Raul Garcia

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Education

Rice University.
- PhD Computational Applied Mathematics and Operations Research (Exp 2026)
  - Advisor: Andrew J. Schaefer
- MA Computational and Applied Mathematics 2023
  - Advisor: Illya V. Hicks

University of California, Davis.
- BS Applied Mathematics 2018
  - Cum laude

Research Interests

Optimization under uncertainty, cancer detection and treatment, mixed-integer programming, partially observable Markov decision processes, bilevel optimization

Published Papers

Optimal Timing of Organs-at-Risk-Sparing Adaptive Radiation Therapy for Head-and-Neck Cancer under Re-planning Resource Constraints.
F. Nosrat et al., *Physics and Imaging in Radiation Oncology (phiRO)*, 2025, 33:100715, 10.1016/j.phro.2025.100715

Strategy Investments in Zero-Sum Games.
R. Garcia, S. Hosseinian, M. M. Pai, A. J. Schaefer, *Optimization Letters*, 2024, 18(8):1771–1789, 10.1007/s11590-024-02130-z

Markov Models for Clinical Decision Making in Radiation Oncology: A Systematic Review.
L. B. McCullum et al., *Journal of Medical Imaging and Radiation Oncology (JMIRO)*, 2024, 68(5):610-623, 10.1111/1754-9485.13656

Combinatorial Disjunctive Constraints for Obstacle Avoidance in Path Planning.
R. Garcia, I. V. Hicks, J. Huchette, *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Detroit, MI, USA, 2023, 267-273, 10.1109/IROS55552.2023.10342117

Deep Object Detection for Waterbird Monitoring using Aerial Imagery.
K. Kabra et al., *2022 21st IEEE International Conference on Machine Learning and Applications (ICMLA)*, Nassau, Bahamas, 2022, 455-460, 10.1109/ICMLA55696.2022.00073

Submitted Papers

Variable-Interval Temporal Feathering to Optimize Organ-at-Risk Repair for Head and Neck Adaptive Radiotherapy.
A. Karagoz et al., Major Revision at *International Journal of Radiation Oncology*Biology*Physics*, medRxiv:10.1101/2024.11.07.24316948

Cost-Effectiveness of Personalized Policies for Implementing Organ-at-Risk Sparing Adaptive Radiation Therapy in Head and Neck Cancer: A Markov Decision Process Approach.
S. Hosseinian et al., Minor Revision at *Physics and Imaging in Radiation Oncology (phiRO)*, medRxiv:10.1101/2024.11.05.24316767

Working Papers

Universal Lung Cancer Screening Guidelines Under Heterogeneous Patient Responses.
R. Garcia, I. Toumazis, A. J. Schaefer

A Finite Test Set for Mixed-Integer Linear Programs.
R. Garcia, M. Guo[†], A. J. Schaefer ([†] undergraduate sophomore)

Teaching

Rice University

Department of Computational Applied Mathematics & Operations Research

Co-Instructor.
- CMOR 477/646: Optimal Cancer Surveillance (Spring 2025)

Teaching Assistant.
- CMOR 360: Introduction to Operations Research and Optimization (Fall 2023)

Grader.
- CMOR 504: Graph Theory (Spring 2024)
- CAAM 519: Computational Science I (Fall 2022)
- CAAM 378: Introduction to Operations Research and Optimization (Spring 2022)
- CAAM 335/334: Matrix Analysis/Matrix Analysis for Data Science (Fall 2021, Spring 2021, Fall 2020)

University of California, Davis

Department of Mathematics

Learning Assistant, (Undergraduate assistant to graduate teaching assistant).
- MAT 17ABC: Calculus for Bioscience Students (Spring 2017, Fall 2016, Spring 2016, resp.)

Presentations

"Strategy Investments in Zero-Sum Games".
- International Symposium on Mathematical Programming (ISMP), July 2024
- INFORMS Computing Society, Mar 2024

"Leveraging Machine Learning to Develop Collision Avoidance Systems for Manned and Unmanned Aircraft".
- CMD-IT/ACM Richard Tapia Celebration of Diversity in Computing Conference, Sep 2022

"A Combinatorial Disjunctive Constraint Approach to Optimal Path Planning".

