

Danielle A. Ripsman

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■ EDUCATION

- University of Waterloo** **Ph.D. Candidate in Management Sciences**
2018 – Present *Management Science & Engineering Department, Waterloo, Canada*
Advisor: Dr. Houra Mahmoudzadeh
Thesis: Structural Approaches to Large-Scale Optimization for Radiation Therapy
Anticipated graduation date: June 2024
- University of Waterloo** **M.A.Sc. in Management Sciences**
2016 – 2018 *Management Sciences Department, Waterloo, Canada*
Advisor: Dr. Houra Mahmoudzadeh
Thesis: Robust Direct Aperture Optimization Methods for Cardiac Sparing in Left-Sided Breast Cancer Radiation Therapy
- University of Toronto** **B.A.Sc. in Industrial Engineering**
2010 – 2016 *Mechanical & Industrial Engineering Department, Toronto, Canada*
■ Graduated with Honours and an Engineering Business Minor

■ PUBLICATIONS

- Journal Publications**
1. **D. A. Ripsman**, F. Rahimi, H. Abouee-Mehrizi, H. Mahmoudzadeh. "Light Pareto robust optimization for IMRT treatment planning". *Medical Physics*, 50(5):2637–2648, 2023. [Link]
 2. **D. A. Ripsman**, T. G. Purdie, T. C. Y. Chan and Houra Mahmoudzadeh. "Robust Direct Aperture Optimization for Radiation Therapy Treatment Planning". *INFORMS Journal on Computing*, 34(4), pages 2017–2038, 2022. [Link]
 3. **D. A. Ripsman**, D. M. Aleman and K. Ghobadi. "Interactive visual guidance for automated stereotactic radiosurgery treatment planning", *Expert Systems with Applications*, 42 (21), pages 8337–8348, 2015. [Link]
- Submitted Manuscripts**
1. F. Rahimi, **D. A. Ripsman**, H. Abouee-Mehrizi and H. Mahmoudzadeh, "Superior and Light Pareto Robust Optimization", under review in *Management Science*.
- Working Papers**
1. **D. A. Ripsman** and H. Mahmoudzadeh. "Closed-Form Constraint Generation for Classes of Robust Polyhedral Uncertainty", to be updated and submitted for publication in *Optimization Letters*.
 2. **D. A. Ripsman**, S. A. Alev and H. Mahmoudzadeh, "A Geometric Approach To Beam Angle Selection In Radiation Therapy Treatment Planning", to be submitted for publication in the *European Journal of Operational Research*.

■ PRESENTATIONS

- Conference Presentations**
1. **D. A. Ripsman**, "Integrating Uncertainty Mitigation into Radiation Therapy Treatment Planning", INFORMS Annual Meeting, Phoenix, AZ, October 2023.
 2. **D. A. Ripsman**, S. A. Alev, H. Mahmoudzadeh, "A Geometric Approach To Beam Angle Selection In Radiation Therapy Treatment Planning", INFORMS Healthcare, Toronto, ON, July 2023.

3. **D. A. Ripsman**, S. A. Alev, H. Mahmoudzadeh, "A Geometric Approach To Beam Angle Selection In Radiation Therapy Treatment Planning", CORS/Optimization Days, HEC Montréal, QC, May 2023.
4. **D. A. Ripsman**, S. A. Alev, H. Mahmoudzadeh, "A Geometric Approach To Beam Angle Selection In Radiation Therapy Treatment Planning", INFORMS Annual Meeting, Indianapolis, IN, October 2022.
5. **D. A. Ripsman**, H. Mahmoudzadeh, "Structural Solution Approaches to Robust Optimization with Polyhedral Uncertainty", CORS/INFORMS International, Vancouver, BC, June 2022.
6. **D. A. Ripsman**, S. A. Alev, H. Mahmoudzadeh, "Closed-form Constraint Generation for Classes of Robust Polyhedral Uncertainty", INFORMS Annual Meeting, Anaheim, CA (Hybrid), October 2021.
7. **D. A. Ripsman**, S. A. Alev, H. Mahmoudzadeh, "A Geometric Approach To Beam Angle Selection In Radiation Therapy Treatment Planning", INFORMS Annual Meeting, Anaheim, CA (Hybrid), October 2021.
8. **D. A. Ripsman**, H. Mahmoudzadeh, "Closed-form constraint generation for robust radiation therapy treatment planning", CORS Annual Meeting, (Virtual), May 2021.
9. **D. A. Ripsman**, H. Mahmoudzadeh, T. C. Y. Chan, T. G. Purdie, "Robust Direct Aperture Optimization for Radiation Therapy Treatment Planning", INFORMS Healthcare, Cambridge, MA, July 2019.
10. **D. A. Ripsman**, H. Mahmoudzadeh, T. C. Y. Chan, T. G. Purdie, "Robust Direct Aperture Optimization for Radiation Therapy Treatment Planning", Canadian Healthcare Optimization Workshop, Saskatoon, SK, May 2019.
11. **D. A. Ripsman**, H. Mahmoudzadeh, T. C. Y. Chan, T. G. Purdie, "Robust Direct Aperture Optimization for Radiation Therapy Treatment Planning", CORS Annual Conference, Halifax, NS, June 2018.
12. **D. A. Ripsman**, H. Mahmoudzadeh, T. C. Y. Chan, T. G. Purdie, "Robust Mixed Integer Optimization for Radiation Therapy Treatment Planning with Delivery Constraints", Optimization Days, Montreal, QC, May 2017.
13. **D. A. Ripsman**, K. Ghobadi and D. M. Aleman. "Interactive visual decision support for radiation therapy treatment planning" (invited presentation), Industrial & Systems Engineering Research Conference (ISERC), Montreal, QC, June 2014.
14. **D. A. Ripsman**, K. Ghobadi and D. M. Aleman. "Interactive visual decision support for radiation therapy treatment planning", Undergraduate Engineering Research Day (UnERD), University of Toronto, ON, August 2013.
Second place in the Industrial Engineering Oral Presentations category.

