

CARLOS MISAEL MADRID PADILLA

CONTACT INFORMATION

255 Hurley Bldg, Office B22
Notre Dame, IN 46556 USA
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EDUCATION

Ph.D., Mathematics, The University of Notre Dame Aug 2019-Present
Advisor: Daren Wang

MS, Mathematics, The University of Notre Dame Aug 2019-Jun 2021
Advisor: Alex Himonas

Bachelor in Mathematics, Universidad de Guanajuato Aug 2014-Jun 2019
Advisor: Victor Perez Abreu, Mario Diaz Torres

RESEARCH INTERESTS

Network Analysis, Change-Point Detection and Time Series, Functional Data Analysis, graphical models, nonparametric statistics, and Bayesian statistics.

PUBLICATIONS AND PREPRINTS

“Temporal-spatial model via Trend Filtering” **Carlos-Misael Madrid-Padilla**, Oscar Hernan Madrid Padilla, Daren Wang. *Submitted to Journal of the Royal Statistical Society: Series B*. 2023. <https://aps.arxiv.org/abs/2308.16172>.

“Change point detection and inference in multivariable nonparametric models under mixing conditions” **Carlos-Misael Madrid-Padilla**, Haotian Xu, Daren Wang, Oscar Hernan Madrid Padilla, Yi Yu. *NeurlPs*. 2023.

“Change-point detection for sparse and dense functional data in general dimensions.” **Carlos-Misael Madrid-Padilla**, Daren Wang, Zifeng Zhao, Yi Yu. *NeurlPs*. 2022.

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

“Distributional regression via Neural Networks” **Carlos-Misael Madrid-Padilla** and Oscar Hernan Madrid Padilla. *In Progress*. 2023+.

“Distributional regression: Trend Filtering and beyond” **Carlos-Misael Madrid-Padilla**, Oscar Hernan Madrid Padilla and Sabyasachi Chatterjee. *In Progress*. 2023+.

“Dense neural networks for temporal spatial model on Manifolds” Ke Xu, **Carlos-Misael Madrid-Padilla**, Daren Wang and Oscar Hernan Madrid Padilla. *In Progress*. 2023+.

“Robust and Scalable Variational Bayes” **Carlos-Misael Madrid-Padilla**, Shitao Fan and Lizhen Lin. *In Progress*. 2023+.

EXPERIENCE *Applied Scientist* Spring 2024
Amazon Internship
I will be intern at Amazon in Spring 2024

Research Assistant Jul 2018-Jul 2019
Center for Research in Mathematics (CIMAT A.C.)
Advisor: Victor Perez Abreu
Project for Senior Thesis: “Analysis Based on Random Matrices and Free Probability of the Dynamics of Generalization of Neural Networks”

Research Experience for Undergraduates Jul 2018-Aug 2018
Center for Research in Mathematics (CIMAT A.C.)
Advisor: Victor Perez Abreu
Directed readings on Artificial Neural Networks and their relationship with random matrices, and programming computer simulations.

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

TEACHING *Instructor*, at 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 = 90%
Class size: 15.
- 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 Guanajuato, for:

Linear Algebra I.
Projective Geometry.

AWARDS

- 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.

TALKS

- Analysis of the dynamics of learning and generalization of a certain neural
network. Financial Mathematics Seminar at Department of Mathematics, Uni-
versity 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 net-
work. 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.
- NeurlPs
- ICLR

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.