Raul Garcia

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raulgarcia66

Education

2020–2026 **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

2014–2018 **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, decision-dependent uncertainty, bilevel optimization

Published Papers

- S. Hosseinian, D. Suarez-Aguirre, C. Dede, **R. Garcia**, et al. "Cost-Effectiveness of Personalized Policies for Implementing Organ-at-Risk Sparing Adaptive Radiation Therapy in Head and Neck Cancer: A Markov Decision Process Approach," *Physics and Imaging in Radiation Oncology (phiRO)*, 2025, 34:100772 10.1016/j.phro.2025.100772
- F. Nosrat, C. Dede, L.B. McCullum, **R. Garcia**, et al. "Optimal Timing of Organs-at-Risk-Sparing Adaptive Radiation Therapy for Head-and-Neck Cancer under Re-planning Resource Constraints," *Physics and Imaging in Radiation Oncology (phiRO)*, 2025, 33:100715, 10.1016/j.phro.2025.100715
- **R. Garcia**, S. Hosseinian, M.M. Pai, A.J. Schaefer. "Strategy Investments in Zero-Sum Games," *Optimization Letters*, 2024, 18(8):1771–1789, 10.1007/s11590-024-02130-z
- L.B. McCullum, A. Karagoz, C. Dede, **R. Garcia**, et al. "Markov Models for Clinical Decision Making in Radiation Oncology: A Systematic Review," *Journal of Medical Imaging and Radiation Oncology (JMIRO)*, 2024, 68(5):610-623, 10.1111/1754-9485.13656
- **R. Garcia**, I.V. Hicks, J. Huchette. "Combinatorial Disjunctive Constraints for Obstacle Avoidance in Path Planning," *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Detroit, MI, USA, 2023, 267-273, 10.1109/IROS55552.2023.10342117
- K. Kabra, A. Xiong, W. Li, M. Luo, W. Lu, T. Yu, J. Yu, D. Singh, **R. Garcia**, et al. "Deep Object Detection for Waterbird Monitoring using Aerial Imagery," *2022 21st IEEE International Conference on Machine Learning and Applications (ICMLA)*, Nassau, Bahamas, 2022, 455-460, 10.1109/ICMLA55696.2022.00073

Submitted Papers

- A. Karagoz, M. Hemmati, F. Nosrat, P. Mavroidis, C. Dede, L.B. MuCullum, **R. Garcia**, et al. "Variable-Interval Temporal Feathering to Optimize Organ-at-Risk Repair for Head and Neck Adaptive Radiotherapy," Submitted to *Physics and Imaging in Radiation Oncology (phiRO)*, medRxiv:10.1101/2024.11.07.24316948

Working Papers

† denotes mentored undergraduate students

- **R. Garcia**, A.J. Schaefer, I. Toumazis. "Universal Lung Cancer Screening Guidelines Under Heterogeneous Patient Responses."
- **R. Garcia**, M. Guo†, A.J. Schaefer. "A Test Set for Mixed-Integer Programs."
- L.B. McCullum, **R. Garcia**, A. Gadepalli†, D. Abraham†, P. Stern†, et al. "QALY-Maximizing Personalized Surveillance Imaging for Head-and-Neck Cancer Patients Treated with Definitive Radiotherapy."

- A. Misra, C. Dede, V. Shah, S. Patankar, H. Klineberg, **R. Garcia**, et al. "Threshold-Triggered Dose Adaptation in Radiotherapy: A Decision-Theoretic Analysis Balancing Tumor Control and Normal Tissue Risk."
- F. Nosrat, I. Hussain, B. Alexander, B. Manduchi, A. Misra, **R. Garcia**, et al. "Optimal Timing for Insertion and Removal of Feeding Tubes to Minimize DIGEST Scores in Head and Neck Cancer Patients Based on Weight and Oral Intake Status."

Presentations

"QALY-Maximizing Personalized Surveillance Imaging for Head-and-Neck Cancer Patients Treated with Definitive Radiotherapy".
- AI in Health Conference - Operations Research in Cancer Care Workshop, Ken Kennedy Institute at Rice University, Sep 2025

"Universal Lung Cancer Screening Guidelines Under Heterogeneous Patient Responses".
- International Conference on Stochastic Programming (ICSP), Jul 2025

"Strategy Investments in Zero-Sum Games".
- International Symposium on Mathematical Programming (ISMP), Jul 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

"Battery Replacement Prediction Based on Survival Analysis".
- Rice D2K Lab Showcase (group poster), **1st Place**, Nov 2021

"Deep Learning for Precision Waterbird Monitoring".
- Rice D2K Lab Showcase (group poster), Apr 2021

Awards and Fellowships

2025–2026 **Future Faculty Fellowship**, *School of Engineering and Computing*, Rice University.

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**, Sponsored by MIT Lincoln Laboratory.

2022 **NSF AGEP STRIDES Scholar**.

2022 **Research Mentoring Fellowship**, *Data to Knowledge Lab*, Rice University.

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

Teaching

Rice University

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)
- CMOR 520: Computational Science I (Fall 2022)
- CMOR 360: Introduction to Operations Research and Optimization (Spring 2022)
- CMOR 302: Matrix Analysis (Fall 2021, Spring 2021, Fall 2020)

University of California, Davis

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

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 team received 1st place at Data to Knowledge Lab Fall 2022 Showcase

Summer 2022 **Research Intern**, *MIT Lincoln Laboratory*, Lexington MA.
Group 42 - Surveillance Systems

2021–Present **Graduate Research Assistant**, *Dept. of Computational Applied Mathematics & Operations Research*, Rice University, Houston TX.

2019–2020 **Quality Product Auditor**, *Pacific Southwest Container*, Modesto CA.

Service, Outreach & Activities

2025 **INFORMS Ad Hoc Committee on Opportunity and Achievement**.

2022–Present **INFORMS Student Chapter**, Rice University.

2020–Present **SIAM Student Chapter**, Rice University.
- Treasurer, 2022-2023; 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.

2020–Present **Graduate Student Association Soccer Club**, Rice University.
- Treasurer, 2023-2024, 2022-2023

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

Programming Languages and Software

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

Languages

English, Spanish