

# Gian-Gabriel Garcia

Assistant Professor  
H. Milton Stewart School of Industrial and Systems Engineering  
Georgia Institute of Technology

765 Ferst Drive NW  
Groselock 416  
Atlanta, GA 30332

E-mail: [giangarcia@gatech.edu](mailto:giangarcia@gatech.edu)  
Phone: +1 (404) 385-3140  
Website: <https://www.giangabrielgarcia.com>

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## I. Earned Degrees

<b>University of Michigan</b> , Ann Arbor, MI	
PhD, Industrial and Operations Engineering	8/2020
MS, Industrial and Operations Engineering	12/2016
<b>University of Pittsburgh</b> , Pittsburgh, PA	
BS, Industrial Engineering, <i>Summa Cum Laude</i>	12/2014

## II. Employment History

<b>Georgia Institute of Technology</b> , Atlanta, GA	
Assistant Professor	8/2021-Present
H. Milton Stewart School of Industrial and Systems Engineering	
<b>Harvard Medical School</b> , Boston, MA	
Postdoctoral Fellow	7/2020-7/2021
Massachusetts General Hospital Institute for Technology Assessment	

## III. Honors and Awards

### A. International or National Awards

Panel Fellow for NSF CMMI Game Changer Academies	2022
Best Paper, IISE Transactions Focus Issue on <i>Operations Engineering &amp; Analytics</i>	2021
SMDM Lee B. Lusted Prize in <i>Quantitative Methods &amp; Theoretical Developments</i>	2020
INFORMS Minority Issues Forum Paper Competition	2020
SMDM Lee B. Lusted Prize in <i>Quantitative Methods &amp; Theoretical Developments</i>	2018
INFORMS Bonder Scholarship for Applied OR in Health Services	2018
INFORMS Minority Issues Forum Doctoral Colloquium Sponsorship	2018
INFORMS Minority Issues Forum Poster Competition - First Place	2017
INFORMS Bonder Scholarship for Applied OR in Health Services - Finalist	2017
NSF Graduate Research Fellowship	2017-2020
Ford Foundation Fellowship Predoctoral Competition - Honorable Mention	2016, 2017

## B. Institute or School Awards

University of Michigan, Ann Arbor, MI

Towner Prize for Distinguished Academic Achievement	2020
Cornell ORIE Young Researchers Workshop - Departmental Nomination	2019
IOE Graduate Student Instructor of the Semester	Winter 2017
IOE Bonder Scholar Fellowship - Honorable Mention	2016
Rackham Merit Fellowship	2015-2020

## IV. Research, Scholarship, and Creative Activities

\* indicates work conducted at Georgia Tech.

Student coauthors advised/mentored by Dr. Garcia at Georgia Tech appear in **bold**.

Student coauthors supervised/mentored by Dr. Garcia outside of Georgia Tech appear in *italics*.

### A. Academic Publications

#### A.1. Published and Accepted Journal Articles

- J12. C. DiGennaro, G.-G. P. Garcia, E. J. Stringfellow, S. Wakeman, and M. S. Jalali (2021). Changes in characteristics of drug overdose death trends during the COVID-19 pandemic. *International Journal of Drug Policy* **98**(Accepted), 103392.
- J11. G.-G. P. Garcia, C. M. Schumb, M. S. Lavieri, H. Koffijberg, T. W. McAllister, M. A. McCrea, and S. P. Broglio (2021). Developing Insights for Possible and Probable Acute Concussions Using Cluster Analysis. *Journal of Neurotrauma* (Accepted), neu.2020.7399.
- J10. L. L. Czerniak, S. W. Liebel, G.-G. P. Garcia, M. S. Lavieri, M. A. McCrea, T. W. McAllister, and S. P. Broglio (2021). Sensitivity and Specificity of Computer-Based Neurocognitive Tests in Sport-Related Concussion: Findings from the NCAA-DoD CARE Consortium. *Sports Medicine* **51**(2), 351–365.
- J9. S. W. Liebel, K. Van Pelt, G.-G. P. Garcia, L. L. Czerniak, M. A. McCrea, T. W. McAllister, and S. P. Broglio (2020). The Relationship between Sport-Related Concussion and Sensation-Seeking. *International Journal of Molecular Sciences* **21**(23), 9097.
- J8. G.-G. P. Garcia, J. Yang, M. S. Lavieri, T. W. McAllister, M. A. McCrea, and S. P. Broglio (2020). Optimizing Components of the Sport Concussion Assessment Tool for Acute Concussion Assessment. *Neurosurgery* **87**(5), 971–981.
- J7. G.-G. P. Garcia, M. S. Lavieri, R. Jiang, M. A. McCrea, T. W. McAllister, and S. P. Broglio (2020). Data-driven stochastic optimization approaches to determine decision thresholds for risk estimation models. *IIE Transactions* **52**(10), 1098–1121.
  - Best Paper, 2021 IIE Transactions Focus Issue on *Operations Engineering & Analytics*
  - Winner, 2020 INFORMS Minority Issues Forum Paper Competition
  - Winner, 2018 SMDM Lee B. Lusted Prize in *Quantitative Methods & Theoretical Developments*
  - First Place, 2017 INFORMS Minority Issues Forum Poster Competition

