SELVAPRABU (SELVA) NADARAJAH

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RESEARCH INTERESTS

- The solution of large scale Markov decision processes using math programming based reinforcement learning, data-driven methods, and algorithms that embed solve intelligence.
- The operations, valuation, and risk management of commodity and energy conversion assets (e.g., production, storage, transport), including renewable energy.
- Corporate clean energy transition, the social impact of this transition, and the interplay between financial and social objectives in supply chains.

APPOINTMENTS

Associate Professor (with Tenure) of Information and Decision Sciences *Aug 2021 - present*
Information and Decision Sciences
College of Business Administration
University of Illinois at Chicago, Chicago, IL, USA

Bielinski Family Endowed Scholar *Aug 2024 - present*
College of Business Administration
University of Illinois at Chicago, Chicago, IL, USA

Decision Intelligence R&D Lead (by invitation) *Aug 2024 - present*
Discovery Partners Institute (innovation hub of the University of Illinois System)
Chicago, IL, USA

Visiting Faculty *Aug 2023 - May 2024*
Argonne National Laboratory, Lemont, IL, USA

Assistant Professor of Information and Decision Sciences *Aug 2014 - July 2021*
Information and Decision Sciences
College of Business Administration
University of Illinois at Chicago, Chicago, IL, USA

EDUCATION

Tepper School of Business, Carnegie Mellon University *May 2014*
PhD in Operations Research
Minor in Operations Management

Thesis: Approximate dynamic programming for commodity and energy merchant operations
Advisor: Prof. Nicola Secomandi (Operations Management, Tepper)

Tepper School of Business, Carnegie Mellon University *May 2011*
Master of Science in Operations Research

Department of Management Sciences, University of Waterloo *Aug 2008*
Master of Applied Sciences in Operations Research
Advisor: Prof. James H. Bookbinder

Department of Aerospace Engineering, Indian Institute of Technology Madras *Jul 2006*
Bachelor of Technology in Aerospace Engineering
Minor in Operations Research

HONORS AND AWARDS

- Harvey J. Greenberg Research Award *2024*
  Description: Honors research excellence in the field of computation and operations research applications, especially those in emerging application fields.
  Awarding organization: Institute for Operations Research and Management Sciences (INFORMS)
- International Faculty and Global Scholar *2024*
  Description: Recognizes outstanding record of international research, scholarship or creative activity.
  Awarding organization: University of Illinois Chicago
- Commodity and Energy Markets Association (CEMA) Best Paper Award *2021*
  Description: Awarded for the best research paper presented at the annual CEMA conference, highlighting excellence in energy and commodity markets research.
  Awarding organization: CEMA
- Manufacturing and Service Operations Management Journal Meritorious Service Award *2021*
  Description: Recognizes outstanding service and high-quality refereeing for the M&SOM journal.
  Awarding organization: INFORMS
- Overall Best Paper *2020*
  Description: Awarded for the top paper at the NeurIPS 2020 Workshop on Tackling Climate Change with Machine Learning; the work was also featured in Fortune magazine's Eye on A.I. newsletter.
  Awarding organization: NeurIPS
- Energy, Natural Resources, and the Environment Young Researcher Prize *2020*
  Description: Recognizes outstanding early-career research applying operations research to critical problems in energy, natural resources, or the environment based solely on papers without senior faculty co-authors.
  Awarding organization: INFORMS
- Manufacturing and Service Operations Management Journal Meritorious Service Award *2020*
  Description: Recognizes outstanding service and high-quality refereeing for the M&SOM journal.
  Awarding organization: INFORMS
- College of Business Teaching Excellence Award *2018*
  Description: Honors faculty that demonstrate commitment to teaching and student learning.
  Awarding organization: University of Illinois at Chicago
- William L. Cooper Doctoral Dissertation Award in Management Sciences *2014*
  Description: Recognizes the best doctoral dissertation in management sciences.
  Awarding organization: Carnegie Mellon University
- Egon Balas Best Student Paper Award *2013*
  Description: Given for an outstanding research paper by a doctoral student in operations research.
  Awarding organization: Carnegie Mellon University
- William Larimer Mellon Fellowship *2009*
  Description: Fellowship awarded for academic excellence and research potential.
  Awarding organization: Carnegie Mellon University
- Innovations in Supply Chain Management Track Best Paper Award *2008*
  Description: Recognizes the best paper in the Supply Chain Management track at the Indian Subcontinent Decision Sciences Institute (DSI) Conference. *Awarding organization:* DSI
- Teaching Assistant Award, Management Sciences *2007*
  Description: Awarded for excellence in teaching assistance and mentorship in quantitative courses.
  Awarding organization: University of Waterloo
- Finalist, Canadian Operational Research Society Simulation Competition *2007*
  Description: Recognized for outstanding performance in a national simulation competition.
  Awarding organization: Canadian Operational Research Society

