# Rafid Mahmood

University of Toronto
Mechanical and Industrial Engineering
Toronto, Ontario, Canada

Phone: (647) 784-6242
Email: rafid.mahmood@mail.utoronto.ca
Homepage: http://rafidrm.github.io

## Education

### University of Toronto, Mechanical and Industrial Engineering

**Ph.D Industrial Engineering (Operations Research)** 2015–2020
Advisor: Professor Timothy C. Y. Chan
Vector Institute Postgraduate Affiliate, 2019-2020
Prospective Professors in Training Program, 2019

### University of Toronto, Electrical and Computer Engineering

**M.A.Sc. Electrical Engineering**, 2013–2015
Advisor: Professor Ashish Khisti
Thesis: Rank metric convolution codes with applications in network streaming

**B.A.Sc. Electrical Engineering**, 2008–2013
Graduated with Honours

## Publications

Articles for Operations Research-style journals use alphabetical author ordering. The primary author is denoted by *.

### In Preparation

1. A. Babier, T. C. Y. Chan, A. Diamant, and **R. Mahmood***, Interior Point Methods with Adversarial Networks.

### Under Review

1. A. Babier*, **R. Mahmood**, A. McNiven, A. Diamant, and T. C. Y. Chan, Knowledge-based Automated Treatment Planning with Three-dimensional Generative Adversarial Networks, *major revision at Medical Physics*, 2018.

2. A. Babier, T. C. Y. Chan, T. Lee, **R. Mahmood***, and D. Terekhov, A Unified Framework for Model Fitting and Evaluation in Inverse Linear Optimization, *major revision at Operations Research*, 2019.

*Previously titled Multiple observations and goodness of fit in generalized inverse optimization. Won Honorable Mention at CORS 2018 Best Student Paper Competition: Open Category.*

## Journal Articles

1. **R. Mahmood***, A. Badr, and A. Khisti, Streaming Codes for Multiplicative-Matrix Channels with Burst Rank Loss, *IEEE Transactions on Information Theory*, 64(7), 5296–5311, 2018.

2. **R. Mahmood***, A. Badr, and A. Khisti, Convolutional Codes with Maximum Column Sum Rank for Network Streaming, *IEEE Transactions on Information Theory*, 62(6), 3039–3052, 2016.

## Conference Proceedings

1. **R. Mahmood***, A. Babier, A. McNiven, A. Diamant, and T. C. Y. Chan, Automated Treatment Planning in Radiation Therapy with Generative Adversarial Networks, *Machine Learning for Health Care*, 484–499, 2018.

   *Won Runners' Up at CORS 2019 HCOR Student Presentation Competition.*

2. **R. Mahmood***, A. Badr, and A. Khisti, Low Delay Network Streaming Under Burst Losses, *IEEE International Symposium on Information Theory*, 2898–2902, 2016.

3. **R. Mahmood***, A. Badr, and A. Khisti, Convolutional Codes with Maximum Column Sum Rank for Network Streaming, *IEEE International Symposium on Information Theory*, 2271–2275, 2015.

4. A. Badr*, **R. Mahmood**, and A. Khisti, Embedded MDS Codes for Multicast Streaming, *IEEE International Symposium on Information Theory*, 2276–2280, 2015.

## Workshop Papers

1. A. Babier, T. C. Y. Chan, T. Lee, **R. Mahmood***, and D. Terekhov, Model Fitting in Generalized Inverse Linear Optimization: Applications in Radiation Therapy, *Canadian Healthcare Optimization Workshop*, 2019.

   *Workshop version of A Unified Framework for Model Fitting and Evaluation in Inverse Linear Optimization.*

2. A. Babier*, **R. Mahmood***, A. McNiven, A. Diamant, and T. C. Y. Chan, Automated Treatment Planning in Radiation Therapy with 3-D Generative Adversarial Networks, *NeurIPS Workshop on Machine Learning for Health*, 2018.

   *Workshop version of Knowledge-based automated treatment planning with three-dimensional generative adversarial networks.*

## Clinical Abstracts

1. A. Babier*, **R. Mahmood**, A. McNiven, A. Diamant, and T. C. Y. Chan, The Importance of Evaluating the Complete Knowledge-based Automated Planning Pipeline, *International Conference on the Use of Computers in Radiotherapy*, 2019.

2. A. Babier*, **R. Mahmood**, A. McNiven, and T. C. Y. Chan, An Optimization Method for Knowledge-based Automated Planning that Leverages Ensemble Dose Predictions, *American Association of Physicists in Medicine*, 2019.

3. A. Babier*, **R. Mahmood**, A. McNiven, and T. C. Y. Chan, Comparing Deep Learning Architectures for Knowledge-Based Automated Planning, *American Association of Physicists in Medicine*, 2019.

## Presentations

**Interior Point Methods with Adversarial Networks**

*(Scheduled)* INFORMS Annual Meeting, Seattle, WA, USA 2019

CORS Annual Conference, Saskatoon, SK, Canada 2019

GERAD Invited Seminar, Université de Montréal, Montréal, QC, Canada 2019

**A Unified Framework for Model Fitting and Evaluation in Inverse Linear Optimization**

*(Scheduled)* INFORMS Health Care, Boston, MA, USA 2019

CORS Annual Conference, Saskatoon, SK, Canada 2019

CORS Annual Conference, Halifax, NS, Canada 2018

INFORMS Annual Meeting, Houston, TX, USA 2017

CORS Annual Conference, Quebec City, QC, Canada 2017

INFORMS Annual Meeting, Nashville, TN, USA 2016

**Automated Treatment Planning in Radiation Therapy with Generative Adversarial Networks**

CORS Annual Conference, Saskatoon, SK, Canada 2019

MLHC Conference, Palo Alto, CA, USA 2018

**Convolutional Codes with Maximum Column Sum Rank for Network Streaming**

IEEE ISIT, Hong Kong, HK, China 2015

## Teaching Assistantships

**MIE 465: Analytics in Action** 2017–2019

*Was responsible for course creation in 2017*

**MIE 1620: Linear Programming and Network Flows** 2018

**MIE 258: Engineering Economics and Accounting** 2016–2017

**ECE 363: Communication Systems** 2015

## Students Supervised

1. Richard Chavez, Sliding Window Generative Adversarial Networks for Radiation Therapy, *Industrial Engineering 4th Year Thesis*, 2019.
   *Co-supervised with Aaron Babier*
2. Michael Shin, Using Portfolio Theory to Optimize Selection of Daily Fantasy Basketball Contests, *Engineering Science 4th Year Thesis*, 2018.
   *Co-supervised with Ben Potter*
3. Yusuf Shalaby, Inverse Optimization for Measuring Cancer Treatment Pathway Concordance, *Industrial Engineering 4th Year Thesis*, 2018.
   *Co-supervised with Nasrin Youssefi*
4. Palmira Pereira, Netflix Prize Problem Using Inverse Optimization, *Masters of Engineering Thesis*, 2017.

## Awards

1. Runners' Up, Health Care Operations Research Student Presentation Competition, CORS Annual Conference, 2019
2. Postgraduate Affiliate Program, Vector Institute, 2019 ($12 000)
3. Honourable Mention, Student Paper Competition: Open Category, CORS Annual Conference, 2018 ($100)
4. Postgraduate Doctoral Scholarship, NSERC, 2017 ($42 000)
5. First Place, Waterfront International Ltd. Quantathon, 2016 ($7 500)

## Industry Experience

**Opus One Solutions**, Toronto, ON, Canada 2019
Power Systems Optimization Expert

## Personal

Languages: English (fluent), French (beginner)

Citizenship: Canadian