- J6. G.-G. P. Garcia, M. S. Lavieri, C. Andrews, X. Liu, M. P. Van Oyen, M. A. Kass, M. O. Gordon, and J. D. Stein (2019). Accuracy of Kalman Filtering in Forecasting Visual Field and Intraocular Pressure Trajectory in Patients With Ocular Hypertension. *JAMA Ophthalmology* **137**(12), 1416–1423.
- J5. G.-G. P. Garcia, M. S. Lavieri, R. Jiang, T. W. McAllister, M. A. McCrea, and S. P. Broglio (2019). A Data-Driven Approach to Unlikely, Possible, Probable, and Definite Acute Concussion Assessment. *Journal of Neurotrauma* **36**(10), 1571–1583.
- J4. G.-G. P. Garcia, K. Nitta, M. S. Lavieri, C. Andrews, X. Liu, E. Lobaza, M. P. Van Oyen, K. Sugiyama, and J. D. Stein (2019). Using Kalman Filtering to Forecast Disease Trajectory for Patients With Normal Tension Glaucoma. *American Journal of Ophthalmology* **199**, 111–119.
- J3. G. J. Schell, G.-G. P. Garcia, M. S. Lavieri, J. B. Sussman, and R. A. Hayward (2019). Optimal Coinsurance Rates for a Heterogeneous Population under Inequality and Resource Constraints. *IIE Transactions* **51**(1), 74–91.
- J2. G.-G. P. Garcia, S. P. Broglio, M. S. Lavieri, M. McCrea, and T. McAllister (2018). Quantifying the Value of Multidimensional Assessment Models for Acute Concussion: An Analysis of Data from the NCAA-DoD Care Consortium. *Sports Medicine* **48**(7), 1739–1749.
- J1. M. H. Mofrad, G.-G. P. Garcia, L. M. Maillart, B. A. Norman, and J. Rajgopal (2016). Customizing Immunization Clinic Operations to Minimize Open Vial Waste. *Socio-Economic Planning Sciences* **54**(March 2016), 1–17.

## A.2. Other Refereed Material

### Refereed Conference Abstracts

- O7. G.-G. P. Garcia, L. N. Steimle, W. J. Marrero, and J. B. Sussman (2022). An Analysis of Structured Optimal Policies for Hypertension Treatment Planning. *IIE Annual Conference*, Seattle, WA
- O6. G.-G. P. Garcia, M. S. Lavieri, T. W. McAllister, M. A. McCrea, and S. P. Broglio (2020). The Value of Incorporating Symptom-Reporting Behavior in Optimal Treatment Decisions: An Application to Return-to-Play from Sports-Related Concussion. *Society of Medical Decision Making 42nd Annual Meeting*, Chicago, IL
- O5. G.-G. P. Garcia, M. S. Lavieri, C. Andrews, X. Liu, M. P. Van Oyen, M. A. Kass, M. O. Gordon, and J. D. Stein (2019). Using a Machine Learning Technique Called Kalman Filtering to Forecast Conversion from Ocular Hypertension to Primary Open Angle Glaucoma. *The Association for Research in Vision and Ophthalmology*, Vancouver, BC
- O4. G.-G. P. Garcia, M. S. Lavieri, R. Jiang, M. A. McCrea, T. W. McAllister, and S. P. Broglio (2018). A Novel Data-Driven Framework for Improving Risk-Based Medical Diagnosis with Application to Acute Concussion Assessment. *Society of Medical Decision Making 40th Annual Meeting*, Montreal, QC

