

# Caitao Zhan

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## ABOUT ME

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I am a **computer scientist/engineer** who works in both classical computing and quantum computing. My expertise lies in wireless sensor networks, machine learning for wireless sensing, and quantum sensing/networks/computing.

## EDUCATION

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Aug. 2017 ~ Aug. 2023	Stony Brook University GPA: 3.9/4.0	Ph.D. Candidate in Computer Science. Advisor: <a href="#">Himanshu Gupta</a>
Aug. 2017 ~ Aug. 2022	Stony Brook University	M.S. in Computer Science
Sept. 2013 ~ Jun. 2017	China University of Geosciences GPA: 92/100	B.S. in Computer Science and Technology Rank: 1/122

## INTERN EXPERIENCE

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May. 2021 ~ Aug. 2021	Software Engineering Intern @ Microsoft (Azure) C# development: Active Directory/Light-weight Directory Service (AD/LDS) Replay Tool Automation. Design/implement AutoQuery, which stresses the AD/LDS server automatically and intelligently.
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## RESEARCH EXPERIENCE

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Aug. 2022 ~ present	Quantum Sensor Network Algorithms for Transmitter Localization. [11] Quantum sensing, quantum state discrimination, hybrid quantum-classical algorithms
Sep. 2021 ~ present	Discrete Outcome Quantum Sensor Networks. [9, 12] Quantum state/channel discrimination, initial state optimization, semidefinite programming, theory.
Jan. 2021 ~ Apr. 2022	Efficient Quantum Communication Networks. [8] Design/implement routing algorithms/protocols for quantum networks using entanglement-swapping trees.
Nov. 2019 ~ Mar. 2022	Intelligent Radio with Deep Learning. [5, 7, 10] Design/implement CNNs to solve wireless network problems: wireless localization & spectrum allocation. Reframe wireless problems to computer vision problems: image-to-image translation & object detection.
Mar. 2019 ~ Oct. 2019	Efficient Localization of Multiple Intruders in Shared Spectrum System. [3] Design/implement. Bayesian approach. Testbed(Odroid,Raspberry Pi,USRP,HackRF).
Dec 2018 ~ Sep. 2020	Datacenter Networks. [4] Multi-hop circuit switch scheduling. Greedy, approximation proof. Participate in implementation.
July 2018 ~ July 2019	Selection of Sensors for Efficient Transmitter Localization. [2, 6] Implement. Greedy, approximation proof. Bayesian approach. GPU acceleration.
Otc. 2015 ~ Sept. 2016	Optimization using Evolutionary Algorithms. [1] Design/implement. Shortest path-finding using ant colony optimization algorithms. Proposed a probability-based evolutionary algorithm solving shape formation problems.

## SKILLS & TOOLS

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**Python** are **C++** are my most frequently used languages. I also have experience in **C#**, **Java**, **C**, and **Matlab**. For machine learning, have experience in **PyTorch**, **scikit-learn**, and **ML.NET**. For quantum, have experience in quantum network simulator **NetSquid** and quantum development SDK **Qiskit**. For GPU programming, have experience in **CUDA** and **Numba**. For software-defined radio, have experience in **GNU Radio**. For database, have experience in **MySQL** and **SQLite**. For convex optimization, have experience in **OR-Tools** and **CVXPY**.

## ACADEMIC SERVICES

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Shadow Program Committee of ACM SenSys 2022

Reviewer of Elsevier The Journal of Networks and Computer Applications

## SELECTED AWARDS AND HONORS

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China National Scholarship	2014, Chinese Ministry of Education, Top 1%
2 <sup>nd</sup> Prize in Freshman ACM ICPC Cup	2014, China University of Geosciences, Top 6%
Travel Grant for ACM IMC	2018, ACM Internet Measurement Conference
Best Poster Award (Participants Choice) in Graduate Research Day	2022, Department of CS, Stony Brook University

## PREPRINT

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- [12] **C. Zhan**, H. Gupta, M. Hillery, “Optimizing Initial State of Detector Sensors in Quantum Sensor Networks”. Submitted to ACM Transactions on Quantum Computing (TQC), [arXiv](#)
- [11] **C. Zhan**, H. Gupta, “Quantum Sensor Network Algorithms for Transmitter Localization”. Submitted to IEEE Quantum Computing and Engineering (QCE) 2023, [arXiv](#)
- [10] M. Ghaderibaneh, **C. Zhan**, H. Gupta, “DeepAlloc: CNN-Based Approach to Efficient Spectrum Allocation in Shared Spectrum Systems”. [arXiv](#)

## PUBLICATION

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- [9] M. Hillery, H. Gupta, **C. Zhan**, “Discrete Outcome Quantum Sensor Networks”. Physical Review A (PRA), [PDF](#)
- [8] M. Ghaderibaneh, **C. Zhan**, C.R. Ramakrishnan, H. Gupta, “Efficient Quantum Network Communication using Optimized Entanglement-Swapping Trees”, IEEE Transactions on Quantum Engineering (TQE) 2022. [PDF](#).
- [7] **C. Zhan**, M. Ghaderibaneh, P. Sahu, H. Gupta, “DeepMTL Pro: Deep Learning Based Multiple Transmitter Localization and Power Estimation”, Elsevier Pervasive and Mobile Computing (PMC) 2022. [PDF](#), [Presentation](#).
- [6] A. Bhattacharya, **C. Zhan**, A. Maji, H. Gupta, S. Das, P. Djuric, “Selection of Sensors for Efficient Transmitter Localization”, IEEE/ACM Transactions on Networking (TON) 2021. [PDF](#).
- [5] **C. Zhan**, M. Ghaderibaneh, P. Sahu, H. Gupta, “DeepMTL: Deep Learning Based Multiple Transmitter Localization”, IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM) 2021. [PDF](#), [Presentation](#).
- [4] H. Gupta, M. Curran, **C. Zhan**, “Near-Optimal Multihop Scheduling in General Circuit-Switched Networks”, ACM International Conference on emerging Networking EXperiments and Technologies (CoNEXT) 2020. [PDF](#), [Presentation](#).
- [3] **C. Zhan**, H. Gupta, A. Bhattacharya, M. Ghaderibaneh, “Efficient Localization of Multiple Intruders in Shared Spectrum System”, ACM/IEEE Information Processing in Sensor Networks (IPSN) 2020. [PDF](#), [Presentation](#).
- [2] A. Bhattacharya, **C. Zhan**, H. Gupta, S. Das, P. Djuric, “Selection of Sensors for Efficient Transmitter Localization”, IEEE International Conference on Computer Communications (INFOCOM) 2020. [PDF](#), [Presentation](#).
- [1] **C. Zhan** and C. Li, “Shape Formation in Games: a Probability-based Evolutionary Approach”, 2016 International Conference on Computational Intelligence and Security. [PDF](#).