Sara Shoouri

US Permanent Resident

Website Email LinkedIn GitHub Google Scholar

Education

University of Michigan **Spring 2026 (Expected)**
Ph.D. in Electrical and Computer Engineering *Ann Arbor, USA*
Thesis: Efficient Deep Learning for Multi-Modal Fusion in Resource-Constrained Systems

University of Michigan **Spring 2021**
M.Sc. in Electrical and Computer Engineering *Ann Arbor, USA*
Signal and Image Processing and Machine Learning. GPA: 4/4

Sharif University of Technology **Spring 2019**
B.Sc. in Electrical Engineering *Tehran, Iran*
Electrical and Communication Systems.

Technical Skills

Languages: Python, MATLAB, Julia, C.
Machine Learning Libraries: PyTorch, TensorFlow, Scikit-learn, NumPy, Pandas, Triton.
Theoretical Foundations: Advanced Computer Vision, Mathematical Optimization, Probabilistic and Matrix Methods, Hybrid Control Systems

Research Interest

Efficient Multi-Modality Perception and Deep Learning Networks, Low-Cost Adaptive Inferences, Multi-Task Learning, Efficient Vision Mamba and Transformers, 3D vision

Industrial Experience

Meta **Summer 2024**
ML/CV Research Ph.D. Intern *NYC, NY*

- Achieved a **5 cm reduction** in indoor localization error, outperforming traditional RSSI-based methods.
- Engineered an end-to-end pipeline to capture and process hours of Channel State Information (CSI) data using Quest headsets and SLAM-computed trajectories.
- Designed and trained a novel Siamese network on Time-of-Flight (TOF) and Angle of Arrival (AOA) heatmaps, delivering a solution recognized for potential **production use**.

Advanced Micro Devices (AMD) **Winter 2024**
AI/ML Data Center Research Ph.D. Tech Intern *Austin, TX*

- Designed and deployed a robust benchmarking pipeline for Large Language Models (LLaMA 7B, 13B, 70B) in a Retrieval-Augmented Generation (RAG) framework.
- Accelerated model inference and improved efficiency by implementing post-training 8-bit quantization for both weights and activations.

Commonwealth Scientific and Industrial Research Organization (CSIRO) **Fall 2018**
Research Intern *Brisbane, Australia*

- Implemented an embedded biologger ML-based pipeline for fish monitoring to estimate heart rate and detect feeding events.

Academic Experience

University of Michigan **2020 – present**
Graduate Student Research Assistant | Advisor: Prof. Hun-Seok Kim *Ann Arbor, MI*

Harnessing Temporal Cues for Efficient 3D Object Detection via Multi-Modal Fusion

- Reduced **LiDAR energy consumption** by over **65**% on nuScenes and Lyft benchmarks while maintaining competitive 3D object detection performance.
- Developed a predictive history-aware adaptive scanning framework that integrates a differentiable Gumbel Softmax mask to intelligently allocate scanning density to regions of interest.

Efficient Computation Sharing for Multi-Task Visual Scene Understanding

- Reduced **computational cost** (FLOPs) by **40.5**% for images and **65.7**% for videos compared to single-task baselines.

- Introduced a novel transformer framework that shares computation and parameters across multiple visual tasks, outperforming SOTA in both accuracy and resource utilization.

Siamese Learning-based Monarch Butterfly Localization

- Achieved SOTA butterfly tracking accuracy, outperforming existing models with a mean absolute error of **1.416**° in latitude and **0.393**° in longitude.
- Advocated a novel, GPS-less deep learning model that accurately localizes butterflies by fusing daylight intensity and temperature data with a Siamese network.

University of Michigan **2019 – 2020**

Graduate Student Research Assistant | ***Advisor: Prof. Necmiye Ozay*** *Ann Arbor, MI*

Falsification of a Vision-based Automatic Landing System

- Engineered a novel, vision-based automatic landing framework for fixed-wing aircraft, integrating PID control with runway location estimation from camera-centric sensors to analyze and enhance system reliability.

Preprints

- Delbert A. Green, **Sara Shoouri**, et al. "Social Thermoregulation Enables Long-Distance, Bidirectional Monarch Butterfly Migration." Under Submission.

Selected Publications

- **Sara Shoouri**, et al. "Adaptive LiDAR Scanning: Harnessing Temporal Cues for Efficient 3D Object Detection via Multi-Modal Fusion." Proceedings of the AAAI Conference on Artificial Intelligence (**AAAI**), 2026.
- Fan, Zichen, Qirui Zhang, Pierre Abillama, **Sara Shoouri**, et al. "A 22nm 25.08 TOPS/W Multi-Task Transformer Accelerator with Mixed Precision Structured Sparsity and Two-Stage Task-Adaptive Power Management." 2025 Symposium on VLSI Technology and Circuits (**VLSI Technology and Circuits**).
- **Sara Shoouri**, et al. "Efficient Computation Sharing for Multi-Task Visual Scene Understanding." In Proceedings of the IEEE/CVF International Conference on Computer Vision (**ICCV**), 2023. | [Code]
- Fan, Zichen, Qirui Zhang, Pierre Abillama, **Sara Shoouri**, et al. "TaskFusion: An Efficient Transfer Learning Architecture with Dual Delta Sparsity for Multi-Task Natural Language Processing." In Proceedings of the 50th Annual International Symposium on Computer Architecture (**ISCA**), 2023.
- Morteza Tavakoli Taba, S. M. Hossein Naghavi, **Sara Shoouri**, et al. "A 53-62 GHz Two-channel Differential 6-bit Active Phase Shifter in 55-nm SiGe Technology." In Proceedings of IEEE 49th European Solid State Circuits Conference (**ESSCIRC**), 2023.
- **Sara Shoouri**, et al. "Siamese Learning-based Monarch Butterfly Localization." In IEEE Data Science and Learning (**DSLW**), 2022. | [Code]
- Inhee Lee, Roger Hsiao, Gordy Carichner, Mingyu Yang, **Sara Shoouri**, et al. "mSAIL: milligram-scale multi-modal sensor platform for monarch butterfly migration tracking." In Proceedings of the 27th Annual International Conference on Mobile Computing and Networking (**Mobicom**), 2021. **(Best Paper Award)** | [Code]
- Yiran Shen, Reza Arablouei, Frank De Hoog, Xing Hao, James Sharp, **Sara Shoouri**, et al."In-situ Fish Heart Rate Estimation and Feeding Event Detection Using an Implantable Biologger." IEEE Transactions on Mobile Computing, 2021.
- **Sara Shoouri**, et al."Falsification of a Vision-based Automatic Landing System." In AIAA Scitech 2021 Forum, 2021.
- Shen, Yiran, Reza Arablouei, Frank de Hoog, James Sharp, **Sara Shoouri**, et al. "Estimating heart rate and detecting feeding events of fish using an implantable biologger." In 19th ACM/IEEE International Conference on Information Processing in Sensor Networks (**IPSN**), 2020.

Scholarships & Awards

- Best Poster Award at CogniSense. | *Oct 2025*
- The College of Engineering Doctoral Intern Funding, University of Michigan. | *Feb 2024*
- Rackham Conference Travel Grant. | *Oct 2023*
- Paper Presentation Award at DSLW 2022. | *May 2022*
- Best Paper Award at Mobicom, 2021. | *Fall 2021*
- PhD Fellowship from UMICH, Purdue University, WISC. | *Fall 2021*
- Ranked 85th (top 0.038 percent) among 222'507 participants in the Iranian Nationwide University Entrance Exam Known as Konkoor. | *Fall 2014*