November 19, 2025


# Jacob M. Aguirre

Operations Research Ph.D. Student
H. Milton Stewart School of Industrial and Systems Engineering
Georgia Institute of Technology


## I. Earned Degrees

- Georgia Institute of Technology

  (2023– Present) Doctor of Philosophy, Operations Research

  Minor: Mathematics

  (2023–2025) Master of Science, Operations Research

  (2022–2025) Master of Science, Mathematics

  (2022–2023) Master of Science, Economics

  (2020–2022) Bachelor of Science, Economics, Mathematics
- Advisors: Dr. Renato D.C. Monteiro and Dr. Anton J. Kleywegt

## II. Employment History

- (Summer 2024) Graduate Teaching Fellow, Georgia Institute of Technology
- (Summer 2023) Research Fellow, Oak Ridge National Laboratory
- (Spring 2023) Graduate Research Assistant, Georgia Institute of Technology
- (2020-2022) Undergraduate Teaching Assistant, Georgia Institute of Technology
- (2020-2022) Undergraduate Research Assistant, Georgia Institute of Technology

## III. Honors and Awards

- (Summer 2025) ISyE Fellowship
- (Spring 2025) M.H. Stewart ISyE Fellowship
- (Spring 2024) M.H. Stewart ISyE Fellowship
- (August 2023) Ernst & Young Fellowship
- (March 2023) NSF Graduate Research Fellowship
- (March 2023) DOE Computational Science Fellowship (Declined, Accepted NSF)
- (February 2023) Stewart ISyE Fellowship
- (February 2023) ISyE Travel Fund Fellowship
- (January 2023) GEM Foundation PhD Fellowship
- (Summer 2022) Amazon Science Research Intern
- (Summer 2022) NSF SURE Research Fellow
- (Summer 2022) Georgia Tech Undergrad Presidential Research Scholar ($\times 2$)
- (May 2022) Georgia Tech SOE Outstanding Undergraduate Researcher
- (May 2022) Georgia Tech OMED Tower Award
- (August 2021) Coca-Cola Scholarship
- (2020–2022) Zell Miller (Full tuition) Scholarship

# IV. Research, Scholarship, and Creative Activities

## A. Refereed Publications and Submitted Articles

### A1. Published and Accepted Journal Articles

[J4] **Aguirre, J.**, Cifuentes, D., Guigues, V., Monteiro, R. D., Nascimento, V. H., Sujanani, A., (2025). "A User Manual for cuHALLaR: A GPU Accelerated Low-Rank Semidefinite Programming Solver". *arXiv preprint arXiv:2508.15951.*

[J3] **Aguirre, J. M.**, Cifuentes, D., Guigues, V., Monteiro, R. D., Nascimento, V. H., Sujanani, A., (2025). "cuHALLaR: A GPU Accelerated Low-Rank Augmented Lagrangian Method for Large-Scale Semidefinite Programming". *arXiv preprint arXiv:2505.13719.* In submission to Mathematical Programming Computation.

[J2] **Aguirre, J. M.** (2024). "Some topological results on convex polytopes and their subdivisions".

[J1] **Aguirre, J. M.**, Blecker, A., Urmanbetova, A., Kower, P., (2023). "Discovering Careers and Diversity in Economics Through Inter-Institutional Student Club Collaborative". *The American Economist.*

### A2. Conference Presentation with Proceedings (Refereed)

[P2] **Aguirre, J.**, Blecker, A., Urmanbetova, A., Kower, P., (2023). "Discovering Careers and Diversity in Economics Through Inter-Institutional Student Club Collaborative". *American Economics Association Annual Meeting.* New Orleans, Louisiana.

[P1] Dench, D., **Aguirre, J.,** (2023). "The Effects of EVALI Crisis on Youth and Adult Use of e-Cigarettes". American Society of Health Economists Annual Meeting. St. Louis, Missouri.

## B. Grants and Contracts

### B1. As Principal Investigator

- Title of Project: (#MTH250047) Accelerated Low-Rank Methods for Large-Scale Semidefinite Programming
  Agency/Company: National Science Foundation XSEDE Program
  Total Dollar Amount: $\$150,000$ (750K credits)
  Role: Principal-Investigator
  Collaborators: Jacob M. Aguirre (PI)
  Period of Contract: 2025-08-26–2026-08-25

### B2. Other Refereed Material

[O2] **Aguirre, J.**, Ma, R., Patel, S., (2022). *A Review of High Dimensional Nonlinear Reduction Techniques.* Georgia Institute of Technology.

