Harshvardhan Uppaluru

Postdoctoral Fellow
Intelligent Multi-Level Power-Aware Circuits And Systems (IMPACT) Lab
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Education

Doctor of Philosophy in Aerospace Engineering Aug 2023
University of Arizona (UoA), Tucson, Arizona, *Advisor: Dr. Hossein Rastgoftar*

Master of Engineering in Robotics Engineering May 2018
University of Maryland (UMD), College Park, Maryland

Bachelor of Technology in Mechatronics Engineering May 2015
SRM University, Chennai, India

Professional and Research Experience

Co-Advisor Present
University of South Alabama (USA) Robotics Club

Postdoctoral Fellow Present
IMPACT Lab, University of South Alabama (USA), *Advisor: Dr. Jinhui Wang*

Graduate Research Assistant Aug 2023
SMART Lab, University of Arizona (UoA), *Advisor: Dr. Hossein Rastgoftar*

Teaching Experience

Instructor
AME455: Control System Design, UoA Summer 2023

Teaching Assistant *with Prof. Hossein Rastgoftar, Prof. Eniko Enikov*
AME455: Control System Design, UoA Spring 2022, Fall 2022, Spring 2023

Outreach

Neuromorphic Computing Nov 2024
Introduced the research area to 50+ high school students as part of the Discover Engineering Day at the University of South Alabama.

Introduction to Robotics Jun 2024
Presented to 20+ high school teachers and undergraduate students as part of Edge AI Summer Program at the University of South Alabama.

Mentoring/Advising

Shah Zayed Riam Aug 2024 - Present
Currently Ph.D. student at the University of South Alabama

Isaac Arnold May 2024 - Present

Currently Ph.D. student at the University of South Alabama

Kyle Mooney — Sept 2023 - Present
Currently Ph.D. student at the University of South Alabama

Mohammed Rafeeq Khan — Sept 2023 - Present
Currently M.S. student at the University of South Alabama

Mohammad Omar Faruque — Sept 2023 - Present
Currently Ph.D. student at the University of South Alabama

Mohammad Ghufran — Aug 2022 - Aug 2023
Currently Research Assistant at the University of Arizona

Jack Hughes — Jan 2023 - Aug 2023
Currently Undergraduate student at the University of Arizona

Aeris El Asslouj — Mar 2022 - Aug 2022
Currently Embedded Firmware Engineer at Skyworks Solutions, Inc.

Awards and Fellowships

Post-doc Activities Enhancement Travel Award — Jun 2024

Graduate Professional and Student Council (GPSC) Travel Award — Jun 2023

Dean's Graduate Fellowship Award — Jul 2021

Thesis

[T1] **H. Uppaluru**. "Continuum Deformation Based Autonomy: Approaches to Multi-Agent Systems", *University of Arizona*, 2023.

Journal Publications

[J3] **H. Uppaluru**, Z. Templin, M. R. Khan, Md O. Faruque, F. Zhao, J. Wang. "256-level Honey-Based In-Memory Neuromorphic System", *Electronics Letters (EL)*.

[J2] A. E. Asslouj, **H. Uppaluru** , M. Ramezani, E. Atkins, H. Rastgoftar. "A Fixed Air Corridor Model for UAS Traffic Management in Urban Areas", *IEEE Transactions on Aerospace and Electronic Systems (TAES)*.

[J1] **H. Uppaluru**, H. Emadi, H. Rastgoftar. "Resilient multi-UAS coordination using cooperative localization", *Aerospace Science and Technology (AST)*.

Conference Publications

[C9] **H. Uppaluru**, Md M. H. Tanim, Md O. Faruque, M. R. Khan, Z. Templin, F. Zhao, J. Wang. "Variation-Aware Non-linear Mapping for Honey-Memristor Based Neuromorphic System", *International Conference on Neuromorphic Systems* (ICONS), 2024.

[C8] **H. Uppaluru**, M. Ghufran, H. Rastgoftar. "Fluid Flow Modeling and Experimental Evaluation of Unscrewed Aerial System Coordination", *International Conference on Unmanned Aircraft Systems* (ICUAS), 2024.

[C7] **H. Uppaluru**, M. Ghufran, A. E. Asslouj, H. Rastgoftar. "Drones Practicing Mechanics", *International Conference on Unmanned Aircraft Systems* (ICUAS), 2023.

