Francisco Girbal Eiras

francisco.girbal@gmail.com · fgirbal.github.io
+44 (0) 7510086693 · Oxford, UK

Education

- **University of Oxford** — Oxford, UK
  PhD in Engineering Science (AIMS) — *Oct. 2020 – Aug. 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 · Self-Supervised Learning
- **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

Experience

- **FiveAI** — Oxford, UK
  Research Scientist Intern — *Dec. 2022 - Jun. 2023*
  - Worked on referring image segmentation using a zero-shot method coupled with a contrastive loss to achieve the new unsupervised state-of-the-art in the field.
  - Self-Supervised Learning · Multimodal ML · Unsupervised 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

Selected Publications

- **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 Workshop Outstanding Paper Award
- **F Eiras**, K Oksuz, A Bibi, PHS Torr, J Redford, PK Dokania, *Unsupervised Referring Image Segmentation via Grounded Contrastive Instance Segmentation*, Under Submission, 2023
- T Lamb, **F Eiras**, R Bunel, K Dvijotham, PHS Torr, MP Kumar, *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 Conference
- **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 Journal
- 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 Conference
- **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 Journal
- SV Albrecht, C Brewitt, J Wilhelm, B Gyevnar, **F Eiras**, M Dobre, S Ramamoorthy, *Interpretable Goal-based Prediction and Planning for Autonomous Driving*, IEEE International Conference on Robotics and Automation (ICRA), 2021 Conference
- 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 Conference
- 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 Conference

Technical Skills

- **Research Interests**: Certified Machine Learning | AI4Science | Optimization | Computer Vision 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€)
- **2013 - 2016** · BSc Academic Excellency Awards