Harshvardhan Uppaluru

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Education

- **Doctor of Philosophy (Ph.D.) in Aerospace Engineering** August 2023
  University of Arizona (UoA), Tucson, Arizona, *Advisor: Dr. Hossein Rastgoftar*
- **Master of Engineering (M.E.) in Robotics Engineering** May 2018
  University of Maryland (UMD), College Park, Maryland
- **Bachelor of Technology (B.Tech.) in Mechatronics Engineering** May 2015
  SRM University, Chennai, Tamil Nadu, 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** August 2023
  SMART Lab, University of Arizona (UoA), *Advisor: Dr. Hossein Rastgoftar*

Thesis

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

Journal Publications

1. **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)*, 2024.
2. 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)*, 2024.
3. **H. Uppaluru**, H. Emadi, H. Rastgoftar. "Resilient multi-UAS coordination using cooperative localization", *Aerospace Science and Technology (AST)*, 2022.

Conference Publications

1. **H. Uppaluru**, Z. Templin, S. Z. Riam, F. Zhao, J. Wang. "Carbon Efficiency of Natural Organic Honey-Memristor Based Neuromorphic Computing", *Great Lakes Symposium on VLSI* (GLSVLSI), 2025.

2. **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.

3. **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.

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

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

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

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

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

9. 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.

10. 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

1. S. Digman, I. L. O. Arnold, K. Mooney, **H. Uppaluru**, N. Gong, S. Wu, J. Wang. "AI Models on Edge Devices with Accelerator", *ACM/IEEE International Conference on Connected Health: Applications, Systems and Engineering Technologies* (CHASE), 2025.

2. **H. Uppaluru**, S. Kunwar, A. Chen, J. Wang. "Interface Memristor Based Neuromorphic Systems", *International Conference on Neuromorphic Systems* (ICONS), 2024.

3. S. C. Johnson, **H. Uppaluru**, W. Oswald, C. M. Francis, N. Gong, S. Leavesley, T. Rich. "Characterization of Agonist-Induced Ca^{2+} 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

1. 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".

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

3. 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".

4. 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".

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

Professional Services

- Great Lakes Symposium on VLSI (GLSVLSI) Poster Session Chair 2025
- Great Lakes Symposium on VLSI (GLSVLSI) Session Chair 2025
- Great Lakes Symposium on VLSI (GLSVLSI) Reviewer 2025
- International Conference on Unmanned Aircraft Systems (ICUAS) Associate Editor 2025
- 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) Reviewer 2022

Proposals and Grants

1. *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 memristive device and analyze its hardware performance for neuromorphic computing applications.

Awards and Fellowships

- Post-doc Activities Enhancement Travel Award Jun 2025
- 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

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

- Sean Digman - *Currently M.S. student at USA* — Aug 2024 - Present
- Shah Zayed Riam - *Currently Ph.D. student at USA* — Aug 2024 - Present
- Isaac Arnold - *Currently Ph.D. student at USA* — May 2024 - Present
- Kyle Mooney - *Currently Ph.D. student at USA* — Sept 2023 - Present
- Mohammed Rafeeq Khan - *Currently Ph.D. student at USA* — Sept 2023 - Present
- Md Omar Faruque - *Currently Ph.D. student at USA* — Sept 2023 - Present
- Mohammad Ghufran - *Currently Research Assistant at UoA* — Aug 2022 - Aug 2023
- Jack Hughes - *Currently undergraduate student at UoA* — Jan 2023 - Aug 2023
- Aeris El Asslouj - *Currently Embedded Firmware Engineer at Skyworks Solutions, Inc.* — Mar 2022 - Aug 2022

Research Publicity

- **Drones Practicing Mechanics**, University of Arizona, College of Engineering, 2022.