[O1] **Aguirre, J.** (2021). "The Effects of EVALI Crisis on Youth and Adult Use of e-Cigarettes". Undergraduate Thesis. Georgia Institute of Technology.

### B3. Submitted (or soon to be) Journal Articles (with Date of Submission)

[U4] **Aguirre, J. M.**, Kleywegt, A. J., Monteiro, R. D., (2025). "An Efficent Method for the Bicriterion Traffic Assignment Problem". In submission to Operations Research.

[U3] **Aguirre, J. M.**, Monteiro, R., Kleywegt, A., (2025). "A low-rank augmented Lagrangian method for large-scale sparse linear programs based on a hybrid approach". In submission to Mathematical Programming.

[U2] **Aguirre, J. M.**, Monteiro, R. D., Kleywegt, A. J., (2025). "Complexity Analysis and Implementation of an accelerated smoothing gradient method". In submission to Mathematics of Operations Research.

[U1] **Aguirre, J. M.**, Monteiro, R. D., Sujanani, A., (2025). "cuHALLaR-C: A strengthened implementation of cuHALLaR for Large-Scale Semidefinite Programming by C language". Work-in-Progress.

## C. Software

[S3] **Aguirre, J. M.**, Cifuentes, D., Guigues, V., Monteiro, R. D., Nascimento, V. H., Sujanani, A., (2025). *cuHALLaR: A GPU Accelerated Low-Rank Augmented Lagrangian Method for Large-Scale Semidefinite Programming*. Supported in Julia. Executable binaries available on Github.

[S2] **Aguirre, J. M.**, Kleywegt, A. J., Monteiro, R. D., (2025). *An Accelerated Gradient smoothing method*. Supported in C++ and Julia.

[S1] **Aguirre, J. M.**, Kleywegt, A. J., Monteiro, R. D., (2025). *BiCriteriaTrafficAssignment - Bi-Criteria Traffic Assignment*. Supported in C++ and Julia. Source available on Github.

## D. Presentations

### D1. Invited talks

[I11] "An Accelerated Augmented Lagrangian Method for Large-Scale Linear Programming." (November 2025). *H. Milton Stewart School of Industrial Systems and Engineering, Georgia Institute of Technology.*

[I10] "Iteration Complexity of an Accelerated Smoothing Gradient Method for the Bi-Criterion Traffic Assignment Problem" (November 2025). *H. Milton Stewart School of Industrial Systems and Engineering, Georgia Institute of Technology.*

[I9] "Accelerated Inexact High-Order Proximal Point Methods for Convex Tensor Optimization" (February 2024). *H. Milton Stewart School of Industrial Systems and Engineering, Georgia Institute of Technology.*

[I8] "On Almost-Periodic Functions, Bohr's Theorem, and Locally Convex Spaces" (November 2024). *School of Mathematics, Georgia Institute of Technology.*

[I7] "A Stochastic Control Framework for Controlled Learning on the Fly" (July 2023). *Oak Ridge National Laboratory, Computing and Computational Sciences Directorate.*

[I6] The Ohio State University, *An Inverse Markov Decision Process Approach to Optimal Smoking Cessation Treatment*, (April 2023).

[I5] Georgia Institute of Technology, Economics seminar, (2022). "How the EVALI crisis affected e-cig and cigarette use and perceptions: evidence from PATH".

[I4] Georgia Institute of Technology, Health Policy seminar, *How the EVALI crisis affected e-cig and cigarette use and perceptions: evidence from PATH*, (2022).

[I3] "How the EVALI crisis affected e-cig and cigarette use and perceptions: evidence from PATH" (2022). *Southern Economics Association Annual Meeting.*

[I2] The Ohio State University, Economics workshop, (September 2022). "How the EVALI crisis affected e-cig and cigarette use and perceptions: evidence from PATH".

[I1] University of Virginia, *How the EVALI crisis affected e-cig and cigarette use and perceptions: evidence from PATH*, (April 2022).

### D2. Conference presentations

[T7] **Aguirre, J. M.**, Cifuentes, D., Guigues, V., Monteiro, R. D., Nascimento, V. H., Sujanani, A., (2025). "cuhALLaR: A GPU accelerated low-rank augmented Lagrangian method for large-scale semidefinite programming". *INFORMS Annual Meeting.* Atlanta, Georgia.

