

Research Profile

Ph.D. candidate in Applied and Computational Mathematics at Princeton University, advised by Maria Chudnovsky. I work on structural graph theory and graph algorithms, especially induced subgraphs, induced minors, tree decompositions, and tree-independence number, with a secondary focus on classical simulation of quantum circuits.

Education

2023–2027 (expected)	Ph.D. in Applied and Computational Mathematics Advisor: Maria Chudnovsky. Qualifying examination passed in 2024.	Princeton University
2020–2021; 2022–2023	M.Sc. in Computer Science Advisor: Gilles Brassard. GPA: 4.3/4.3.	Université de Montréal
2021–2022	M.Sc. in Mathematics and Foundations of Computer Science Awarded with distinction. Advisor: John van de Wetering.	University of Oxford
2017–2020	B.Sc. in Mathematics and Computer Science Awarded with honours; valedictorian. GPA: 4.279/4.3.	Université de Montréal

Selected Research

- M. Chudnovsky, J. Codsi, S. Hajeji, and S. Spirk.** *Induced subgraphs and tree decompositions XIX: Thetas and forests.* *SIAM Journal on Discrete Mathematics*, 2026.
- M. Bucić, M. Chudnovsky, and J. Codsi.** *Counting independent sets in structured graphs.* *Combinatorics, Probability and Computing*, 2025.
- M. Chudnovsky, J. Codsi, J. P. Gollin, M. Milanič, and V. Sivashankar.** *Tree-independence number and forbidden induced subgraphs: Excluding a 6-vertex path and a $(2, t)$ -biclique.* *Preprint*, 2026.
- J. Codsi, S. U. Ngueveu, and B. Gendron.** *LinA: A faster approach to piecewise linear approximations using corridors and its application to mixed-integer optimization.* *Mathematical Programming Computation*, 2025.
- J. Codsi and J. van de Wetering.** *Classically simulating intermediate-scale instantaneous quantum polynomial circuits through a random graph approach.* *Physical Review A*, 2025.

Experience and Teaching

2024–present	Teaching Assistant Current: MAT214 Numbers, Equations, and Proofs. Previous courses include Advanced Graph Theory, Topics in Graph Theory, and Calculus I.	Princeton University
2018–2020	Undergraduate Research Assistant Research in operations research, analytic number theory, and graph theory; developed and maintained the Julia package LinA.jl.	Université de Montréal

Selected Talks

2026	A Tale of the Tree-Independence Number Graph Theory Seminar.	Georgia Tech
2025	Tree independence number of graphs with no induced $S_{t,t,t}$, $K_{t,t}$, and line graph of subdivided walls Solving Problems on Graphs: From Structure to Algorithms.	Dagstuhl Seminar
2023	Classically Simulating Quantum Supremacy IQP Circuits through a Random Graph Approach Quantum Physics and Logic Conference.	QPL 2023

Selected Honors

- Google PhD Excellence Scholarship** (\$25,000), 2021
- Canada Graduate Scholarship---Doctoral** (\$105,000), 2021–2024
- Doctoral Research Scholarship**, FRQ, 2021–2025

Service and Skills

- Organizer, PACM Social (2024–present). Referee for SODA, SIDMA, QPL, and the Electronic Journal of Combinatorics.
- Languages:** French (native), English (fluent).
- Programming:** Julia, Python, Rust, Java, OCaml, JavaScript, C, $\LaTeX$, Git.