# Bora Yongacoglu | Curriculum Vitae

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## Education

**Queen's University** **Dec 2022**
*PhD, Applied Mathematics*
Thesis: Decentralized Learning in Stochastic and Mean-Field Games
Advisors: Serdar Yüksel and Gürdal Arslan

**Queen's University** **Aug 2018**
*Master of Science, Applied Mathematics*
Thesis: Reinforcement Learning for Decentralized Stochastic Control
Advisors: Serdar Yüksel

**McGill University** **June 2016**
*Bachelor of Arts*
Majors in Mathematics and Economics

## Research Interests

Learning in multi-agent systems, reinforcement learning, game theory, decentralized and large-scale systems, mean-field games, partially observed Markov decision problems, randomized algorithms

## Work Experience

**Post-Doctoral Fellow** **January 2023–August 2023**
*Department of Mathematics and Statistics, Queen's University*
Conducting research on reinforcement learning in random and decentralized systems.

**Teaching Fellow** **September 2020–April 2021**
*Department of Mathematics and Statistics, Queen's University*
Instructor for MTHE 493, a fourth year course for students in the Mathematics and Engineering program.

**Teaching Assistant** **September 2016–April 2020**
*Department of Mathematics and Statistics, Queen's University*
Various TA positions in the Department of Mathematics and Statistics, including graduate courses on information theory, stochastic processes, and stochastic control, and an undergraduate course on programming in MATLAB for engineering applications.

**Research Intern** **May 2014–August 2014**
*Department of Economics, McGill University*
Supervised by Professor Rohan Dutta, I conducted research on the role of information in conflict as part of the Arts Research Internship Award.

## Research Contributions

### Journal Papers

**Yongacoglu, B.**, G. Arslan, and S. Yüksel. "Decentralized Learning for Optimality in Stochastic Dynamic Teams and Games with Local Control and Global State Information." *IEEE Transactions on Automatic Control.* 67, no. 10 (2022).

### Peer-Reviewed Conference Papers

**Yongacoglu, B.**, G. Arslan, and S. Yüksel. "Independent Learning and Subjectivity in Mean-Field Games." *2022 IEEE 61st Conference on Decision and Control (CDC)* (pp. 2845-2850). IEEE.

**Yongacoglu, B.**, G. Arslan, and S. Yüksel. "Reinforcement Learning for Decentralized Stochastic Control." *2019 IEEE 58th Conference on Decision and Control (CDC)* (pp. 5556-5561). IEEE.

A. Altabaa, **Yongacoglu, B.**, and S. Yüksel. "Decentralized Multi-Agent Reinforcement Learning for Continuous-Space Stochastic Games." *American Control Conference* 2023 (to appear).

### Preprints (Under Review)

**Yongacoglu, B.**, G. Arslan, and S. Yüksel. "Satisficing Paths and Independent Multi-Agent Reinforcement Learning in Stochastic Games." arXiv: 2110.04638 (2022).

- Advanced to second round of reviews at *The Society for Industrial and Applied Mathematics Journal on Mathematics of Data Science*

**Yongacoglu, B.**, G. Arslan, and S. Yüksel. "Independent Learning in Mean-Field Games: Satisficing Paths and Convergence to Subjective Equilibria." arXiv: arXiv:2209.05703 (2022).

### Working Papers

G. Arslan, **Yongacoglu, B.**, and S. Yüksel. "Asynchronous Decentralized Q-Learning with Constant Step Sizes." (in preparation).

### Other Communications

Yongacoglu, B. "Policy Revision Dynamics and Algorithm Design in Stochastic and Mean-Field Games." *GERAD Seminar.* Polytechnique Montreal, February 15th, 2023.

**Yongacoglu, B.**, G. Arslan, and S. Yüksel. "Decentralized Q-Learning with Constant Aspirations in Stochastic Games." *2019 53rd Asilomar Conference on Signals, Systems, and Computers* (pp. 1744-1749). IEEE.

Yongacoglu, B. "Reinforcement Learning under Decentralized Information." [Poster] *Canadian Mathematical Society Winter Meeting* December 2017. Waterloo, Ontario.

Yongacoglu, B. "The Role of Information in Conflict." [Poster] *McGill University Arts Research Internship Gala.* December 2014. Montreal, Quebec.

## Project Supervision

As part of my teaching fellowship for MTHE 493 at Queen's University, I directly supervised capstone projects and final thesis reports of sixteen students, divided into four groups of four students. Over the course of two semesters, each group applied reinforcement learning techniques to the application area of their choosing. Applications included epidemic modelling, portfolio optimization, market making, and automated warehouse management.

## Professional Activities

**Various Journals** **2017-Present**
*Referee*
I have served as a referee for various academic journals and conferences, including *Transactions on Automatic Control*, *Automatica*, *Journal of Artificial Intelligence Research*, *Systems and Control Letters*, the *IEEE Conference on Decision and Control*, the *International Symposium on Information Theory*, the *American Control Conference*, and the *IEEE Transactions on Control of Network Systems*

**Stochastic Control and Related Fields Seminar Coordinator** **Winter 2023**
*Department of Mathematics and Statistics, Queen's University*

**Graduate Seminar Coordinator** **Fall 2022**
*Graduate Mathematics Society of Queen's University*

**Secretary and Treasurer** **2019-2020**
*Graduate Mathematics Society of Queen's University*

**President** **2018-2019**
*Graduate Mathematics Society of Queen's University*

**Industrial Problem Solving Workshop** **June 2018**
*Fields Institute and the National Research Council of Canada*
In a team of three collaborators, we analyzed the viability of infrared vision technology for aerial search-and-rescue. Our findings were presented at the National Research Council of Canada.

**Industrial Problem Solving Workshop** **August 2017**
*Pacific Institute for the Mathematical Sciences & CRM*
With a group of twelve collaborators, we used various randomized algorithms to optimize performance in a vehicle routing problem presented by *The Cooperators*.

## Awards and Honours

**2021-2022**: Senator Frank Carrel Fellowship ($10,000)
**2020-2021**: Ontario Graduate Scholarship ($15,000)
**2020-2021**: Dorrance Family Award ($7,000)
**2019-2020**: E.G. Bauman Fellowship ($15,000)
**2018-2019**: E.G. Bauman Fellowship ($15,000)
**2017-2018**: R. Samuel McLaughlin Fellowship ($10,000)
**2017-2018**: Queen's Graduate Award ($1,500)
**2016-2017**: Queen's Graduate Award ($4,000)
**2014** : McGill University Arts Research Internship Award ($4,000)

## Skills

### Programming Languages

Proficient in Python, LaTeX, and MATLAB.

### Public Speaking

- Several technical presentations delivered to audiences of 50+ professional researchers;
- Over 15 technical seminars delivered to groups of 10-20 people;

## Languages

English (native language), Turkish (bilingual proficiency), and French (professional working proficiency)

## Service

**Treasurer** **October 2022–October 2023**

*Kingston Bouldering Cooperative*

In a volunteer capacity, I served on the board of directors of a non-profit climbing gym. As treasurer, I handled the day-to-day finances of the organization, including the acquisition of professional services, bill payments, reimbursements, and bookkeeping.