Raul Garcia

Houston, TX
✉ rjgarcia@rice.edu
🏠 raulgarcia66.github.io
in raulgarcia66

Education

2020–2026 **Rice University**.
- PhD Computational Applied Mathematics and Operations Research (Expected 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, healthcare, mixed-integer programming, partially observable Markov decision processes, decision-dependent uncertainty, bilevel optimization

Published Papers

P1. 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*, 2025, 34:100772.

P2. 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*, 2025, 33:100715.

P3. **R. Garcia**, S. Hosseinian, M.M. Pai, A.J. Schaefer. "Strategy Investments in Zero-Sum Games," *Optimization Letters*, 2024, 18(8):1771–1789.

P4. 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*, 2024, 68(5):610-623.

P5. **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*, Detroit, MI, USA, 2023, 267-273.

P6. 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*, Nassau, Bahamas, 2022, 455-460.

Submitted Papers

S1. 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*.

Working Papers

† denotes mentored undergraduate students

W1. **R. Garcia**, A.J. Schaefer, I. Toumazis. "Universal Lung Cancer Screening Guidelines Under Heterogeneous Patient Responses." Target journal: *Operations Research*.

W2. **R. Garcia**, M. Guo†, A.J. Schaefer. "A Finite Test Set for Mixed-Integer Programs." Target journal: *Operations Research Letters*.

W3. 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."

W4. 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."

W5. 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

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

"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

"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 2022

"Deep Learning for Precision Waterbird Monitoring".
- Rice D2K Lab Showcase (group poster), Apr 2022

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 (de facto[†]).
- CMOR 477/646: Optimal Cancer Surveillance (Spring 2025); Working papers 3, 4, and 5 resulted from this class; [†]Could not be listed as an official instructor due to NIH Diversity Supplement policy

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

Instructor, Tapia STEM Camp (Summer 2021).
Guided high school students from historically underrepresented backgrounds on computational projects

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.)

Grader.
○ MAT 127A: Real Analysis (Spring 2018, Fall 2017)
○ MAT 119A: Ordinary Differential Equations (Winter 2018)

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 comprising 4 undergraduate and 1 graduate student. 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

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.
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 (Native), Spanish (Native)