

SELVAPRABU (SELVA) NADARAJAH

Information and Decision Sciences ◊ University of Illinois at Chicago

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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.

ACADEMIC 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, 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, 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

- Commodity and Energy Markets Association (CEMA) Best Paper Award *2021*
- Manufacturing and Service Operations Management Journal Meritorious Service Award, INFORMS *2021*

- Overall Best Paper, 2020
NeurIPS 2020 Workshop on Tackling Climate Change with Machine Learning
Research covered by Fortune magazine in its December 20, 2020 [Eye on A.I.](#) newsletter
- Energy, Natural Resources, and the Environment Young Researcher Prize 2020
Institute for Operations Research and Management Sciences (INFORMS)
- Manufacturing and Service Operations Management Journal 2020
Meritorious Service Award, INFORMS
- College of Business Teaching Excellence Award, 2018
University of Illinois at Chicago
- Dean’s Recognition For Outstanding Teaching, College of Business, 2016-18
University of Illinois at Chicago
- William L. Cooper Doctoral Dissertation Award in Management Sciences 2014
or Management, Carnegie Mellon University
- Egon Balas Best Student Paper Award, Carnegie Mellon University 2013
- William Larimer Mellon Fellowship, Carnegie Mellon University 2009
- Innovations in Supply Chain Management Track Best Paper Award, 2008
Indian Subcontinent Region of Decision Sciences Institute Conference
- Teaching Assistant Award, Management Sciences, University of Waterloo 2007
- Finalist, Canadian Operational Research Society Simulation Competition 2007
- Merit Scholarship, Faculty of Engineering, University of Waterloo 2006
- International Students Masters Award, University of Waterloo 2006
- Graduate Entrance Scholarship, University of Waterloo 2006
- Best Student Paper Award, National Aerospace Symposium, India 2006

PUBLICATIONS

Working Papers ¹

1. P. Pakiman[†], S. Nadarajah, N. Soheili, Q. Lin. Self-guided approximate linear programs. [[Link](#); Under revision for third round review at **Management Science**]
2. B. Yang[†], S. Nadarajah, N. Secomandi. Pathwise optimization for merchant energy production. [[Link](#); Under revision for third round review at **Operations Research**]
3. S. Nadarajah, N. Secomandi. Real options in energy: A guided analysis of the operations literature. [[Link](#); Under revision for second round review at **European Journal of Operational Research**; **Invited article by editors**]
4. S. Nadarajah, A. Cire. Self-adapting network approximations for solving weakly-coupled dynamic programs. [[Link](#); Under review at **Management Science**]
5. D. Jang[†], L. Spangher[†], S. Nadarajah, and C. Spanos. Decarbonizing buildings via energy demand response and deep reinforcement learning: The deployment value of supervisory planning and guardrails. [[Link](#)]
6. B. Chen, S. Nadarajah, P. Pakiman[†], S. Jasin. Self-adapting robustness in dynamic learning. [[Link](#); Under revision for resubmission to **Operations Research**]
7. Q. Lin, R. Ma, S. Nadarajah, and N. Soheili. Level-set method for convex constrained optimization with error bound conditions. [In preparation for **Mathematics of Operations Research**]

¹† indicates advised PhD/Masters student

8. A. Kleiven[†], S. Nadarajah, and S.E. Fleten. Revisiting hierarchical planning for hydropower plant upgrades using semi-analytical policies and reinforcement learning. [In preparation for **Production and Operations Management**.]

Journal Papers

9. C. Mandl[†], S. Nadarajah, S. Minner, N. Gavirneni. Structured data-driven operating policies for commodity storage. [[Link](#); Forthcoming at **Production and Operations Management**]
10. A. Trivella[†], D. Mohseni-Taheri[†], S. Nadarajah. Meeting corporate renewable power targets. [[Link](#); *Received the 2021 Commodity and Energy Markets Association Best Paper Award and 2020 INFORMS ENRE Early Career Publication Award*; Forthcoming at **Management Science**]
11. A. Trivella[†], S. Nadarajah. Socially responsible merchant operations: Comparison of shutdown-averse CVaR and anticipated regret policies. **Operations Research Letters**, 49(4), 2021. [[Link](#)]
12. 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](#)]
13. 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](#)]
14. 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](#)]
15. A. Kazachkov[†], S. Nadarajah, E. Balas, F. Margot. Partial hyperplane activation for generalized intersection cuts. **Mathematical Programming Computation**, 12, 2020. [[Link](#)]
16. S. Nadarajah, A. Cire. Network-based approximate linear programming for discrete optimization. **Operations Research**, 68(6), 2020. [[Link](#)]
17. 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](#)]
18. S. Nadarajah, N. Secomandi. Merchant energy trading in a network. **Operations Research**, 66(5), 2018. [[Link](#)]
19. S. Nadarajah, N. Secomandi. Relationship between least squares Monte Carlo and approximate linear programming. **Operations Research Letters**, 45(5), 2017. [[Link](#)]
20. 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](#)]
21. 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](#)]
22. 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

