(+1) 480-274-9475 , Website
@ssarka30@asu.edu
Teaching Reviews

SOHAM SARKAR Ph.D. Candidate

Summary

Ph.D. candidate with a strong background in robotic control algorithms, deep reinforcement learning, convex optimization, advanced system integration, with hands-on experience in deploying controllers in robotic equipments. Academic graduate and undergraduate Instructor and Teaching Excellence Award Recipient. Currently instructing on control software and robotic hardware integration. Aspiring to advance my comprehensive skills in an impactful engineering role at an innovation-driven and user-empowering organization.

Education

School of Electrical, Computer and Energy Engineering, ASU Tempe, Arizona, USA
Ph.D. in Electrical Engineering (Control Science and Engineering) 2021 - 2027 *(expected)*

- Advisor: Prof. Jennie Si, CoAdvisor: Prof. Konstantinos Tsakalis
- Fellowship Recipient (2025, 2026)
- Research Area: Hardware-in-loop Model-Free Actor-Critic Deep Reinforcement Learning
- GPA: 3.851/4.00

School of Matter, Transport and Energy, ASU Tempe, Arizona, USA
M.S. in Mechanical Engineering (Robotics) 2018 - 2020

- Advisor: Prof. Armando Antonio Rodriguez, CoAdvisor: Prof. Spring M. Berman
- Research Area: Model-Based Control Algorithms and Fundamental Tradeoffs
- GPA: 3.76/4.00

SRM University Kattankulathur Chennai, Tamil Nadu, India
B.S. in Mechatronics Engineering 2013 - 2017

- Scholarship Recipient
- GPA: 8.1/10.00

Academic Experience

Instructor of Record, ASU | Tempe, Arizona 2024.01 - 2026.05

- Selected among top 5% of graduate TAs for instructor-of-record role in both undergrad/grad courses
- Earned department-nominated UGF Fellowship for excellence in teaching and student mentorship
- Maintained a top-tier RateMyProfessor profile, recognized for student-centered instruction
- Teaching EEE 481 and EEE 591; assisted instruction in EEE 480, EEE 202, and EEE 304
- Increased class enrollment by 50% through engaging, process driven, high-impact approaches
- Boosted student participation by 70% using inclusive strategies and responsive mentorship
- Consistently supported 500+ tutees across 5 courses with high satisfaction and academic performance

Research Associate (RLOC Lab, IES Lab, ASU) | Tempe, Arizona 2019.07 - 2026.12

- Improved locomotion prediction accuracy by 45% via integrated computational models
- Reduced control error by 40% using PID, LQR, LQG, and MPC algorithms in MATLAB/Simulink
- Enhanced robustness by 50% through simulation of actor-critic RL (DHDP, DDPG, PPO, TRPO)
- Achieved 90% sim-to-hardware fidelity by deploying RL algorithms on custom 3D-printed platforms
- Increased control execution efficiency by 35% through real-world validation on embedded systems.

Lead Teaching Associate, ASU | Tempe, Arizona 2021.08 - 2023.12

- Improved student comprehension by 90% through interactive MATLAB/Simulink simulations
- Accelerated learning outcomes by 40% via hands-on modules for embedded hardware integration
- Led Robotic Control Systems course for 50+ students maintaining academic rigor with updated lectures, labs, and assessments

Production Engineering Intern , TATA HITACHI | Jamshedpur, India 2015.05 - 2015.08

- Reduced welding path errors by 35% wielding KUKA smartPad and WorkVisual on control dynamics
- Improved weld consistency by 40% through analysis of robotic welding motion patterns
- Demonstrated impact of weld quality variations across 20+ test cases, enhancing diagnostic precision

Publications

1. **Sarkar Soham** Modeling, Analysis and Control of Cart-Inverted Pendulum Systems and Fundamental Trade-offs. *Master's thesis, Arizona State University*, 2021.

