Ümit Şen

Personal

Address and Phone: Northampton/MA/USA - +1 413 326 66 05
Email: umitsen@umass.edu
Website: senumit.com

Education

Doctor of Philosophy in Mechanical Engineering · *2024 - Present*
University of Massachusetts Amherst · MA, USA
Current GPA: 4.00/4.00 ·

Bachelor of Science in Mechatronics Engineering · *2019 - 2023*
Kadir Has University · Istanbul, Turkey
GPA: 4.00/4.00 · Valedictorian

Work Experience

ASELSAN · *8/2023 - 8/2024*
Control Design Engineer - Full Time
Worked on developing algorithms to automate and improve the controller design process with frequency domain analysis on MATLAB/Simulink. Deployed and debugged control architectures on industrial-grade hardware platforms. Performed system identification to analyze the dynamic behavior of 2-DoF and 3-DoF antenna systems. Conducted hardware-in-the-loop (HIL) testing using Speedgoat real-time computers that are integrated with Simulink.

Research Experience

- **Soft Robotic Snake Design & Locomotion** · *9/2024 - Present*
  PhD Research. Advisor: Assist. Prof. Gina Olson
  Working on soft robotic snake robot to achieve snake-like locomotion based on frictional anisotropy. Prototyping and fabricating pneumatic McKibben actuators and designing bio-inspired robotic skins through elastomer molding and FDM-based thermoplastic printing. Designed friction & locomotion experiments and conducted data analysis to correlate friction properties with locomotion outcomes. First-year PhD research performance led to the **award of two merit-based fellowships.**

- **Wrist-Worn Haptic Device** · *10/2022 - 7/2023*
  Senior Thesis · Advisor: Assist. Prof. Mine Sarac Stroppa
  Designed and developed a wrist-worn haptic device based on a custom-made voice coil actuator. Built an electronic board and firmware for communication and control of the device, and iteratively optimized a 3D-printed mechanical case for user ergonomics and smooth haptic feedback transmission. Conducted user studies to validate the performance. Presented the work in the **2023 IEEE World Haptics Conference** as a **poster**.

- **Visible Light Positioning** · *2/2021 - 9/2022*
  Advisors: Emeritus Prof. Erdal Panayirci, Assoc. Prof. Taner Arsan
  Performed MATLAB simulations for spatial modulation-based 3D indoor positioning algorithm. Designed simulation parameters like user trajectory, and worked on data analysis using the Monte Carlo method. This research resulted in a publication in the **Optics Communications journal.**

- **Robot Swarm Coordination** · *10/2020 - 10/2022*
  Advisor: Prof. Feza Kerestecioglu
  Worked on communication-free robot group formation based on local strategies with cost-minimization. Specifically focused on developing necessary cost functions, and simulation parameters to obtain arc and circle group formation. Conducted MATLAB simulations for different navigation trajectories. This work concluded with a paper in the **Adaptive Behavior journal**.

Journal Publications

- B. Kudsi, D, Xu, **U. Sen**, K.T. Yoshida, F. Stroppa, C.M. Nunez, M. Sarac, "Gamifying Haptics User Studies: Comparison of Response Times From Smartphone Interfaces," *IEEE Trans. Haptics*, vol. 18, no. 2, pp. 423–429, Apr. 2025, doi: 10.1109/TOH.2025.3536885.
- A. Adeyemi, **U. Sen**, S. M. Ercan, and M. Sarac, "Hand Dominance and Congruence for Wrist-Worn Haptics Using Custom Voice-Coil Actuation," *IEEE Robot. Autom. Lett.*, vol. 9, no. 4, pp. 3053–3059, Apr. 2024, doi: 10.1109/LRA.2024.3360815.
- **U. Sen**, Y. E. Yesilirmak, I. O. Bayman, T. Arsan, E. Panayirci, and N. Stevens, "3D indoor positioning with spatial modulation for visible light communications," *Optics Communications*, vol. 529, p. 129091, Feb. 2023, doi: 10.1016/j.optcom.2022.129091.
- F. Kerestecioğlu, **Ü. Şen**, Ç. Işıkver, and A. Göktekin, "Circular formations of non-communicating robot groups via local strategies," *Adaptive Behavior*, vol. 32, no. 4, pp. 291–300, Aug. 2024, doi: 10.1177/10597123231204627.

Conference Publications

- Y. Nandwana, **U. Sen**, and G. Olson, "A Highly Articulated Backbone for Soft Snake Robots," in Biomimetic and Biohybrid Systems, vol. 15582, pp. 234–246. doi: 10.1007/978-3-032-07448-5_20.
- **Sen, U.**, Sarac, M. "Design for Wrist-Worn Haptic Device with Custom Voice Coil Actuation," *in 2023 IEEE World Haptics Conference (Work-in-Progress)*, Delft, Netherlands, 2023.

Awards & Honours

- **Robert and Deanna Hagerty Scholarship** · *2025*
  $3,000 merit based award given for an interest or excellence in the field of Robotics through coursework, research and/or extracurricular activities.
- **Joseph E. Motherway Fellowship** · *2025*
  Monetary award given to an outstanding student for their work in the area of design at University of Massachusetts Amherst.
- **Kadir Has University** · *2023*
  First Top Ranking Graduate of Kadir Has University among the Class of 2023.

Additional Academic Involvement

Student Volunteer: Worked as a Student Volunteer at the **2023 World Haptics Conference in Delft, Netherlands**. In addition to presenting a poster, I provided help during presentation sessions, workshops, and conference registration.

Assistantships: Took responsibility as a **Teaching Assistant** in the courses listed below.

- MIE124 - Computer Prog. for Eng. Problem Solving (Graduate TA) · *Spring 2024 - 2025*
- KHAS109 - Computational Thinking (Undergrad TA) · *Fall 2022 - 2023*
- KHAS110 - Civic Responsibility Project (Undergrad TA) · *Spring 2021 - 2022*
- KHAS101- Origins and Consequences (Undergrad TA) · *Fall 2021 - 2022*
- TLL102 - Critical Reading and Writing in Turkish II (Undergrad TA) · *Spring 2020 - 2021*
- TLL101 - Critical Reading and Writing in Turkish I (Undergrad TA) · *Fall 2020 - 2021*

Skills

- **Programming Skills:** MATLAB, Simulink, Python, C#, Unity3D, LaTeX, ROS, MicroPython, Arduino, C++
- **Prototyping Skills:** SolidWorks, Fusion360, Ansys, FDM 3D Printing, Elastomer Molding, Mechatronic Design
- **Language Skills:** Turkish (Native), English (Advanced, TOEFL iBT: 107)