University** Hong Kong  
**Ph.D. Candidate** Nov 2014 – Feb 2019  
**Senior Research Assistant / Post-doctoral Research Fellow** Dec 2018 – Present

- 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** Syracuse, NY, USA  
**Visiting Scholar** Sep 2017 – Dec 2017

- 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** Hong Kong  
**Core Maintainer** Feb 2015 – Feb 2017

- <https://brew.sh>
- 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.

**EDUCATION** **Hong Kong Baptist University** Hong Kong  
Ph.D. in Computer Science Nov 2014 – Feb 2019  
Dissertation: Authenticated Query Processing in the Cloud  
Advisor: Prof. Jianliang Xu

**Huazhong University of Science and Technology** Wuhan, China  
Bachelor of Engineering in Electronics & Information Engineering Sep 2009 – Jun 2014

**SKILLS** **Programming** C/C++, Rust, Java, Python, Ruby, Matlab,  $\text{\LaTeX}$ , Bash, Javascript  
**Tools** Vim, Tmux, Git, macOS, Linux  
**Languages** English, Mandarin

## PUBLICATIONS

1. 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, *Demo Paper*.
2. S. Guo, Y. Ji, C. Zhang, C. Xu, and J. Xu, "vCBIR: A verifiable search engine for content-based image retrieval," in *Proceedings of the 36th IEEE International Conference on Data Engineering (ICDE '20)*, Dallas, TX, USA, Apr. 2020, *Demo Paper*.
3. 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*.
4. C. Zhang, C. Xu, J. Xu, Y. Tang, and B. Choi, "GEM<sup>2</sup>-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*.
5. S. Guo, J. Xu, C. Zhang, C. Xu, and T. Xiang, "ImageProof: Enabling authentication for large-scale image retrieval," in *Proceedings of the 35th IEEE International Conference on Data Engineering (ICDE '19)*, Macau SAR, China, Apr. 2019, pp. 1070–1081, *Full Paper*.
6. Y. Ji, C. Xu, J. Xu, and H. Hu, "vABS: Towards verifiable attribute-based search over shared cloud data," in *Proceedings of the 35th IEEE International Conference on Data Engineering (ICDE '19)*, Macau SAR, China, Apr. 2019, pp. 2028–2031, *Demo Paper*.
7. 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*.
8. 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*.
9. 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*.
10. C. Xu, Q. Chen, H. Hu, J. Xu, and X. Hei, "Authenticating aggregate queries over set-valued data with confidentiality (extended abstract)," in *Proceedings of the 34th IEEE International Conference on Data Engineering (ICDE '18)*, Paris, France, Apr. 2018, pp. 1797–1798, *Poster Paper*.
11. Y. Tang, Z. Xing, C. Xu, J. Chen, and J. Xu, "Lightweight logging over the blockchain for data-intensive applications," in *2nd Workshop on Trusted Smart Contracts at International Conference on Financial Cryptography and Data Security*, Santa Barbara Beach Resort, Curaçao, Mar. 2018, pp. 308–324, *Workshop 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*.

## 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
- Excellent Teaching Assistant Performance Award, Hong Kong Baptist University 2017
- Teaching Assistant Performance Award, Hong Kong Baptist University 2015, 2016