Joana Fonseca

Machine Learning and Robotics Engineer — Ph.D.

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Skills

Machine Learning and Robotics, 10+ years of ML and Robotics, including control, estimation, deep learning, computer vision. 6+ years of research and 10+ publications.

Programming, 10+ years of coding in C++, Python, MatLab, using mathematics, control, and learning libraries. Wrote 10+ repositories for simulation and experiments.

Teacher and Reviewer, Reviewed 40+ articles and BSc, MSc, and PhD theses. Taught 100+ hours as lecturer and teaching assistant. Supervised 20+ BSc and MSc students.

Innovation, Knowledge of deep-tech innovation and research commercialization through a pre-incubator with KTH innovation. Contacted 100+ prospect customers and stakeholders.

Project Management, Created a team during my PhD project, including partnerships with 3 marine centers and with BSc, MSc, and PhD students.

Agile Methodology, Worked alongisde key stakeholders and customers to set the requirements and develop the technology for environmental monitoring of Swedish waters.

Languages, Fluent in English and Portuguese. Expert in Swedish and Spanish. Beginner in French and Mandarin.

Education

2017-2023 **Ph.D in Robotics and Machine Learning**, *KTH, Sweden*, Supervised by *Karl H. Johansson*. Worked on Data-Informed Adaptive Estimation and Data Fusion.

2016-2017 **M.Sc. in Control and Automation**, *U.Porto, Portugal*, Courses and projects on Control, Machine Learning, Dynamic Programming. GPA: 17/20 (Top 1%)

2015-2016 **M.Sc. in Systems and Control**, *T.U.Delft, Netherlands*, Courses and projects on Systems, Control, Filtering, Identification, Modelling, Optimization. GPA: 17/20

2012-2015 **B.Sc. in Electrical and Computer Engineering**, *U.Porto, Portugal*, Courses and projects on Systems, Control, Data Structures, Data Analysis, Programming. GPA: 17/20 (Top 1%)

Experience

2024-2024 **Software Engineer in Machine Learning and Computer Vision**, *Univrses*, Developed software for vehicle autonomy using Deep Learning and camera datasets.

2019-2023 **Invited Lecturer in Foundations of Control**, *KTH*, Taught Foundations of Control to mechanical engineers in the MSc course Underwater Technology.

2018-2023 **BSc and MSc Thesis Supervisor**, *KTH*, Designed and supervised 10+ BSc and MSc thesis on Machine Learning, Deep Learning, Robotics, and Control.

2018-2023 **Member of WOP@KTH**, *Organized 5+ networking events for PhD women. Gathered 500.000+ SEK from 10+ financing sources.*

2017-2020 **Teaching Assistant in Nonlinear Control**, *KTH*, Taught Lyapunov analysis and controller design for nonlinear systems to MSc students.

2014-2017 **Public Relations**, *U.Porto*, Participated in 10+ events to introduce high-school students to robotics.

2016-2017 **Teaching Assistant in FEUP Project**, *U.Porto*, Taught Electronics to 50+ BSc students.

2014-2015 **Teaching Assistant in Mathematics and Physics**, *U.Porto*, Held help sessions for BSc students on mathematics, physics, and more.

Publications

2023 **Optimizing Ocean Feature Estimation and Tracking through Adaptive Sampling and Formation Control of Autonomous Underwater Vehicles**, *J. Fonseca*, Doctoral thesis in KTH

Submitted for revision **Distributed Formation Control for Environmental Monitoring: A Gradient Estimation-based Approach**, *Z. Yang, J. Fonseca, S. Zhu, C. Chen, K. Johansson*, Transactions on Automatic Control

Submitted for revision **Adaptive Sampling of Algal Blooms Using Autonomous Underwater Vehicle and Satellite Imagery: Experimental Validation in the Baltic Sea**, *J. Fonseca, S. Bhat, M. Lock, I. Stenius, K. Johansson*, IEEE Journal of Oceanic Engineering

2023 **Adaptive Estimation for Environmental Monitoring using an Autonomous Underwater Vehicle**, *Z. Yang, J. Fonseca, S. Zhu, C. Chen, K. Johansson*, CDC 2023

2023 **Adaptive Sampling of Algal Blooms using an Autonomous Underwater Vehicles and Satellite Imagery**, *J. Fonseca, A. Rocha, M. Aguiar, K. Johansson*, CCTA 2023

2021 **3D Tracking of a River Plume Front with an AUV**, *D. Teixeira, J. Sousa, R. Mendes, J. Fonseca*, OCEANS 2021

2021 **Algal Bloom Front Tracking Using an Unmanned Surface Vehicle: Numerical Experiments Based on Baltic Sea Data**, *J. Fonseca, M. Aguiar, J. Sousa, K. Johansson*, OCEANS 2021

2020 **Cooperative Multi-Vehicle Circumnavigation and Tracking of a Mobile Target**, *J. Fonseca*, Licentiate thesis in KTH

2020 **Cooperative Circumnavigation for a Mobile Target using Adaptive Estimation**, *J. Fonseca, J. Wei, K. Johansson, T. Johansen*, CONTROLO 2020

2019 **Cooperative Decentralised Circumnavigation with Application to Algal Bloom Tracking**, *J. Fonseca, J. Wei, K. Johansson, T. Johansen*, IROS 2019

2017 **Optimal Control Applied to AUVs**, *J. Fonseca*, Master Thesis in U.Porto

2017 **Design of Minimum Time Trajectories for Autonomous Underwater Vehicles**, *J. Fonseca, M. Pinho, A. Matos*, Poster presented at NHOC2017, and EPCO2017

Awards

2023 **EECS Impact Travel Grant**, *Best research poster in the 2023 EECS Poster Competition.*

2022 **VFT grant from KTH Holding**, *Awarded for market research on comercialization of my research.*

2022 **DigiLeaders Award**, *Future Leader in Digitalization from the Digital Futures Research Center.*

2019 **Jubileumsanslaget Grant**, *For promoting scientific exchanges for the benefit of Swedish research.*

2017 **KTH Excellence Program**, *Most promising woman PhD student in EECS-KTH.*

2017 **Research Scholarship at U.Porto**, *For research on Optimal Control in Robotics.*

2015 **ERASMUS Scholarship**, *Scholarship for exchange studies in T.U.Delft.*

2014 **Research Scholarship at U.Porto**, *For research on Fourier series and Transforms.*