

# Yuncong Hu

Assistant Professor at Shanghai Jiao Tong University

## Personal Information

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EMAIL: [yuncong\\_hu@berkeley.edu](mailto:yuncong_hu@berkeley.edu)  
HOMEPAGE: [huyuncong.com](http://huyuncong.com)  
GITHUB: [@huyuncong](https://github.com/huyuncong)

## Research Interests

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I am broadly interested in systems security and applied cryptography. My current research focuses on secure decentralized systems and zero-knowledge proofs.

## Education

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- 2017-2022 Doctor of Philosophy in Computer Science, UC Berkeley  
Advisors: Prof. Raluca Ada Popa and Prof. Alessandro Chiesa  
Thesis: Decentralized Ledgers: Design and Applications
- 2017-2020 Master of Science in Computer Science, UC Berkeley  
Advisors: Prof. Raluca Ada Popa and Prof. Alessandro Chiesa  
Thesis: Broadcast Encryption with Fine-grained Delegation and its Application to IoT
- 2013-2017 Bachelor in Computer Science, Shanghai Jiao Tong University (SJTU), China  
ACM Honored Class, Zhiyuan College

## Selected Publications

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- *AVES: Approximately Verifiable Statistics on Append-Only Authenticated Dictionaries*  
Yan Ji, Mahimna Kelkar, Deepak Maram, Konstantinos Chalkias, Yuncong Hu, Ari Juels  
**In Submission**
- *A Succinct Range Proof for Polynomial-based Vector Commitment*  
Rui Gao, Zhiguo Wan, Yuncong Hu, Huaqun Wang  
**CCS 2024** (31th ACM Conference on Computer and Communications Security)
- *VPNNT: A Verifiable and Privacy-Preserving Neural Network Training Framework*  
Haohua Duan, Zedong Peng, Liyao Xiang, Yuncong Hu, Bo Li  
**TDSC 2024** (IEEE Transactions on Dependable and Secure Computing)
- *Gemini: Elastic SNARKs for Diverse Environments*  
(alphabetical order) Jonathan Bootle, Alessandro Chiesa, Yuncong Hu and Michele Orrù  
**Eurocrypt 2022** (41st Annual International Conference on the Theory and Applications of Cryptographic Techniques)
- *Non-Interactive Differentially Anonymous Router*  
(alphabetical order) Benedikt Bünz, Yuncong Hu, Shin'ichiro Matsuo and Elaine Shi  
**Cryptology ePrint Archive 2021**
- *Merkle<sup>2</sup>: A Low-Latency Transparency Log System*  
Yuncong Hu, Kian Hooshmand, Harika Kalidhindi, Seung Jin Yang, Raluca Ada Popa  
**S&P 2021** (42nd IEEE Symposium on Security and Privacy)
- *Marlin: Preprocessing zkSNARKs with Universal and Updatable SRS*  
(alphabetical order) Alessandro Chiesa, Yuncong Hu, Mary Maller, Pratyush Mishra, Noah Vesely, and Nicholas P. Ward  
**Eurocrypt 2020** (39th Annual International Conference on the Theory and Applications of Cryptographic Techniques)

- [\*Ghostor: Toward a Secure Data-Sharing System from Decentralized Trust\*](#)  
Yuncong Hu, Sam Kumar, and Raluca Ada Popa  
**NSDI 2020** (17th USENIX Symposium on Networked Systems Design and Implementation)
- [\*JEDI: Many-to-Many End-to-End Encryption and Key Delegation for IoT\*](#)  
Sam Kumar, Yuncong Hu, Michael P Andersen, Raluca Ada Popa, and David E. Culler  
**USENIX Security 2019** (28th USENIX Security Symposium)

## Open Source Projects

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- [Merkle<sup>2</sup>: A Low-Latency Transparency Log System](#) (S&P 2021)
  - A Go library that implements a low-latency transparency log system and a new authenticated data structure. Our system can support 100x more users than prior state-of-the-art key transparency systems.
- [Arkworks: An Ecosystem for Developing and Programming with zkSNARKs](#)
  - A modular, coherent Rust ecosystem that provides a low-cost abstraction for developing and programming with zkSNARKs. Our ecosystem has been used in several blockchain companies (such as Aleo) for building applications with zkSNARKs.
  - The [Marlin](#) library implements a preprocessing zkSNARK for R1CS with universal and updatable SRS and is published at Eurocrypt 2020.
  - The [Gemini](#) library implements an elastic zkSNARK for R1CS and is published at Eurocrypt 2022.
- [JEDI: Many-to-Many End-to-End Encryption and Key Delegation for IoT](#) (USENIX Security 2019)
  - A Golang library that implements a secure many-to-many messaging protocol with decentralized key delegations for IoT devices. Our library has been used in a decentralized authorization framework that has been running for more than 2 years, with more than 800 IoT devices.

## Selected Talks

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- **Gemini: Elastic SNARKs for Diverse Environments**
  - ChinaCrypt 2023
  - [CMU Cylab Crypto Seminar 2022](#)
- **Merkle<sup>2</sup>: A Low-Latency Transparency Log System**
  - RISELab Retreat Summer 2021
  - [S&P 2021](#) (42nd IEEE Symposium on Security and Privacy)
- **Marlin: Preprocessing zkSNARKs with Universal and Updatable SRS**
  - [Eurocrypt 2020](#) (39th Annual International Conference on the Theory and Applications of Cryptographic Techniques)
- **Ghostor: Toward a Secure Data-Sharing System from Decentralized Trust**
  - RISELab Retreat Winter 2020, Summer 2019, Winter 2019, Summer 2018.
  - Microsoft Research Redmond Cryptography Colloquium 2020.
- **JEDI: Many-to-Many End-to-End Encryption and Key Delegation for IoT**

- RISELab Retreat Summer 2019, Summer 2018, Winter 2018.
- Stanford Secure Internet of Things Project 2018.

## **Selected Scholarships, Grants, and Awards**

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- Science Fund Program for Excellent Young Scientists (Overseas), 2023
- Shanghai Overseas High-level Young Talents, 2023
- Huawei ExploreX Research Grant, Shanghai Jiao Tong University, 2022
- Berkeley Graduate Division Conference Travel Grant, University of California, Berkeley, 2020
- Hui-Chun Chin and Tsung-Dao Lee Chinese Undergraduate Research Endowment Receiver, Shanghai Jiao Tong University, 2017
- Boot Camp Project Grand Prize Winners (top 1), IC3-Ethereum Crypto Boot Camp and Workshop, 2016
  - [Blog](#) and [Report](#)
- International Collegiate Programming Contest (ACM-ICPC) Asia Regional
  - 10th Place in Taichung site, 2014
  - Gold Medal in Hangzhou site, 2013

## **Service**

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PROGRAM COMMITTEE    Asiacrypt 2023, USENIX Security 2024

## **Work Experience**

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Summer 2021    Research intern at NTT Research Lab, advised by Prof. Elaine Shi  
                    and Prof. Shin'ichiro Matsuo  
Fall 2016      Research intern at Cornell University, advised by Prof. Elaine Shi

## **Teaching**

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Spring 2024    Introduction to Blockchains, Shanghai Jiao Tong University  
Fall 2023      Introduction to Cryptography, Shanghai Jiao Tong University