Competitions

1. **D. A. Ripsman**, H. Mahmoudzadeh, T. C. Y. Chan, T. G. Purdie, "Warm-Started Robust Direct Aperture Optimization for Cancer Treatment Planning", CORS Health Care Operational Research SIG Student Presentation Competition, CORS Annual Conference, Saskatoon, SK, May 2019.
Competition Winner.
2. University of Waterloo Three-Minute Thesis Competition, Waterloo, ON, Canada, 2018.
Selected to represent the Management Science department as finalist.

Poster Presentations

1. **D. A. Ripsman**, K. Ghobadi and D. M. Aleman. "Graphical Interface for Interactive Parameter Selection in Radiation Therapy Treatment Planning", MIE Research Symposium, University of Toronto, Toronto, Canada, June 2013.

■ AWARDS

Scholarships

- 2019 – 2022 ■ NSERC CGS-D (\$105,000, \$35,000 for 3 years)
- 2018 – 2022 ■ Engineering Excellence PhD Fellowship (\$120,000, \$30,000 for 4 years)
- 2018 ■ Provost's Doctoral Entrance Award for Women (\$5,000 for 1 year)
- 2017 ■ University of Waterloo Graduate Scholarship (\$750 for 4 months)
- 2013 ■ NSERC Undergraduate Student Research Award (\$4,500 for 4 months)
- 2010 – 2011 ■ John Hirschorn Memorial Scholarship (\$20,000, \$10,000 for 2 years)
- 2010 ■ University of Toronto Scholars Scholarship (\$5,000 for 1 year)

Teaching Awards

- 2020, 2022 ■ Sandford Fleming Foundation TA award for TAing the R lab for the introductory statistics course, University of Waterloo

Competitions

- 2019 ■ First place in the CORS Health Care Operational Research SIG Student Presentation Competition, CORS Conference, Saskatoon, SK, Canada
- 2018 ■ Finalist, Three Minute Thesis (3MT) Competition. First Place in Department-Wide Heat, Finalist at the University of Waterloo Level, Waterloo, Canada
- 2014 ■ Third place, Simulation Competition, IIE's National Student Conference, Toronto, Canada
- 2013 ■ Third place, Operations Research Case Competition, Industrial Engineering Competitions Day (IECD), University of Toronto, Canada
- 2012 ■ First place, Student Design Competition, American Society of Mechanical Engineers (ASME), University of Toronto, Canada

■ TEACHING EXPERIENCE

- Course Instructor** **Department of Management Science & Engineering, University of Waterloo**
May 2023 – Aug 2023 *Taught the options section of Introduction to Optimization (MSCI 331)*
- Course instructor for a class of 112 upper-year undergraduate students
 - Oversaw two teaching assistants while also creating and administering online auto-graded assignments, written quizzes, midterms and exams
 - Executed all administrative tasks, including announcements, emails, grade-entry and documentation
 - Received $\geq 4/5$ in all 4 areas of instructor characteristic feedback in the student course perception (SCP) survey with 29 respondents
- Teaching Assistant** **Department of Management Science & Engineering, University of Waterloo**
Took on a variety of teaching assistant roles over the past 7 years
- Sep 2019 – Dec 2023* *MSCI 251: Probability and Statistics for Engineers 1*
- Designed and taught applied laboratories in R for Dr. Houra Mahmoudzadeh
 - Reconfiguring labs for virtual consumption during the pandemic
 - Asked back 4 times, for a total of 5 terms of TAing
- Sept 2023 – Dec 2023* *MSCI 734: Network Models*
- Helped grade assignments and projects for Dr. Fatma Gzara
- Jan 2022 – Apr 2022* *MSCI 435: Advanced Optimization Techniques*
- Graded, handled tutorials and answered student questions for Dr. Samir Elhedhli

