James Motes

jmotes.dev@gmail.com
jmotes2@illinois.edu

5324 Donovan Gardens Ln
Houston, TX, 77091

Education

Ph.D. in Computer Science, University of Illinois Urbana Champaign August 2023
Ph.D Thesis: Multi-robot Task and Motion Planning in Hybrid State Spaces
Advisor: Dr. Nancy M. Amato

M.S. in Computer Science, Texas A&M University August 2019
M.S. Thesis: Interaction Templates for Multi-Robot Systems
Advisor: Dr. Nancy M. Amato

B.S. in Computer Engineering, Texas A&M University May 2018
Minor in Mathematics, Engineering Honors, Undergraduate Research Scholar

Honors

Engineering Graduate Merit Fellowship — August 2018 - August 2019
Presidential Endowed Scholarship — August 2014 - May 2018
Distinguished Student Award - Dwight Look College of Engineering — May 2017
Industrial Affiliates Program Scholarship — August 2014 - May 2018
Dell Merit Scholarship — August 2017 - May 2018
Salutatorian - Rowlett High School (2/591) — June 2014

Experience

Normandy Automation, Founder May 2023 - Present
- Developing autonomous robotic manufacturing solutions
- Leveraging AI and multi-robot systems for just-in-time manufacturing with minimal human reprogramming

QuickReports, Founder May 2023 - Present
- Developing software for healthcare management service organization business development teams
- Providing autonomously generated competition and demographics reports for brick and mortar healthcare practices

Postdoctoral Researcher, University of Illinois Urbana-Champaign August 2023 - Present
- Leading multiple graduate research teams on several robotics projects
- Developing general framework for autonomous factories applied to manufacturing, biofabrication labs, and extraterrestrial resource collection
- Evaluation of the tradeoff of multi-robot planning paradigms in different settings
- Developing routing design tools for Three-Dimensional Spatial Packaging of Interconnected Systems with Physical interactions (3D SPI2)
- Leading software development for the open source deployment of the Parasol Planning Library (PPL)

Graduate Research, University of Illinois Urbana-Champaign May 2018 - August 2023
- Collaborating with Foxconn Interconnect Technologies and two other research labs at UIUC (Dr. Timothy Bretl, Dr. Katie Driggs-Campbell) on a series of projects for a collaborative human-robot factory
- Developed multi-agent interaction template method enabling multi-agent task planning through a single motion planning query rather than a traditional task and motion planning system
- Designed framework for optimal multi-robot planning for large task sets
- Developed complex precedence and synchronization task constraint handling for multi-robot systems
- Mentored graduate students (10) within my research group
- Mentored undergraduate students (10) both local university students and DREU program students

AI4All August 2021 - Present

- Instructor for Discover AI introductory artificial intelligence courses at the University of Texas at El Paso and New Mexico State University (Spring 2022), Texas A&M University (Fall 2022, Spring, 2023, Fall 2023) and Worcester Polytechnic Institute (Fall 2022 and Spring 2023)
- Developed course curriculum for Discover AI introductory artificial intelligence course (Summer 2022)
- TA for Discover AI introductory artificial intelligence course at the University of Illinois Urbana-Champaign (Fall 2021)

Undergraduate Research Scholar September 2017 - May 2018

- Developed proactive multi-agent persistent task performance system under battery constraint
- Culminated in undergraduate thesis

Hewlett Packard Enterprise - Design Verification Engineer May - August 2017

- Worked on Gen-Z project within the Silicon Design Lab
- VLSI Design Verification utilizing Universal Verification Methodology (UVM)

Publications

- McBeth, C., **Motes, J**., Uwacu, D., Morales, M., & Amato, N. M. (2023). Scalable Multi-robot Motion Planning for Congested Environments With Topological Guidance. *IEEE Robotics and Automation Letters*. Presented at the International Conference on Robotics and Automation (ICRA), Yokohama, Japan, May, 2024.
- **Motes, J**., Chen, T., Bretl, T., Aguirre, M. M., & Amato, N. M. (2023). Hypergraph-based multi-robot task and motion planning. *IEEE Transactions on Robotics*. Presented at the International Conference on Robotics and Automation (ICRA), Yokohama, Japan, May, 2024.
- Chen, T., Huang, Z., **Motes, J.**, Geng, J., Ta, Q., Dinkel, H., Abdul-Rashid, H., Myers, J., Mun, Y., Lin, W., Huang, Y., Liu, S., Morales, M., Amato, N. M., Driggs-Campbell, K., Bretl, T., 2022. Insights from an Industrial Collaborative Assembly Project: Lessons in Research and Collaboration. *IEEE ICRA Workshop on Collaborative Robots and the Work of the Future,* Philadelphia, USA, 2022.
- Lee, H., **Motes, J.,** Morales, M., and Amato, N. M., 2021. Parallel Hierarchical Composition Conflict-Based Search for Optimal Multi-Agent Pathfinding. *IEEE Robotics and Automation Letters*, 6(4), pp. 7001-7008. Presented at the International Conference on Intelligent Robots and Systems (IROS), Prague, Czech Republic, 2021 (virtual).
- Solis, I., **Motes, J.**, Sandström, R., and Amato, N. M., 2021. Roadmap-Optimal Multi-Robot Motion Planning using Conflict-Based Search. *IEEE Robotics and Automation Letters*, 6(3), pp. 4608-4615. Presented at the International Conference on Robotics and Automation (ICRA), Xi'an, China, 2021 (virtual).
- **Motes, J.**, Sandström, R., Lee, H., Thomas, S., and Amato, N. M., April 2020. "Multi-Robot Task and Motion Planning With Subtask Dependencies," in *IEEE Robotics and Automation Letters*, 5(2), pp. 3338-3345. Presented at the International Conference on Robotics and Automation, Paris (ICRA), France, 2020 (virtual).
- **Motes, J.**, Sandström, R., Adams, W., Ogunyale, T., Thomas, S. and Amato, N.M., 2019. Interaction Templates for Multi-Robot Systems. *IEEE Robotics and Automation Letters*, 4(3), pp. 2926-2933. Presented at the International Conference on Intelligent Robots and Systems (IROS), Macao, China, 2019.

Technical Skills

C/C++	Python	ROS/ROS2	JavaScript
C#	Swift	React/React Native	Dart