

ALEJANDRO TORIELLO

H. Milton Stewart School of Industrial and Systems Engineering
Georgia Institute of Technology
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Last updated January 7, 2024

RESEARCH INTERESTS

Supply chains and logistics, particularly transportation and inventory management.

Optimization, especially discrete and/or dynamic models.

EDUCATION

Ph.D. in Industrial Engineering. 12/2010.

Stewart School of Industrial and Systems Engineering, Georgia Institute of Technology.

- Thesis: Time Decomposition of Multi-Period Supply Chain Models.
- Advisor: George Nemhauser.

B.S. in Industrial Engineering. 05/2003 (Highest Honors).

Stewart School of Industrial and Systems Engineering, Georgia Institute of Technology.

EMPLOYMENT

Scientific Director. 12/2023 - present.

Supply Chain and Logistics Institute, Georgia Institute of Technology.

Professor. 08/2023 - present.

Stewart School of Industrial and Systems Engineering, Georgia Institute of Technology.

Benatar Early Career Professor. 10/2017 - 09/2022.

Stewart School of Industrial and Systems Engineering, Georgia Institute of Technology.

Associate Professor. 08/2017 - 07/2023.

Stewart School of Industrial and Systems Engineering, Georgia Institute of Technology.

Assistant Professor. 08/2013 - 07/2017.

Stewart School of Industrial and Systems Engineering, Georgia Institute of Technology.

Assistant Professor. 08/2010 - 07/2013.

Epstein Department of Industrial and Systems Engineering, University of Southern California.

Research Assistant. 08/2005 - 08/2010.

Stewart School of Industrial and Systems Engineering, Georgia Institute of Technology.

Instructor. 01/2009 - 05/2009.

Stewart School of Industrial and Systems Engineering, Georgia Institute of Technology.

Consultant. 06/2003 - 02/2005.

PowerPlan Consultants, Inc., Atlanta, Georgia.

Published or Accepted

1. S. Güven-Koçak*, A. Heching, P. Keskinocak, A. Toriello. Continuity of Care in Home Health Care Scheduling: Rolling Horizon Approach. *Journal of Scheduling*. Forthcoming, 2023.
2. C. Muir*, L. Marshall, A. Toriello. Temporal Bin Packing with Half-Capacity Jobs. *INFORMS Journal on Optimization*. Forthcoming, 2023.
3. F. Lagos*, M. Klapp*, A. Toriello. Branch-and-Price for Routing with Probabilistic Customers. *Computers and Industrial Engineering*. 183:109429, 2023.
4. D. Banerjee*, A. Erera, A. Stroh*, A. Toriello. Who Has Access to E-Commerce and When? Time-Varying Service Regions in Same-Day Delivery. *Transportation Research Part B: Methodological*. 170:148–168, 2023.
5. C. Muir*, A. Toriello. Interval Scheduling with Economies of Scale. *Computers and Operations Research*. 150:106056, 2023.
6. R. Khir*, A. Erera, A. Toriello. Robust Planning of Sorting Operations in Express Delivery Systems. *European Journal of Operational Research*. 306:615–631, 2023.
Second Place, IISE Logistics and Supply Chain Division Best Student Paper Award, 2020.
7. A. Torricco*, A. Toriello. Dynamic Relaxations for Online Bipartite Matching. *INFORMS Journal on Computing*. 34:1871–1884, 2022.
Featured article, July / August 2022 issue.
8. D. Banerjee*, A. Erera, A. Toriello. Fleet Sizing and Service Region Partitioning for Same-Day Delivery Systems. *Transportation Science*. 56:1327–1347, 2022.
Finalist, INFORMS TSL Student Paper Award, 2023.
9. A. Stroh*, A. Erera, A. Toriello. Tactical Design of Same-Day Delivery Systems. *Management Science*. 68:3444–3463, 2022.
10. S. Pérez-Salazar*, I. Menache, M. Singh, A. Toriello. Dynamic Resource Allocation in the Cloud with Near-Optimal Efficiency. *Operations Research*. 70:2517–2537, 2022.
Runner-Up, INFORMS Computing Society Student Paper Award, 2019.
11. C. Muir*, A. Toriello. Dynamic Node Packing. *Mathematical Programming*. 196:875–906, 2022.
12. W. Zhang, N.A. Uhan, M. Dessouky, A. Toriello. Acyclic Mechanism Design for Freight Consolidation. *Transportation Science*. 56:571–584, 2022.
13. S. Pérez-Salazar*, M. Singh, A. Toriello. Adaptive Bin Packing with Overflow. *Mathematics of Operations Research*. 47:3317–3356, 2022.
Honorable mention, INFORMS Optimization Society Student Paper Prize, 2022.
14. M. Farhadi, P. Tetali, A. Toriello. The Traveling Firefighter Problem. Proceedings of the 2021 SIAM Conference on Applied and Computational Discrete Mathematics (ACDA). SIAM, 205–216, 2021.
15. R. Khir*, A. Erera, A. Toriello. Two-Stage Sort Planning for Express Parcel Delivery. *IISE Transactions*. 53:1353–1368, 2021.

