Soroush Bateni

soroush@berkeley.edu | utdallas.edu/∼soroush | github.com/Soroosh129 | (682) 330-5395

RESEARCH INTERESTS

Cyber-Physical Systems, in particular, autonomous embedded systems such as self-driving vehicles.
Real-Time Systems, in particular, predictable embedded GPGPU computing and deterministic models of computation.

EDUCATION

The University of Texas at Dallas — **Richardson, TX**
PhD in Computer Science. GPA: 3.76. — *Graduated: May 2022*

The University of Texas at Dallas — **Richardson, TX**
MS in Computer Science. Jonsson School Graduate Scholarship. GPA: 3.72. — *Graduated: May 2018*

EXPERIENCE

The University of California, Berkeley — **Berkeley, CA**
Postdoc — *May 2022 - Current*

- Research on
  - deterministic heterogeneous distributed embedded systems in the context of Lingua Franca (LF),
  - pluggable schedulers for LF to create a viable platform for real-time systems research, and,
  - enhancing the testability of autonomous embedded systems by enabling easy migration from Robot Operating System (ROS) to LF.
- Leading undergraduate students on several projects, including the porting of Amazon's DeepRacer software stack from ROS to Lingua Franca.
- Supervisor: Prof. Edward A. Lee

The University of Texas at Dallas — **Richardson, TX**
Research Assistant — *May 2017 - May 2022*

- Published NeuOS, a timing-predictable DNN framework for autonomous embedded systems, designed to minimize energy consumption and maximize accuracy in USENIX ATC 2020.
- Published two papers in RTSS 2019 and RTAS 2020 about data constraints and memory management in autonomous embedded systems.

The University of California, Berkeley — **Berkeley, CA**
Visiting Ph.D. Student Researcher — *Fall 2020, Summer 2021*

- Research on the semantics of Lingua Franca (lf-lang.org), a synchronous programming language framework based on discrete time event models.
- Ported Autoware.Auto 1.0, an open-source autonomous driving framework to LF.
- Under the supervision of Prof. Edward A. Lee.

Fujitsu Laboratories of America — **Richardson, TX**
Research Intern — *Summer 2019*

- Developed a comprehensive prototype of an efficient distributed collective intelligence system for edge-connected autonomous vehicles.
- Used Java, C++, and CUDA, along with open source ROS and Autoware software to implement an interactive computing framework using the latest NVIDIA embedded platforms.

Stanford University — **Remote**
Stanford Crowd Research Collective — *Spring 2015*

- Worked with a large research group on Daemo, under the supervision of Prof. Michael Bernstein.

SELECTED PUBLICATIONS

2021 Edward A. Lee, **Soroush Bateni**, Shaokai Lin, Marten Lohstroh, and Christian Menard. Quantifying and generalizing the cap theorem. *arXiv preprint arXiv:2109.07771*, 2021

- Marten Lohstroh, Christian Menard, **Soroush Bateni**, and Edward A Lee. Toward a lingua franca for

deterministic concurrent systems. *ACM Transactions on Embedded Computing Systems (TECS)*, 20(4):1–27, 2021

2020 **Soroush Bateni** and Cong Liu. "NeuOS: A latency-predictable multi-dimensional optimization framework for dnn-driven autonomous systems". *USENIX Annual Technical Conference (ATC)*

- **Soroush Bateni***, Zhendong Wang*, Yuankun Zhu, Yang Hu, and Cong Liu. "Co-optimizing performance and memory footprint via integrated cpu/gpu memory management, an implementation on autonomous driving platform". *IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS)*. *Equal Contribution.

2019 **Soroush Bateni** and Cong Liu. "Predictable data-driven resource management: an implementation using autoware on autonomous platforms". *Real-Time Systems Symposium (RTSS)*

2018 **Soroush Bateni**, Husheng Zhou, and Cong Liu. "PredJoule: A timing-predictable energy optimization framework for deep neural networks". *Real-Time Systems Symposium (RTSS)*

- **Soroush Bateni** and Cong Liu. "ApNet: Approximation-aware real-time neural network". *Real-Time Systems Symposium (RTSS)*
- Husheng Zhou, **Soroush Bateni**, and Cong Liu. "S^3DNN: Supervised streaming and scheduling for gpu-accelerated real-time dnn workloads". *IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS)*. Best Paper Award
- Zheng Dong, Cong Liu, **Soroush Bateni**, Zelun Kong, Liang He, Lingming Zhang, Ravi Prakash, and Yuqun Zhang. "A general analysis framework for soft real-time tasks". *Transactions on Parallel and Distributed Systems*
- Husheng Zhou, **Soroush Bateni**, and Cong Liu. "GRU: Exploring computation and data redundancy via partial gpu computing result reuse". *ACM International Conference on Supercomputing (ICS)*

2016 Javad Salimi Sartakhti, Mohammad Hossein Manshaei, **Soroush Bateni**, and Marco Archetti. "Evolutionary dynamics of tumor-stroma interactions in multiple myeloma". *PLOS ONE*, 11:1–17

LECTURES

Operating Systems Concepts — **UT Dallas**
Sole Instructor — *Undergraduate Course - Summer 2018*

General Purpose GPU Computing — **UT Dallas**
GPU/CUDA programming - Co-Instructor — *Graduate Course - Spring 2018*

Parallel Processing — **Isfahan University of Technology**
GPU/CUDA programming - Co-Instructor — *Graduate Course*

Medical Image and Signal Processing Research Center — **Isfahan University of Medical Sciences**
GPU/CUDA programming - Sole Instructor

Skills

Programming Languages
CUDA_C, C, C++, C#, Java, Python

Open-Source Contributions
lflang/Lingua-Franca, NeuOS

Relevant System Experiences:
Researched on GPU Drivers (NOUVEAU + GDev), embedded Linux, LITMUS ^{RT} (Real-Time OS)

Autonomous Vehicle and Embedded System Frameworks:
ROS (Robot Operating System), Autoware, and Lingua Franca.

Neural Network Frameworks
Caffe (CaffeNet, AlexNet, ResNet, GoogleNet, VGGNet), Darknet (YOLO), TensorFlow

Platforms
NVIDIA Drive PX2 Autochauffeur, Jetson AGX Xavier, Jetson TX2, DGPU

Miscellaneous
Proficient in English, love teamwork, and very passionate about research.