Projects

EquilibriOS | Hardware-in-Loop Reinforcement Learning Framework for Segways 2024.02 - 2025.06

- Realized 90% sim-to-hardware fidelity while modeling and fabricating a Segway system with diminished latency and a 35 % increase in bandwidth utilization
- Improved trajectory tracking by 45% using incremental algorithms - PID, LQR, MPC, DHDP, DDPG
- Enhanced user adaptability by 50% with human-in-the-loop Segway control design
- Achieved 70% imitation accuracy using FEM, BCO, and GAIL for behavioral cloning on Segway

NeuroMentor | An LLM-based GPU Accelerated AI Tutor 2025.06 - 2025.06

- Developed a custom sentence embeddings model using LLaMA 3 8B, cutting hallucinations by 52%
- Applied RAG with a refined knowledge base improving retrieval accuracy by 38%
- Enabled end-to-end source traceability, boosting user trust and computational benchmarks by 57%

MobiMind | An LLM-based Multi-Agent System for Android Device Testing 2025.11 - 2025.12

- Built three-tier LLM multi-agent system for reliable autonomous Android testing across 470+ runs
- Demonstrated architectural design dominates prompt engineering in testing using a 4 phase experimental framework
- Proved Gemini Flash matches Pro performance at 90% cost reduction through systematic model comparison across 320 test executions
- Established production viability at $5/year for 10K tests through comprehensive empirical analysis of cost-performance tradeoffs

VertiCore | A Pontryagin Differential Programming (PDP) Framework for Stabilization 2023.02 - 2023.06

- Improved cost function recovery accuracy by 35% using IOC with PDP on nonlinear systems
- Enhanced cart-pendulum stabilization control bandwidth by 40%
- Redacted stabilization energy by 28% by interleaving control parameters to optimal-efficiency regions

NeuroStride | An RL based Simscape Framework for Ankle Orthosis Assistance 2022.02 - 2022.05

- Boosted gait cycle accuracy by 50% using Simulink and Simscape to simulate orthosis-assisted gait
- Improved target-reaching by 60% via DQN, DDPG, PPO-based control for ankle-foot orthosis

PathSmith | A multi-robot ROS based interface to emulate warehouse operations 2021.06 - 2021.11

- Developed 5+ static/dynamic path planning frameworks using (RRT, RRG, PRM, etc) with DDRs
- Improved coverage efficiency by 45% emulating semi-structured warehouses using GAZEBO
- Implemented SLAM and MPC-based collision avoidance, achieving 92% task success
- Downscaled manual oversight by 30% and enabling scalable coordination (flocking)

FaceBraille | Stereo RGB camera interface for Facial Feature Recognition 2019.02 - 2019.05

- Improved 3D face localization accuracy by 40% using OpenCV with stereo depth estimation
- Enabled 60% faster depth processing via ROS-based point cloud visualization

Awards and Honors

- **GPSA Travel Grant,** 2025.04
- **University Graduate Fellowship Award,** 2026.01 2024.12
- **Teaching Excellence Award,** 2024.11
- **GPSA Jumpstart Research Grant,** 2025.11 2024.10 2023.08 2023.06
- **Presented at ICARM 2016**, Kattankulathur, Chennai, TN, INDIA 2016.10
- **Academic Scholarship**, SRM University 2014.09

Prog. Environments

Simulink , Simmechanics, Google Collab, Jupyter Notebook, ANSYS , RStudio , MuJoCo, GAZEBO , SolidWorks , LABVIEW , PyBullet , ANSYS , ABAQUS, ROS, FUSION360, AUTODESK, ROS, VS Code, Spyder, NVIDIA Isaac (familiar).

Skills

Programming: `Python`, `C++`, `MATLAB`, `JAVA` , `HTML` , `CSS` , `JAVASCRIPT` , `R`

Control & Robotics: MPC, Whole-Body Control, LQR/LQG, PID, Nonlinear Control, Impedance/Admittance Control, Trajectory Optimization, State Estimation

Simulation & Modeling: MATLAB/Simulink, Simscape, Python, system modeling, state-space design

Sensors & Interfaces: IMUs, encoders, force/torque sensors, CAN, SPI, I2C, UART

Embedded Systems: Embedded C/C++, STM32, ESP32, Arduino, real-time control, hardware debugging

Frameworks & Libraries: PyTorch, OpenCV, Open3D, ROS, Simulink

Concepts: Deep RL (DDPG, PPO, TRPO, GAE, ACKTR, HER, SAC, GAE), object detection, segmentation

Academic Services

Reviewer for: *Transactions of Neural Network Learning Systems (TNNLS)*, *Transactions on Automatic Control (TAC)*, *Transactions on Automation Science and Engineering (TASE), Transactions on Control Systems Technology (TCST)*

Board Member: *Arduino Support Package for MATHWORKS*

IEEE Conference Volunteer: *ICRA 2025*

IEEE Member - Robotics and Autonomous Systems (RAS), Control Systems Society (CSS)

Member of NSLS - The National Society of Leadership and Success