Best Application Paper, *IIE Transactions* 2022 Focus Issue on Supply Chain and Logistics.

16. J. Li*, A. Toriello, H. Wang, S. Borin, C. Gallarno. Dynamic Inventory Allocation for Seasonal Merchandise at Dillard's. *INFORMS Journal on Applied Analytics*. 51:297–311, 2021.
17. D. Blado*, A. Toriello. A Column and Constraint Generation Algorithm for the Dynamic Knapsack Problem with Stochastic Item Sizes. *Mathematical Programming Computation*. 13:185–223, 2021.
18. M. Klapp*, A. Erera, A. Toriello. Order Acceptance in Same-Day Delivery. *Transportation Research Part E: Logistics and Transportation Review*. 143:102083, 2020.
19. W. Hu*, Z. Yu*, A. Toriello, M. Dessouky. Decomposition-Based Approximation Algorithms for the One-Warehouse Multi-Retailer Problem with Concave Batch Order Costs. *Naval Research Logistics*. 67:503–523, 2020.
20. D. Blado*, A. Toriello. Relaxation Analysis for the Dynamic Knapsack Problem with Stochastic Item Sizes. *SIAM Journal on Optimization*. 29:1–30, 2019.
21. W. Zhang, N.A. Uhan, M. Dessouky, A. Toriello. Moulin Mechanism Design for Freight Consolidation. *Transportation Research Part B: Methodological*. 116:141–162, 2018.
22. W.B. Haskell, A. Toriello. Modeling Stochastic Dominance as Infinite-Dimensional Constraint Systems via Strassen's Theorem. *Journal of Optimization Theory and Applications*. 178:726–742, 2018.
23. M. Klapp*, A.L. Erera, A. Toriello. The Dynamic Dispatch Waves Problem for Same-Day Delivery. *European Journal of Operational Research*. 271:519–534, 2018.
24. W. Hu*, A. Toriello, M. Dessouky. Integrated Inventory Routing and Freight Consolidation for Perishable Goods. *European Journal of Operational Research*. 271:548–560, 2018.
25. A. Torricco*, S. Ahmed, A. Toriello. A Polyhedral Approach to Online Bipartite Matching. *Mathematical Programming*. 172:443–465, 2018.

Conference version: Proceedings of the 18th Conference on Integer Programming and Combinatorial Optimization (IPCO). Springer, 287–299, 2016.

26. M. Klapp*, A.L. Erera, A. Toriello. The One-Dimensional Dynamic Dispatch Waves Problem. *Transportation Science*. 52:402–415, 2018.
27. D. Reyes*, M. Savelsbergh, A. Toriello. Vehicle Routing with Roaming Delivery Locations. *Transportation Research Part C: Emerging Technologies*. 80:71–91, 2017.
28. A. Toriello, N.A. Uhan. Dynamic Linear Programming Games with Risk-Averse Players. *Mathematical Programming*. 163:25–56, 2017.
29. D. Blado*, W. Hu*, A. Toriello. Semi-Infinite Relaxations for the Dynamic Knapsack Problem with Stochastic Item Sizes. *SIAM Journal on Optimization*. 26:1625–1648, 2016.
30. W. Hu*, M.S. Lavieri, A. Toriello, X. Liu. Strategic Health Workforce Planning. *IIE Transactions*. 48:1127–1138, 2016.