- Merit Scholarship, Faculty of Engineering *2006*
  Description: Awarded for academic distinction in graduate engineering studies.
  Awarding organization: University of Waterloo
- International Students Masters Award *2006*
  Description: Recognizes academic excellence among international master's students.
  Awarding organization: University of Waterloo
- Graduate Entrance Scholarship *2006*
  Description: Awarded upon entry into graduate studies based on academic merit.
  Awarding organization: University of Waterloo
- Best Student Paper Award, National Aerospace Symposium *2006*
  Description: Recognizes the best student-authored paper in aerospace engineering.
  Awarding organization: Madras Institute of Technology

PUBLICATIONS

Working Papers [1]

1. P. Pakiman†, S. Nadarajah. Back to the future: Revisiting a pioneering approximation of average cost Markov decision processes using a multi-shot perspective. [Link; Under revision for resubmission to **Operations Research**]
2. Q. Lin, R. Ma, S. Nadarajah, and N. Soheili. A parameter-free and projection-free restarting level set method for adaptive constrained convex optimization under the error bound condition. [Under review after revision at **Journal of Machine Learning Research**]
3. A. Kleiven†, S. Nadarajah, and S.E. Fleten. Hierarchical planning for hydropower capacity upgrade: Exploiting structure in reoptimization and investment policies. [Link; Under review at **INFORMS Journal of Computing**]
4. P. Pakiman†, B. Chen, S. Nadarajah, S. Jasin. Self-adapting robustness in demand learning. [Link; Under revision for resubmission to **Manufacturing and Service Operations Management**]
5. S. Nadarajah and A. Cire. A little structure goes a long way: Managing feasibility risk in fluid models for weakly coupled Markov decision processes. [In preparation]
6. S. Nadarajah and P. Pakiman. Self-adapting least squares Monte Carlo for managing financial and real options. [In preparation]
7. N. Soheili, B. Yang, and S. Nadarajah. Revisiting model selection for sequential decision making approximations. [In preparation]

Journal Papers

7. D. Mohseni-Taheri†, S. Nadarajah, A. Trivella†. Physical vs. virtual corporate power purchase agreements: Meeting renewable targets amid demand and price uncertainty, **European Journal of Operational Research**, 320 (1), 2025. [Link]
8. P. Pakiman†, S. Nadarajah, N. Soheili, Q. Lin. Self-guided approximate linear programs: Randomized multi-shot approximation of discounted Markov decision processes, **Management Science**, 71 (4), 2024. [Link]
9. S. Nadarajah, A. Cire. Self-adapting network approximations for solving weakly-coupled dynamic programs, **Management Science**, 71 (2), 2024. [Link, *Received the 2024 INFORMS Harvey J. Greenberg Award*]
10. B. Yang†, S. Nadarajah, N. Secomandi. Least squares Monte Carlo and pathwise optimization for merchant energy production, **Operations Research**, 72 (6), 2024. [Link]