- IEEE/RSJ IROS 2023, Oct 2023
- INFORMS Annual Meeting, Oct 2022
- MIP Workshop (poster), May 2022
- Kavraki Lab, Apr 2022

"Battery Replacement Prediction Based on Survival Analysis".

- Rice D2K Lab Showcase (group poster), Nov 2021

"Deep Learning for Precision Waterbird Monitoring".

- Rice D2K Lab Showcase (group poster), Apr 2021

Awards and Fellowships

2022–2025 **Diversity Supplement: SCH: Personalized Rescheduling of Adaptive Radiation Therapy for Head and Neck Cancer**.
NIH National Cancer Institute, $227,383

2022–2023 **GEM Fellowship**, MIT Lincoln Laboratory.

2022 **NSF AGEP STRIDES Scholar**.

2022 **Research Mentoring Fellowship**, *Data to Knowledge Lab*, Rice University.
Mentored team received 1st place at Data to Knowledge Lab Fall 2022 Showcase

2020–2024 **Computational Science and Engineering Recruiting Fellowship**, *Ken Kennedy Institute*, Rice University.

Experience

2023-Present **Visiting Graduate Student Researcher**, *Dept. of Radiation Oncology*, Univ. of Texas MD Anderson Cancer Center, Houston TX.
Clifton D. Fuller Laboratory.

Fall 2022 **Research Mentor**, *Data to Knowledge Lab*, Rice University, Houston TX.
Mentored a team of students on a capstone data science project focusing on forecasting yearly battery replacements for medical devices (sponsored by LivaNova). Team received 1st place in showcase.

Summer 2022 **Research Intern**, *MIT Lincoln Laboratory*, Lexington MA.
Group 42 - Surveillance Systems
Contributed algorithm analysis tool for development of the Airborne Collision Avoidance System X (ACAS X) and variants.

2019–2020 **Quality Product Auditor**, *Pacific Southwest Container*, Modesto CA.
Performed daily testing and data collection of products. Assisted in development of experiments for analysis of product quality. Conducted internal process audits.

Service, Outreach & Activities

2025 **INFORMS Ad hoc Committee on Opportunity and Achievement**.
Sole student member of ad hoc committee created to counsel INFORMS strategic and tactical planning, following the sunsetting of the INFORMS DEI Committee in February 2025.

2024–2025 **STEM Muse Mentoring Program Graduate Student Liaison**, Rice University.
Work with the STEM Muse Mentoring Program directors to navigate Rice's professional development programs, communication channels, student organizations, and resources, in its inaugural year at Rice.

2020–Present	**Society for Industrial and Applied Mathematics (SIAM) Student Chapter**, Rice University.

- Treasurer, 2022-2023
- Doctoral Program Recruitment Representative, 2022-2023
- Graduate Seminar Chair, 2021-2022
- Grill Master, 2020-2021

2022–Present	**Latin American Graduate Student Association (LAGSA)**, Rice University.

- Treasurer, 2023-2024

2020–Present	**Latinx Grads**, Rice University.
Summer 2021	**Instructor**, *Tapia STEM Camp*, Rice University.

Guided high school students from underrepresented backgrounds on projects focusing on computational thinking and equity.

2020–Present	**Graduate Student Association Soccer Club**, Rice University.

- Treasurer, 2023-2024, 2022-2023

2015–2018	**Chicano and Latino Engineers and Scientists Society (CALESS)**, UC Davis.

Professional Societies

- Institute for Operations Research and the Management Sciences (INFORMS)
- Society for Industrial and Applied Mathematics (SIAM)

Relevant Coursework

Linear and Integer Programming; Stochastic Optimization; Online Optimization and Decision Making Under Uncertainty; Stochastic Simulation; Applied Machine Learning Projects; Intro to Machine Learning; Iterative Methods for Systems of Equations and Unconstrained Optimization; Advanced Numerical Analysis; Computational Science; Object-Oriented Programming

Programming Languages and Software

Programming & Software	Proficient: Julia
	Experience with: Python, C++, C, MATLAB, Rust

Languages

English, Spanish