

Craig Fernandes

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Education

PhD Operations Research, University of Toronto

Sep 2021 – Aug 2026

Advisors: Timothy C.Y. Chan and Ningyuan Chen

MASc Operations Research, University of Toronto

Jan 2020 – Aug 2021

Advisor: Timothy C.Y. Chan

cGPA: A+/A+ in all course work

BASc Industrial Engineering, University of Toronto

Sep 2014 – May 2018

Ranked 4th out of 105 students

Research Interests

Optimization, economics, public policy, engineering education, sports analytics

Working Papers

8. *Income pools for superstar markets*

Timothy Chan, Ningyuan Chen, Craig Fernandes

Under review at **Management Science**, 2023.

7. *Aiming for competitive balance: Developing fair handicap systems for darts using a Markov decision process framework*

Timothy Chan, Craig Fernandes, Rachael Walker

Working paper, 2023

- Finalist, CORS Student Paper Competition (Undergraduate Category), 2023 [Awarded to Rachael]

6. *Equity, diversity, and inclusion in sports analytics*

Craig Fernandes, Jason Vescovi, Richard Norman, Cheri Bradish, Nathan Taback, Timothy Chan

Minor Revision at **Journal of Quantitative Analysis in Sports**, 2022.

Published Papers

5. *Case Article – Moneyball for Murderball: Using analytics to construct lineups in wheelchair rugby*

Timothy Chan, Craig Fernandes, Albert Loa, Nathan Sandholtz

INFORMS Transactions on Education, forthcoming, 2023.

- First Place, INFORMS Case Competition, 2022

- Media Coverage: [ORMS Today](#)

4. *Advising student-driven analytics projects: A summary of experiences and lessons learned*

Aaron Babier, Craig Fernandes, Ian Zhu

INFORMS Transactions on Education, 23(2):121-135, 2023.

- Media Coverage: [ORMS Today](#)

3. *A Markov approach to untangling intention versus execution in tennis*

Timothy Chan, Doug Fearing, Craig Fernandes, Stephanie Kovalchik

Journal of Quantitative Analysis in Sports, 18(2): 127-145, 2022.

- Finalist, MIT Sloan Sports Analytics Conference Poster Competition, 2022

2. *Points gained in football: Using Markov process-based value functions to assess team performance*

Timothy Chan, Craig Fernandes, Martin Puterman

Operations Research, 69(3): 877-894, 2021.

- Second place, CORS Student Paper Competition (Undergraduate Category), 2018

1. *Predicting plays in the National Football League*

Craig Fernandes, Ronen Yakubov, Yuze Li, Amrit Prasad, Timothy Chan

Journal of Sports Analytics, 6(1): 35-43, 2020.

Conferences

Income Pools for Superstar Markets

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| - INFORMS Annual Conference, Phoenix (Oral) | 2023 |
| - INFORMS RMP Conference, London (Oral) | 2023 |
| - MSOM Conference, Montreal (Oral) | 2023 |
| - INFORMS Annual Conference, Indianapolis (Oral) | 2022 |
| - CORS / INFORMS International, Vancouver (Oral) | 2022 |

A Markov approach to untangling intention versus execution in tennis

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| - MIT Sloan Sports Analytics Conference, Boston (Poster) | 2022 |
| - New England Symposium on Statistics in Sports, Boston (Oral) | 2021 |
| - U of T Engineering Research Conference, Virtual (Poster) | 2021 |
| - CORS Annual Conference, Virtual (Oral) | 2021 |
| - Sport Innovation Summit, Virtual (Poster) | 2020 |

Points gained in football: Using Markov process-based value functions to assess team performance

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|--|------|
| - U of T Engineering Research Conference, Virtual (Poster) | 2020 |
| - Sport Innovation Summit, Virtual (Oral) | 2019 |
| - CORS Annual Conference, Virtual (Oral) | 2018 |

Predicting plays in the National Football League

- | | |
|--|------|
| - U of T Engineering Research Conference, Virtual (Poster) | 2020 |
| - Sport Innovation Summit, Virtual (Oral) | 2019 |
| - New England Symposium on Statistics in Sports, Boston (Oral) | 2017 |