[C6] **H. Uppaluru**, H. Rastgoftar. "Multi-Layer Continuum Deformation Optimization of Multi-Agent Systems", *International Federation of Automatic Control World Congress* (IFAC), 2023.

[C5] **H. Uppaluru**, H. Rastgoftar. "Deep Continuum Deformation Coordination and Optimization with Safety Guarantees", *American Control Conference* (ACC), 2023.

[C4] **H. Uppaluru**, H. Rastgoftar. "A Physics-Based Data-Driven Approach for Finite Time Estimation of Pandemic Growth", *Modeling, Estimation and Control Conference* (MECC), 2022.

[C3] **H. Uppaluru**, X. Liu, H. Emadi, H. Rastgoftar. "A Continuous-Time Optimal Control Approach to Congestion Control", *European Control Conference* (ECC), 2022.

[C2] H. Emadi, **H. Uppaluru**, H. Ashrafiuon, H. Rastgoftar. "Collision-Free Continuum Deformation Coordination of a Multi-Quadcopter System Using Cooperative Localization", *European Control Conference* (ECC), 2022.

[C1] H. Emadi, **H. Uppaluru**, H. Rastgoftar. "A Physics-Based Safety Recovery Approach for Fault-Resilient Multi-Quadcopter Coordination", *American Control Conference* (ACC), 2022.

Poster Presentations

[P2] **H. Uppaluru**, S. Kanwar, A. Chen, J. Wang. "Interface Memristor Based Neuromorphic Systems", *International Conference on Neuromorphic Systems* (ICONS), 2024.

[P1] S. C. Johnson, **H. Uppaluru**, W. Oswald, C. M. Francis, N. Gong, S. Leavesley, T. Rich. "Characterization of Agonist-Induced Ca2+ Signals in Human Airway Smooth Muscle Cells Using Excitation Scanning Hyperspectral Imaging and Image Analysis Approaches", *American Society for Pharmacology and Experimental Therapeutics (ASPET)*, 2024.

Under Preparation and Preprints

[U6] S. Z. Riam, I. L. O. Arnold, K. Mooney, S. Haq, **H. Uppaluru**, N. Gong, J. Wang, "Evaluating Tools for Estimating Energy Consumption and Tracking Carbon Emissions in AI Computations: A Survey and Comparative Analysis".

[U5] **H. Uppaluru**, Z. Templin, F. Zhao, J. Wang, "Carbon Efficiency of Natural Organic Honey-Memristor Based Neuromorphic Computing".

[U4] **H. Uppaluru**, S. Kunwar, A. Chen, J. Wang, "Interface-Type Memristor for Neuromorphic Computing Applications: System Optimization, Non-linearity Mitigation, and Carbon Footprint".

[U3] J. Wang, F. Zhao, M. R. Khan, Md M.H. Tanim, Z. Templin, **H. Uppaluru**. "Honey-ReRAM Enabled Sustainable Edge AI System for IoT Applications".

[U2] Md M.H.Tanim, Z. Templin, **H. Uppaluru**, J. Wang, K. Y. Cheong, F. Zhao "Carbon Nanotube Embedded Honey Admixture Based Memristive Synaptic Device and Neuromorphic Computing System".

[U1] M Romano, **H Uppaluru**, H. Rastgoftar, E. Atkins. "Quadrotor Formation Flying Resilient to Abrupt Vehicle Failures via a Fluid Flow Navigation Function".

Professional Services

Design Automation Conference (DAC) Reviewer	2025
International Conference on Physical Assurance and Inspection of Electronics (PAINE) Reviewer	2024
International Conference on Neuromorphic Computing Systems (ICONS) Session Chair	2024
Great Lakes Symposium on VLSI (GLSVLSI) Program Committee Member	2024
Design Automation Conference (DAC) Reviewer	2024
International Conference on Unmanned Aircraft Systems (ICUAS) Reviewer	2024
IEEE Transactions on Aerospace and Electronic Systems (TAES) Journal Reviewer	2022

Proposals and Grants

Center for Integrated Nanotechnologies (CINT) User Proposal Aug 2024 - Present

Collaborated with researchers at Los Alamos National Laboratory (LANL) to mitigate the nonlinear effects of interface-type memristive device and analyze its hardware performance for neuromorphic computing applications.

Research Publicity

Drones Practicing Mechanics: University of Arizona, College of Engineering, 2022.