Daniel Lane

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Summary

PhD Candidate in Mechanical Engineering with 10+ years of systems integration experience, transitioning from IT project leadership into autonomous system and robotics. Graduate research centered on real-time LiDAR–camera fusion for maritime autonomy in addition to data-driven modeling methods for non-linear dynamical systems. Proven ability to bridge enterprise-scale system thinking with cutting-edge robotics implementation for real-world autonomous platforms. Seeking to contribute to aerospace and defense autonomy initiatives, especially in perception, sensor fusion, and embedded systems.

Education

Embry-Riddle Aeronautical University – PhD in Mechanical Engineering   Anticipated Dec 2025
Dissertation: "A Study in Object Detection and Classification Performance by Sensing Modality for Autonomous Surface Vessels"
Embry-Riddle Aeronautical University – MS in Mechanical Engineering   Dec 2021
Stetson University – BS in Physics   May 2009

Core Engineering Competencies

Software Development & Project Managements: Python, C, C++, HTML/CSS/JavaScript, ROS/ROS2, Git
Machine Learning & Vision: OpenCV, TensorFlow, PyTorch, YOLO, reinforcement learning models
Software & Tools: MATLAB/Simulink, Gazebo/RViz, Fusion 360, SolidWorks, 3D printing and prototyping
Robotics & Perception: Sensor fusion, object detection/classification, real-time systems, GNSS/INS integration
Sensors & Hardware: Visual/thermal camera and LiDAR calibration (spatial and temporal), microcontrollers
Modeling & Control: Nonlinear dynamic systems, Kalman filters, PID/LQR control, path planning

Engineering Projects & Research

LiDAR-Camera Fusion for Maritime Autonomy
ASV Perception Research, Robotics & Autonomous Systems Lab (RASL), ERAU | NEEC/ONR Grant   2024 – Present
- Contributed to the development of a self-contained autonomous perception package, integrating multi-sensor fusion algorithms to provide real-time situational awareness across multiple maritime vessels.
- Optimized real-time sensor fusion pipelines for maritime object detection, achieving precise spatial and temporal synchronization between multiple LiDAR units and high-resolution cameras.

Maritime RobotX Challenge & RoboBoat Challenge – Lead Perception Engineer
Sr. Software Team Member   2024, 2025
- Developed real-time LiDAR–HDR fusion pipelines for object detection and classification, enabling autonomous mission planning on our ASV for 2024 and 2025 international competitions
- Designed ground control interfaces and sensor pipelines tailored to mission constraints and real-time performance requirements
- Collaborated on testing and validation of perception algorithms in challenging real-world marine environments

Consultation for Yamaha - Future Boat Concept
Co-Researcher   2024
- Conducted feasibility analysis for emerging marine technologies in collaboration with Yamaha's Marine Division
- Collaborated under NDA with a multidisciplinary team to develop high-level design concepts for future vessels

Data-Driven Modeling of Traffic Systems
Researcher, Complex Dynamical Systems Lab (CDSL), ERAU | NSF Grant   2022 – 2023
- Developed framework for recovering nonlinear system dynamics by detecting model structure through data-driven and information-theoretic methods
- Co-authored peer-reviewed journal publication and presented findings at international MECC 2023 conference
- Supervised undergraduate team on hardware integration and software testing, supporting experimental validation of modeling framework

Publications & Presentations

- D. Lane and S. Roy, "Validating a data-driven framework for vehicular traffic modeling," *Journal of Physics: Complexity*, vol. 5, no. 2, p. 025008, May 2024. doi: 10.1088/2632-072X/ad3ed6.
- D. Lane and S. Roy, "Using information theory to detect model structure with application in vehicular traffic systems," *IFAC-PapersOnLine*, vol. 56, no. 3, pp. 367–372, 2023. 3rd Modeling, Estimation and Control Conference (MECC 2023). doi: 10.1016/j.ifacol.2023.12.051.

Professional Experience

Note: Transitioned from IT systems leadership to graduate research in mechanical engineering and robotics in 2017.

Imaging Systems Specialist, Embry-Riddle Aeronautical University – Daytona Beach, FL   2017 – 2020
- Coordinated software development efforts between internal functional experts and external software development teams to automate document workflows with OCR
- Integrated admissions and registrar systems to streamline student document processing, reducing manual work from hours to minutes

Technology Project Manager, FDOT - Turnpike – Ocoee, FL   2014 – 2017
- Coordinated development and deployment of enterprise-level systems including public-facing web platforms
- Coordinated stakeholder requirements and software vendor efforts to deliver robust IT infrastructure
- Supported SharePoint integration and streamlined internal business process documentation

Senior Technical Roles   2009 – 2014
Apple Inc., Stetson University
- Managed enterprise IT infrastructure, technical troubleshooting, and multimedia systems across multiple organizations
- Built foundational expertise in systems integration, documentation, and automation workflows directly applicable to current robotics R&D and laboratory setup

Additional Highlights

- U.S. Citizen (ITAR eligible)
- Experience leading research teams, integrating autonomous systems, and delivering technical presentations
- Strong foundation in technical documentation and interdisciplinary communication
- Comfortable bridging technical and operational perspectives across academia and industry