

Pol Mestres

PHD STUDENT · SYSTEMS AND CONTROL

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Education

University of California, San Diego

La Jolla, California, USA

PHD MECHANICAL ENGINEERING

09 2020 - present

- Advisor: Dr. Jorge Cortés
- Research topics: safety-critical control, optimization-based controllers, epidemic spreading

University of California, San Diego

La Jolla, California, USA

MS MECHANICAL ENGINEERING

09 2020 - 07 2021

- GPA: 3.966.
- Specialization in Dynamical Systems and Control
- Coursework: Linear Systems, Parametric Identification, Cooperative Control of Multiagent Systems, Nonlinear Systems, Optimal Estimation, Convex Optimization, Nonlinear Control, Linear Control Design, Optimal Control, Hybrid Systems.

Universitat Politècnica de Catalunya

Barcelona, Spain

BS MATHEMATICS, BS ENGINEERING PHYSICS

09 2015 - 06 2020

- 8.34/10 (Mathematics)
- 8.25/10 (Engineering Physics)
- Bachelor's Thesis at the University of California, San Diego, (10/10 with honors).

Publications

JOURNAL PUBLICATIONS

- 5.- P. Mestres, A. Allibhoy and J. Cortés. Robinson's Counterexample and Regularity Properties of Optimization-Based Controllers. *Systems and Control Letters*, submitted
- 4.- P. Mestres, K. Long, N. Atanasov and J. Cortés. Feasibility Analysis and Regularity Characterization of Distributionally Robust Safe Stabilizing Controllers. *IEEE Control Systems Letters*, to appear
- 3.- P. Mestres and J. Cortés. Feasibility and Regularity Analysis of Safe Stabilizing Controllers under Uncertainty. *Automatica*, submitted
- 2.- P. Mestres and J. Cortés. Optimization-Based Safe Stabilizing Feedback with Guaranteed Region of Attraction. *IEEE Control Systems Letters* (with joint submission to 61st IEEE Conference on Decision and Control), 7 (2023), 367-372.
- 1.- M. Vaquero, P. Mestres, J. Cortés. Resource-Aware Discretization of Accelerated Optimization Flows. *IEEE Transactions on Automatic Control*, 68 (4) (2023).

CONFERENCE PUBLICATIONS

- 1.- P. Mestres, J. Cortés. 2023. Distributed and Anytime Algorithm for Network Optimization Problems with Separable Structure. *Proceedings of the 62nd IEEE Conference on Decision and Control*, Singapore, pp. 5457-5462.
- 1.- P. Mestres, J. Cortés. 2022. Safe Design for Controlling Epidemic Spreading under Heterogeneous Testing Capabilities. *Proceedings of the American Control Conference*, Atlanta, Georgia, 2022, pp. 697-702.

Professional Experience

U.S. Army DEVCOM Army Research Laboratory

Adelphi, Maryland

RESEARCH INTERN

06 2023 - 09 2023

- ROS implementation of safe navigation algorithms for multi-agent systems. The algorithm was tested in simulation and in real robotic platforms, like Clearpath Jackals and Husky robots.

Barcelona Supercomputing Center - Computational Biology Group

Barcelona, Spain

RESEARCH INTERN

06 2019 - 08 2019

- Data Science project in epigenetics. The aim of the project was to reconstruct a certain cell differentiation tree by using epigenetic data: hi-c chromatin contacts, histone marks data, etc.

BaseTIS

Barcelona, Spain

DATA SCIENCE INTERN

06 2018 - 08 2018

- Machine Learning project on attrition (predicting whether a given employee will leave a company).
- Deep Learning project on image classification for an olive oil company.

Institut de Robòtica Industrial (IRI)

Barcelona, Spain

RESEARCH INTERN

08 2017 - 08 2017

- Worked on a project called "Detecting variable symmetries on continuous domains".

Talks

December 2022. *Optimization-Based Safe Stabilizing Feedback with Guaranteed Region of Attraction*. Regular session at the 61st IEEE Conference on Decision and Control.

November 2022. *Optimization-Based Controllers for Safety-Critical Systems*. Robograde. UC San Diego.

June 2022. *Optimization-Based Safe Stabilizing Feedback with Guaranteed Region of Attraction*. Poster Session at the SoCal Hub Workshop on Secure Autonomy, University of California, Riverside, USA.

June 2022. *Safe Policy Design for Controlling Epidemic Spreading under Heterogeneous Testing Capabilities* Rapid Interactive Session at the 2022 American Control Conference, Atlanta, Georgia, USA.

Awards, Fellowships, & Grants

2020-2021 **MAE First Year Fellowship**, Department of Mechanical and Aerospace Engineering, UCSD

2015-2020 **CFIS Half Tuition and Housing Fellowship**, CFIS-UPC

2018 **Finalist - HackUPC**, Universitat Politècnica de Catalunya

2018 **Winner - Datathon CFIS**, Centre de Formació Interdisciplinària Superior (CFIS)

2015 **Excellence Distinction on the University Entrance Exam**, Generalitat de Catalunya

2015 **Silver Medal in Spanish Physics Olympiad**, Real Federación Española de Física

2015 **Silver Medal in Catalan Physics Olympiad**, Societat Catalana de Física

Outreach & Professional Development

PEER REVIEW

IEEE Transactions on Automatic Control

IEEE Conference on Decision and Control

American Control Conference

IEEE Transactions on Control of Network Systems
Automatica
International Journal of Robust and Nonlinear Control

PROFESSIONAL MEMBERSHIPS

IEEE Student Member
SIAM Student Member

SERVICE

UCSD Robograds - Treasurer (School year 2023-2024)

Skills

Programming: Python, C++, MATLAB, R, AMPL, Mathematica.

Software: ROS, Linux, LaTeX, LabVIEW.

Languages: Catalan (native), Spanish (native), English (fluent), French (basic).