

Raul Garcia

Houston, TX
✉ rjgarcia@rice.edu
📁 [raulgarcia66.github.io](https://github.com/raulgarcia66)
in [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

- **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, D. Suarez-Aguirre, C. Dede, **R. Garcia**, L.B. McCullum, M. Hemmati, A. Karagoz, A.S.R. Mohamed, S.Y. Lai, K.A. Hutcheson, A.C. Moreno, K.K. Brock, F. Nosrat, C.D. Fuller, A.J. Schaefer, *Physics and Imaging in Radiation Oncology (phiRO)*, 2025, 34:100772 10.1016/j.phro.2025.100772
- **Optimal Timing of Organs-at-Risk-Sparing Adaptive Radiation Therapy for Head-and-Neck Cancer under Re-planning Resource Constraints.**
F. Nosrat, C. Dede, L.B. McCullum, **R. Garcia**, A.S.R. Mohamed, J.G. Scott, J.E. Bates, B.A. McDonald, K.A. Wahid, M.A. Naser, R. He, A. Karagoz, A.C. Moreno, L.V. van Dijk, K.K. Brock, J. Heukelom, S. Hosseinian, M. Hemmati, A.J. Schaefer, C.D. Fuller, *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, A. Karagoz, C. Dede, **R. Garcia**, F. Nosrat, M. Hemmati, S. Hosseinian, A.J. Schaefer, C.D. Fuller, *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, A. Xiong, W. Li, M. Luo, W. Lu, T. Yu, J. Yu, D. Singh, **R. Garcia**, M. Tang, H. Arnold, A. Vallery, R. Gibbons, A. Barman, *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, M. Hemmati, F. Nosrat, P. Mavroidis, C. Dede, L.B. McCullum, **R. Garcia**, S. Hosseinian, J.G. Scott, J.E. Bates, H. Enderling, A.S.R. Mohamed, K.K. Brock, A.J. Schaefer, C.D. Fuller, Submitted to *Physics and Imaging in Radiation Oncology (phiRO)*, medRxiv:10.1101/2024.11.07.24316948

Working Papers

[†] denotes mentored undergraduate students

- **Universal Lung Cancer Screening Guidelines Under Heterogeneous Patient Responses.**
R. Garcia, A.J. Schaefer, I. Toumazis
- **A Test Set for Mixed-Integer Programs.**
R. Garcia, M. Guo[†], A.J. Schaefer
- **QALY-Maximizing Personalized Surveillance Imaging for Head-and-Neck Cancer Patients Treated with Definitive Radiotherapy.**
L.B. McCullum, R. Garcia, A. Gadepalli[†], D. Abraham[†], P. Stern[†], F. Nosrat, A. Misra, C. Dede, L. Humbert-Vidan, A.J. Schaefer, C.D. Fuller
- **Threshold-Triggered Dose Adaptation in Radiotherapy: A Decision-Theoretic Analysis Balancing Tumor Control and Normal Tissue Risk.**
A. Misra, C. Dede, V. Shah, S. Patankar, H. Klineberg, R. Garcia, L.B. McCullum, F. Nosrat, L. Humbert-Vidan, A.J. Schaefer, C.D. Fuller
- **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.**
F. Nosrat, I. Hussain, B. Alexander, B. Manduchi, A. Misra, R. Garcia, L.B. McCullum, C. Dede, L. Humbert-Vidan, A.J. Schaefer, C.D. Fuller

Teaching

Rice University

Department of Computational Applied Mathematics & Operations Research (CMOR)

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)

Presentations

"Universal Lung Cancer Screening Guidelines Under Heterogeneous Patient Responses".

- International Conference on Stochastic Programming (ICSP), July 2025

"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

"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

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| 2025–2026 | Future Faculty Fellowship , <i>School of Engineering and Computing</i> , 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 , 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.

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.
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**, *CMOR Dept.*, 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