Madeline Navarro

Rice University
Dept. of Electrical and Computer Engineering
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Research Interests

Signal processing; Optimization; Trustworthy and principled machine learning; Graphs and network science

Education

Rice University, Houston, TX, United States — August 2020 – present
Ph.D. in Electrical Engineering
Advisor: Santiago Segarra
Thesis: "Learning graphs from data"

Rice University, Houston, TX, United States — August 2020 – April 2023
M.Sc. in Electrical Engineering
Advisor: Santiago Segarra
Thesis: "Inference of multiple sparse networks in the presence of hidden nodes"

Old Dominion University, Norfolk, VA, United States — January 2018 – May 2020
B.Sc. in Electrical Engineering, Minor in Computer Engineering

Tidewater Community College, Virginia Beach, VA, United States — August 2012 – December 2017
A.S. in Electrical Engineering, *summa cum laude*

Publications

Peer-reviewed Journal Papers

[J1] Lisa R. O'Bryan, **Madeline Navarro**, Juan Segundo Hevia, and Santiago Segarra, "ML-SPEAK: A theory-guided machine learning method for studying and predicting conversational turn-taking patterns", *Journal of Personality and Social Psychology*, 2025.

[J2] **Madeline Navarro**, Samuel Rey, Andrei Buciulea, Antonio G. Marques, and Santiago Segarra, "Joint network topology inference in the presence of hidden nodes", *IEEE Transactions on Signal Processing*, vol. 72, pp. 2710–2725, 2024.

[J3] **Madeline Navarro** and Santiago Segarra, "Joint network topology inference via a shared graphon model", *IEEE Transactions on Signal Processing*, vol. 70, pp. 5549–5563, 2022.

[J4] **Madeline Navarro**, Yuhao Wang, Antonio G. Marques, Caroline Uhler, and Santiago Segarra, "Joint inference of multiple graphs from matrix polynomials", *Journal of Machine Learning Research*, vol. 23, no. 76, pp. 1–35, 2022.

Peer-reviewed Conference Papers

[C1] Bishwadeep Das, **Madeline Navarro**, Santiago Segarra, and Elvin Isufi, "Bayesian filtering on graphs", in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, IEEE, 2025. **[ICASSP 2025 Best Paper Award]**

[C2] **Madeline Navarro**, Sergio Rozada, Antonio G. Marques, and Santiago Segarra, "Low-rank tensors for multi-dimensional Markov models", in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, IEEE, 2025.

[C3] Andrei Buciulea, **Madeline Navarro**, Samuel Rey, Antonio G. Marques, and Santiago Segarra, "Online network inference from graph-stationary signals with hidden nodes", in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, IEEE, 2025.

[C4] Andrea Cavallo, **Madeline Navarro**, Santiago Segarra, and Elvin Isufi, "Fair coVariance neural networks", in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, IEEE, 2025.

[C5] Samuel Rey, **Madeline Navarro**, Victor Tenorio, Antonio G. Marques, and Santiago Segarra, "Redesigning graph filter-based GNNs to relax the homophily assumption", in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, IEEE, 2025.

[C6] Victor M. Tenorio, **Madeline Navarro**, Samuel Rey, Santiago Segarra, and Antonio G. Marques, "Structure-guided input graph for GNNs facing heterophily", in *Asilomar Conference on Signals, Systems, and Computers*, IEEE, 2024.

[C7] **Madeline Navarro**, Samuel Rey, Andrei Buciulea, Antonio G. Marques, and Santiago Segarra, "Fair GLASSO: Estimating fair graphical models with unbiased statistical behavior", *Advances in Neural Information Processing Systems (NeurIPS)*, 2024.

[C8] **Madeline Navarro**, Samuel Rey, Andrei Buciulea, Antonio G. Marques, and Santiago Segarra, "Mitigating subpopulation bias for fair network topology inference", in *European Signal Processing (EUSIPCO)*, IEEE, 2024.

[C9] **Madeline Navarro** and Santiago Segarra, "SC-MAD: Mixtures of higher-order networks for data augmentation", in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 13446–13450, IEEE, 2024.

[C10] **Madeline Navarro**, Camille Little, Genevera I. Allen, and Santiago Segarra, "Data augmentation via subgroup mixup for improving fairness", in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 7350–7354, IEEE, 2024.

[C11] Victor M. Tenorio, **Madeline Navarro**, Santiago Segarra, and Antonio G. Marques, "Recovering missing node features with local structure-based embeddings", in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 9931–9935, IEEE, 2024.

[C12] **Madeline Navarro** and Santiago Segarra, "GraphMAD: Graph mixup for data augmentation using data-driven convex clustering", in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 1–5, IEEE, 2023.

[C13] Samuel Rey, **Madeline Navarro**, Andrei Buciulea, Santiago Segarra, and Antonio G. Marques, "Joint graph learning from Gaussian observations in the presence of hidden nodes", in *Asilomar Conference on Signals, Systems, and Computers*, pp. 53–57, IEEE, 2022.

[C14] **Madeline Navarro** and Santiago Segarra, "Graphon-aided joint estimation of multiple graphs", in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 5458–5462, IEEE, 2022.

[C15] Samuel Rey, Andrei Buciulea, **Madeline Navarro**, Santiago Segarra, and Antonio G. Marques, "Joint inference of multiple graphs with hidden variables from stationary graph signals", in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 5817–5821, IEEE, 2022.