- O3. M. S. Lavieri, X. Liu, G.-G. P. Garcia, Z. Zhou, E. Lobaza, J. Wang, K. Sugiyama, K. Nitta, C. Andrews, M. P. Van Oyen, and J. D. Stein (2017). Using Kalman Filtering to Personalize the Monitoring of Persons with Normal Tension Glaucoma. *The Association for Research in Vision and Ophthalmology*, Baltimore, MD
- O2. G.-G. P. Garcia, M. S. Lavieri, and S. P. Broglio (2017). A Markov Decision Process to Model Symptom Self-Reporting Behavior in Concussion Management. *The 3rd Multidisciplinary Conference on Reinforcement Learning and Decision Making*, Ann Arbor, MI
- O1. G.-G. P. Garcia, M. S. Lavieri, and S. P. Broglio (2016). Quantifying Risk Thresholds for On-field Concussion Diagnosis. *Industrial and Systems Engineering Research Conference*, Anaheim, CA

### A.3. Submitted Journal Articles

- R4. \*G.-G. P. Garcia, R. Dehghanpoor, E. J. Stringfellow, M. Gupta, J. Rochelle, E. Mason, T. Pujol, and M. S. Jalali (2021). Identifying Advice-Seekers for Suboxone Use on Reddit via Social Network Characteristics and Suboxone Use Stage. *medRxiv* (Submitted). arXiv: [2021.08.25.21262427v1](https://arxiv.org/abs/2021.08.25.21262427v1) [10.1101]
  - Pre-print: <https://www.medrxiv.org/content/10.1101/2021.08.25.21262427v1>
  - Garcia and Dehghanpoor have equal contributions as authors
- R3. \*G.-G. P. Garcia, E. J. Stringfellow, C. DiGennaro, N. Poellinger, J. Wood, S. E. Wakeman, and M. S. Jalali (2021). Emerging and Continuing Trends in Opioid Overdose Decedent Characteristics during COVID-19. (Submitted)
  - Pre-print: <https://www.medrxiv.org/content/10.1101/2021.07.28.21261276v1>
- R2. \*J. B. Caccese, G.-G. P. Garcia, A. P. Kontos, N. L. Port, K. Valerio, S. P. Broglio, M. A. McCrea, T. W. McAllister, P. F. Pasquina, and T. A. Buckley (2021). Test-Retest Reliability and Efficacy of Individual Symptoms in Concussion Management. (Under revision)
- R1. \*G.-G. P. Garcia, L. N. Steimle, W. J. Marrero, and J. B. Sussman (2021). An Analysis of Structured Optimal Policies for Hypertension Treatment Planning: The Tradeoff Between Optimality and Interpretability. (Under revision).
  - Pre-print: [http://www.optimization-online.org/DB\\_HTML/2021/08/8539.html](http://www.optimization-online.org/DB_HTML/2021/08/8539.html)

### A.4. Articles in Preparation

- P5. \*G.-G. P. Garcia, M. S. Lavieri, T. W. McAllister, M. A. McCrea, and S. P. Broglio (2021). Estimating the Value of Incorporating Patient Behavior in Return-to-play from Concussion. (In Preparation)
  - Winner, 2020 SMDM Lee B. Lusted Prize in *Quantitative Methods & Theoretical Developments*

