EFIMIA PANAGIOTAKI

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Website ◇ GitHub ◇ LinkedIn ◇ Google Scholar

RESEARCH INTERESTS

Geometric Deep Learning, Scene Representations, Graph Neural Networks, Neural Algorithmic Reasoning, Reasoning ML, 3D Spatial Perception, Multimodal Semantic SLAM, Introspective Learning

EDUCATION

University of Oxford, Oxford Robotics Institute (ORI) October 2021 - Present
DPhil in Engineering Science (PhD) *Thesis Submission: November 2025*

Google DeepMind Engineering Science Research Scholarship
Mobile Robotics Group (MRG) & Cognitive Robotics Group (CRG)

Topics: Graph Learning, spatiotemporal representations, reasoning, and ML introspection

- Neural algorithmic reasoning for classical robotics, advised by Dr Petar Veličković
- Spatiotemporal representations and temporal GNNs for sequence modelling and traffic forecasting
- Hierarchical semantic-geometric scene representations for introspective attention-based localisation
- Research lead of the RobotCycle project: Managed and coordinated a team of 15 students and engineers. Author of 3 successful research grants.
- Supervisor of 6 MEng students; defining and guiding their research projects
- Lab Demonstrator: B16 Software Engineering (C++) (2022 - 2025), B14 Computer Vision (2025)

ETH Zürich, D-ITET, Computer Vision Lab (CVL) February - September 2017
Master Thesis, Visiting Student *Supervisors: Prof. Luc Van Gool & Dr. Dengxin Dai*

- Development of a lightweight object detection and pose estimation pipeline for semantic boundaries classification as a prior to a visual-inertial SLAM system based on ORB-SLAM and Rovio
- Design, development, and integration of a prototype Visual Inertial (VI) sensor

National Technical University of Athens (NTUA) September 2012 - October 2017
MEng Electrical and Computer Engineering, Diploma (5 years Integrated degree)

- AMZ Racing Driverless Formula Student Team: Perception Software Engineer (2017)
- Prom Racing Formula Student Team: Head of Partnerships, Business, Marketing, and Fundraising. Established the long-term collaboration with Bosch Hellas.

PROFESSIONAL EXPERIENCE

OXA (Oxbotica)
Senior ML Engineer (Part-time), Office of the CTO — *Oxford, UK* *April 2024 - Present*

Member of the CTO's, Prof Paul Newman, research consulting team. Working on representations, reasoning, scene understanding, and explainability. Part-time employment during PhD studies.

StreetDrone (acquired by OXA)
Lead Self-Driving Software Engineer (R&D) — *Oxford, UK* *June 2020 - October 2021*

Leading all self-driving software research and development efforts, including the 5G-enabled CAL project as part of the "5G Create Scheme" for a prototype self-driving truck at the Nissan factory.

- Technical Lead; defining the technical roadmap, direct collaboration with the CEO to shape the software strategy of the company, led all features development efforts

· Team Lead; provided technical expertise and guidance, led the software team to the successful delivery of the 5G-enabled CAL project and various real-world AV demonstrations, as well as the development of StreetDrone's SaaS product and an open-source AV software project Project Aslan [Forbes]

Software Engineer (R&D) — *Oxford, UK* *June 2018 - June 2020*

Developed a full stack self-driving software for the Nissan ENV200 and Renault Twizy for the SMLL Urban AV Trials, CCAV and Innovate UK project.

· Development and evaluation of localisation, mapping, object detection, and path planning algorithms
· Development of the 3–DoF Vehicle Model of the Renault Twizy for Gazebo simulation [project page]
· Development of the software communication between ROS and the embedded CAN Bus [project page]

Williams Grand Prix Engineering Ltd January - June 2018
Data Processing Engineer — *Grove, UK*

· Mathematical modelling for vehicle dynamics and sensors data processing within MAT ATLAS
· Development of a Graphical User Interface (GUI) for vehicle setup
· Race Support to race engineers during all Formula 1 events

HONORS, AND AWARDS

Queen's Anniversary Prize	Selected by ORI Professors to represent the PhD students at the
Investiture, Buckingham Palace	ceremony (contribution-based). Award won by ORI in 2023
Program Grant	RobotCycle project raising **£xxx,xxx** (2022)
Equipment Grant	RobotCycle project raising **£xx,xxx** (2022)
EPSRC IAA Fund	Strategic Fund, RobotCycle project raising **£xx,xxx** (2024)
PhD Scholarship	Google DeepMind Engineering Science Research Scholarship
Pembroke College	Senior Studentship Award (x1) & Dean of Graduate Funds Award (x2)
Formula Student	1st place overall with AMZ Driverless (Germany 2017)

SKILLS AND INTERESTS

Technical Skills	**Python** (expert), **C/C++** (intermediate), PyG, JAX, TensorFlow, PyTorch, NetworkX, RAG, W&B, OpenAI API, Docker, ROS, Unix Bash, PCL, OpenCV
Languages	**Greek** (Native), **English** (Fluent), **French** (Basic), **Italian** (Basic)

PAPERS, THESIS

Panagiotaki E., De Martini D., Kunze L., & Veličković P. NAR-*ICP: Neural Execution of Classical ICP-based Pointcloud Registration Algorithms. *Under review at IJRR* paper

Panagiotaki E., Thuremella D., Baghabrah J., Sze S., Fu F., Hardin B., Reinmund T., Flatscher T., Marques D., Prahacs C., Kunze L., & De Martini D. The Oxford RobotCycle Project: A Multimodal Urban Cycling Dataset for Assessing the Safety of Vulnerable Road Users. *Rebuttal phase at T-FR*

Panagiotaki E., Pramatarov G., Kunze L., & De Martini D. GraphSCENE: On-Demand Critical Scenario Generation for Autonomous Vehicles in Simulation. *Under review at IROS2025* paper

Panagiotaki E., Reinmund T., Mouton S., Pitt L., Shanthini A. S., Tubby W., Towlson M., Sze S., Liu B., Prahacs C., De Martini D., & Kunze L. RobotCycle: Assessing Cycling Safety in Urban Environments. (IV2024) paper

Gadd M., De Martini D., Bartlett O., Murcutt P., Towlson M., Widojo M., Muşat V., Robinson L., Panagiotaki E., Pramatarov G., Kühn M. A., Marchegiani L., Newman P., & Kunze L. OORD: The Oxford Offroad Radar Dataset. (T-ITS 2024) paper

Drayson G.*, Panagiotaki E.*[1], Omeiza D., & Kunze L. CC-SGG: Corner Case Scenario Generation using Learned Scene Graphs. *Alphabetically listed. [1]Project Lead. (ICRA2024 - withdrawn) paper

Panagiotaki E., De Martini D., Pramatarov G., Gadd M., & Kunze L. (2023). SEM-GAT: Explainable Semantic Pose Estimation using Learned Graph Attention. (ICAR2023) paper

Panagiotaki E., De Martini D., & Kunze L. (2023). Semantic Interpretation and Validation of Graph Attention-based Explanations for GNN Models.(ICAR2023) paper

Panagiotaki E., De Martini D., & Kunze L. (2023). Towards Semantic Interpretation and Validation of Graph Attention-based Explanations. (ICRA2023 XRo Workshop) paper

Panagiotaki E.[1,2]. An Efficient Track Detection and Mapping System for Autonomous Driving Race Car. Master/Diploma Thesis. Supervisors: Dr. Dengxin Dai[1], Prof. Luc Van Gool[1], Prof. Evangelos Christoforou[2]. [1]ETH Zürich. [2]National Technical University of Athens. thesis