JOSEPH ORTIZ

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EDUCATION

Imperial College London *Oct. 2018-March 2023*
Doctor of Philosophy in Computer Science
Title: Gaussian Belief Propagation for Real-Time Decentralised Inference.
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

Meta AI (FAIR) *May. 2023-Present*
Postdoctoral Researcher.
Working on real-time 3D scene understanding for robot manipulation.

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.

Oleeo, 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.
Reviewing	ICRA 2020-2023, IROS 2022-2022.
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.