Murtadha Alsayegh

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Professional Summary

AI and robotics researcher specializing in privacy-preserving computation, multi-robot coordination, and secure autonomous systems. Ten years of combined academic and industry experience spanning robotics, AI, and ICS/SCADA cybersecurity. Recognized through peer-reviewed publications, invited talks, and awards (e.g., Best Paper Finalist, IEEE CASE 2025). Currently advancing secure, learning-enhanced coordination for agricultural robotics at the University of Central Florida—work aligned with U.S. national interests in food systems, infrastructure safety, and technological competitiveness.

Education

Ph.D. Computer Science, Florida International University, Miami, FL
Dissertation: *Privacy-Preserving Multi-Agent Coordination in Autonomous Systems*
M.S. Software Engineering, University of Michigan, Dearborn, MI
B.S. Computer Science, Lawrence Technological University, Southfield, MI

Research Interests

- Secure multi-party computation (SMPC), Shamir's Secret Sharing, and privacy-preserving robotics.
- Heterogeneous multi-robot systems, decentralized coordination, reinforcement learning, scalable task allocation.
- Cybersecurity for robotics, industrial control systems, and SCADA infrastructures.
- Multi-robot communication, distributed planning, and uncertainty-aware motion control.
- Applications in agriculture, information gathering, and smart autonomous systems.

Teaching Interests

- Introductory computer science (CS1/CS2), programming fundamentals, and data structures.
- Artificial Intelligence, Machine Learning, and Data Science methods.
- Cybersecurity and secure computing for distributed and autonomous systems.
- Robotics, reinforcement learning, and control of cyber-physical systems.

Research Experience

Postdoctoral Researcher, University of Central Florida, Orlando, FL

- Developed privacy-preserving frameworks integrating Secure Multi-Party Computation and Shamir's Secret Sharing in decentralized robotic systems.
- Advanced learning-enhanced coordination (LDARA/NNDARA) for harvesting robots under uncertainty.
- Mentored graduate researchers; co-authored manuscripts and proposals in robotics and AI security.
- Finalist for *Best Paper* at IEEE CASE 2025 (secure cooperative harvesting).

Graduate Researcher, Florida International University, Miami, FL

- Designed privacy-preserving algorithms for decentralized multi-robot task allocation and coordination.
- Proposed oblivious MDP execution for secure policy learning and planning.
- Published in IEEE RA-L, CDC, ECC, and IROS; developed lightweight communication protocols for robot coordination.

Teaching Experience

Teaching Assistant, Florida International University, Miami, FL

- Supported CAP 4630 *Artificial Intelligence* and CDA 4625 *Introduction to Mobile Robotics*.
- Designed/graded assignments on intelligent agents, adversarial search, motion planning, and RL.
- Provided one-on-one and group support on programming projects.

Teaching Assistant, AI4ALL (Discover AI)

- Tracked student progress, graded assignments, supported certificate preparation, and facilitated final presentations.
- Monitored discussion boards and fostered community via email and virtual meetings.

Graduate Student Mentor, Florida International University, Miami, FL

Selected Publications

- Alsayegh, M., Xu, Y., *A Secure MPC Framework for Decentralized Row Allocation in Cooperative Strawberry Harvesting*, IEEE CASE, 2025. (IEEE Xplore)
- Alsayegh, M., et al., *Oblivious Markov Decision Processes for Robust Robotic Policy Execution*, IEEE CDC, 2023. (IEEE Xplore)
- Alsayegh, M., Newaz, A., Bobadilla, L., *Decentralized Multi-Robot Information Gathering from Unknown Spatial Fields*, IEEE RA-L, 2023. (IEEE Xplore)
- Alsayegh, M., et al., *Lightweight Multi-Robot Communication Protocols for Information Synchronization*, IEEE/RSJ IROS, 2020. (IEEE Xplore)
- Alsayegh, M., et al., *Privacy-Preserving Multi-Robot Task Allocation via Secure MPC*, ECC, 2022. (IEEE Xplore)

Invited Talks & Presentations

- FIU KFSCIS Lecture Series, Miami, FL, Apr 2024.
  Talk: *Secure Multi-Robot Computation for Heterogeneous Teams: Foundations and Applications*.
- Expanding AI/AgAAID Symposium, University of Central Florida, Orlando, Sep 2025.
  Talk: *Privacy-preserving methods in agricultural robotics with a focus on harvesting systems*.

Honors & Awards

Best Paper Finalist, IEEE CASE 2025

Professional Service

- Reviewer: ICRA 2025, IEEE RA-L, IROS, CDC, ECC, CASE.
- Panelist, STEM outreach events for K–12 students (FIU, UCF).
- Member: IEEE Robotics & Automation Society, IEEE Computer Society.

Industry Experience

Automation Engineer, Schneider Electric, Saudi Arabia

- Implemented IEC-62443-compliant security measures for SCADA/ICS networks.
- Designed automation architectures reducing downtime in energy and water sectors.
- Conducted vulnerability assessments, improving network resilience.