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
R&R 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, MIT Sloan Sports Analytics Conference (Oral), 2024
- Finalist, CORS Student Paper Competition (Undergraduate Category), 2023 [Awarded to Rachael]

Published Papers

6. *Equity, diversity, and inclusion in sports analytics*
Craig Fernandes, Jason Vescovi, Richard Norman, Cheri Bradish, Nathan Taback, Timothy Chan
Journal of Quantitative Analysis in Sports*,* forthcoming, 2023.

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

- 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

- 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

- 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, 2024
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

Redeploy.ca, Co-Founder & Consultant 2020

- 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

CORS / INFORMS International (Sports Analytics) 2022

Honors and Awards

NSERC CGS MSFSS ($6,000)	2023
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 CGS M ($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