

Nicholas André G. Johnson

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Education

Massachusetts Institute of Technology, Cambridge, MA
Candidate for PhD in Operations Research; expected completion, June 2024.
GPA: 5.0/5.0
Advisor: Dimitris Bertsimas

Princeton University, Princeton, NJ
BS in Engineering, June 2020. GPA: 4.0/4.0. Summa Cum Laude. Valedictorian.
Minors in Applications of Computing, Applied & Computational Mathematics, and Statistics & Machine Learning
Thesis title: *Sequential Stochastic Network Structure Optimization With Applications To Addressing Canada's Obesity Epidemic*

Work Experience

- 2020 -2022** **Black Wealth Club**, Montreal, Canada
Founding Board Member and Steering Committee Member
The Black Wealth Club is a non-profit established to help the Black community in Canada build wealth and reinvest it in their environment. By annually bringing together a cohort of emerging Black leaders with inspiring speakers and industry professionals, the BWC aims to enhance their leadership skills, network, and business acumen.
- 2020**
(Summer) **D. E. Shaw Group**, New York City, NY
Hybrid Quantitative Research and Software Developer Intern
Developed a simulated exchange environment and studied the optimal trading behavior of reinforcement learning agents trading against each other in this environment when given various forecasts.
- 2018-2020** **Princeton University - Whitman College**, Princeton, NJ
Residential College Adviser (RCA)
Worked closely with a group of first year advisees to help them transition to life as Princeton students and develop responsible personal, academic, and social decision-making skills.
- 2017-2020** **Princeton University Writing Center**, Princeton, NJ
Writing Fellow
Offered 150+ individual 50-minute conferences to undergraduate and graduate students across all disciplines to workshop various forms of written work and develop their writing skills.
- 2019**
(Summer) **Google**, Mountain View, CA
Machine Learning Software Engineering Intern
Developed a pipeline to incorporate the image content of image based advertisements when deciding which advertisement(s) to display to a user following a Google search query. This

enhances user experience and optimizes Google's advertisement revenue, which comprises 70% of total revenue.

Research Experience

- 2020–Present** **Massachusetts Institute of Technology**, Cambridge, MA
Research Assistant
Advisor: Dimitris Bertsimas
Research focused on making methodological and algorithmic contributions to discrete optimization and leveraging modern advances in discrete optimization to solve central machine learning problems exactly at scale without using heuristics.
- 2022** **Bain Capital Crypto**, San Francisco, CA
Researcher In Residence
Supervisor: Guillermo Angeris
Research focused on tackling central problems in Decentralized Finance and Blockchain scaling using tools from convex analysis, mathematical optimization (convex, discrete, robust, stochastic) and game theory.
- 2019-2020** **Princeton University**, Princeton, NJ
Research Assistant
Supervisor: Miklos Racz, Yacine Ait-Sahalia and Prateek Mittal
Research broadly focused on sequential decision problems in healthcare and in finance, and research focused on developing privacy preserving machine learning methods.
- 2018-2019** **Oxford University**, Oxford, United Kingdom
Research Intern
Supervisor: Aleksandr Sahakyan
Research focused on developing novel combinatorial optimization techniques to solve specific problem of interest in computational biology.
- 2018** **Montreal Institute of Learning Algorithms**, Montreal, Quebec
Research Intern
Supervisor: Yoshua Bengio
Research focused on reproducing and expanding upon state of the art ResNet results for Computer Vision.

Teaching Experience

- 2022**
(Fall) **Massachusetts Institute of Technology**, Cambridge, MA
Teaching Assistant for 15.095 Machine Learning Under a Modern Optimization Lens
Duties: preparing and leading recitations, developing and grading assignments and exams, holding office hours, and supervising final projects.
- 2021**
(Fall) **Massachusetts Institute of Technology**, Cambridge, MA
Teaching Assistant for 15.060 Data, Models and Decisions
Duties: preparing and leading recitations, developing and grading assignments and exams, holding office hours, and supervising final projects.

Publications

"Sparse Plus Low Rank Matrix Decomposition: A Discrete Optimization Approach", with Dimitris Bertsimas, and Ryan Cory-Wright, submitted to *Journal of Machine Learning Research*, September, 2021.

"Optimus: a general purpose adaptive optimization engine in R", with Xin Liu, Liezel Tamon, and Aleksandr Sahakyan, submitted to *Oxford University Press Bioinformatics*, January, 2022.

"Sequential Stochastic Network Structure Optimization with Applications to Addressing Canada's Obesity Epidemic", with Miklos Racz. Preprint available on arXiv.

"Greek Government School Choice Design", with Dimitris Bertsimas, Michael Lingzhi Li, and Alex Paskov, ongoing work.

"Compressed Sensing: A Discrete Optimization Approach", with Dimitris Bertsimas, ongoing work.

"Concave Pro-rata Games", with Theo Diamandis, Alex Evans, Henry de Valence and Guillermo Angeris, ongoing work.

"Optimal Routing with Gas is Convex", with Theo Diamandis, Guillermo Angeris and Alex Evans, ongoing work.

"Robust Optimal Routing", with Guillermo Angeris and Alex Evans, ongoing work.

Honors and Awards

- 2022** Dr. Angela E. Grant Best Algorithm Award
"Sparse Plus Low Rank Matrix Decomposition: A Discrete Optimization Approach"
Awarded at the 2022 Conference for African American Research in the Mathematical Sciences.
- 2021** INFORMS Data Mining Section Student Paper Competition 1st Place
"Sparse Plus Low Rank Matrix Decomposition: A Discrete Optimization Approach"
Awarded by the Data Mining Section at INFORMS 2021.
- 2020** INFORMS Undergraduate Operations Research Prize Honorable Mention
"Sequential Stochastic Network Structure Optimization With Applications To Addressing Canada's Obesity Epidemic"
The award honors a group of students who conducted significant applied or theoretical work in operations research as undergraduate students.
- 2020** Contrary Capital – C20 Talent Fellow
A fellowship awarded to a select group of top early-career engineers and product minds working in technology.
- 2020** The James Hayes-Edgar Prize in Engineering
Awarded by Princeton University to the engineering student who has best manifested excellent scholarship, capacity for leadership and the promise of achievement in engineering.

- 2020** The Frank Castellana Prize
Established in 1999, the prize is awarded by the Princeton Operations Research and Financial Engineering department to a senior for outstanding scholarship and academic achievement.
- 2020** Richard D. Challener '44 Senior Thesis Prize in Canadian Studies
Established in 2000 in honor of Professor Richard D. Challener, Princeton Class of 1944, the Challener prize is awarded by the Faculty Committee on Canadian Studies to an undergraduate senior in any department or program who's senior thesis is of outstanding quality on a topic having substantial relevance to Canadian culture, themes, experiences or issues.
- 2019** Rhodes Scholarship Finalist
Selected as one of 12 finalists for the 2020 Quebec Rhodes Scholarship.
- 2019** The Class of 1939 Princeton Scholar Award
Awarded each year by Princeton University to the undergraduate who, at the end of junior year, has achieved the highest academic standing for all preceding college work at the University
- 2019** Dr. Angela E. Grant Best Modelling Award
"Optimus: A General Purpose Monte Carlo Optimisation Engine in R"
Awarded at the 2019 Conference for African American Research in the Mathematical Sciences.

Skills and Activities

Programming Languages: Java, Python, C, C++, R, Julia, Matlab, SQL, Solidity
Optimization Software: JuMP, CPLEX, MOSEK
Languages: English (native), French (fluent)
Extracurriculars: Chess, Basketball, Fitness

Citizenship Citizen of Canada, Bahamas