CARLOS MISAEL MADRID PADILLA

CONTACT INFORMATION

Jolley Hall, Office 534
Washington University in St. Louis, MO 63130 USA
Phone: (574) 514-4178
carlosmisael@wustl.edu

EMPLOYMENT

Assistant Professor — July 2024-Present
Department of Statistics
Washington University in St. Louis

EDUCATION

Ph.D., Mathematics, The University of Notre Dame — Aug 2019-May 2024
Advisor: Daren Wang
GPA: 3.9/4

M.S., Mathematics, The University of Notre Dame — Aug 2019-Jun 2021
Advisor: Alex Himonas
GPA: 3.9/4

Bachelor in Mathematics, The Universidad de Guanajuato — Aug 2014-Jun 2019
Advisor: Victor Perez Abreu and Mario Diaz Torres
GPA: 9.37/10

RESEARCH INTERESTS

Network analysis, change-point detection in time series, functional data analysis, graphical models, nonparametric statistics, and bayesian statistics.

PUBLICATIONS

[1] "The Neumann and Robin problems for the Korteweg-de Vries equation on the half-line". Alexandrou Himonas, **Carlos-Misael Madrid-Padilla**, and Fangchi Yan (alphabetical order). ***Journal of Mathematical Physics, 62, 111503***. 2021. (selected as Editors' Pick)

[2] "Change-point detection for sparse and dense functional data in general dimensions." **Carlos-Misael Madrid-Padilla**, Daren Wang, Zifeng Zhao, and Yi Yu. ***NeurIPS***. 2022.

[3] "Change point detection and inference in multivariable nonparametric models under mixing conditions" **Carlos-Misael Madrid-Padilla**, Haotian Xu, Daren Wang, Oscar Hernan Madrid Padilla, and Yi Yu. ***NeurIPS***. 2023.

[4] "Risk Bounds For Distributional Regression" **Carlos-Misael Madrid-Padilla**, Oscar Hernan Madrid Padilla, and Sabyasachi Chatterjee. ***To appear in NeurIPS,*** 2025. ***arXiv:2505.09075***.

PREPRINTS

[1] "Multivariate Poisson intensity estimation via low-rank tensor decomposition." Haotian Xu, **Carlos-Misael Madrid-Padilla**, Daren Wang, and Oscar Hernan Madrid Padilla. ***Under Review***, Journal of the American Statistical Association, 2025. ***arXiv:2504.15879***.

[2] "Dense ReLU Neural Networks for Temporal-spatial Model" **Carlos-Misael Madrid-Padilla**, Zhi Zhang, Xiaokai Luo, Daren Wang, and Oscar Hernan Madrid Padilla. ***Under Review***, IEEE Transactions on Information Theory, 2025. ***arXiv:2411.09961***.

[3] "Confidence Interval Construction and Conditional Variance Estimation with Dense ReLU Networks" **Carlos-Misael Madrid-Padilla**, Oscar Hernan Madrid Padilla, Kei Yik Lun (Allen), Zhi Zhang, and Yanzhen Chen. ***Under Review***, IEEE Transactions on Information Theory, 2025. ***arXiv:2412.20355***.

[4] "Robust and Scalable Variational Bayes" **Carlos-Misael Madrid-Padilla**, Shitao Fan, and Lizhen Lin. ***Under Review (second round)***, Bayesian Analysis, 2025. ***arXiv:2504.12528***.

[5] "Amortized Structured Variational Inference" Shitao Fan, **Carlos-Misael Madrid-Padilla**, Yun Yang, and Lizhen Lin. ***Under Review***, AISTATS, 2025.

[6] "Bias-variance tradeoff in tensor estimation" Shivam Kumar, Haotian Xu, **Carlos-Misael Madrid-Padilla**, Yuehaw Khoo, Oscar Hernan Madrid Padilla, and Daren Wang. ***Under Review***, ICLR, 2025. ***arXiv:2509.17382***

[7] "Online Change Point Detection for Multivariate Poisson Point Processes" Xiaokai Luo, **Carlos-Misael Madrid-Padilla**, Haotian Xu, and Oscar Hernan Madrid Padilla ***Under Review***, ICLR, 2025.

[8] "A Unified Framework for Online Change Point Detection in Nonparametric Regression" **Carlos-Misael Madrid-Padilla**. ***Under Review***, ICLR, 2025.

