

Francisco Girbal Eiras

DPhil in Optimization and Machine Learning supervised by Prof. Phil Torr, Dr. Adel Bibi (University of Oxford) and Dr. M. Pawan Kumar (Google DeepMind)

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EDUCATION

- University of Oxford** Oxford, UK
DPhil (PhD) in Engineering Science (AIMS) Oct. 2020 – Oct. 2024 (Expected)
 - Supervisors:** Prof. Philip H.S. Torr, Dr. Adel Bibi, Dr. M. Pawan Kumar (Google DeepMind)
 - Relevant Taught Courses:** Optimization, Data Estimation and Inference, Machine Learning, Reinforcement Learning, Discriminative & Deep Learning for Big Data
 - Certified Machine Learning Optimization AI4Science Robustness Multimodal Learning LLM Safety
- University of Oxford** Oxford, UK
MSc in Computer Science; Grade: Distinction Oct. 2017 – Sep. 2018
 - Dissertation:** "To Err is Human: Designing Correct-by-Construction Driver Assistance Systems using Cognitive Modelling" (supervised by Prof. Morteza Lahijanian and Prof. Marta Kwiatkowska)
 - Formal Methods Probabilistic Model Checking Reachability Markov Decision Processes
- EPFL** Lausanne, Switzerland
Student Exchange; GPA: 5.75/6 Sep. 2016 – Feb. 2017
- Técnico Lisboa** Lisbon, Portugal
BSc in Electrical and Computer Engineering; GPA: 18/20 (top 2% of class) Sep. 2013 – Jul. 2016
 - Multiple View Geometry

SELECTED PUBLICATIONS

- F Eiras**, K Oksuz, A Bibi, PHS Torr, PK Dokania, *Segment, Select, Correct: a Framework for Weakly-Supervised Referring Segmentation*, Under Submission, 2023
- F Eiras**, R Bunel, K Dvijotham, A Bibi, PHS Torr, MP Kumar, *Provably Correct Physics-Informed Neural Networks*, 2nd Workshop on Formal Verification of Machine Learning, International Conference on Machine Learning (ICML), 2023 Outstanding Paper Award
- A Petrov, **F Eiras**, A Sanyal, PHS Torr, A Bibi, *Certifying Ensembles: A General Certification Theory with S-Lipschitzness*, International Conference on Machine Learning (ICML), 2023
- T Lamb, R Bunel, K Dvijotham, PHS Torr, MP Kumar, **F Eiras**, *Faithful Knowledge Distillation*, Under Submission, 2023
- T Rumezhak, **F Eiras**, PHS Torr, A Bibi, *RANCER: Non-Axis Aligned Anisotropic Certification with Randomized Smoothing*, Winter Applications of Computer Vision (WACV), 2023
- F Eiras**, M Alfarra, MP Kumar, PHS Torr, PK Dokania, B Ghanem, A Bibi, *ANCER: Anisotropic certification via sample-wise volume maximization*, Transaction of Machine Learning Research (TMLR), 2022
- H Pulver, **F Eiras**, L Carozza, M Hawasly, S Albrecht, S Ramamoorthy, *PILOT: Efficient Planning by Imitation Learning and Optimisation for Safe Autonomous Driving*, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2021
- F Eiras**, M Hawasly, SV Albrecht, S Ramamoorthy, *A Two-Stage Optimization-based Motion Planner for Safe Urban Driving*, IEEE Transaction on Robotics (T-RO), 2021

- SV Albrecht, C Brewitt, J Wilhelm, B Gyevar, **F Eiras**, M Dobre, S Ramamoorthy, *Interpretable Goal-based Prediction and Planning for Autonomous Driving*, IEEE International Conference on Robotics and Automation (ICRA), 2021
- E Ayers, **F Eiras**, M Hawasly, I Whiteside, *PaRoT: A Practical Framework for Robust Deep Neural Network Training*, 12th NASA Formal Methods Symposium (NFM), 2020
- P Miraldo, **F Eiras**, S Ramalingam, *Analytical modeling of vanishing points and curves in catadioptric cameras*, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018

EXPERIENCE

- **FiveAI** Oxford, UK
Research Scientist Intern Dec. 2022 - Jun. 2023
 - Worked on the problem of referring image segmentation using a zero-shot method coupled with a constrained greedy loss to achieve the new weakly-supervised state-of-the-art in the field.
 - Self-Supervised ML Multimodal Learning Weakly-supervised Instance Segmentation PyTorch WandB
- **FiveAI** Edinburgh, UK
Research Engineer Sep. 2018 - Sep. 2020
 - Led the development of safe and scalable optimization-based motion planning algorithms, working in a team with research scientists and software engineers
 - Published and presented research work developed at top tier conferences and journals within the robotics community, as well as to non-technical audiences
 - Wrote and reviewed research and development code, ensuring CI with other tools within the company
 - Motion Planning and Prediction Imitation Learning Optimization Robotics PyTorch Tensorflow pandas
git CI/CD Docker Front-end Dev
- **Institute for Systems and Robotics, Lisbon** Lisbon, Portugal
Graduate Research Assistant Apr. 2017 - Sep. 2017
 - Studied and developed new methods to perform pose estimation through vanishing points in general (central and non-central) omnidirectional cameras which lead to a publication at CVPR 2018.
 - 3D Computer Vision Epipolar Geometry Camera Calibration Matlab C/C++ POV-Ray

TECHNICAL SKILLS

- **Research Interests:** LLM Safety Certified Machine Learning AI4Science Optimization Adversarial Robustness
Multimodal and Self-Supervised Learning Formal Methods Robotics Multiple View Geometry
- **Programming/Frameworks:** Python C/C++ Matlab Javascript PyTorch Tensorflow WandB git
CI/CD AWS Docker React HTML+CSS Javascript flask POV-Ray

ACCOMPLISHMENTS & AWARDS

- **2023** · Outstanding Paper Award at the 2nd Workshop on Formal Verification of Machine Learning, ICML
- **2016/2017** · ISR-Lisbon Undergraduate & Graduate Research Fellowships (6,800€)
- **2016** · Swiss-European Mobility Programme Studentship @ EPFL (2,700 CHF)
- **2013 - 2016** · BSc Academic Excellency Awards