- P4. \*G.-G. P. Garcia, M. S. Lavieri, S. W. Liebel, K. Van Pelt, T. W. McAllister, M. A. McCrea, S. P. Broglio, and CARE Consortium Investigators (2021). Tailoring the Symptom-Free Waiting Period in Return-to-Play from Concussion: A Simulation Analysis Using CARE Consortium Data. (Working Paper)
- P3. \*G.-G. P. Garcia, N. Ghaffarzadegan, and M. S. Jalali (2021). Analyzing "Optimal" Diagnosis Policies for Post-traumatic Stress Disorder in the Presence of Social Stigma. (Working Paper)
- P2. \*L. L. Czerniak, S. W. Liebel, H. Zhou, G.-G. P. Garcia, M. S. Lavieri, M. A. McCrea, T. W. McAllister, S. P. Broglio, and CARE Consortium Investigators (2021). Sensitivity and Specificity of the ImPACT Neurocognitive Test in Collegiate Athletes and United States Military Cadets with ADHD and/or LD: Findings from the NCAA-DoD CARE Consortium. (In Preparation)
- P1. \*C.-Y. Liao, G.-G. P. Garcia, C. DiGennaro, and M. S. Jalali (2021). Data Aggregation Obscures Racial Disparities in Opioid Overdose Deaths: A Call to Improve Data Reporting Practices. (In Preparation)

## B. Presentations

### B.1. Invited Conference and Workshop Presentations

- 13. \*G.-G. P. Garcia, L. N. Steimle, and W. J. Marrero (2021). An Analysis of Structured Optimal Policies for Hypertension Treatment Planning: The Tradeoff Between Optimality and Interpretability. *INFORMS Annual Meeting*, Anaheim, CA
- 12. \*G.-G. P. Garcia, M. S. Lavieri, T. W. McAllister, M. A. McCrea, and S. P. Broglio (2021). Estimating the Value of Incorporating Patient Behavior in Return to Play from Concussion. *INFORMS Annual Meeting* (Bonder Scholars Session), Anaheim, CA
- 11. G.-G. P. Garcia, C. DiGennaro, E. J. Stringfellow, J. Wood, N. Poellinger, and M. S. Jalali (2021). A Multi-state Analysis of Opioid Overdose Death Trends Since the Onset of COVID-19. *INFORMS Healthcare* (Invited Session), Virtual Meeting
- 10. G.-G. P. Garcia, L. N. Steimle, and W. J. Marrero (2021). An Analysis of Structured Optimal Policies for Hypertension Treatment Planning. *INFORMS Healthcare* (Bonder Scholars Session), Virtual Meeting
- 9. G.-G. P. Garcia, M. S. Lavieri, T. W. McAllister, M. A. McCrea, and S. P. Broglio (2020). The Value of Incorporating Symptom-Reporting Behavior in Return-to-play from Concussion. *INFORMS Annual Meeting* (Bonder Scholars Session), National Harbor, MD
- 8. G.-G. P. Garcia, M. S. Lavieri, and S. P. Broglio (2019). Optimizing Treatment Decisions Under Strategically Reported Symptoms. *INFORMS Annual Meeting* (Bonder Scholars Session), Seattle, WA
- 7. G.-G. P. Garcia, M. S. Lavieri, R. Jiang, T. W. McAllister, M. A. McCrea, and S. P. Broglio (2019). Data-driven Stochastic Optimization Approaches to Determine Decision Thresholds for Risk Estimation Models. *INFORMS Annual Meeting* (Invited Session), Seattle, WA

6. G.-G. P. Garcia, J. Yang, M. S. Lavieri, T. W. McAllister, M. A. McCrea, and S. P. Broglio (2019). Doing More with Less: Applying Modern Predictive Modeling Methods to Improve Acute Concussion Assessment. *INFORMS Healthcare* (Bonder Scholars Session), Boston, MA
5. G.-G. P. Garcia, M. S. Lavieri, T. W. McAllister, M. A. McCrea, and S. P. Broglio (2019). Optimizing Treatment Decisions Under Objective Clinical Measures and Strategically Reported Symptoms. *INFORMS Healthcare* (Invited Session), Boston, MA
4. G.-G. P. Garcia, M. S. Lavieri, and S. P. Broglio (2018). Optimization Approaches for Concussion Management Decisions. *INFORMS Annual Meeting* (Invited Session), Phoenix, AZ
3. G.-G. P. Garcia, M. S. Lavieri, and S. P. Broglio (2018). Data-driven Optimization Models for Concussion Management Decisions. *INFORMS Annual Meeting* (Bonder Scholars Session), Phoenix, AZ
2. G.-G. P. Garcia, M. S. Lavieri, R. Jiang, M. McCrea, T. W. McAllister, S. P. Broglio, and CARE Consortium Investigators (2017). A Novel Framework to Determine Decision Thresholds for Medical Diagnosis. *INFORMS Annual Meeting* (Invited Session), Houston, TX
1. G.-G. P. Garcia, M. S. Lavieri, and S. P. Broglio (2016). An Optimization Approach to Concussion Management. *INFORMS Annual Meeting* (Invited Session), Nashville, TN

