Cristóbal **Heredia**

PhD Student · Industrial Engineering

University of South Florida, Tampa, FL

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Summary

Ph.D. student in Industrial Engineering working on the intersection of optimization and machine learning, with current research on decision trees. Background spans peer-reviewed publications, two R packages on CRAN, and industry experience in causal inference methods at Penske Truck Leasing Co.

Education

Ph.D. in Industrial Engineering — *Tampa, FL, USA*

University of South Florida (USF) — *Aug. 2024 – May 2028 (expected)*

M.Sc. in Data Science — *Santiago, Chile*

Adolfo Ibáñez University (UAI) — *Mar. 2022 – Dec. 2023*

B.Sc. in Engineering Sciences (Industrial and Computer Engineering) — *Santiago, Chile*

Adolfo Ibáñez University (UAI) — *Mar. 2018 – Dec. 2022*

Experience

Graduate Research Assistant — *Tampa, FL, USA*

University of South Florida — *Dec. 2024 – May 2025, Aug. 2025 – Present*

- Advisor: Dr. Kaixun Hua, Department of Industrial & Management Systems Engineering.
- Designing and implementing optimization-based methods for optimal regression trees, with a focus on scalability and computational performance on large datasets.

Graduate Intern – Data Science — *Reading, PA, USA*

Penske Truck Leasing Co. — *May – Aug. 2025*

- Research-focused internship in the Digital Experience-Ops team, developing causal inference models in Python to support business decision-making (project details confidential).

Research Assistant — *Viña del Mar, Chile*

Adolfo Ibáñez University (UAI) — *2022 – 2024*

- **A method for studying shared meaning in cultural groups** *(Funded by James S. McDonnell Foundation, 2022–2024)*
  Built and maintained an R package for statistical estimation, implementing distribution analysis, clustering, and probabilistic simulation of word-similarity among groups of individuals.
- **Statistical relational models for OD-matrix estimation and behavioral mobility patterns** *(Funded by FONDECYT #11230076, 2023)*
  Co-developed the ODMeans model and applied it to origin-destination vehicle data from Santiago, Chile, to characterize urban mobility patterns at scale.
- **Kernelised linear tests: combining statistics and ML to boost test power** *(Funded by FONDECYT #11221143, 2022)*
  Implemented two novel kernel-based hypothesis tests using algebraic methods, contributing at the intersection of classical statistical inference and modern machine learning.

Part-time Lecturer — *Viña del Mar, Chile*

Adolfo Ibáñez University (UAI) — *Aug. – Dec. 2023*

- **Programming** *(Student Evaluation of Teaching: 7.0/7.0)*
  Fundamentals and application of programming. Conducted interactive classes that prioritized building a solid foundation in programming concepts, ensuring students comprehended key principles before engaging in hands-on coding.
- **Data Science Fundamentals** *(Student Evaluation of Teaching: 6.9/7.0)*
  Data analysis, visualization, and machine learning techniques. Facilitated an understanding of fundamental data science concepts during class, including data preprocessing, feature engineering, and model selection.

Skills

- **Programming** Python (proficient); C++ & CUDA (learning, GPU-focused)
- **Solvers** Gurobi, CPLEX (modeling and implementation)
- **Tools** Git, LaTeX
- **Languages** Spanish (native); English (advanced, TOEFL iBT 101/120)
- **Other** Classical Piano — Sergei Prokofiev Conservatory (2015–2024)

Publications

ODMeans: an R package for global and local cluster detection for Origin-Destination GPS data
C. Heredia, S. Moreno, W. Yushimito
SoftwareX (WOS-Q2), vol. 26, 101732, 2024
DOI: 10.1016/j.softx.2024.101732

Characterization of Mobility Patterns with a Hierarchical Clustering of Origin-Destination GPS Taxi Data
C. Heredia, S. Moreno, W. Yushimito
IEEE Transactions on Intelligent Transportation Systems (WOS-Q1), vol. 23, no. 8, pp. 12700–12710, 2022
DOI: 10.1109/TITS.2021.3116963

R Packages

WordListsAnalytics: Multiple Data Analysis Tools for Property Listing Tasks
Author and maintainer, 2024
Tools for property listing tasks: distribution analysis, clustering, and probabilistic simulation of word similarity.
CRAN · Shiny App

ODMeans: k-Means for Origin-Destination Data
Author and maintainer, 2022
Adaptive k-means variant for global and local cluster detection in Origin-Destination GPS data.
CRAN

Honors & Awards

National Master Scholarship *Chile*
Awarded by the National Council for Research and Development (ANID) *2023*
- Scholarship of the Chilean government for Master Studies with an acceptance rate of 11.5%. Obtained a score of 4.965/5.000 based on grades, research, and employment history.

Amazon SCOT / INFORMS Scholarship *Indianapolis, USA*
Awarded by Amazon *2022*
- International scholarship given to undergraduate and graduate students to present/attend the INFORMS Annual Meeting.

Undergraduate Operations Research Prize (Finalist) *Indianapolis, USA*
Awarded by INFORMS *2022*
- Annual competition honoring outstanding undergraduate students for significant contributions in operations research.

Academic Honor Scholarship *Chile*
Adolfo Ibáñez University *2018 – 2022*
- Scholarship for students with grades over 5.95 on a 1.00–7.00 scale, approximately top 5.6% of students.

References

Sebastián Moreno, PhD
Associate Professor, UAI
Available upon request

Kaixun Hua, PhD
Assistant Professor, USF
Available upon request