Honorable Mention, INFORMS SPPSN Best Paper Award, 2013.

31. J. Woodruff, W.B. Haskell, A. Toriello. *Optimized Financial Systems* Helps Customers Meet their Personal Finance Goals with Optimization. *Interfaces*. 46:345–359, 2016.
32. G.J. Schell, M.S. Lavieri, F. Jankovic, X. Li, A. Toriello, K.K. Martyn, G.L. Freed. Strategic Modeling of the Neonatal Nurse Practitioner Workforce. *Nursing Outlook*. 64:385–394, 2016.

33. L. Rademacher, A. Toriello, J.P. Vielma. On Packing and Covering Polyhedra in Infinite Dimensions. *Operations Research Letters*. 44:225–230, 2016.
34. G.J. Schell, X. Li, M.S. Lavieri, A. Toriello, K.K. Martyn, G.L. Freed. Strategic Modeling of the Pediatric Nurse Practitioner Workforce: How Policy Changes Can Yield Self-Sufficiency. *Pediatrics*. 135:298–306, 2015.
35. A. Toriello, W.B. Haskell, M. Poremba*. A Dynamic Traveling Salesman Problem with Stochastic Arc Costs. *Operations Research*. 62:1107–1125, 2014.
36. C. Nguyen*, M. Dessouky, A. Toriello. Consolidation Strategies for the Delivery of Perishable Products. *Transportation Research Part E: Logistics and Transportation Review*. 69:108–121, 2014.
37. A. Toriello. Optimal Toll Design: A Lower Bound Framework for the Asymmetric Traveling Salesman Problem. *Mathematical Programming*. 144:247–264, 2014.
38. A. Toriello, N.A. Uhan. Dynamic Cost Allocation for Economic Lot Sizing Games. *Operations Research Letters*. 42:82–84, 2014.
39. A. Toriello, N.A. Uhan. On Traveling Salesman Games with Asymmetric Costs. *Operations Research*. 61:1429–1434, 2013. (Technical note.)
40. C. Nguyen*, A. Toriello, M. Dessouky, J. Moore. Evaluation of Transportation Practices in the California Cut Flower Industry. *Interfaces*. 43:182–193, 2013.
41. D. Papageorgiou, A. Toriello, G. Nemhauser, M. Savelsbergh. Fixed-Charge Transportation with Product Blending. *Transportation Science*. 46:281–295, 2012.
42. A. Toriello, J.P. Vielma. Fitting Piecewise Linear Continuous Functions. *European Journal of Operational Research*. 219:86–95, 2012.
43. A. Toriello, G. Nemhauser. The Value Function of an Infinite Lot-Sizing Problem. *Operations Research Letters*. 40:12–14, 2012.
44. A. Toriello, G. Nemhauser, M. Savelsbergh. Decomposing Inventory Routing Problems with Approximate Value Functions. *Naval Research Logistics*. 57:718–727, 2010.
45. F. Kılınç-Karzan, A. Toriello, S. Ahmed, G. Nemhauser, M. Savelsbergh. Approximating the Stability Region for Binary Mixed-Integer Programs. *Operations Research Letters*. 37:250–254, 2009.

Working Papers and Pre-Prints

1. I. Erazo*, A. Toriello. Submodular Dispatching with Multiple Vehicles.
2. K. Shu*, D. Cifuentes, A. Toriello. A Semidefinite Hierarchy for Expected Independence Numbers of Random Graphs.
3. M. Eom*, A. Toriello. Batching and Greedy Policies: How Good Are They in Dynamic Matching?
4. D. Banerjee*, A. Erera, A. Toriello. Customer Satisfaction and Differentiated Pricing in E-Retail Delivery.
5. S. Pérez-Salazar*, M. Singh, A. Toriello. The IID Prophet Inequality with Limited Flexibility.
6. I. Erazo*, A. Toriello. Optimizing the Trade-Off Between Batching and Waiting: Subadditive Dispatching.
7. M. El Tonbari*, G. Nemhauser, A. Toriello. Distributionally Robust Disaster Relief Planning under the Wasserstein Set.
8. S. Pérez-Salazar*, M. Singh, A. Toriello. Robust Online Selection with Uncertain Offer Acceptance.

