

Emre Girgin

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LinkedIn — Google Scholar — GitHub — Website

Summary

Ph.D. student in Aerospace Engineering with a strong Computer Engineering background, specializing in perception and autonomous navigation for robotic systems. Experienced in designing and deploying real-time SLAM, state estimation, and sensor fusion algorithms for ground and aerial vehicles. Proven leader in an R&D environment, having led technical roadmaps, secured project funding, and mentored large engineering teams while publishing in top-tier robotics conferences like ICRA.

Education

Embry-Riddle Aeronautical University, USA Ph.D. in Aerospace Engineering (Dynamics and Control) Advisor: Asst. Prof. Cagri Kilic	Jan 2025 – Present GPA: 4.0/4.0
Bogazici University, Turkey Master of Science in Computer Engineering Thesis: Occlusion-Aware Benchmarking in 3D Human Pose and Shape Estimation Advisor: Prof. Lale Akarun	Sep 2021 – Mar 2024 GPA: 4.0/4.0
Bogazici University, Turkey Bachelor of Science in Computer Engineering (Honors Degree) Senior Project: Latent Composition for Adversarial Robustness (<i>Received External Funding</i>) Advisor: Asst. Prof. Pinar Yanardag	Sep 2016 – Jul 2021 GPA: 3.21/4.0

Projects (Selected)

- Developed a full-stack autonomous navigation system for a custom hexacopter, featuring monocular camera-based 3D position estimation and an AI model deployed on an embedded MCU for real-time control (EU-HORIZON, ICRA 2025).
- Designed a learning-based model to analyze vehicle-terrain interaction for space robotics, improving path planning and manipulation capabilities in unstructured environments (ICRA 2025).
- Created a novel benchmarking pipeline for 3D human pose and shape estimation, proposing a new occlusion index to improve model evaluation and robustness (M.Sc. Thesis, ICPR 2024).

Experience

Embry-Riddle Aeronautical University, USA <u>Graduate Research Assistant</u>	Jan 2025 – Present
<ul style="list-style-type: none">– Researching and developing visual SLAM and uncertainty-aware localization algorithms for autonomous robots operating in unstructured, GPS-denied environments.– Architecting multi-modal perception systems that fuse data from stereo/RGB/thermal cameras, 3D LiDAR, and IMUs to enable robust state estimation.– Co-authoring multiple successful grant proposals for robotics research.– Leading system integration and experimental validation for lunar and planetary exploration prototypes.	
TUBITAK BILGEM, Turkey <u>Robotics Engineer (Full-Time)</u>	Jul 2021 – Nov 2024 (3.5 years)
<ul style="list-style-type: none">– Led the technical roadmap for a newly formed Robotics division, defining the technology stack and architecture for autonomous ground and aerial vehicle projects.– Authored the technical work packages for 3+ successful, large-scale EU-HORIZON project proposals, securing multi-million euro R&D funding.– Deployed robust SLAM, object detection (over 90% mAP on online embedded systems), and sensor fusion systems on both aerial systems and ground vehicles including cars and trucks across five major EU-HORIZON projects.	

- Designed and built a low-cost, custom hexacopter platform, enabling new research avenues and securing an additional 100K euros in project funding.
- Mentored and provided technical guidance to over 25 junior engineers and interns on robotics software, perception systems, deep learning, and ROS/ROS2 development.

Robotics Engineer (Intern)

Summer 2020

- Built a CNN-based visual anomaly detection tool for automated security screening using TensorFlow and OpenCV.

BAYKAR Makina, Turkey

Software Engineer (Intern)

Summer 2018

- Developed a low-latency video streaming pipeline from a UAV to a ground station over RTSP.

Publications (Selected)

- Girgin, E., et al. (2025). *EdgeAI Drone for Autonomous Construction*. Workshop at the IEEE International Conference on Robotics and Automation (ICRA).
- Girgin, E., et al. (2025). *Learning Rock Pushability on Rough Planetary Terrain*. Workshop at the IEEE International Conference on Robotics and Automation (ICRA).
- Girgin, E., et al. (2024). *Detection and Quantification of Occlusion for 3D Human Pose and Shape Estimation*. Workshop at the IEEE International Conference on Pattern Recognition (ICPR).
- Sari, T., Sever, M., Candan, A. T., Girgin, E., et al. (2022). *Cloud Assisted Connected and Automated Mobility System Architecture Design and Experimental Verification: The 5G-MOBIX Autonomous Truck Routing Use Case*. IEEE Intelligent Vehicles Symposium (IV).

Skills

- **State Estimation & Localization:** SLAM, Visual-Inertial Odometry (VIO), Kalman Filtering (EKF, UKF, ESKF), Smoothing (Factor Graphs, Pose Graph Optimization, Bundle Adjustment), Sensor Fusion, Lie Theory
- **Robotics & Control:** ROS/ROS2, Navigation Stack, MAVROS, Ardupilot/PX4, Gazebo, Isaac Sim, Modern Control Theory, MPC, Legged Robotics
- **Computer Vision & Deep Learning:** PyTorch, TensorFlow, OpenCV, PCL, Object Detection, 3D Vision, CNNs, ViTs, DUST3R, DINO
- **Programming:** C++, Python (Numpy, Scipy, Pandas, Matplotlib/Seaborn Jax, Pytorch, Tensorflow), Git, CMake, MATLAB

Awards and Scores

- Outstanding Paper Award (3rd Place), SIU 2023, IEEE
- National Undergraduate Entrance Exam: Top 0.01% (Ranked 349th out of 2.5M+ applicants)
- National Graduate Entrance Exam: Top 0.15% (Ranked 292nd out of 200,000+ applicants)