Paula Navarrete

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Education

University of Massachusetts Amherst. Ph.D. in Computer Science — Amherst, MA
Advisor: Yair Zick. GPA: 4.0 — 2022 –Expected: 2027
Coursework: Advanced Algorithms, Advanced Natural Language Processing, Artificial Intelligence, Game Theory and Fairness, Database Design and Implementation, Probabilistic Graphical Models.

Pontifical Catholic University of Chile (PUC). M.S. in Engineering — Santiago, Chile
Advisor: Rodrigo Cienfuegos. GPA: 3.89 — 2016 –2019
Thesis: Assessment of the tsunami forecast capacity using sea surface data assimilation [J3]

Pontifical Catholic University of Chile (PUC). B.S. in Mathematical Engineering — Santiago, Chile
GPA: 3.64. Relevant Coursework: Linear Algebra, Stochastic Models, Real Analysis, Probabilities, Statistical Inference, Multivariate Calculus, Simulations, Optimization under uncertainty — 2012 –2016

Experience

Special Research Student. University of Tokyo — Mar 2025 – May 2025
Combinatorial Optimization; Chore Division — Tokyo, Japan
- Investigating chore allocation algorithms for more than two agents with a focus on fairness and efficiency
- Exploring market-based approaches with fake money to achieve EF1 and Pareto optimality
- Designing heuristics to extend SOTA algorithms to multi-agent settings, aiming for theoretical or approximate guarantees
- Implementing algorithms and testing performance and fairness properties on synthetic and real-world datasets

Graduate Research Assistant. University of Massachusetts Amherst — Feb 2024 – Present
Combinatorial Optimization; Fair Division; Scalable and Interpretable Algorithm Design — Amherst, MA
- Develop and analyze fair, efficient algorithms for fair division [W1,O1]
- Translate theoretical insights into implementable solutions, balancing efficiency with real-world constraints
- Perform time complexity analysis and establish theoretical guarantees for algorithmic performance
- Lead data collection and analysis using real-world data
- Design experiments, run simulations, and conduct statistical analyses to assess practical effectiveness

Data Science Intern. Data Science for the Common Good program (DS4CG) — May 2024 – Sept 2024
Developed web tool for iNaturalist to improve species range predictions with expert feedback — Amherst, MA
- Designed and implemented a backend database to store machine learning predictions and user annotations
- Built interactive front-end features, including a hexagonal grid for map annotations
- Collaborated with a multidisciplinary team to deploy a human-in-the-loop workflow for biodiversity data quality

Data Scientist. PUC Energy and Complex Systems Lab — Jun 2021 – Jul 2022
Project lead on short and long term time series forecasting for solar energy and electric demand — Santiago, Chile
- Integrated deep learning models into solar operation management software
- Connected models to a database with real-time measurement inputs
- Created protocols to handle outliers and patch missing data for model training
- Co-authored journal article on MDP models for solar farm cleaning [J1]

Researcher. Research Center for Integrated Disaster Risk Management (CIGIDEN) — Mar 2019 – May 2021
Developed new techniques for non-seismic data based Near-Real time Tsunami forecasting — Santiago, Chile
- Built PCA algorithm to select and cluster candidate tsunami observation points
- Implemented near-real time data assimilation algorithm for tsunami forecasting
- Developed heuristic to optimize networks, achieving state-of-the-art forecasts with only three additional stations
- First author on a peer-reviewed journal publication [J3] and coauthor on two related publications [J2, J4]

Collaborated in public funding research project
- Formulated Bayesian inference approach for tsunami source reconstruction through an inverse problem
- Achieved state of the art tsunami forecasts by relying in sea surface observations rather than seismic data

Research Fellow. Earthquake Research Institute (ERI), University of Tokyo — Oct 2017 – Nov 2017
Supervisor: Kenji Satake — Tokyo, Japan
Research on Empirical Orthogonal Functions and Data Assimilation for tsunami forecasting

Publications and Academic Works

[W1] G. Bissias, C. Cousins, **P. Navarrete*** and Y. Zick. 2025. Deploying Fair and Efficient Course Allocation Mechanisms. https://arxiv.org/abs/2502.10592

[O1] **P. Navarrete***, C. Cousins, G. Bissias and Y. Zick. 2024. Deploying Fair and Efficient Course Allocation Mechanisms. In Incentives of Academia Workshop of the 25th ACM Conference on Economics and Computation (EC'24).

[J1] M. González-Castillo, **P. Navarrete**, T. Tapia, Á. Lorca, D. Olivares, and M. Negrete-Pincetic. 2023. Cleaning scheduling in photovoltaic solar farms with deterministic and stochastic optimization. Sustainable Energy, Grids and Networks, vol. 36, p. 101 147, 2023.

[J2] Y. Wang, H. Tsushima, K. Satake and **P. Navarrete**. 2021. Review on recent progress in near-field tsunami forecasting using offshore tsunami measurements: Source inversion and data assimilation. Pure and Applied Geophysics, pp. 1–20.

[J3] **P. Navarrete***, R. Cienfuegos, K. Satake, Y. Wang, A. Urrutia, R. Benavente, P. Catalán, J. Crempien and I. Mulia. 2020. Sea surface network optimization for tsunami forecasting in the near field: Application to the 2015 illapel earthquake. Geophysical Journal International, vol. 221, no. 3, pp. 1640–1650.

[J4] Y. Wang, K. Satake, R. Cienfuegos, M. Quiroz and **P. Navarrete**. 2019. Far-field tsunami data assimilation for the 2015 illapel earthquake. Geophysical Journal International, vol. 219, no. 1, pp. 514–521.

Key: [J] Journal publication; [W] Working paper; [O] Other; * Lead Author

Teaching Experience

Teaching Assistant. University of Massachusetts Amherst — Fall 2022 –Spring 2024
Introduction to Computation, Reasoning Under Uncertainty, Artificial Intelligence

Teaching Associate. University of Massachusetts Amherst — Fall 2023
Instructor for the course Introduction to Python

Adjunct Faculty. Pontifical Catholic University of Chile — Spring 2020–Spring 2022
Head Instructor for the Stochastic Models engineering course

Teaching Assistant. Pontifical Catholic University of Chile — Spring 2013 –Fall 2018
Calculus, Linear Algebra, Marketing, Stochastic Models

Other Academic Activities

• Attended the Santiago Summer Workshop on Combinatorial Optimization 2025, at Pontifical Catholic University of Chile.

• Attended the Dagstuhl seminar on "Fair Division: Algorithms, Solution Concepts, and Applications" (2024), Wadern, Germany.

• One of two selected speakers at the Incentives of Academia Workshop of the 25th ACM Conference on Economics and Computation (EC'24), for the work titled "Deploying Fair and Efficient Course Allocation Mechanisms" in collaboration with C. Cousins, G. Bissias and Y. Zick.

• Poster presenter at the Columbia Workshop on Fairness in Operations and AI. Columbia University, New York, 2023, on the work titled "Efficient Yankee Swap for Fairly Allocating Courses to Students" with C. Cousins, V. Viswanathan and Y. Zick.

• Received PUC School of Engineering Letter of Recognition for Outstanding Teaching, 2022.

• Awarded Most Inspiring Professor of the Industrial and Systems Engineering Department, 2020.

• Received JASSO Grant for exchange students in Japan, 2017.

Skills

Programming: Python, SQL, MATLAB, C#, Java, Bash, LaTeX, R, Excel
Libraries: NumPy, Pandas, Networkx, Matplotlib, Pytorch, JAX