[1] † indicates advised PhD/Masters student

11. D. Jang†, L. Spangher†, S. Nadarajah, and C. Spanos. Deep reinforcement learning with planning guardrails for building energy demand response, **Energy and AI**, 11, 2023. [Link]
12. S. Nadarajah, N. Secomandi. A review of the operation literature on real options in energy, **European Journal of Operational Research**, 309 (2), 2023. [Link; **Invited review article by editors**]
13. A. Trivella†, D. Mohseni-Taheri†, S. Nadarajah. Meeting corporate renewable power targets, **Management Science**, 69 (1), 2023. [Link; *Received the 2021 Commodity and Energy Markets Association Best Paper Award and 2020 INFORMS ENRE Early Career Publication Award*]
14. C. Mandl†, S. Nadarajah, S. Minner, N. Gavirneni. Data-driven storage operations: Cross-commodity backtest and structured policies, **Production and Operations Management**, 36(1), 2022. [Link]
15. A. Trivella†, S. Nadarajah. Socially responsible merchant operations: Comparison of shutdown-averse CVaR and anticipated regret policies. **Operations Research Letters**, 49(4), 2021. [Link]
16. Q. Lin, S. Nadarajah, N. Soheili, T. Yang. A data efficient and feasible level set method for stochastic convex optimization with expectation constraints. **Journal of Machine Learning Research**, 21(143), 2020. [Link]
17. A. Trivella†, S. Nadarajah, S. E. Fleten, D. Mazieres, D. Pisinger. Managing shutdown decisions in merchant commodity and energy production: A social commerce perspective. **Manufacturing and Service Operations Management**, 23(2), 2021. [Link]
18. Q. Lin, S. Nadarajah, N. Soheili. Revisiting approximate linear programming: Constraint violation learning with applications to inventory control and energy storage. **Management Science**, 66(4), 2020. [Link]
19. A. Kazachkov†, S. Nadarajah, E. Balas, F. Margot. Partial hyperplane activation for generalized intersection cuts. **Mathematical Programming Computation**, 12, 2020. [Link]
20. S. Nadarajah, A. Cire. Network-based approximate linear programming for discrete optimization. **Operations Research**, 68(6), 2020. [Link]
21. Q. Lin, S. Nadarajah, N. Soheili. A level-set method for convex optimization with a feasible solution path. **SIAM Journal on Optimization**. 28(4), 2018. [Link]
22. S. Nadarajah, N. Secomandi. Merchant energy trading in a network. **Operations Research**, 66(5), 2018. [Link]
23. S. Nadarajah, N. Secomandi. Relationship between least squares Monte Carlo and approximate linear programming. **Operations Research Letters**, 45(5), 2017. [Link]
24. S. Nadarajah, F. Margot, N. Secomandi. Comparison of least squares Monte Carlo methods with applications to energy real options. **European Journal of Operational Research**, 256(1), 2017. [Link]
25. S. Nadarajah, F. Margot, N. Secomandi. Relaxations of approximate linear programs for the real option management of commodity storage. **Management Science**, 61(12), 2015. [Link]
26. S. Nadarajah, J. H. Bookbinder. An integrated approach to the less-than-truckload carrier collaboration problem. **Journal of Heuristics**, 19(6), 2013. [Link]

Conference Proceedings and Workshop Papers

27. D. Jang, L. Spangher, T. Srivistava, M. Khattar, U. Agwan, S. Nadarajah, C. Spanos, Offline-online reinforcement learning for energy pricing in office demand response: Lowering energy and data costs, **Proceedings of the 8th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (BuildSys '21)**, 2021. [Link]
28. P. Pakiman†, S. Nadarajah, N. Soheili, Q. Lin. Self-guided approximate linear programs. **Workshop on Self-Supervised Learning – Theory and Practice, NeurIPS**, 2020.
29. J. Wang†, S. Nadarajah, J. Wang, A. Ravikumar, A machine learning approach to methane emissions mitigation in the oil and gas industry. **Workshop on Tackling Climate Change with Machine Learning, NeurIPS**, 2020. [*Spotlight Talk; Overall Best Paper*]

30. D. Mohseni-Taheri†, S. Nadarajah, T. Tulabandhula. Interpretable user models via decision-rule Gaussian processes, **Advances in Approximate Bayesian Inference Workshop, NeurIPS**, 2019.
31. B. Chen, S. Nadarajah, S. Jasin. Robust demand learning, **Workshop on Safety and Robustness in Decision Making, NeurIPS**, 2019.
32. A. Chenreddy†, P. Pakiman†, S. Nadarajah, R. Chandrasekaran, R. Abens. SMOILE: Shopper marketing optimization and inverse learning engine. **Proceedings of the 25th ACM SIGKDD Conference on Knowledge Discovery and Data Mining**, 2019. [Link; *acceptance rate of 6.4%*]
33. S. H. Andresen†, E. F. Aas†, S. Nadarajah, S. E. Fleten, D. Mazieres. Operation, valuation, and electricity sourcing for a generic Aluminium smelter. **Real Options Workshop**, 2015.

Book Chapters

34. Decision-centered decarbonization: Empowering scalable and community-led pathways to close emissions gaps. **Pathways to Sustainability: Collaborative Solutions for a Resilient Future.** Editors: Tim Killeen, Don Wuebbles, and Jason Lane. University of Illinois Press. 2025. [Link]
35. S. Nadarajah and S. Dziemian. Decision intelligence for healthcare decarbonization, **Lessons from the Pandemic for Healthcare Operations, Foundations and Trends in Information, Technology, and Operations Management**, 19 (2-3), 2025. [Link]
36. S. Nadarajah, Corporate Procurement Analytics, **Frontiers in Supply Chain Finance and Risk Management, Foundations and Trends in Information, Technology, and Operations Management**, 16 (3-4), 2023. [Link]
37. S. Nadarajah, N. Secomandi, Least squares Monte Carlo and approximate linear programming: Error bounds and energy real option application, **Advances in Supply Chain Finance and FinTech Innovations, Foundations and Trends in Technology, Information and Operations Management**, 14 (1–2), 2020. [Link]
38. S. Nadarajah, N. Secomandi, G. Sowers, and J. Wassick. Real option management of hydrocarbon cracking operations. **Real Options in Energy and Commodity Markets**, 2017. [Link]