## B.2. Conference and Workshop Presentations

2. \*C. G. Turner, A. Svirsko, G.-G. P. Garcia, and S. W. Liebel (2021). Temporal Network Architectures of Neurocognitive and Psychological Symptoms in Collegiate Athletes with Sports-related Concussion. *INFORMS Annual Meeting*, Anaheim, CA
1. G.-G. P. Garcia, M. S. Lavieri, R. Jiang, T. W. McAllister, M. A. McCrea, and S. P. Broglio (2019). Data-driven Stochastic Optimization Approaches to Determine Decision Thresholds for Risk Estimation Models. *ORIE Young Investigators Workshop*, Cornell University

## B.3. Invited Seminar Presentations

4. \*An Analysis of Structured Optimal Policies for Hypertension Treatment Planning: The Tradeoff Between Optimality and Interpretability
  - Department of Industrial and Systems Engineering, Virginia Tech, November 2021
3. Predictive and Prescriptive Analytics for Concussion Management Decisions
  - MGH Institute for Technology Assessment, Harvard Medical School, August 2020
  - Department of Industrial and Systems Engineering, University of Minnesota, January 2020
  - Department of Industrial Engineering, Clemson University, January 2020

- School of Industrial Engineering and Regenstrief Center for Healthcare Engineering, Purdue University, December 2019
  - H. Milton Stewart School of Industrial and Systems Engineering, Georgia Institute of Technology, December 2019
  - Department of Industrial and Systems Engineering, University of Florida, December 2019
2. Data-driven Decision Thresholds for Risk Estimation Models with Application to Acute Concussion Assessment
    - Edward P. Fitts Department of Industrial & Systems Engineering Department, North Carolina State University, April 2019
  1. Data-driven Optimization for Concussion Management Decisions
    - Department of Industrial and Operations Engineering, University of Michigan, September 2018

#### **B.4. Other Presentations**

11. L. L. Czerniak, S. W. Liebel, G.-G. P. Garcia, M. S. Lavieri, M. A. McCrea, T. W. McAllister, and S. P. Broglio (2020). Sensitivity and Specificity of Computer-Based Neurocognitive Assessments in Sport-Related Concussion. *Traumatic Brain Injury Conference*, Washington D.C.
10. L. L. Czerniak, S. W. Liebel, G.-G. P. Garcia, M. S. Lavieri, M. A. McCrea, T. W. McAllister, and S. P. Broglio (2020). Characterizing the Accuracy of Computer-Based Neurocognitive Tests in Sport-Related Concussion. *INFORMS Annual Meeting Minority Issues Forum Poster Competition*, National Harbor, MD
9. G.-G. P. Garcia, J. Yang, M. S. Lavieri, T. W. McAllister, M. A. McCrea, and S. P. Broglio (2019). Optimization of the SAC, BESS, and SCAT Symptom Checklist for Acute Concussion Assessment. *Traumatic Brain Injury Conference*, Washington D.C.
8. G.-G. P. Garcia, M. S. Lavieri, C. M. Schumb, T. W. McAllister, M. A. McCrea, and S. P. Broglio (2018). Developing Insights For Hard-to-Diagnose Concussions Using Machine Learning. *INFORMS Annual Meeting Minority Issues Forum Poster Competition*, Phoenix, AZ
7. G.-G. P. Garcia, M. S. Lavieri, R. Jiang, M. McCrea, T. W. McAllister, S. P. Broglio, and CARE Consortium Investigators (2018). A Stochastic Programming Approach to Determine Decision Boundaries for Medical Diagnosis. *YinzOR Conference 3rd Place*, Carnegie Mellon University, Pittsburgh, PA
6. M. S. Lavieri, X. Liu, G.-G. P. Garcia, Z. Zhou, E. Lobaza, J. Wang, K. Sugiyama, K. Nitta, C. Andrews, M. P. Van Oyen, and J. D. Stein (2017). Using Kalman Filtering to Personalize the Monitoring of Persons with Normal Tension Glaucoma. *The Association for Research in Vision and Ophthalmology*, Baltimore, MD

