

Xiao Li, Ph.D. Candidate

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Online CV

Research Objective

- 📌 I'm a fifth-year Ph.D. candidate. My research interest spans over the theory and practice of **distributed systems**, **programming languages** and **computer security**. I'm particularly interested in **Byzantine fault-tolerant replication** and **program synthesis** in distributed systems..

Education

- 2019 – Present 📌 **Ph.D. Candidate, University of California, Riverside, USA** in Computer Science. GPA:3.88/4
- 2017 – 2019 📌 **M.Sc., University of California, Riverside, USA** in Computer Science.
GPA: 3.88/4 (Transferred to Ph.D. program)
- 2013 – 2017 📌 **B.E., Huazhong University of Science and Technology, China** in Information Security. GPA: 3.65/4 (Outstanding Graduates)



Employment

- 2023 Fall 📌 **Research Engineer Intern.** Chainlink Labs.
- 2019 – Present 📌 **Graduate Student Researcher.** UC Riverside.

Research Projects

- 2023 – Present 📌 **Reconfigurable clustered Byzantine replication**) (under review) Advisor: Prof. Mohsen Lesani
 - Design replication protocols that enable higher throughput with heterogeneous reconfigurable clusters.
- 2022 – Present 📌 **Reconfigurable Heterogeneous Quorum Systems**) (under review) Advisor: Prof. Mohsen Lesani
 - Design reconfiguration protocols for heterogeneous quorum systems (HQS) to enable open membership for permissioned blockchains.
 - Present a graph characterization of HQS, and its application for reconfiguration optimization.
 - Implement the reconfiguration protocols in Stellar-core framework with C++.
- 2022 – 2023 📌 **On the power of quorum subsumption for heterogeneous quorum systems** (will appear in DISC 2023) Advisor: Prof. Mohsen Lesani
 - Prove an impossibility result that shows quorum intersection and quorum availability are not sufficient for Byzantine reliable broadcast (BRB) and consensus in HQS setting.
 - Propose quorum-subsumption to help achieve BRB and consensus with detailed protocols and correctness proofs.





Research Projects (continued)

- 2020 – 2022  **Hamraz: Resilient Partitioning and Replication** (published in *SeP 2022*) Advisor: Prof. Mohsen Lesani
- Present a security-typed object-based language and an information flow type inference system to automatically synthesis trustworthy-by-construction distributed system.
 - Design and implement a CPS transformation and program partitioning system in Java.
 - Design and implement a type inference system to generate verification conditions in Python and Z3 framework.
- 2019 – 2020  **Hampa: Solver-aided Recency-Aware Replicated Objects** (published and artifact evaluated in *CAV 2020*) Advisor: Prof. Mohsen Lesani
- Design a relational object language, its denotational semantics and syntax-directed analysis to infer optimum staleness bounds.
 - Design and implementation of Java module to generate verification conditions in CVC4 framework.
 - Design and experiment synthesised run-time system on top of BFT-SmaRt library and SMT solver.

Publications

- 1 Li, X., Chan, E., & Lesani, M. (2023). On the power of quorum subsumption for heterogeneous quorum systems, In *Disc'23 (international symposium on distributed computing)*.
- 2 Li, X., Houshmand, F., & Lesani, M. (2022). Hamraz: Resilient partitioning and replication, In *SeP'22 (ieee symposium on security and privacy)*.
- 3 Li, X., Houshmand, F., & Lesani, M. (2020). Hampa: Solver-aided recency-aware replication, In *International conference on computer aided verification*. Springer.

Technical Skills

Object-Oriented Programming Languages	 Java, Python, C++.
SMT Solvers (SMT-LIB)	 Z3, CVC4.
Databases	 SQL (PostgreSQL).
Others	 Version Control (Git), L ^A T _E X.

Awards and Achievements

- 2023  **Grace Hopper Conference Scholarship 2023**, UC Riverside .
-  **Dissertation Year Program Fellowship 2023/2024**, UC Riverside .
- 2022  **Student Travel Grant**, 2022 ACM CCS.
-  **GSA Travel Award**, UC, Riverside.
-  **Student Travel Award**, 2022 IEEE Symposium on Security and Privacy.
- 2021  **Selected and Funded**, PLMW@SPLASH 2021.
- 2019  **Department Fellowship Award**, UC, Riverside.
- 2017  **Outstanding Graduates**, Huazhong University of Science and Technology.
- 2016  **Outstanding Academic Award**, Huazhong University of Science and Technology.
- 2015  **Third Prize**, in the 8th National College Student Information Security Contest.
- 2014  **Public Welfare Scholarship**, Huazhong University of Science and Technology.