Technical Reports

39. S. Nadarajah, N. Secomandi. Least squares Monte Carlo and approximate linear programming: Error bounds and energy real option application. [Extended version of conference proceedings with same title; Link]
40. S. Nadarajah, Y. F. Lim, Q. Ding. Dynamic pricing for hotel rooms when customers request multiple-day stays. [Link]

PHD STUDENTS

Current

- Satender Gunwal, University of Illinois at Chicago (PhD student since 2023).
  Education: Integrated BS and MS in Mathematical Sciences, Indian Institute of Science Education and Research (IISER)
  Research interests: Energy and data center loads, machine learning, hierarchical planning.
- Mahtab Danaee, University of Illinois at Chicago (PhD student since 2024).
  Education: BS in Industrial Engineering, Amirkabir University.
  Research interests: Reinforcement learning, Large Language Models, hierarchical planning.

Former

- Parshan Pakiman, University of Illinois at Chicago (Graduated in Spring 2023).
  Education: BSc in Applied Mathematics, University of Tehran.
  Thesis: Self-guided approximate linear programs: Randomized multi-shot approximation of Markov decision processes
  First position: Post-doctoral Principal Researcher, Booth School of Business, University of Chicago.
  Upcoming position: Assistant Professor of Operations Management, School of Management, University of Buffalo.
- Bo Yang, Carnegie Mellon University (Graduated in Spring 2022).
  Education: BS in Industrial Engineering, University of Shanghai for Science and Technology; MS in Management Sciences and Engineering, Shanghai Jiao Tong University.
  Thesis: A pathwise optimization approach for reinforcement learning in merchant energy operations.
  Co-advisor: Nicola Secomandi.
  First position: Post-doctoral fellow, Columbia University.
  Current position: Assistant Professor of Industrial Engineering and Decision Analytics, Hongkong University of Science and Technology.
- Andreas Kleiven, NTNU (Graduated in Spring 2022).
  Background: BSc in Statistics and MSc in Applied Physics and Statistics, NTNU.
  Thesis title: Investment and operational planning under uncertainty.
  Co-advisor: Stein-Erik Fleten.
  First position: Power Associate, Citadel.
- Danial Mohseni-Taheri, University of Illinois at Chicago (Graduated in Spring 2021).
  Education: BSc in Industrial Engineering, Amirkabir University of Technology.
  Thesis: Reinforcement learning for real options: Planning under uncertainty and limited data.
  First position: Senior Machine Learning Scientist, JP Morgan.
- Alessio Trivella, Denmark Technical University (Graduated in Fall 2018).
  Education: PhD in Management Engineering, Denmark Technical University; BSc and MSc in Mathematics, University of Milan.
  Thesis: Decision making under uncertainty in sustainable energy operations and investments.
  Co-advisors: David Pisinger and Stein-Erik Fleten.
  First position: Post-doctoral fellow, ETH Zurich.
  Current position: Assistant Professor of Operations Research, Industrial Engineering and Business Information Systems, University of Twente.

SEMINARS AND PRESENTATIONS

- Approximating weakly coupled systems for energy investment and operations. Invited tutorial at Planning Under Uncertainty in Energy Markets Winter School, Kvitfjell, Norway, 2025. Organized by NHH, NTNU, Norway Research Council, NORDAB, and NTNU Energy Initiative.
- Analytics and AI for supply chain excellence and sustainability. SEED Masterclass, Virtual, 2025.
- Empowering communities to address local environmental implementation gaps. UIC SparkTalks, Chicago, 2025.
- Back to the future: Revisiting a pioneering approximation of average cost Markov decision processes using a multi-shot perspective. INFORMS Annual Meeting, Seattle, 2024.
- Safe investment and operations for the Netzero transition. Institute of Mathematical and Statistical Innovation, University of Chicago, Chicago, USA, 2024.
- A little structure goes a long way: Structure aware Lagrangian relaxations for weakly coupled MDPs. International Symposium on Mathematical Programming, Montreal, Canada, 2024.