[C16] T. Mitchell Roddenberry, **Madeline Navarro**, and Santiago Segarra, "Network topology inference with graphon spectral penalties", in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 5390–5394, IEEE, 2021.

Preprints

[P1] **Madeline Navarro**, Andrei Buciulea, Samuel Rey, Antonio G. Marques, and Santiago Segarra, "Estimating fair graphs from graph-stationary data", *arXiv preprint arXiv:2510.07536*, 2025.

[P2] **Madeline Navarro**, Lisa R. O'Bryan, and Santiago Segarra, "Learning time-varying turn-taking behavior in group conversations", *arXiv preprint arXiv:2510.18649*, 2025.

[P3] Ali Azizpour, **Madeline Navarro**, and Santiago Segarra, "Adaptive node feature selection for graph neural networks", *arXiv preprint arXiv:2510.03096*, 2025.

[P4] Rostyslav Olshevskyi, **Madeline Navarro**, and Santiago Segarra, "Adaptive graph coarsening for efficient GNN training", *arXiv preprint arXiv:2509.25706*, 2025.

[P5] Victor M. Tenorio, **Madeline Navarro**, Samuel Rey, Santiago Segarra, and Antonio G. Marques, "Adapting to heterophilic graph data with structure-guided neighbor discovery", *arXiv preprint arXiv:2506.08871*, 2025.

[P6] Camille Little, **Madeline Navarro**, Santiago Segarra, and Genevera I. Allen, "Fair feature importance scores via feature occlusion and permutation", *ICLR 2025 Workshop Advances in Financial AI*, 2025.

[P7] **Madeline Navarro**, Genevera I. Allen, and Michael Weylandt, "Network clustering for latent state and changepoint detection", *arXiv preprint arXiv:2111.01273*, 2021.

Invited Talks

Reducing GNN Complexity via Adaptive Learning 6 October 2025
Universidad Rey Juan Carlos

Estimating Fair Graphs with Unbiased Connections
University of Pennsylvania 22 April 2025
Massachusetts Institute of Technology 28 March 2025
Carnegie Mellon University 3 March 2025
Jr. MINDS Seminar at Johns Hopkins University 24 February 2025

Fair GLASSO: Estimating Fair Graphical Models with Unbiased Statistical Behavior
Prof. Genevera Allen Group Meeting at Columbia University 20 November 2024
SIAM Conference on Mathematics of Data Science (MDS24) 24 October 2024

MAD Overview: Mixup for Augmenting Data in Myriad Scenarios
Delft University of Technology 11 July 2024
Universidad Rey Juan Carlos 15 January 2024

Fair Network Topology Inference with Unbiased Connections 21 February 2025
University of Virginia

Mitigating Subpopulation Bias for Fair Network Topology Inference 24 June 2024
Graph Signal Processing Workshop 2024

Joint Network Topology Inference 17 January 2024
Universidad Rey Juan Carlos

GraphMAD: Graph Mixup for Data Augmentation using Data-Driven Convex Clustering 13 June 2023
Graph Signal Processing Workshop 2023

Awards

- ICASSP 2025 Best Paper Award for "Bayesian Filtering on Graphs"

Service

- Reviewer for machine learning venues: Journal of Machine Learning Research (JMLR), Neural Processing Letters, Neural Information Processing Systems (NeurIPS)
- Reviewer for journals: IEEE Transactions on Signal Processing (TSP), IEEE Signal Processing Letters (SPL), IEEE Transactions on Signal and Information Processing over Networks (TSIPN), Signal Processing (SIGPRO), IEEE Open Journal of Signal Processing (OJSP)
- Reviewer for conferences: IEEE International Symposium in Information Theory (ISIT), IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)

Teaching Experience

Department of Electrical and Computer Engineering, Rice University Houston, TX
Teaching Assistant

- ELEC 573: Network Science and Analytics, *Graduate Level* Fall 2024
- ELEC 242: Signals, Systems, & Transforms, *Undergraduate Level* Spring 2024
- ELEC 478/578: Introduction to Machine Learning, *Undergraduate/Graduate Level* Fall 2023
- ELEC 242: Signals, Systems, & Transforms, *Undergraduate Level* Spring 2023
- ELEC 573: Network Science and Analytics, *Graduate Level* Fall 2022
- ELEC 242: Signals, Systems, & Transforms, *Undergraduate Level* Spring 2022
- ELEC 573: Network Science and Analytics, *Graduate Level* Fall 2021

Tidewater Community College Virginia Beach, VA
Math Tutor August 2016 – August 2019

Professional Memberships

IEEE Membership Student Member
IEEE Signal Processing Society (SPS) Membership Student Member
IEEE Young Professionals Student Member

Industry Experience

NAVSEA Virginia Beach, VA
Student Trainee June 2019 – September 2019

- Assisted RF engineering team with implementing transmitters and receivers for Naval training purposes
- Helped RF engineers develop decoding equipment to replace obsolete systems

INIT Chesapeake, VA
APC Intern October 2018 – April 2019

- Developed SQL queries for processing automatic passenger counting data from train station servers
- Inspected and programmed sensory hardware components before implementation
- Created dashboard visualizations of query data via Elasticsearch, Logstash, and Kibana
- Consulted on purchasing lidar equipment for station detection during train operation