Teaching Experience

Course Instructor

MIE368: Analytics in Action

Fall 2023

Teaching Assistant

MIE263: Stochastic Operations Research, Rated 4.62/5

Winter 2023

MIE368: Analytics in Action, Rated 4.86/5

Fall 2020, 2021, 2022

- MIE Teaching Assistant Award, 2022
- MIE Group Teaching Assistant Award, 2020

Research Mentorship

Developing fair handicap systems for darts using a Markov decision process framework

2023

R. Walker, **undergraduate thesis**

Defining Soccer Playing Styles through a Data-Driven Approach

2021

M. Arif, **undergraduate thesis** (co-advised with Binghao Zhang)

Drafting for the Columbus Blue Jackets

2021

D. Nalbantoglu, K. Smith, Y. Pan, **engineering capstone project** (co-advised with Timothy Chan)

Points Gained in Curling: Modelling Curling as a Markov Reward Process

2020

J. Tin, **undergraduate thesis** (co-advised with Timothy Chan)

Optimizing Lineup Selection Dynamically in Wheelchair Rugby

2020

A. Loa, **undergraduate thesis** (co-advised with Timothy Chan)

Professional Experience

Amazon.com, Data Scientist I

Summer 2021

- Formulated a gradient boosting classifier on AWS SageMaker to identify low performing promotions with an accuracy of 84%, resulting in an annual savings of \$25.6 million
- Presented results to senior leadership, garnering >\$100K of funding
- Established a cross-functional implementation and maintenance plan to productionalize the ML model, which is currently still deployed

PepsiCo, Process Improvement Engineering Intern

Fall 2019 | Summer 2017

- Managed a team of three junior interns to drive process improvement initiatives across the plant
- Utilized lean manufacturing methodologies to optimize the production on three major machines, resulting in annual savings of 101 hours of downtime and \$73,000
- Created a comprehensive database and dashboard for the Toronto and Moncton facilities to pinpoint the optimal allocation of maintenance resources and presented the results to senior leadership

Applied Research Projects

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| Redeploy.ca , Co-Founder & Consultant | 2020 |
| <ul style="list-style-type: none"> - Developed a full stack software tool to optimize hospital staffing during the COVID-19 pandemic, speeding up the process by 400% - Built the staffing algorithm using mathematical optimization and created a web application which received positive user feedback - Collaborated with and advised 20+ hospitals worldwide, including University Health Network and was featured in several news articles | |

Service

Session Chair

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| CORS / INFORMS International (Sports Analytics) | 2022 |
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Honors and Awards

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| Mitacs Globalink Research Award (\$6,000) | 2023 |
| TD MDAL Research Grant (\$4,000) | 2023 |
| U of T MIE TA Teaching Excellence Award (\$500) | 2023 |
| NSERC Vanier CGS (\$150,000) | 2023-2025 |
| NSERC CGS D [Declined] (\$105,000) | 2023-2025 |
| Wallberg Research Fellowship (\$7,500) | 2022 |
| First Place, INFORMS Case Competition (\$500) | 2022 |
| U of T SGS Conference Travel Grant (\$800) | 2022 |
| U of T MIE Conference Travel Grant (\$650) | 2022 |
| Finalist, MIT Sloan Sports Analytics Conference Poster Competition | 2022 |
| Ontario Graduate Scholarship (\$15,000) | 2021 |
| First place, U of T Engineering Research Conference (\$300) | 2021 |
| U of T MIE Group TA Teaching Excellence Award (\$300) | 2021 |
| NSERC Canada Graduate Scholarship Master's (\$17,500) | 2020 |
| Second place, U of T Engineering Research Conference (\$300) | 2020 |
| Second place, CORS Undergraduate Student Paper Competition (\$200) | 2018 |
| U of T CSA Group Award (\$5,000) | 2017 |
| U of T President's Entrance Scholarship (\$5,000) | 2014 |