5. G.-G. P. Garcia, M. S. Lavieri, R. Jiang, M. McCrea, T. W. McAllister, S. P. Broglio, and CARE Consortium Investigators (2017). A Stochastic Programming Approach to Determine Decision Boundaries for Medical Diagnosis. *Center for Healthcare Engineering and Patient Safety Symposium*, University of Michigan, Ann Arbor, MI
4. G.-G. P. Garcia, M. S. Lavieri, R. Jiang, M. McCrea, T. W. McAllister, S. P. Broglio, and CARE Consortium Investigators (2017). A Stochastic Programming Approach to Determine Decision Boundaries for Medical Diagnosis. *Engineering Graduate Symposium 2nd Place*(Session IOF-2), University of Michigan, Ann Arbor, MI
3. G.-G. P. Garcia, M. S. Lavieri, R. Jiang, M. McCrea, T. W. McAllister, S. P. Broglio, and CARE Consortium Investigators (2017). A Stochastic Programming Approach to Determine Decision Boundaries for Medical Diagnosis. *INFORMS Annual Meeting Minority Issues Forum Poster Competition 1st Place*, Houston, TX
2. G.-G. P. Garcia, M. S. Lavieri, and S. P. Broglio (2016). Optimal Return-to-Play From Concussion. *Center for Healthcare Engineering and Patient Safety Symposium*, University of Michigan, Ann Arbor, MI
1. G.-G. P. Garcia, M. S. Lavieri, and S. P. Broglio (2016). Optimal Return-to-Play From Concussion. *Engineering Graduate Symposium*, University of Michigan, Ann Arbor, MI

## V. Teaching

### A. Courses Taught

Semester, Year	Course Number	Course Title	Number of Students
Spring 2022	IsyE 3232	Stochastic Manufacturing and Service Systems	60
Spring 2022	ISyE 8803	Special Topics: Prediction Modeling in Medical Decision Making and Health Policy	13

### B. Individual Student Guidance

#### B.1. Ph.D. Students

##### B.1.a. In Process Ph.D. Students

3. Kelsey Custodio  
Advising Start Date: Fall 2021
2. Che-Yi Liao  
Advising Start Date: Fall 2021
1. Sun Ju Lee  
Advising Start Date: Fall 2020



## **VI. Service**

### **A. Professional Contributions**

#### **A.1. Society Officers, Activities, and Membership**

- Award Committees:
  1. Member of INFORMS Minority Issues Forum Best Paper Award committee 2021
  2. Member of INFORMS Seth Bonder Scholarship for Applied Operations Research in Health Services committee 2021
- Membership:
  3. INFORMS: Institute for Operations Research and Management Science
  2. SMDM: Society for Medical Decision Making
  1. IISE: Institute of Industrial and Systems Engineering
- Conference Session Chair:
  3. INFORMS Annual Meeting, 2017, 2020
  2. INFORMS Healthcare, 2019, 2021
  1. ISERC, 2016
- Mentoring:
  1. INFORMS Annual Meeting AMAZON SCOT Mentorship Program, 2021

#### **A.2. Technical Journal or Conference Referee Activities**

- Technical Journal Referee:
  7. European Journal of Operational Research
  6. Healthcare Management Science
  5. INFORMS Journal on Computing
  4. Management Science
  3. Manufacturing & Service Operations Management
  2. Medical Decision Making
  1. Operations Research
- Medical Journal Referee:
  9. American Journal of Public Health
  8. Applied Neuropsychology: Adult

7. BMJ Open Sport & Exercise Medicine
6. BMC Medical Research Methodology
5. International Journal of Sports Medicine
4. JAMA Network Open
3. Journal of Athletic Training
2. Neurosurgery
1. The Clinical Neuropsychologist