

# Soroush Bateni

✉ soroush@utdallas.edu | 🌐 utdallas.edu/~soroush | 🐙 github.com/Soroosh129 | ☎ (682) 330-5395

## RESEARCH INTERESTS

**Cyber-Physical Systems**, in particular, autonomous systems such as self-driving vehicles.

**Real-Time Systems**, in particular, predictable GPGPU computing and deterministic models of execution.

## EDUCATION

**The University of Texas at Dallas**

*PhD in Computer Science.*

**Richardson, TX**

*Expected Graduation: May 21st 2022*

**The University of Texas at Dallas**

*MS in Computer Science. Jonsson School Graduate Scholarship.*

**Richardson, TX**

*Graduated: May 2018*

## EXPERIENCE

**The University of Texas at Dallas**

*Research Assistant*

**Richardson, TX**

*May 2017 -*

- 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 RTAS and RTSS in 2019 about data constraints and memory management in autonomous driving platforms.
- Published two first-author papers in RTSS 2018 about balancing energy, timing and accuracy of DNNs in autonomous driving platforms.
- Ongoing research on predictable, energy-efficient, and accurate computing in autonomous vehicles using Lingua Franca (repo.lf-lang.org).

**The University of California, Berkeley**

*Visiting Ph.D. Student Researcher*

**Berkeley, CA**

*Fall 2020, Summer 2021*

- Research on the semantics of Lingua Franca (LF), a synchronous programming language framework based on discrete time event models.
- Ported Autoware.auto 1.0, an open-source autonomous driving framework to LF.
- Continuing work on Federated Lingua Franca, a distributed variant of LF that can achieve a consistent global state across machines by default.
- Under the supervision of Prof. Edward A. Lee.

**Fujitsu Laboratories of America**

*Research Intern*

**Richardson, TX**

*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**

*Stanford Crowd Research Collective*

**Remote**

*Spring 2015*

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

**Institute for Research in Fundamental Sciences (IPM)**

*Research Intern*

**Tehran, Iran**

*Summer 2013*

- Worked on parallel stereo vision for MEMOCODE 2013 (IPM won first place).

## 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

Sole Instructor

UT Dallas

Undergraduate Course - Summer 2018

### General Purpose GPU Computing

GPU/CUDA programming - Co-Instructor

UT Dallas

Graduate Course - Spring 2018

### Parallel Processing

GPU/CUDA programming - Co-Instructor

Isfahan University of Technology

Graduate Course

### Medical Image and Signal Processing Research Center

GPU/CUDA programming - Sole Instructor

Isfahan University of Medical Sciences

## Skills

### Programming Languages

CUDA\_C, C, C++, C#, Java, Python

### Open-Source Contributions

Iflang/Lingua-Franca, NeuOS

### Relevant System Experiences:

Researched on GPU Drivers (NOUVEAU + GDev), embedded Linux, LITMUS<sup>RT</sup> (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.