# Francisco Girbal Eiras

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UNIVERSITY OF OXFORD, OXFORD, UK • OCT. 2020 - AUG. 2024 (EXPECTED)

### PhD Candidate, Autonomous Intelligent Machines and Systems CDT

Studying and developing research within the areas of machine learning, computer vision, optimization and verification as part of Oxford's Autonomous Intelligent Machines and Systems (AIMS) Center for Doctoral Training (CDT) programme. Scholarship partially funded by FiveAI Ltd.

FIVEAI, EDINBURGH, UK • SEP. 2018 - APR. 2020

### Research Scientist, Motion Planning and Prediction

• 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
• Carried out literature reviews, prepared and presented cutting edge research at paper reading groups

FIVEAI, EDINBURGH, UK • SEP. 2018 - APR. 2020

### Research Engineer, Motion Planning and Prediction

• Developed prototypes of new motion planning algorithms and testing them in collaboration with research scientists
• Wrote and reviewed research and development code, ensuring CI with other tools within the company
• Carried out literature reviews, prepared and presented cutting edge research at paper reading groups

INSTITUTE FOR SYSTEMS AND ROBOTICS, LISBON • APR. 2017 - SEP. 2017

### Graduate Research Assistant

Studied and developed new methods to perform pose estimation through vanishing points in general (central and non-central) omnidirectional cameras which lead to the publication of a paper in one of the top conferences in the field, IEEE CVPR 2018.

INSTITUTE FOR SYSTEMS AND ROBOTICS, LISBON • APR. 2016 - SEP. 2016

### Research Student (Undergraduate)

Constructed modules for gesture recognition through supervised learning using RGB-D cameras, from simple binary classification gestures (e.g. waving) to more complex regression ones (e.g. pointing estimation) and integrated them in a MOnarCH robot as part of the INSIDE project.

## Education

UNIVERSITY OF OXFORD, OXFORD, UK • OCT. 2020 - AUG. 2024 (EXPECTED)

### PhD in Engineering Science (AIMS)

**Relevant courses**: Data Estimation & Inference, Machine Learning, Reinforcement Learning, Discriminative & Deep Learning for Big Data
**Supervisors**: Prof. Pawan Kumar and Prof. Phil H.S. Torr

UNIVERSITY OF OXFORD, OXFORD, UK • OCT. 2017 - SEP. 2018

### MSc in Computer Science

**Relevant courses**: Computational Game Theory, Probabilistic Model Checking
**Dissertation**: *"To Err is Human: Designing Correct-by-Construction Driver Assistance Systems using Cognitive Modelling"*
**Supervisors**: Dr. Morteza Lahijanian and Prof. Marta Kwiatkowska

EPFL, LAUSANNE, SWITZERLAND • SEP. 2016 - FEB .2017

### Student Exchance (5.75/6)

**Relevant courses**: Applied Machine Learning, Image and Video Processing, Lab in Image and Signal Processing

TÉCNICO LISBOA, LISBON, PORTUGAL • SEP. 2013 - JUL. 2016

### BSc in Electrical and Computer Engineering (18/20)

**Relevant courses**: Algorithms and Data Structures, Signals and Systems, Computational Mathematics, Automatic Control
**Top 2% of class**

## Selected Publications

### An Optimization-based Motion Planner for Safe Autonomous Driving

**F. Eiras**, M. Hawasly, S.V. Albrecht, S. Ramamoorthy — 2020 RSS - Workshop on Safe Autonomy

### PaRoT: A Practical Framework for Robust Deep Neural Network Training

E. Ayers, **F. Eiras**, M. Hawasly, I. Whiteside — 12th NASA Formal Methods Symposium, 2020

### Correct-by-Construction Advanced Driver Assistance Systems based on a Cognitive Architecture

**F. Eiras**, M. Lahajinan, M. Kwiatkowska — 2019 IEEE Connected and Automated Vehicles Symposium (Oral)

### Analytical Modeling of Vanishing Points and Curves in Catadioptric Cameras

P. Miraldo, **F. Eiras**, S. Ramalingam — 2018 IEEE/CVF Conference on Computer Vision and Pattern Recognition

## Technical Skills

### Research Interests

Robotics
Multiple View Geometry (3D Vision)
Mathematical Optimization
Robust Computer Vision
Formal Methods
Machine Learning
Neural Networks/Deep Learning

### Programming/Frameworks

Python, Matlab, C/C++
TensorFlow, pyTorch, scikit-learn, flask
Git, CI/CD, Docker, AWS
LaTeX
HTML, CSS, Javascript, jQuery
POV-Ray

### Language Skills

Portuguese (native)
English (fluent - 8.5 overall IELTS)
Spanish (elementary)
French: (elementary)

## Accomplishments

2018 - Honourable mention at LauzHack 2018 for SolarRooftops project (using computer vision for social good)

2017 - ISR-Lisbon Graduate Research fellowship (4,500€)

2016 - Swiss-European Mobility Programme Studying abroad scholarship (2,700 CHF)

2016 - Academic Excelency Award for BSc (over 3 years)

2016 - ISR-Lisbon Undergraduate Research studentship (2,310€)

2015/16 - Elected the Class representative for BSc and 3rd year

2013 - AFS Wilmington Friends School International Scholarship ($25,000)

2013 - 3rd place at the Delaware State Science Olympiad in Data Analysis and Genetics