* Supervised student co-author.

RECENT INVITED PRESENTATIONS

Batching and Greedy Policies: How Good Are They in Dynamic Matching? Department of Industrial and Systems Engineering, University of Florida. Gainesville, Florida. 08/2023.

Submodular Dispatching.

- Department of Industrial and Systems Engineering, University of Southern California. Los Angeles, California. 02/2023.
- Amazon Modeling and Optimization. Bellevue, Washington. 11/2022.
- International Workshop on Freight Transportation and Logistics (Odysseus). Tangier, Morocco. 05/2022.
- Rotterdam School of Management, Erasmus University. Rotterdam, the Netherlands. 01/2022. (Virtual.)
- School of Computing and Augmented Intelligence, Arizona State University. Tempe, Arizona. 11/2021.

Submodular Interval Scheduling. INFORMS Computing Society Conference. Tampa, Florida. 01/2022.

Tactical Design of Same-Day Delivery Systems.

- School of Industrial and Systems Engineering, University of Oklahoma. Norman, Oklahoma. 04/2023.
- Department of Industrial Engineering, Sharif University. Tehran, Iran. 01/2021. (Virtual.)
- Lyft Rideshare Labs. 01/2021. (Virtual.)
- Industrial Engineering and Operations Research Seminar, PUC Chile. Santiago, Chile. 10/2020. (Virtual, in Spanish.)
- IEOR-DRO Seminar, Columbia University. New York, New York. 09/2020. (Virtual.)
- David Simchi-Levi Research Group, Department of Civil and Environmental Engineering, Massachusetts Institute of Technology. Cambridge, Massachusetts. 06/2020. (Virtual.)
- Department of Industrial Engineering and Management Sciences. Northwestern University. Evanston, Illinois. 10/2019.
- Krannert School of Management, Purdue University. West Lafayette, Indiana. 09/2019.
- Universidad Galileo. Guatemala City, Guatemala. 07/2019.
- Tenth Triennial Symposium on Transportation Analysis (TRISTAN X). Hamilton Island, Australia. 06/2019.

Polyhedral Approaches to Online Bipartite Matching. Department of Analytics and Operations, NUS Business School, National University of Singapore. 03/2019.

ACADEMIC HONORS

Best Paper Award, Facilities Design and Planning Track, 2022 IISE Conference. (With R. Khir and A. Elera.)

Meritorious Service Award, *Transportation Science*, 2021, 2022.

Participant, National Academy of Engineering U.S. Frontiers of Engineering Symposium, 2019.

CAREER Award, National Science Foundation. 2016 - 2021.

Honorable Mention, INFORMS SPPSN Best Paper Award. 2013.

Fellow, Achievement Rewards for College Scientists (ARCS) Foundation. 08/2008 - 08/2010.

Graduate Research Fellow, National Science Foundation. 05/2007 - 04/2010.

President's Fellow, Georgia Institute of Technology. 08/2005 - 07/2009.

Fellow, Roberto C. Goizueta Foundation. 08/2005 - 05/2009.

TEACHING

Georgia Institute of Technology

ISyE 3103 - Supply Chain Modeling: Logistics. Last taught Fall 2023.

ISyE 3133 - Engineering Optimization. Last taught Spring 2009.

ISyE 4106 - Senior Design (Team Advisor). Last taught Fall 2023.

ISyE 4301 - Supply Chain Economics. Last taught Spring 2014.

ISyE 6203 - Transportation and Supply Chain Systems. Last taught Spring 2022.

