

JOSEPH ORTIZ

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| <https://joeaortiz.github.io/>

EDUCATION

Imperial College London

Oct. 2018-Present

Doctor of Philosophy in Computer Science

Robot Vision Group, supervised by Prof. Andrew Davison and Dr Stefan Leutenegger.

University of Oxford – Christ Church.

Oct. 2014-2018

MPhys – Masters in Physics

First Class Honours, Top 5%

Specialised in Theoretical Physics and Physics of Oceans and Atmospheres.

Thesis: Study of Detectability of Optical Transients associated with Gravitational wave events.

Supervised by Prof. Ian Shipsey and Prof. Marcelle Soares-Santos.

EXPERIENCE

Facebook AI Research (FAIR)

Aug. 2021-June 2022

Research Scientist Intern (Aug-Dec 2021), Research Scientist Contractor (Jan-June 2022).

Projects: Continual learning of neural signed distance fields for robot motion planning.

Contributed to Theseus, a differentiable nonlinear optimisation library for vision and robotics.

Massachusetts Institute of Technology, CSAIL

June-Sept. 2018

Visiting Research Student at the AnyScale Learning For All (ALFA) Group.

Project: Using GPs and NNs to approximate Nash Equilibrium for expensive black-box games.

Designed novel acquisition function for Bayesian optimization which can be used to minimize game theoretic regret. With Prof. Una-May O'Reilly.

Brazilian National Institute for Space Research (INPE)

June-Sept. 2016

Intern in the Earth Science Systems Department (CCST)

Project: 3D terrain reconstruction of regions of the Amazon rainforest using lidar data collecting from over-forest flights. Model was used to estimate the biomass in a region.

Oleco, London

June-Sept. 2017

Data Science Intern. Project: Quantify bias in hiring of minority gender and ethnicity groups.

AWARDS

Johnson Memorial Prize, University of Oxford

June 2018

Best MPhys Thesis in Astrophysics.

Academic Scholar at Christ Church, University of Oxford

2015-2018

BP Internship Award

2015

For Research at Brazilian National Institute for Space Research.

PUBLICATIONS

- [1] **Theseus: A Library for Differentiable Nonlinear Optimization.** Luis Pineda, Taosha Fan, Maurizio Monge, Shobha Venkataraman, Paloma Sodhi, Ricky Chen, Joseph Ortiz,

Daniel DeTone, Austin Wang, Stuart Anderson, Jing Dong, Brandon Amos, Mustafa Mukadam. In: *Conference on Neural Information Processing Systems (NeurIPS)*, 2022.

- [2] **iSDF: Real-Time Neural Signed Distance Fields for Robot Perception.** Joseph Ortiz, Alexander Clegg, Jing Dong, Edgar Sucar, David Novotny, Michael Zollhoefer, Mustafa Mukadam. In: *Robotics: Science and Systems (RSS)*, 2022.
- [3] **A Robot Web for Distributed Many-Device Localisation.** Riku Murai, Joseph Ortiz, Sajad Saeedi, Paul Kelly, Andrew J. Davison. In: *ArXiv pre-print*.
- [4] **Incremental Abstraction in Distributed Probabilistic SLAM Graph.** Joseph Ortiz, Talfan Evans, Edgar Sucar, Andrew J. Davison. In: *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, 2022.
- [5] **iMAP: Implicit Mapping and Positioning in Real-Time.** Edgar Sucar, Shikun Liu, Joseph Ortiz, Andrew J. Davison. In: *Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV)*, 2021.
- [6] **A Visual Introduction to Gaussian Belief Propagation.** Joseph Ortiz, Talfan Evans, Andrew J. Davison. Self-published at <https://gaussianbp.github.io/>.
- [7] **Bundle Adjustment on a Graph Processor.** Joseph Ortiz, Mark Pupilli, Stefan Leutenegger, Andrew J. Davison. In: *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)* 2020.
- [8] **FutureMapping 2: Gaussian Belief Propagation for Spatial AI.** Andrew J. Davison, Joseph Ortiz. In: *arXiv pre-print 1910.14139*, 2019.

SKILLS

Workshops	Organised workshop on Distributed Graph Algorithms at ICRA 2023.
Teaching	Imperial College TA - Mathematics for CS, CO145 (2019), Robotics (2021, 2022). Private tutor for Undergraduate Physics.
Students supervised	Frank Mu, Fengming Lui (Imperial College 2020).
Programming	Python, MATLAB, C++, Poplar (Graphcore), Javascript, HTML; PyTorch, Tensorflow.
Languages	English (native), Spanish (proficient).

INTERESTS

Sport	Member of Great Britain U19 Water Polo Team (2012-2014). Oxford Blue in Water Polo, Men's Captain 2016/17.
Other	Travelling, astronomy.