- Sustainable syndemic clinic design in Chicago. Fourth Midwest Healthcare Conference, Gies College of Business and Carle Illinois College of Medicine, University of Illinois Urbana Champaign, 2024 (by invitation).
- Self-adapting network relaxations for weakly coupled Markov decision processes.
  - INFORMS Computing Society Harvey J. Greenberg Award Presentation, INFORMS Annual Meeting, Seattle, 2024.
  - Chicago Operations Day, Kellogg School of Management, Northwestern University, 2024.
  - College of Management of Technology Research Seminar Series, EPFL, Lausanne, Switzerland.
  - Analytics and Operations Research Seminar Series, Imperial College London Business School, 2024.
  - Operations Management Research Seminar Series, University College London Business School, 2024.
  - Operations and Decision Technologies Research Seminar Series, University of California Irvine, 2023.
  - Discrete Optimization Talks, Mixed Integer Programming Society and Mathematical Optimization Society, Virtual, 2023.
  - Computational applied mathematics and operations research department, Rice University, Houston, TX, 2023.
  - International Conference on Continuous Optimization, Lehigh, PA, 2022.
- Navigating the Uncertain Path to Net Zero: Balancing Urgency and Social Responsibility. CRSSCA - 8th Annual Supply Chain & Logistics Management Workshop, Dalhousie University, Halifax, Canada, 2023 (Virtual).
- Building resilience in municipal infrastructure. Workshop on Leadership in Sustainability, Discovery Partners Institute, University of Illinois, 2023 (Virtual).
- Decarbonizing healthcare: A goal-oriented valuation perspective. Third Midwest Healthcare Conference, Gies College of Business and Carle Illinois College of Medicine, University of Illinois Urbana Champaign, 2023 (by invitation).
- Panelist at the round table on "How to create value through better investment decisions in the green economy?". Sustainable Value Creation Summit, Organized by Nova SBE and European Commission, Cascais, Portugal, 2023 (by invitation).
- ESG pathways and best practices. Illinois Metropolitan Mayors Caucus Environment Committee Virtual Meeting, 2023 (by invitation).
- Clean energy transition: The interface of operations and analytics. Frontiers of Energy in Operations Track, Inaugural Decision Sciences Journal Symposium (developmental talk for faculty and PhD students), Bauer School of Business, University of Houston, Houston, TX, 2023.
- Decarbonizing buildings via energy demand response and deep reinforcement learning: The deployment value of supervisory planning and guardrails. Commodity and Energy Markets Association Annual Meeting, Chicago, IL, 2022.
- Pathwise optimization based reinforcement learning for informationally rich models. Commodity and Energy Markets Association Annual Meeting, Chicago, IL, 2022.
- Risk management of merchant energy storage. Production and Operations Management Society (POMS) Annual Conference, Virtual, 2022.
- Meeting corporate renewable energy targets
  - Production and Operations Management Society (POMS) Annual Conference, Virtual, 2022.
  - Virtual INFORMS Annual Meeting, 2021
  - Commodity and Energy Markets Association Annual Meeting, Virtual, 2021.
  - ENRE Awards Session, INFORMS Annual Meeting, Virtual, 2020.

  - Management Science Climate Change Special Issue Session, INFORMS Annual Meeting, Virtual, 2020.
  - Commodity and Energy Markets Association Annual Meeting, Pittsburgh, PA, 2019
  - MSOM Annual Conference, Singapore, 2019
  - INFORMS Annual Meeting, Phoenix, AZ, 2018
- Self-guided approximate linear programs
  - Department of Economics and Management, University of Luxembourg, Luxembourg, 2021
  - INFORMS Annual Meeting, Seattle, WA, 2019
- Data-driven decision making in energy and sustainability. UIC Data Science Lightning Talk, 2020.
- Self-adapting robustness in demand learning
  - Production and Operations Management Society (POMS) Annual Conference, Virtual, 2021.
  - Supply Chain Finance and Risk Management Workshop, McDonough School of Business, Georgetown University, Washington D.C., 2020 [Canceled due to COVID-19]
- Self-adapting algorithms for operations and valuation
  - Invited tutorial, Trans-Atlantic Cooperation on Energy Market Models (TACEMM) Winter School Workshop, Norway, 2020 [Canceled due to COVID-19]
  - Keynote, mini-symposium on "New Models and Algorithms for Commodity Operations and Valuation", Joint European Conference on Stochastic Optimization and Computational Management Science, Venice, Italy, 2020. [Postponed to 2021 due to COVID-19]
- Approximate convex programs for solving intractable operations management problems
  - Semi-plenary, 16th Computational Management Science Conference, Norway, 2018
- Network-based approximate linear programming for discrete optimization
  - INFORMS Annual Meeting, Seattle, WA, 2019
  - INFORMS Annual Meeting, Nashville, TN, 2017
- Structured data-driven operating policies for commodity storage
  - Supply Chain Finance and Risk Management Workshop, Olin School of Business, University of Washington at St. Louis, St. Louis, MO, 2019
- Managing shutdown decisions in merchant commodity and energy production: A social commerce perspective
  - Indian School of Business, Hyderabad, India, 2019
  - MSOM Interface of Finance, Operations, and Risk Management (iFORM) SIG meeting, Singapore, 2019
  - INFORMS Annual Meeting, Phoenix, AZ, 2018
  - Commodity and Energy Markets Association Annual Meeting, Rome, Italy, 2018
  - Production and Operations Management Society Annual Conference, Houston, TX, 2018
  - INFORMS Annual Meeting, Nashville, TN, 2016
- Revisiting approximate linear programming: Constraint violation learning with applications to inventory control and energy storage
  - Industrial Engineering and Management Sciences, Northwestern University, 2018
  - INFORMS Annual Meeting, Phoenix, AZ, 2018
  - Singapore University of Technology and Design, Singapore, 2018
  - Lee Kong Chian School of Business, Singapore Management University, Singapore, 2018
  - Ecole Polytechnique Federale de Lausanne (EPFL) Business School, Switzerland, 2018
  - INFORMS Annual Meeting, Nashville, TN, 2017
- A level set method for stochastic optimization with expectation constraints