[T6] **Aguirre, J.**, Blecker, A., Urmanbetova, A., Kower, P., (2023). "Discovering Careers and Diversity in Economics Through Inter-Institutional Student Club Collaborative". *American Economics Association Annual Meeting.*

[T5] **Aguirre, J.**, Garcia, G., Dench, D., (2023). "An Inverse Markov Decision Process Approach for Optimal Smoking Cessation". *INFORMS Annual Meeting.* Phoenix, Arizona.

[T4] Czerniak, L., **Aguirre, J.**, Sabogal, M., Cartes, S., (2023). "Minority Issues Forum PhD Panel". *INFORMS Annual Meeting.* Phoenix, Arizona.

[T3] Dench, D., **Aguirre, J.,** (2023). "The Effects of EVALI Crisis on Youth and Adult Use of e-Cigarettes". *American Society of Health Economists 2023 Conference.*

[T2] **Aguirre, J.**, Blecker, A., Urmanbetova, A., Kower, P., (December 2022). "Discovering Careers and Diversity in Economics Through Inter-Institutional Student Club Collaborative". *Southern Economics Association Annual Meeting.*

[T1] **Aguirre, J.**, Ma, R., Patel, S., (2022). "A Review of High Dimensional Nonlinear Reduction Techniques". *Undergraduate Math Research Conference at Georgia Tech.*

## E. Societal and Policy Impacts

1. Reviewer and Interviewer for Georgia Governors Honors Program (GHP) Mathematics
2. Instructor (Mathematics) for Georgia Governors Honors Program (GHP) (Summer 2022)

## F. Other Professional Activities

1. Standing Committee member for Presidential Undergraduate Research Awards (PURA) at Georgia Tech (2023-2025)
2. Test writer for Georgia Tech ISyE high school statistics competition (2024, 2025)
3. Treasurer, Georgia Tech ISyE INFORMS Chapter (2024-2025)
4. President, Georgia Tech ISyE INFORMS Chapter (2025-2026)

# V. Education

## A. Courses Taught or Assisted

| Semester | Number | Course Title | # Students |
|---|---|---|---|
| Summer 2024 | ISYE 3133 | Engineering Optimization | 54 |
| **Semester** | **Number** | **Course Title** | **# Students** |
| Fall 2022 | ECON 8801 | Grad. Behavioral Economics | 17 |
| **Semester** | **Number** | **Course Title** | **# Students** |
| Fall 2022 | ECON 4803 | Behavioral Economics | 35 |
| **Semester** | **Number** | **Course Title** | **# Students** |
| Summer 2022 | ECON 2105 | Intro to Macroeconomics | 30 |
| **Semester** | **Number** | **Course Title** | **# Students** |
| Spring 2022 | ECON 2105 | Intro to Macroeconomics | 78 |
| **Semester** | **Number** | **Course Title** | **# Students** |
| Spring 2022 | ECON 2101 | The Global Economy | 76 |

Note: Occasionally taught lectures, prepared all course and project materials, and did all grading for both ECON 4803 & 8801.

## B. Individual Student Guidance

### B1. Undergraduate Students

*Students advised as part of Undergraduate Research Ambassador Program*

- Xingyu Gong (ISyE), (Summer 2022 – Fall 2023)
- Kun-Lin Hsieh (Math), Spring 2022
- Maggie Xia (Math), Spring 2022
- Dhairya Patel (Biology), Spring 2022
- Xinyu Chen (ISyE), Spring 2022
- Carson Cole (Economics + Mathematics), Fall 2021 & Spring 2022
- Eric Chen (Economics), Fall 2021

# VI. Service

## A. Professional Contributions

### A1. Appointments and Memberships

- (2022 – Present) Institute for Operations Research and Management Sciences (INFORMS)
  1. Mathematical Optimization Society (MOS)
  2. Transportation Society and Logistics (TSL)
- (2021 – Present) Institute of Industrial and Systems Engineers (IISE)
- (2020 – Present) Society of Industrial and Applied Mathematics (SIAM)
- (2020 – 2023) American Economics Association (AEA)
- (2020 – 2023) American Society of Health Economists (ASHEcon)

### A2. Referee

1. Journal of Machine Learning Research (JMLR)