ISyE 6662 - Discrete Optimization. Last taught Spring 2023.

ISyE 7203 - Logistics Systems Engineering. Last taught Fall 2022.

ISyE 7205/8813 - Inventory Theory. Last taught Fall 2020.

University of Southern California

ISE 330 - Introduction to Operations Research: Deterministic Models. Last taught Fall 2012.

ISE 532 - Network Flows. Last taught Spring 2013.

STUDENTS

Ph.D. Students - Advisor

Myungeun Eom. Fall 2021 - present.

Ignacio Erazo. Spring 2021 - present. (With D. Goldsman.)

Dipayan Banerjee. Fall 2019 - present. (With A. Erera.)

Finalist, INFORMS TSL Student Paper Award, 2023.

ISyE Atlanta Air Cargo Association Fellowship for Supply Chain Research Excellence, 2022.

NSF Graduate Research Fellow.

Christopher Muir. Fall 2018 - Summer 2022.

First position: OR Scientist, Wayfair.

NSF Graduate Research Fellow.

Sebastián Pérez-Salazar. Fall 2017 - Summer 2022. (With M. Singh.)

First position: Assistant Professor, Computational and Applied Mathematics, Rice University.

Honorable mention, INFORMS Optimization Society Student Paper Prize, 2022.

ISyE Shabbir Ahmed Optimization Fellowship for Research Excellence, 2021.

Runner-Up, 2019 INFORMS Computing Society Student Paper Award.

Reem Khir. Fall 2017 - Spring 2022. (With A. Erera.)
First position: Assistant Professor, Industrial Engineering, Purdue University.
Best Paper Award, 2022 Facilities Design and Planning Track, IISE Conference.
Second Place, 2020 IISE Logistics and Supply Chain Best Student Paper Competition.

Alex Stroh. Fall 2017 - Summer 2021. (With A. Erera.)
First position: Lead OR Scientist, Target.

Alfredo Torrico. Fall 2014 - Spring 2019. (With S. Pokutta, M. Singh.)
First Position: Postdoctoral Researcher, Polytechnique Montréal.

Daniel Blado. Spring 2015 - Spring 2018.
First Position: Research Scientist, Ford Motor Co.
NSF Graduate Research Fellow.

Mathias Klapp. Fall 2013 - Fall 2016. (With A. Erera.)
First position: Assistant Professor, Industrial Engineering, Pontificia Universidad Católica de Chile.

Weihong Hu. Summer 2012 - Summer 2016.
First position: Research Scientist, Amazon Inc.

Ph.D. Students - Advisor (USC)

Michael Poremba. Spring 2011 - Summer 2017.
First position: Pricing Strategy and Operations Analyst, Zappos.

Christine Nguyen. Fall 2011 - Summer 2014. (With M. Dessouky.)
First position: Assistant Professor, Industrial and Systems Engineering, Northern Illinois University.

Ph.D. Students - Directed Research

Kevin Shu. Summer 2023 - Fall 2023. (With D. Cifuentes.)

Ravit Pichayavet. Spring 2021 - present. (With A. Erera.)

Mohamed El Tonbari. Summer 2020 - Fall 2021. (With G. Nemhauser.)

Sungwoo Kim. Spring 2020. (With H. Wang.)

Adolfo Rocco. Fall 2019 - Spring 2021. (With A. Erera.)

Keyu Zhu. Fall 2019. (With H. Wang.)

Junxuan Li. Fall 2017 - Spring 2018. (With H. Wang.)

Şeyma Güven-Koçak. Fall 2015 - Summer 2016. (With P. Keskinocak.)

Felipe Lagos. Fall 2015 - Summer 2016.

Damián Reyes. Fall 2014 - Spring 2015. (With M. Savelsbergh.)

MS Students - Directed Research

Zhuoting Yu. Fall 2018 - Fall 2019.

FUNDING

Office of Naval Research, N00014-23-1-2631. Semidefinite Relaxations for Dynamic Combinatorial Optimization. \$479,118. 05/2023 - 05/2026. PI, with D. Cifuentes (Co-PI).