[9] "Temporal-spatial model via Trend Filtering" **Carlos-Misael Madrid-Padilla**, Oscar Hernan Madrid Padilla, and Daren Wang. ***Under Review (second round)***, Journal of Machine Learning Research, 2024. ***arxiv:2308.16172***.

[10] "A causal fused lasso for interpretable heterogeneous treatment effects estimation" Oscar Hernan Madrid Padilla, Yanzhen Chen, **Carlos-Misael Madrid-Padilla**, and Gabriel Ruiz. ***Under Review (last round)***, Journal of Machine Learning Research, 2025. ***arXiv:2110.00901***. (Equal contribution from the second and third authors)

WORKING PAPER

[1] "ELBO Empirical Bayes" **Carlos-Misael Madrid-Padilla**, Shitao Fan, Yun Yang, and Lizhen Lin. ***In Progress***. 2025+.

[2] "Risk Bounds for Quantile Temporal-Spatial Analysis" Zhi Zhang, Kyle Ritcher, **Carlos-Misael Madrid-Padilla**, and Oscar Hernan Madrid Padilla. ***In Progress***. 2025+.

[3] "Multilayer Change Point Detection for Brain data" Fan Wang, Yik Lun Kei, **Carlos-Misael Madrid-Padilla**, Xin Ma, and Oscar Hernan Madrid Padilla. ***In Progress***. 2025+.

[4] "Regularized Estimation under High-Dimensional Covariates and Treatment Effects" **Carlos-Misael Madrid-Padilla**. ***In Progress***. 2025+.

[5] "Inferring latent structure in ecological communities via Neural Networks" **Carlos-Misael Madrid-Padilla**, and David Dunson. ***In Progress***. 2025+.

[6] "Kernel-based offline Change-point Detection for Conditional distribution" **Carlos-Misael Madrid-Padilla**. ***In Progress***. 2025+.

[7] "Distributional regression: change point detection and neural networks" Shourjo Chakraborty, and **Carlos-Misael Madrid-Padilla**. ***In Progress***. 2025+.

[8] "Change Point Detection in the Temporal Dynamics of Ocean Plankton Species" **Carlos-Misael Madrid-Padilla** and Sangwon Hyun. ***In Progress***. 2025+.

[9] "A Unified Framework for offline Change Point Detection in Distributional Regression" Weichen Kang and **Carlos-Misael Madrid-Padilla**. ***In Progress***. 2025+.

[10] "Heterogenous Distributional Treatment Effect Estimation with Noncrossing ReLU Neural Networks" Davis Berlind, Junpeng Ren, **Carlos-Misael Madrid-Padilla**. 2025+.

[11] "Transfer Learning in Nonparametric Regression with Deep ReLU Networks" Junpeng Ren, Oscar-Hernan Madrid-Padilla, **Carlos-Misael Madrid-Padilla**. 2025+.

TEACHING EXPERIENCE

Instructor, at Washington University in St. Louis:

- Statistical Computation (SDS 475/5210)
  Fall 2024
  My Instructor Rating: 5 out of 5 (median)
  Response Rate = 88.24%
  Class size: 34.

Instructor, at The University of Notre Dame:

- Introduction to Linear Algebra and Differential Equations (Math 20580)
  Summer 2023
  My Instructor Rating: 4.8 out of 5 (median)
  Response Rate = 71.44%
  Class size: 14.

- Introduction to Linear Algebra and Differential Equations (Math 20580)
  Summer 2022
  My Instructor Rating: 4.7 out of 5 (median)
  Response Rate = 76.9%
  Class size: 13.

- Elements of Calculus I (Math 10250)
  Fall 2021
  My Instructor Rating: 4.2 out of 5 (median)
  Response Rate = 93.9%
  Class size: 66.

- Introduction to Linear Algebra and Differential Equations (Math 20580)
  Summer 2021
  My Instructor Rating: 5 out of 5 (median)

Response Rate = 71.4%
Class size: 14.

Teaching Assistant, at The University of Notre Dame, for the following courses:

Glynn Math Seminar II, Principles of Calculus, Introduction to Linear Algebra and Differential Equations, Elements of Calculus I.

Teaching Assistant, at The Universidad de Guanjuato, for the following courses:

Linear Algebra I, Projective Geometry and Measure Theory I.

