Stanford, CA
+1 (310)-486-4714
fareces@stanford.edu

Felipe Areces

linkedin.com/in/felipeareces

Education

Stanford University, Stanford, CA **Expected 06/27**
PhD degree in Electrical Engineering

University of California, Los Angeles (UCLA) , Los Angeles, CA **06/22**
B.S. in Electrical Engineering with Summa Cum Laude Latin Honors

Areas of Expertise

- Machine Learning.
- Statistics.
- Optimization.
- Deep learning.
- Information theory.
- Calibration & conformal prediction.

Research Experience

Graduate Research Assistant **09/22 — Present**
Stanford University with advisor John Duchi Stanford, CA

- Designed online conformal inference algorithms for stochastic modeling with improved statistical consistency properties.
- Obtained tight upper bounds on the convergence rate of the proposed online procedures leveraging techniques from monotone operator theory and convex optimization.
- Proved matching upper and lower bounds for estimation of weak calibration error under VC dimension constraints, and presented results at COLT 2024.
- Developed local minimax bounds using information-theoretic tools to assess the statistical optimality of algorithms designed to provide weighted conformal coverage.

Undergraduate Research Assistant **01/21 — 06/22**
Communication Systems Laboratory (CSL) at University of California, Los Angeles (UCLA) Los Angeles, CA

- Designed a dynamic programming algorithm for computation of general converses for arbitrary discrete memoryless channels, and presented results at ISIT 2022.
- Programmed simulation software for error rate estimation of maximum accumulated information density decoding using both fixed and variable length blocklength with stop feedback.
- Developed MATLAB trellis code interfaces for custom code structures using state space representations.

Research Assistant **09/20 — 06/22**
Logic, Interaction and Intelligent Systems (LIIS) group at Universidad Nacional de Córdoba (UNC)

- Designed a system for classification and ranking of relevant actions in the grounding stage of automated planning tasks using fastText embeddings in Python.
- Integrated learning models into standard planning solvers.
- Engineered software for effective data visualization of ML model performance using custom evaluation metrics.

Skills

Programming	Python, MATLAB
Machine Learning	PyTorch, Keras, Scikit-learn, Pandas, NumPy
Languages	Spanish (Native), English (Bilingual)

Publications

1. **Areces**, **F.**, Cheng, C., Duchi, J. & Rohith, K. *Two fundamental limits for uncertainty quantification in predictive inference* in *Proceedings of Thirty Seventh Conference on Learning Theory* **247** (PMLR, 2024), 186–218.
2. Wang, L., Song, D., **Areces**, **F.**, Wiegart, T. & Wesel, R. D. Probabilistic Shaping for Trellis-Coded Modulation With CRC-Aided List Decoding. *IEEE Transactions on Communications* **71,** 1271–1283 (2023).
3. **Areces**, **F.**, Song, D., Wesel, R. & Wagner, A. B. *Efficiently Computable Converses for Finite-Blocklength Communication* in *2022 IEEE International Symposium on Information Theory (ISIT)* (2022), 2094–2099.
4. Song, D., **Areces**, **F.**, Wang, L. & Wesel, R. *Shaped TCM with List Decoding that Exceeds the RCU Bound by Optimizing a Union Bound on FER* in *2022 IEEE Global Communications Conference (GLOBECOM)* (2022).
5. Wang, L., Song, D., **Areces**, **F.** & Wesel, R. D. *Achieving Short-Blocklength RCU Bound via CRC List Decoding of TCM with Probabilistic Shaping* in *ICC 2022 - IEEE International Conference on Communications* (2022), 2906–2911.

Awards & Honors

Stanford University

- Stanford Graduate Fellowship (SGF) [Mr. and Mrs. Chun Chiu Fellow] (2022).

University of California, Los Angeles (UCLA)

- Stanton & Stockwell Architects Scholarship Fund at UCLA (2020).
- The Boeing Scholarship in Electrical Engineering at UCLA (2019).
- Dean’s honors list at UCLA (Winter 2019 through Winter 2022).