# Emre Girgin

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## Summary

Ph.D. student in Aerospace Engineering (Dynamics and Control) with a Computer Engineering background, specializing in visual **state estimation**, deep **SLAM**, and uncertainty modeling for space **robotics**. Experienced in **perception** system design for autonomous ground and aerial platforms using **deep learning, stereo vision, LIDAR, and IMU fusion**. Led EU-funded robotics projects, published at ICRA and ICPR, and developed real-time field-deployable robotic perception systems.

## Education

**Embry-Riddle Aeronautical University**, USA — Jan 2025 – Present
Ph.D. in Aerospace Engineering (Dynamics and Control) — GPA: 4.0/4.0
Advisor: Asst. Prof. Cagri Kilic

**Bogazici University**, Turkey — Sep 2021 – Mar 2024
Master of Science in Computer Engineering — GPA: 4.0/4.0
Thesis: Occlusion-Aware Benchmarking in 3D Human Pose and Shape Estimation
Advisor: Prof. Lale Akarun

**Bogazici University**, Turkey — Sep 2016 – Jul 2021
Bachelor of Science in Computer Engineering (Honors Degree) — GPA: 3.21/4.0
Project: *Latent Composition for Adversarial Robustness*; Funded Externally; Adv: Asst. Prof. Pinar Yanardag

## Projects (Selected)

- Designed learning-based pushability model using terrain-aware features for space robotics (ICRA 2025).
- Built custom hexacopter with 3D position estimate by monocular camera, deep learning on MCU, and ROS2-based navigation; deployed in construction automation demo with public dataset collection (EU HORIZON, ICRA 2025, ICRA 2024, IV 2022).
- Developed occlusion-aware benchmarking pipeline for 3D human pose estimation using SMPL; proposed novel occlusion index (M.Sc. Thesis, ICPR 2024, SIU 2023).

## Experience

**Embry-Riddle Aeronautical University**, USA
*Graduate Research Assistant* — Jan 2025 – Present

- Conduct research on visual state estimation, SLAM, and uncertainty-aware localization for autonomous space robotics in unstructured terrain.
- Develop multi-modal perception systems integrating stereo/RGB/thermal cameras, 3D LiDAR, and IMU sensors.
- Lead lab hardware setup, system integration, and support other students with onboarding, troubleshooting, and research guidance.
- Contribute to published research at ICRA and co-lead robotic experiments for lunar and planetary exploration prototypes.
- Co-author and contribute to multiple grant proposals, resulting in two successful awards (in less than 4 months) with others currently under review.

**TUBITAK BILGEM**, Turkey
*Robotics Software Engineer (Full-Time)* — Jul 2021 – Nov 2024 (3.5 years)

- Led technical roadmap for newly formed Robotics division; managed setup, technology stack, and early project design.
- Authored the technical tasks under work packages for our division's role in successful, large-scale EU-HORIZON project proposals.

– Integrated multi-modal sensor suites including stereo cameras, 3D LiDAR, thermal cameras, and IMUs for SLAM and navigation tasks.

– Implemented SLAM, object detection, and sensor fusion systems across 5 EU-HORIZON projects up to 100M euros; project shares: 200K- 500K euros.

– Designed a low-cost hexacopter platform, unlocking additional 100K euros in project funding.

– Mentored and technically guided over 25 junior engineers and interns on robotics software, perception systems, and ROS-based development.

– Contributed to 3 peer-reviewed publications (2 first-author); balanced full-time role with MSc studies and thesis.

*Robotics Software Engineer (Intern)* Summer 2020

– Built visual anomaly detection tool for customs security using CNNs and proprietary dataset (TensorFlow, OpenCV).

**BAYKAR Makina**, Turkey
*Software Engineer (Intern)* Summer 2018

– Video streaming from UAV to ground station via Directshow over RTSP.

# Publications

– Girgin, E.*, Girgin, T.*, Kilic, C. (2025). *Learning Rock Pushability on Rough Planetary Terrain.* Workshop on Field Robotics, ICRA.

– Girgin, E., Candan, A. T., Zaman, C. A. (2025). *EdgeAI Drone for Autonomous Construction.* 4th Workshop on Future of Construction: Safe, Reliable, and Precise Robots in Construction Environments, ICRA.

– Girgin, E., Gokberk, B., Akarun, L. (2024). *Detection and Quantification of Occlusion for 3D Human Pose and Shape Estimation.* 2nd Workshop on Facial and Body Expressions, ICPR.

– Girgin, E.*, Girgin, T.*, Yildirim, Y., Ugur, E., Haklidir, M. (2024). *Bidirectional Human Interactive AI Framework for Social Robot Navigation.* Workshop on Robot Trust for Symbiotic Societies (RTSS), ICRA.

– Girgin, E., Gökberk, B., Akarun, L. (2023). *A Novel Occlusion Index.* SIU. (Outstanding Paper Award)

– Sari, T., Sever, M., Candan, A. T., Girgin, G. T. Ç., Girgin, E., Haklıdır, M. (2022). *Cloud Assisted Connected and Automated Mobility System Architecture Design and Experimental Verification: The 5G-MOBIX Autonomous Truck Routing Use Case.* Intelligent Vehicles Symposium.

# Research Skills

**Perception:** SLAM (ORB-SLAM, Cartographer, LIO-SAM), Visual-Inertial Odometry, Multi-view Geometry, Depth Estimation, Semantic Segmentation
**ML/DL:** PyTorch, Tensorflow, Jax, CNN, ViT, GCN, PCA, MLP, NeRFs, SMPL
**Robotics:** ROS/ROS2, Navigation Stack, Robot Localization, MAVROS, PX4, Ardupilot, Pixhawk, Gazebo, IsaacSim
**Tools:** OpenCV, Open3D, COLMAP, Trimesh, PCL, Git, C++, Python (Numpy, Scipy, Pandas), CMake

# Awards and Scores

– Outstanding Paper Award (3rd Place), SIU 2023, IEEE

– National Graduate Exam: Top 0.15% (292nd / 200,000+)

– National Undergraduate Exam: Top 0.01% (349th / 2.5M+)

– GRE Quantitative Reasoning: 162