

Joana Fonseca

Robotics and Machine Learning Engineer

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Skills

- Robotics and Machine Learning**, 10+ years of Robotics and ML education, including systems, control, identification, estimation, prediction, and data fusion. 6+ years of research and 10+ publications.
- Programming**, 10+ years of coding in C++, Python, MatLab, Simulink, ROS, using mathematics, physics, control, and learning libraries. Wrote 10+ repositories for simulation and experiments.
- Teacher and Reviewer**, Reviewed 30+ articles and journals for CDC, CCTA, IROS, ICRA, IEEE JOE, and BSc, MSc, and PhD theses. Taught 100+ hours as lecturer and teaching assistant and graded 200+ exams, homework, and projects. Supervised 20+ BSc and MSc thesis.
- 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 within my PhD project, including partnerships with 3 marine centers and with BSc, MSc, and PhD students focused on data fusion and decision-making.
- Agile Methodology**, Worked with key stakeholders to develop the technology for environmental monitoring of Swedish coastal waters, resulting in changes on datasets, data tools, and data-informed algorithm.
- 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

- 2019–2023 **Invited Lecturer in Foundations of Control**, *KTH*, Taught Foundations of Control to mechanical engineers in the graduate course Underwater Technology.
- 2018–2023 **BSc and MSc Thesis Supervisor**, *KTH*, Designed and supervised 10+ BSc and MSc thesis on Robotics, Control, Machine Learning.
- 2018–2023 **Member of WOP@KTH**, *Organized 5+ networking events for PhD women. Gathered 500.000+ SEK from 10+ financing sources. One event remains KTH's PhD event with the most participants.*
- 2017–2020 **Teaching Assistant in Nonlinear Control**, *KTH*, Taught Lyapunov analysis and controller design for nonlinear systems to graduate students.
- 2014–2017 **Public Relations**, *U.Porto*, Spokesperson at 10+ events for high-school students, to teach them about robotics and motivate them in their studies.
- 2016–2017 **Teaching Assistant in FEUP Project**, *U.Porto*, Taught the Foundations of Electronics to 50+ BSc students. Helped them in designing end-of-course projects.
- 2014–2015 **Teaching Assistant in Mathematics and Physics**, *U.Porto*, Held private and group help sessions for bachelor 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.*