

Raul Garcia

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. McCullum, **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. F. Nosrat, I. Hussain[†], B. Alexander[†], L. Dumin[†], 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."
- W5. 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."

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

Languages

English (Native), Spanish (Native)