23. 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](#)]
24. P. Pakiman[†], S. Nadarajah, N. Soheili, Q. Lin. Self-guided approximate linear programs. **Workshop on Self-Supervised Learning – Theory and Practice, NeurIPS**, 2020.

25. 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*]
26. 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](#)]
27. D. Mohseni-Taheri[†], S. Nadarajah, T. Tulabandhula. Interpretable user models via decision-rule Gaussian processes, **Advances in Approximate Bayesian Inference Workshop, NeurIPS**, 2019.
28. B. Chen, S. Nadarajah, S. Jasin. Robust demand learning, **Workshop on Safety and Robustness in Decision Making, NeurIPS**, 2019.
29. 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%*]
30. 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

31. 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

32. 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](#)]
33. S. Nadarajah, Y. F. Lim, Q. Ding. Dynamic pricing for hotel rooms when customers request multiple-day stays. [[Link](#)]

PHD STUDENTS

Current

- Parshan Pakiman, University of Illinois at Chicago (PhD student since 2017).
Education: BSc in Applied Mathematics, University of Tehran.
Research interests: Self-adapting reinforcement learning, E-commerce.
Co-adviser: Negar Soheili.

Former

- 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 title: Decision making under uncertainty in sustainable energy operations and investments.
Co-advisers: David Pisinger and Stein-Erik Fleten.
First position: Post-doctoral fellow, ETH Zurich.
Current position: Assistant Professor of Operations Research, University of Twente.
- Danial Mohseni-Taheri, University of Illinois at Chicago (Graduated in Spring 2021).
Education: BSc in Industrial Engineering, Amirkabir University of Technology.
Thesis title: Reinforcement learning for real options: Interpretable planning under uncertainty and limited data.
First position: Senior Machine Learning Scientist, JP Morgan.

- 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-adviser: Stein-Erik Fleten.
First position: Power Associate, Citadel.
- 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 title: A pathwise optimization approach for reinforcement learning in merchant energy operations.
Co-adviser: Nicola Secomandi.
First position: Post-doctoral fellow, Columbia University.

SEMINARS AND PRESENTATIONS

- 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

TEACHING

- **Instructor, University of Illinois at Chicago** *Aug 2014 - present*
 - Analytics for Optimization – Spring 2022
(undergraduate core for UIC BS in Data Science and graduate analytics elective)
 - Introduction to operations management (graduate core)
 - MBA: Fall 2014/15/16/20/21; Spring 2015/18/19/20/21/22 [**Avg. score: 4.5/5**]
 - Corporate MBA: Fall 2016; Spring 2019 [**Avg. range: 4.8/5**]
 - Supply chain management (graduate elective) – Spring 2015/16/17/18, Fall 2021 [**Avg. score: 4.5/5**]
 - Introduction to modern optimization (PhD core) – Fall 2019 [**Avg. score: 5/5**]
 - Dynamic programming (PhD elective) – Fall 2016 [**two students; no score available**]

- **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**, Electronic Commerce Research *2014 - 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**
 - 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**
 - Program committee, Commodity and Energy Markets Association Annual Meeting, *2022*
 - Programm 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:

- 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, 2020-21
 - Member, Center for Business Analytics Faculty Advisory Committee 2015 - present
 - Member, Faculty Hiring Committee 2015 - 2019
- Curriculum and programs
 - 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
 - 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

MISCELLANEOUS

- Programming languages: C, C++, Java, R, Python, Julia
- Software: Excel, RiskSolver, Matlab, Arena, Simul8, SPSS
- Optimization solvers: CPLEX, GUROBI, COIN-OR
- Languages: English, Tamil
- Professional affiliations: INFORMS, POMS