  - 23rd International Symposium on Mathematical Programming, Bordeaux, France, 2018
- Merchant energy trading in a network
  - INFORMS Annual Meeting, Houston, TN, 2017
  - Paul Merage School of Business, University of California, Irvine, CA, 2017
  - MSOM iFORM SIG meeting, University of North Carolina, Chapel Hill, NC, 2017
  - INFORMS Annual Meeting, Nashville, TN, 2016
  - MSOM Annual Conference, University of Auckland, Auckland, New Zealand, 2016
  - POMS Annual Conference, Orlando, FL, 2016
  - Rotman School of Management, University of Toronto, Toronto, ON, 2016
  - INFORMS Optimization Society Conference, Princeton University, Princeton, NJ, 2016
  - INFORMS Annual Meeting, San Francisco, CA, 2014 (earlier version under the title "Tradeoff between storage and transport in merchant energy trading on a network")
  - INFORMS Annual Meeting, Minneapolis, MN, 2013 (earlier version under the title "Joint merchant management of natural gas storage and transport assets")
- Relationship between least squares Monte Carlo and approximate linear programming
  - Booth School of Business, University of Chicago, Chicago, IL, 2015
  - Fuqua School of Business, Duke University, Durham, NC, 2015
  - INFORMS Annual Meeting, Philadelphia, PA, 2015
  - International Symposium on Mathematical Programming, Pittsburgh, PA, 2015 (earlier version under the title "Connections between least squares Monte Carlo and math programming based approximate dynamic programming")
  - INFORMS Annual Meeting, San Francisco, CA, 2014 (earlier version under the title "Connections between least squares Monte Carlo and math programming based approximate dynamic programming")
- Relaxations of approximate linear programs for the merchant management of commodity and energy conversion assets
  - Darden Business School, University of Virginia, Charlottesville, VA, 2014
  - Department of Management Sciences, University of Waterloo, Waterloo, ON, Canada, 2014
  - Lee Kong Chian School of Business, Singapore Management University, Singapore, 2013
  - Industrial and Systems Engineering, University of Minnesota, Minneapolis, MN, 2014
  - Jindal School of Management, University of Texas at Dallas, Dallas, TX, 2014
  - Kelley School of Business, Indiana University, Bloomington, IN, 2014
  - Kenan-Flagler Business School, University of North Carolina, Chapel Hill, NC, 2014
  - Liautaud Graduate School of Business, University of Illinois, Chicago, IL, 2014
  - London Business School, London, United Kingdom, 2014
  - Queens School of Business, Queen's University, Kingston, ON, Canada, 2014
  - Singapore University of Technology and Design, Singapore, 2014
- Relaxations of approximate linear programs for the real option management of commodity storage
  - INFORMS Annual Meeting, Minneapolis, MN, 2013
  - MSOM Annual Conference, INSEAD, Fontainebleau, France, 2013
  - Modeling and Optimization: Theory and Applications (MOPTA), Lehigh University, Bethlehem, PA, 2013
  - POMS Annual Meeting, Denver, CO, 2013
  - 21st International Symposium on Mathematical Programming, Berlin, Germany, 2012
  - SIAM Conference on Financial Engineering and Mathematics, Minneapolis, MN, 2012

