# 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 — 2012 –2016
Relevant Coursework: Linear Algebra, Stochastic Models, Probabilities Theory, Statistical Inference, Regression Analysis, Multivariate Calculus, Simulations, Optimization under uncertainty, Real Analysis.

## Experience

**Graduate Research Assistant.** University of Massachusetts Amherst — Feb 2024 – Present
Conduct research in algorithmic design, analysis, and implementation, specializing in combinatorial optimization and fair division — Amherst, MA
- Develop and analyze fair, efficient algorithms for applications such as course allocation [W1] and chore division
- Translate theoretical algorithmic insights into implementable solutions, balancing efficiency with real-world constraints
- Perform comprehensive time complexity analysis and establish theoretical guarantees for algorithmic performance
- Lead data collection and analysis efforts 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 based annotation tool to improve iNaturalist species range predictions — Amherst, MA
- Engineered back-end of web application
- Designed and implemented database to store and retrieve species predictions and expert annotations
- Designed and implemented features for retrieving and visualizing species predictions, enhancing iNaturalist's accuracy

**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
- Developed and integrated forecasting tool to the backend of solar operation management software
- Co-authored peer-reviewed journal article on MDP models for optimal solar farm cleaning, contributing to the advancement of renewable energy management. [J1]

**Adjunct Faculty.** Pontifical Catholic University of Chile — March 2020 – Jul 2022
Head instructor of the fourth-year engineering course Stochastic Models on Poisson process, discrete and continuous Markov Chains, queuing theory, random number generation, and simulation — Santiago, Chile

**Project Engineer.** Public Funding Research Project — Dec 2019 – May 2021
Developed new techniques for non-seismic data based Tsunami forecasting — Santiago, Chile
- 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

**Researcher.** Research Center for Integrated Disaster Risk Management (CIGIDEN) — Mar 2019 – May 2021
Researched on 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 select optimal observation network
- Achieved state of the art forecasts with only 3 additional observation stations
- First author on a peer-reviewed journal publication [J3] and coauthor on two related publications [J2, J4].

**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] **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.

[C1] **P. Navarrete**, R. Cienfuegos and K. Satake. 2018. Assessment of the tsunami forecast capacity using sea surface data assimilation: The 2015 Illapel Earthquake. III Engineering UC-USM Congress. Santiago, Chile.

Key: [J] Journal paper; [C] Conference; [W] Workshop paper

## 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
Introduction to Python

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

## Other Academic Activities

• Invited to 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.