

## Education

- Aug 2017 - **University of North Carolina**, Chapel Hill, NC  
Aug 2023 - Ph.D. in Computer Science  
- Advisor: Shahriar Nirjon  
- Research Area: **On-device Machine Learning, Edge Computing, Embedded Systems**
- Sept 2014 - **Tsinghua University**, Beijing, China  
July 2017 - M.S in Electronic and Communications Engineering  
- Advisor: Yongfeng Huang
- Sept 2010 - **Central South University**, Changsha, China  
July 2014 - B.S in Communications Engineering  
- **Course Ranking 1<sup>st</sup>/151**

## Research Experience

- Jan 2021 - **Efficient Multi-task Learning on Resource-constrained Systems**  
Aug 2023
  - Exploited task affinity to build a compact execution graph for vision and audio based tasks
  - Leveraged task dependencies to decrease model context switching and inference overhead
  - Built dedicated hardware systems to facilitate multi-task context switch
- Dec 2018 - **Use Reinforcement Learning to Improve Energy Efficiency**  
Dec 2020
  - Leveraged reinforcement learning to optimize energy consumption on batteryless systems
  - Built an energy harvesting system to do on-device learning and online adaptation
- Dec 2018 - **Enable Machine Learning on Intermittent Systems**  
Dec 2020
  - Implemented on-device training of ML algorithms on intermittent systems
  - Leveraged early termination of DNNs to schedule time-sensitive tasks on intermittent systems
- Mar 2015 - **Poetry Generation Based on NLP Models**  
Apr 2017
  - Built a Markov language model to generate Songci poetry
  - Built a recurrent neural network model to generate Chinese classical poetry
  - Both above works led to first-authored publications

## Professional Experience

- July 2023 - **Black Sesame Technologies**, Full-time, Architect, AI Computing & Modeling  
ongoing
  - Conducting performance modeling and architecture optimization analysis for vision and AI
  - Instrumenting architecture optimization for high-efficiency Neural Network acceleration
- May 2022 - **Meta**, Marketplace, Machine Learning Engineer Intern  
Aug 2022
  - Leveraged data downsampling strategies to decrease necessary training data by 20%
  - Leveraged Scaling User Models to improve model evaluation metrics by 1% - 2%
  - Implemented multiple data ingestion pipelines to automate data extraction and delivery
- May 2020 - **Amazon**, Alexa, Applied Scientist Intern  
Aug 2020
  - Studied active learning approaches for acoustic event classification
  - Proposed and implemented reinforcement learning based active learning approaches
  - Re-implemented and compared with a state-of-the-art clustering based active learning approach
- June 2019 - **Nokia Bell Labs**, Research Intern  
Aug 2019
  - Conducted control analysis of virtual network functions

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## Selected Publication

### Conference and Journal

- SenSys 2023 **Efficient Multitask Learning on Resource-Constrained Systems**  
(in submission) [Yubo Luo](#), Le Zhang, Zhenyu Wang, and Shahriar Nirjon [\[paper\]](#)  
Proceedings of the 21th Conference on Embedded Networked Sensor Systems
- MobiSys 2023 **Seconds-Long Audio Event Recognition on Intermittently-Powered Systems**  
Mahathir Monjur, [Yubo Luo](#), Zhenyu Wang, and Shahriar Nirjon [\[paper\]](#)  
The 21st ACM International Conference on Mobile Systems, Applications, and Services
- IoTDI 2023 **Amalgamated Intermittent Computing Systems**  
Bashima Islam, [Yubo Luo](#), and Shahriar Nirjon [\[paper\]](#)  
The 8th ACM/IEEE Conference on Internet of Things Design and Implementation
- DCOSS 2021 **SmartON: Just-in-Time Active Event Detection on Energy Harvesting Systems**  
[Yubo Luo](#), and Shahriar Nirjon [\[paper\]](#)[\[code\]](#)[\[slide\]](#)  
The 17th Annual International Conference on Distributed Computing in Sensor Systems
- Ubicomp 2020 **Intermittent Learning: Machine Learning on Intermittent System**  
Seulki Lee, Bashima Islam, [Yubo Luo](#), and Shahriar Nirjon [\[paper\]](#)[\[code\]](#)[\[slides\]](#)[\[talk\]](#)  
Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies
- RTAS 2019 **Just-in-Time Active Event Detection on Energy Autonomous Sensing Systems**  
(WIP) [Yubo Luo](#), and Shahriar Nirjon [\[paper\]](#)[\[code\]](#)  
25th IEEE Real-time and Embedded Technology and Applications Symposium
- IHMMSEC 2017 **Text Steganography with High Embedding Rate: Using Neural Networks to Generate Chinese Classic Poetry**  
[Yubo Luo](#), and Yongfeng Huang [\[paper\]](#)  
The 5th ACM Workshop on Information Hiding and Multimedia Security
- 2016 **Text Steganography Based on Ci-poetry Generation Using Markov Chain Model**  
[Yubo Luo](#), Yongfeng Huang, Fufang Li, and Chinchun Chang [\[paper\]](#)  
KSII Transactions on Internet and Information Systems

### Demo and Poster

- IPSN 2022 **(Demo) Capuchin: A Neural Network Model Generator for 16-bit Microcontrollers**  
Le Zhang, [Yubo Luo](#), and Shahriar Nirjon [\[paper\]](#)[\[code\]](#)[\[slides\]](#)[\[talk\]](#)  
The 21th ACM/IEEE International Conference on Information Processing in Sensor Networks
- IPSN 2019 **(Poster) On-Device Training from Sensor Data on Batteryless Platforms**  
Bashima Islam, [Yubo Luo](#), Seulki Lee, and Shahriar Nirjon [\[paper\]](#)  
The 18th ACM/IEEE International Conference on Information Processing in Sensor Networks

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## Awards

- Ubicomp 2020 Best Presentation, Judge's Award
- 2016 The Huawei Scholarship (**top 5%**)
- 2014 The Honor of Excellent Graduate in Hunan Province (**top 2%**)
- 2014 Central South University Outstanding Award (**top 1%**)
- 2013 **1<sup>st</sup>** Prize in American International Mathematical Contest in Modeling
- 2012 **2<sup>st</sup>** Prize in China Undergraduate Mathematical Contest in Modeling
- 2012 The National Scholarship (**top 1%**)

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## Professional Services

Journal Review IOTJ: IEEE Internet of Things Journal  
WCM: IEEE Wireless Communications Magazine  
CSSE: Computer Systems Science and Engineering  
IASC: Intelligent Automation & Soft Computing  
CMC: Computers, Materials & Continua

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## Teaching Assistantship

Spring 2023 COMP380: Introduction to Digital Culture  
Spring 2018 COMP455: Models of Languages and Computation  
Fall 2017 COMP411: Computer Organization

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## Skills

Programming Python, C/C++, Matlab, SQL  
ML Framework TensorFlow, Pytorch  
Hardware Arduino, MSP430, STM32, EAGLE