AWARDS

- NeurIPS 2025 Top Reviewer Award
- NSF Travel Award, International Indian Statistical Association (IISA) Annual Conference, Kochi, India — 2024
- Eli J. and Helen Shaheen Graduate School Award, The University of Notre Dame.
  May 2024.
- Graduate School Fellowship, The University of Notre Dame.
  August 2021 - May 2022.
- Graduate School Fellowship, The University of Notre Dame.
  Summer 2021
- Research assistant scholarship, CIMAT.
  July 2018 - July 2019.
- Excellence Scholarship, Mathematical Research Center (CIMAT, Mexico).
  August 2014 - June 2019.
- Honorable mention, for best undergraduate thesis in mathematics at Mexican Mathematical Society, 2020.
- Honorable mention, Ibero–American Mathematical Olympiad.
  2013.
- Gold Medal, Honduran Mathematical Olympiad.
  2010-2013.

Coding skills

Programming languages and mathematical packages: Python, R, C++, SQL and MATLAB.

TALKS

- Confidence Interval Construction and Conditional Variance Estimation with Dense ReLU Networks. Seminar at Department of Statistics, International Indian Statistical Association Conference, Nebraska, USA. 2025.
- Confidence Interval Construction and Conditional Variance Estimation with Dense ReLU Networks. Neyman Seminar at Department of Statistics, University of California, Berkeley. March, 2025.
- Confidence Interval Construction and Conditional Variance Estimation with Dense ReLU Networks. Seminar at Department of Statistics, University of California, Santa Cruz. May, 2025.
- Change point detection for nonparametric data. Seminar at Department of Statistics, International Indian Statistical Association Conference, Cochin, India. 2024.

- Temporal-spatial Model via Trend Filtering. Seminar at Department of Statistics, The 7th International Conference on Econometrics and Statistics, Beijing, China. 2024.
- Temporal-spatial Model via Trend Filtering. Seminar at Department of Statistics, University California, Riverside. 2024.
- Change point detection for nonparametric data. Seminar Series at Department of Statistics, The Ohio State University. 2024.
- Temporal-spatial Model via Trend Filtering. Statistics and Data Science Seminar at Department of Statistics and Data Science, Washington University in St. Louis. 2024.
- Analysis of the dynamics of learning and generalization of a certain neural network. Financial Mathematics Seminar at Department of Mathematics, University of Notre Dame. 2019.
- Adversary generative neural network. Deep Learning Seminar at the Research Center in Mathematics (CIMAT A.C.). 2019.
- Analysis of the dynamics of learning and generalization of a certain neural network. Deep learning Seminar at the Research Center in Mathematics (CIMAT A.C.). 2018.
- Waiting times in banks. IX Summer School of Probability and Statistics at the Research Center in Mathematics (CIMAT A.C.). 2016.

Editorial service

Reviewer for:

- Stat
- NeurIPS
- ICLR
- ICML
- Bernoulli
- AAAI
- JASA
- JRSSB
- Methodology and Computing in Applied Probability
- Computational Statistics and Data Analysis
- AISTATS

Professional service

- Session chair at Econometrics and Statistics conference (EcoSta), August 2025, Tokyo, Japan.

Advising

- Shourjo Chakraborty, Statistics PhD, WashU, 2024–present.
- Weichen Kang, Statistics & Data Science Master's, WashU, 2025–present.

Thesis Committees

Serving/Served on the following Ph.D. thesis committees:

- Jincheng Pang, Statistics PhD, WashU, 2024.

Serving/Served on the following Master's thesis committees:

- Ran Hu, Statistics & Data Science Master's, WashU, 2025–present.
- Yutian Han, Statistics & Data Science Master's, WashU, 2025–present.
- Zhaoxuan Wang, Statistics & Data Science Master's, WashU, 2025–present.

Service and outreach

University Tutoring Center at the University of Guanajuato, Mexico. Coordination of a group of students that gave their mandatory social university service as tutors at math to elementary, middle, and high school students. 2014 - 2019.

REFERENCES

Professor Lizhen Lin
University of Maryland
lizhen01@umd.edu

Professor Daren Wang
University of Notre Dame
dwang24@nd.edu

Professor Yi Yu
University of Warwick
yi.Yu.2@warwick.ac.uk

Professor of the Practice Brian Mulholland
University of Notre Dame
bmulholland@nd.edu