  - INFORMS Annual Meeting, Charlotte, NC, 2011 (earlier version under the title "Approximate linear programming relaxations for commodity storage real option management")
  - MSOM Annual Conference, Ann Arbor, MI, 2011 (earlier version under the title "Approximate dynamic programs for natural gas storage valuation based on approximate linear programming relaxations")
- Approximate dynamic programming for the merchant operations of commodity and energy conversion assets. Enterprise-Wide Optimization Seminar, Carnegie Mellon University, Pittsburgh, PA, 2013.
- Valuation of multiple exercise options with energy applications. INFORMS Annual Meeting, Phoenix, AZ, 2012
- An incomplete activation procedure to generate generalized intersection cuts
  - 16th Combinatorial Optimization Workshop, Aussois, France, 2012
  - Modeling and Optimization: Theory and Applications (MOPTA), Lehigh University, PA, 2012

GRANTS

- Capturing Cost-Benefit Distributions in Grid Planning and Operations. Argonne National Labs, $172,777, Sole PI, 01/01/2025-12/30/2026.
- Envisioning Equitable Transitions to Sustainable Transportation. Alfred P. Sloan Foundation, co-PI, $50,000, Jan 2023 - March 2024.

TEACHING

- **Instructor, University of Illinois at Chicago** *Aug 2014 - present*

  Foundations of analytics and AI for supply chain and operations management
  Master of Science in Supply Chain and Operations Management (MS-SCOM) core
  Spring 2025

  Data-driven decisions for sustainable business
  Undergraduate elective for BS in IDS and interdisciplinary BS in Data Science
  Spring 2025

  Analytics for Optimization
  Undergraduate core for UIC interdisciplinary BS in Data Science
  Spring 2022/23

  Introduction to operations management
  MBA and MS-SCOM core
  MBA: Fall 2014/15/16/20/21; Spring 2015/18/19/20/21/22/23
  Corporate MBA: Fall 2016; Spring 2019

  Supply chain management
  MS-SCOM core and graduate elective
  Spring 2015/16/17/18, Fall 2021

  Introduction to modern optimization
  PhD course
  Fall 2019

  Dynamic programming
  PhD course
  Fall 2016

- **Instructor, Mathematical Sciences, Carnegie Mellon University** *Oct 2012 - Dec 2012*
  Second half of Topics in applied mathematics: Combinatorial optimization
  (undergraduate elective; E. Balas taught the first half of this course)

- **Teaching assistant, Carnegie Mellon University** *Jan 2010 - Dec 2013*
  MBA: Optimization and decision making (F. Margot),
  Real options (N. Secomandi)
  PhD: Integer programming, Advanced integer programming, Graph theory,
  Networks and matchings, Convex polytopes (E. Balas)
- **Co-instructor, University of Waterloo** *May 2008 - Aug 2008*
  Introduction to optimization
  (undergraduate elective; J. H. Bookbinder was the primary instructor)
- **Teaching assistant, University of Waterloo** *Jan 2008 - Aug 2009*
  Undergraduate: Engineering economics
  Graduate: Logistics and supply chain management,
  Economics concepts for management
- **Completed courses at the Center for Teaching Excellence, University of Waterloo** *Jan 2008 - Aug 2009*
  Preparing for university teaching (GS901), and Teaching practicum (GS903)

SERVICE

External

- **Associate editor**, Decision Analysis area
  Operations Research (INFORMS) *2025 - present*
- **Associate editor**, Revenue Management area
  Production and Operations Management (POMS) *2023 - present*
- **Associate editor**, Socially Responsible Operations and the Circular Economy area
  Decision Sciences (DSI) *2022 - present*
- **Area editor**, Energy, Natural Resources, and the Environment
  Information Systems and Operational Research (CORS) *2022 - present*
- **Reviewer**
  Management Science, Operations Research, Manufacturing and Service Operations Management, Production and Operations Management, IIE Transactions, Journal of Commodity Markets, Energy Economics, Energy Systems, INFORMS Journal on Computing, Naval Research Logistics, Computer and Operations Research, European Journal of Operations Research, Operations Research Letters, Electronic Commerce Research and Applications
- **Student development and award committees**
  - Co-chair of INFORMS Harvey J. Greenberg Award Committee *2025*
  - INFORMS Nicholson student paper prize committee *2020-21*
  - Climate change AI workshop mentor *2020*
    Neural Information Processing Systems (NeurIPS) Conference
  - External thesis reader for Daniel Blado, *2018*
    Algorithms, Combinatorics, and Optimization, Georgia Institute of Technology
- **Conference/workshop organization**
  - Founding program committee, Chicago Operations Day *2024*
  - Program committee, Commodity and Energy Markets Association
    Annual Meeting *2022/23/24/25*
  - Program committee, Workshop on Operations of People-centric Systems
    ACM Conference on Economics and Computation *2022*