Office of Naval Research, N00014-18-1-2075. A Unified Framework for Distributed Stochastic Optimization. \$267,125. 03/2021 - 05/2023. PI, taking over from G. Nemhauser upon his retirement.

Dillard's Inc. Data Analytics and Inventory Management for Fashion Goods. 08/2019 - 07/2020. \$75,000. Co-PI with H. Wang (PI).

Dillard's Inc. Data Analytics for Inventory Shipment Decisions in a Retail Network. 10/2017 - 02/2018. \$25,000. PI with H. Wang.

SF Express Co., Ltd. Data-Driven Design and Operation of Hyperconnected Inter-City Logistics Service Networks. 03/2017 - 01/2021. \$3,054,353. Co-PI with A. Erera, B. Montreuil (PI), M. Savelsbergh.

National Science Foundation, CMMI 1552479. CAREER: Towards Exact Methods for Dynamic Integer Programs. 05/2016 - 05/2021. \$500,000.

National Science Foundation, CMMI 1265616. Collaborative Research: Supply Chain Consolidation and Cooperation in the Agriculture Industry. 09/2013 - 07/2016. Lead PI with M. Dessouky and N. Uhan (PI). \$284,000. (Project re-structured after moving to Georgia Tech.)

California Cut Flower Commission. Evaluation of Transportation Practices in the California Cut Flower Industry. 01/2011 - 12/2011. Co-PI with M. Dessouky (PI) and J. Moore, \$100,000.

SERVICE

Stewart School of Industrial and Systems Engineering (Georgia Tech)

Faculty Search Committee. Fall 2019 - present (Chair, 2020, 2021).

Graduate Committee. Fall 2016 - Spring 2018.

Ph.D. Admissions Committee. Spring 2017.

Georgia Tech

Associate Director, ACO PhD Program. Spring 2020 - present.

Faculty Advisor, Society of Hispanic Professional Engineers (SHPE). Fall 2016 - present.

Faculty Guide, Stamps President's Scholars. 2018 cohort.

Member, College of Engineering Assistant-to-Associate RPT Committee. Fall 2018 - Spring 2020.

Community

Area Editor. *Transportation Science*, 2024 - present.

Award Committee. INFORMS TSL Society Best Paper, 2019 - 2021 (Chair, 2021). *Naval Research Logistics* Kuhn (Best Paper) Award, 2021.

Cluster Chair. Emerging Topics, Sharing Economy and Crowdsourcing, INFORMS Annual Meeting, 2019.

Editorial Board. *Mathematical Methods of Operations Research*, 2015 - 2020; *Optimization Methods and Software*, 2014 - 2018; *Transportation Research Part B*, 2020 - present; *Transportation Science*, 2015 - 2023.

Newsletter Editor. INFORMS Optimization Society. 2020 - 2022.

Organizing Committee. Conference on Integer Programming and Combinatorial Optimization (IPCO), 2021; INFORMS Transportation Science and Logistics Workshop, 2016 (Chair); NemFest ISyE Workshop, 2017; Mixed-Integer Programming (MIP) Workshop, 2018, 2019 (Chair); Shabbir Ahmed Memorial Workshop, 2019.

Panelist or Proposal Reviewer. Académie universitaire Louvain, Belgium, 2011; FONDECYT, Chile, 2011; National Cooperative Highway Research Program, 2021; NSF, Spring 2013, Fall 2015, Fall 2016, Summer 2020.

Program/Referee/Scientific Committee. INFORMS Optimization Conference, 2024; INFORMS TSL Conference, 2017, 2020, 2023; INFORMS TSL Workshop, 2021; International Symposium on Combinatorial Optimization (ISCO), 2018; Latin American Algorithms, Graphs and Optimization Symposium (LAGOS), 2013; Triennial Symposium on Transportation Analysis (TRISTAN), 2022.

Review Committee. *Transportation Science*, 2023; *TutORials in Operations Research*, 2014.

Vice-President/President. INFORMS TSL Society, 2022-2023.

LANGUAGES

Fluent in English and Spanish. Conversant in German.