- Jan 2022 – Apr 2022 *MSCI 703: Applied Optimization*
- Graded and generated answer manuals for Dr. Samir Elhedhli
- Jan 2019 – Aug 2019 *MSCI 401/2: Design Project*
- Assisted in course logistics and preparation for Dr. Ada Hurst
 - Organized and led discussion sessions
- Sept 2018 – Dec 2018 *Work Report Marking TA*
- Read and graded work term reports for course instructor, Dayna Chan
 - Provided constructive feedback on issues such as grammar and logic
- Jan 2017 – May 2017 *MSCI 436: Decision Support Systems*
- Used Visual Basic to prepare weekly tutorial slideshows for Dr. Majid Karimi
 - Taught tutorials, graded assignments, held office hours for the 42 students
- Sept 2017 – Dec 2017 *MSCI 331: Introduction to Optimization*
- Solved then graded assignments, exams for Dr. Abdelhalim Hiassat
 - Held weekly tutorials, office hours and posted solutions for 41 students

■ MENTORSHIP EXPERIENCE

- Graduate Mentor** **Department of Management Science & Engineering, University of Waterloo**
Worked with a number of undergraduate students on various projects
- 2023 **Gatik Gola**, undergraduate Co-op student. Motivated a project, recommended techniques and attended weekly meetings for a CT voxel sampling project.
- 2023 **Karina Wilk**, undergraduate Co-op student. Assisted in the onboarding, and weekly planning for the hospital optimization pipeline that began in my internship at the Grand River Hospital.
- 2021 – 2022 **William Kwong**, undergraduate research assistant. Suggested and oversaw the development of an interface for the seamless running of sampling protocols for fluence map optimization.
- 2021 **Tiantian Li**, undergraduate research assistant. Proposed and supported an exploratory project that focused on adapting existing, open-source radiation therapy tools to optimization software (CERR, vs. MatRad).
- 2019 **Gogilan Selvarajah**, undergraduate research assistant. Mentored, pair coded, and suggested project developments for a sliding window IMRT visualization.
- 2018 **Jessie Yeung**, undergraduate research assistant. Helped with background information and data acquisition for an IMRT sliding window modeling project.
- Student Mentor** **Mechanical & Industrial Eng. Mentorship Program, University of Toronto**
Fall 2012 – April 2014 *Provided advice and guidance for new students entering the department.*
- Met regularly with mentees
 - Discussed any relevant issues and departmental opportunities

■ RESEARCH EXPERIENCE

- Research Assistant** **Department of Management Science & Engineering, University of Waterloo**
Sept 2016 – Present *Researched under the supervision of Professor Houra Mahmoudzadeh.*
- Designed specialized models for radiation therapy treatment planning, often tailored for breathing uncertainties in breast cancer treatment planning
 - Used large clinical datasets and custom C++/CPLEX code bank to prototype and test models
 - Implemented structured visualizations using MATLAB software
- Thesis Student** **Toronto Intelligent Decision Engineering Laboratory, University of Toronto**
Sept 2015 – April 2016 *Studied scheduling under the supervision of Professor J. Christopher Beck.*
- Developed A*-based batch scheduling algorithms
 - Wrote a C++ implementation of Dijkstra and A* algorithms

Capstone Student **Addiction Medicine Services at the Centre for Addiction and Mental Health, Toronto, Canada**
Sept 2015 – April 2016

Worked under the supervision of Professor Michael Carter.

- Learned and streamlined clinic scheduling and resource allocation
- Collected data to build a simulation that was used to validate recommended interventions

Research Assistant **The Medical Operations Research Laboratory, Toronto, Canada**

Fall 2012 – May 2014

Researched under the supervision of Professor Dionne Aleman.

- Developed an interface for interactively improving radiosurgery treatments
- Took two fully functional prototypes from concept to completion using self-taught MATLAB programming
- Gave feedback on other students' research projects in weekly lab meetings

■ WORK EXPERIENCE

Student Intern **Medical Physics Department, Grand River Hospital, Kitchener, Canada**

Oct 2018 – Dec 2018

Worked on facilitating I/O for the radiation therapy treatment planning under the supervision of Dr. Ernest Osei.