- Track co-chair, *2021*
  MSOM interface of finance, operations, and risk management (iFORM),
  INFORMS Annual Meeting
- Cluster co-chair, Energy, natural resources and the environment cluster, *2018*
  60th Canadian Operational Research Society Annual Conference
- Session chair/co-chair/discussant
  * Commodity and Energy Markets Association Annual Meeting *2018-19*
  * POMS Annual Conference *2016-19*
  * International Symposium on Mathematical Programming *2015*
  * INFORMS Annual Meeting *2013-18*
  * INFORMS Optimization Society Conference *2016*
  * SIAM Conference on Financial Engineering and Mathematics *2012*

University of Illinois at Chicago

College of Business and University:

- Launched undergraduate fellowship program on e-mobility with EVNoire *2024*
- Chair, Sustainability curriculum working group *2024*
- Co-Lead (with Lisa Bonnett, Former Illinois EPA Director)
  Empowering Leadership in Sustainability: A Climate Action and Financing Workshop
  Joint UIC Business and Discovery Partners Institute Initiative *2023*
- Member, MBA Committee *2015 - 18*
- Founding advisor, Operations Management (Student) Group *2015 - present*
- Member, College Undergraduate Core Curriculum Review Committee *2018 - 19*
- Member, University Committee on Data Sciences and Social Sciences *2018 - 19*
- Member, Undergraduate Academic Program Committee (UAPC) *2019 - present*

Department of Information and Decision Sciences:

- Faculty
  - Member, Department Advisory Committee *2015 - 19, 2020-23, 2024-25*
  - Member, Center for Business Analytics Faculty Advisory Committee *2015 - 2024*
  - Member, Faculty Hiring Committee *2015 - 2019*
- Curriculum and programs
  - Chair, Strategic Initiatives Committee 2025
  - Member, PhD in Business - IDS Area of Inquiry Revision Committee *2015 - 16*
  - Member, IDS PhD Committee *2015 - 17*
  - Member, MS in Supply Chain and Operations Management Proposal Committee *2017 - 18*
  - Coordinator, MBA Concentration Revision Committee *2015 - 16, 2019 - 20*
- Events and Workshops
  - Organizing committee, Frontiers of AI in Business and Society Workshop *2025*
  - Steering committee, Frontiers of AI in Business and Society Workshop *2024*
  - Inaugural chair, Frontiers of AI in Business and Society Workshop *2023*
  - Member, Research Seminar Series *2015 - 2018*
  - New initiative, Summer Research Square Seminar Series *2019 - 20*
  - New initiative, CBA Distinguished Speaker Series *2018 - present*

Carnegie Mellon University

- Member, University Committee on Discipline *2012 - 14*
- Member, Academic Review Board *2012 - 14*

University of Waterloo

- Member, South Western Ontario Operations Research Day Committee *2007*
- Member, UW-CORS Seminar Series Committee *2007*
- Member, NAFTA Workshop Committee *2007*

PROFESSIONAL EXPERIENCE

- **Continuous Improvements Group, Research in Motion (Blackberry)** *Apr 2011 - May 2011*
  Consultant Waterloo, Canada
  - Analyzed the hardware ordering process and determined opportunities for improving order fulfillment
  - Collaborated with multiple departments in the high technology supply chain and presented recommendations to management
- **Dow Chemicals/CMU Enterprise-Wide Optimization Center** *Aug 2010 - Aug 2011*
  Research Consultant Pittsburgh, USA
  - Introduced managers to the concept of merchant operations and real options
  - Collaborated with senior managers and analysts on business requirements, gathering data, and discussing findings
- **Optimization Group, Canadian Tire Corporation** *Sep 2008 - Aug 2009*
  Operations Planning Analyst Brampton, Canada
  - Worked on the modeling and solution of supply chain management and logistics problems with estimated annual savings of over 2 million Canadian dollars
  - Problems included direct shipping, work load planning, automotive spare parts inventory and routing, and container yard management
  - Helped setup optimization software infrastructure
  - Collaborated with and presented findings to higher level management
- **Optimization Group, Canadian Tire Corporation** *Jan 2008 - May 2008*
  Optimization Intern Brampton, Canada
  - Developed optimization software to solve a shipping problem for the transportation department