Alexandre Cortiella

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SUMMARY

Curious aerospace engineer passionate about science and technology. I aspire to become an expert and make useful contributions to the aerospace sector. Fitness, finance, and psychology are my hobbies. Seeking a growth opportunity in space engineering.

EDUCATION

Ph.D. Aerospace Engineering *Spring 2021*
University of Colorado Boulder, Boulder, CO
Ph.D. Thesis: Data-driven model development and identification of dynamical systems.

M.S. Aerospace Engineering *Spring 2018*
University of Colorado Boulder, Boulder, CO

B.S. Aerospace Engineering *Spring 2014*
Technical University of Catalonia, Barcelona, Spain
B.S. Thesis: Study of numerical techniques for structural optimization in aeronautics.

EXPERIENCE

Graduate research assistant, Aerospace Mechanics Research Center Boulder, CO *January 2017 - Present*

- Developed a dynamical system identification algorithm via non-convex optimization and sensitivity/adjoint methods.
- Devised novel algorithms for data-driven dynamical model identification from noisy data using sparse regularization and machine learning techniques.
- Implemented finite element thermal-structure and fluid-structure interaction algorithms with moving meshes.
- Presented research at various workshops and conferences including SIAM Computational Science and Engineering 2021.
- Served as a teaching assistant for Structures and Materials course, mentored students, and prepared lectures.

Research Scientist, Laboratory for Atmospheric and Space Physics Boulder, CO *June 2018 - August 2018*

- Analyzed data from Juno spacecraft to identify plasma and radiation particles of Jupiter's radiation belts.
- Performed Monte Carlo simulations and sensitivity analyses using ESA's Multi-Layered Shielding Simulation Software.
- Developed mathematical models for Jupiter radiation high-energy particle environment.
- Collaborated with and reported results to NASA Jet Propulsion Laboratory.

GN&C Researcher, UPC Nanosat Lab Barcelona, Spain *May 2015 - August 2016*

- Designed and implemented attitude determination and control algorithms for a Earth Observation nanosatellite.
- Programmed a spacecraft flight dynamics simulator for Low Earth Orbit nanosatellite missions.
- Planned, executed, evaluated, and supervised all phases of spacecraft flight dynamics, estimation, and control operations.
- Collaborated and scheduled critical review meetings with industry partners from Elecnor Deimos.

SKILLS

Communication

- Spanish (Native), Catalan (Native), English (Professional), French (Basic).
- Presented and published research in prestigious conferences and journals.
- Mentored undergraduate and graduate engineering students.

Leadership

- President of the CU Catalan Club - Managed and organized events to promote Catalan culture.
- Founding member of CU Graduate Colloquium Seminars - Organized and coordinated talks and workshops.
- Captain of a Federated Handball team – Federated Handball player for 17 years in three different teams.

Technical

- MATLAB & Simulink, Python, C++, HTML-CSS.
- Solid Works, CATIA, AutoCad.
- Finite element analysis, Machine learning, Numerical simulation, Spacecraft dynamics.

HONORS AND AWARDS

- Awarded a SIAM Student Travel Award CSE 2021 Conference (2021).
- Awarded a Graduate International Travel Grant by University of Colorado (2019).
- Awarded a Conference Travel Grant by University of Washington (2019).
- Ph.D. research funded by National Science Foundation (NSF) Grant: CMMI-1454601 (2018).
- Winner of the Space Station Design Challenge at the Institute of Space Systems, Germany (2016).
- Recipient of a Balsells Fellowship for graduate studies at University of Colorado Boulder (2016).
- Recipient of a Research Fellowship by Institut d'Estudis Espacials de Catalunya (IEEC) (2015).
- Distinguished B.S. Thesis Award for being among the top 5% (2014).

PUBLICATIONS

- Cortiella, A.; Vidal, D.; Jané, J.; Juan, E.; Olivé, R.; Amézaga, A.; Munoz, J.F.; Via, P.; Carreno-Luengo, H.; Camps, A. "^{3}Cat-2 - Attitude Determination and Control System for a GNSS-R Earth Observation 6U CubeSat Mission". European Journal Of Remote Sensing Vol. 49, Iss. 1, 2016.

- Carreno-Luengo, H.; Camps, A.; Via, P.; Munoz, J.F.; Cortiella, A.; Vidal, D.; Jané, J.; Catarino, N.; Hagenfeldt, M.; Palomo, P.; Cornara, S. "3Cat-2—An Experimental Nanosatellite for GNSS-R Earth Observation: Mission Concept and Analysis", in IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, vol. 9, no. 10, pp. 4540-4551, 2016.

- Cortiella, A.; Park, K.C.; Doostan, A. "Sparse Identification of Nonlinear Dynamical Systems via Reweighted ℓ1-regularized Least Squares". Computer Methods in Applied Mechanics and Engineering. vol. 376. 2021.

CONFERENCES

- 2015 IEEE Young Professionals in Remote Sensing Conference. Dec 2 – Dec 5, 2015, Barcelona, Catalonia, Spain. Presentation: Attitude Determination and Control System for a GNSS-R Earth Observation 6U CubeSat Mission.

- Multi-Physics Workshop: Advances in Numerical Methods for Simulation, Optimization, and Uncertainty Quantification of Coupled Physics Problems. Apr 23 – Apr 24, 2018, University of Colorado Boulder, Boulder, CO, U.S.A.

- 8th International Conference on Computational Methods for Coupled Problems in Science and Engineering (COUPLED PROBLEMS 2019). Jun 3 – Jun 5, 2019, Sitges, Catalonia, Spain. Presentation: Partitioned Symmetric Formulation and Solution Algorithms of Thermoelastic Interaction Problems.

- SIAM Computational Science and Engineering 2021. Mar 1 – Mar 5 1, 2021, (Virtual Conference). Presentation: Denoising Methods for Data-Driven Recovery of Nonlinear Dynamical Systems.

- Engineering Mechanics Institute Conference/Probabilistic Mechanics and Reliability 2021 Conference. May 25 – May 28, 2021, (Virtual Conference). Presentation: Sparse Identification of Nonlinear Dynamical Systems via Reweighted ℓ1-regularized Least Squares.