- Worked with Varian's Eclipse software for designing and exporting plans
- Customized open source CERR modules for importing Eclipse DICOM files
- Wrote custom collimator rotation code and integrated it into CERR codes
- Validated the I/O mechanisms on patient plans

Rational Software Developer **IBM Canada Software Lab, Markham, Canada**

May 2014 – August 2015

Developed, tested and debugged new features for Eclipse-based enterprise software products under the supervision of Rob Cecco.

- Worked with IBM softwares such as Jazz, RFT, RTC
- Made 4 major bug fixes for the latest TPF Toolkit release
- Ran testing and debugging for TPF Toolkit and RDi softwares
- Used TPF, linux and IBMi commands to access files and run commands

Engineering Intern **Engineering Department, Rotork Controls Canada, Mississauga, Canada**

Summer 2012

Worked in a number of roles to facilitate actuator distribution and repair.

- Prepared engineering drawings and official customer documents
- Configured a Visual Basic based database of old engineering drawings for more efficient intracompany retrieval
- Assisted in the process and software training of an incoming full-time engineer

■ SERVICE EXPERIENCE

President **The Operations Research Challenge (TORCH), University of Waterloo**

Sept 2017 – Present

Brought the annual high school competition to the Waterloo region for the first time.

- Worked with volunteers both locally and from Concordia University and University of Toronto, to prepare for the March 2018, 2019 and 2020* competitions
- Took on the high level logistics roles for launching the competition, such as student and volunteer recruitment, funding, testing and scheduling
- Wrote competition questions, validators and assisted with automated grading software and recruited support for these tasks

Student Chapter President **Canadian Operations Research Society (CORS), Waterloo, ON**

Sept 2017 – Sept 2018,

Present

Organized regular events for operations research enthusiasts living in Waterloo.

- Coordinated speakers, events (socials, group discussions, meetings, etc.), for the local CORS Student Chapter
- Initiated email communication, on-boarding new members, website oversight, planning and delegation
- Helped boost local membership from less than 10 to nearly 30 active members

*Cancelled due to the pandemic

- MSSA President** **Management Sciences Student Association, University of Waterloo**
Sept 2016–August 2017 *Was elected to be the departmental representative of graduate students.*
- Budgeted, organized and advertised several invited speaker and social events
 - Kept an open line of communication between students, professors and staff
 - Attended and relayed information to the class from monthly departmental meetings, committee meetings and cross-departmental meetings
- Executive Member** **The Operations Research Challenge (TORCH), University of Toronto**
Fall 2014 – Winter 2016 *Assisted in the planning, organization and running of the annual competition.*
- Oversaw the creation of the 2016 contest as Co-Chief Creative Officer
 - Supervised students during 2015 contest, organized and graded
 - Edited 2015 contest problems in the role of Assistant Editor-in-Chief
 - Wrote a scheduling problem and an automated solver for grading
- Case Study Author** **Industrial Engineering Department, University of Toronto**
Fall 2014 *Wrote a case that was actively used as a teaching aid for the Cases in Operational Research (MIE367) course at the University.*
- Designed a case study to highlight the challenges of multi-criteria decision making through the study of a restaurant venture in the Greater Toronto Area
 - Created realistic data distributions pertaining to Toronto restaurant ownership
 - Built the corresponding financial planning simulation

■ ADDITIONAL EXPERIENCE

- YHack Hackathon** **Annual Yale Hackathon, New Haven, CT, USA**
2017 ■ Worked on a web hack for wavelet analysis to allow for the future implementation of real-time speech-based sentiment analysis
- CODE Hackathon** **Canadian Open Data Experience, Toronto, Canada**
2015 ■ Designed and implemented a website for recalled product alerts
- RBC Hackathon** **The Next Great Innovator, RBC Hackathon, Toronto, Canada**
2013 ■ Designed and implemented a working android application for social banking

■ SKILLS

- Technology** MATLAB, LaTeX, C/C++, CPLEX, Java, Minitab, Simul8, Arena, Gurobi, AMPL, Solidworks, Eclipse(+Pluggins), SQL, TPF Toolkit, RDi, Solid Edge, Visual Basic, Excel
- Proficiencies** Operations Research, Statistics, Linear Algebra, Simulation, Financial Modelling, Applied Design, Agile Development, Interface Design, Formal Reporting, Technical Writing, Poster Design, Decision Support

Last updated: January 25, 2024