Edward Hallé-Hannan

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Education

Polytechnique Montréal — Montréal, QC
Ph.D.: Applied mathematics — 2022–today

- **Thesis**: *Advances in constrained blackbox optimization problems with categorical and meta variables*
- **GPA** : 4/4 (17 credits)
- **Supervision**: Pr. Charles Audet, Pr. Sébastien Le Digabel and Pr. Youssef Diouane

Polytechnique Montréal — Montréal, QC
M.Sc.A : Applied mathematics — 2020–2022

- **Master's thesis**: *A general mathematical framework for constrained blackbox optimization problems with meta and categorical variables*
- **GPA**: 4/4 (18 credits)
- **Supervision**: Pr. Charles Audet and Pr. Sébastien Le Digabel

Polytechnique Montréal — Montréal, QC
B.Ing: Engineering physics — 2016–2020

- **Specialization**: Mathematics
- **GPA**: 3.84/4 (126 credits)
- **Experience** : two research internships funded by NSERC-FRQNT

Scholarships and awards

PhD

- FRQNT scholarship: $100,000 over four years (partially held concurrently with NSERC) — 2023–2027
- NSERC scholarship: $63,000 over three years — 2023–2026
- Trottier Energy Institute scholarship: $51,000 over three years — 2022–2025
- GERAD conference grant: $1,750 (ICIAM 2023 conference in Japan) — 2023

Master's

- Nomination for the Best Master's Thesis in Applied Mathematics at Polytechnique Montréal — 2022
- IVADO Excellence Scholarship: $40,000 over two years — 2020–2022
- Hydro-Québec Excellence Scholarship: $10,000 over one year — 2020–2021

Bachelor's

- NSERC Undergraduate Student Research internship award: $4,500 over one term — 2019
- FRQNT Undergraduate Research internship scholarship: $2,000 over one term — 2019
- NSERC Undergraduate Student Research internship award: $4,500 over one term — 2018
- FRQNT Undergraduate Research internship scholarship: $2,000 over one term — 2018

First-author publications

1. C. Audet, Y. Diouane, E. Hallé-Hannan, S. Le Digabel and C. Tribes (2025). "Surrogate-based categorical neighborhoods for mixed-variable blackbox optimization". *In preparation.*

2. C. Audet, Y. Diouane, E. Hallé-Hannan, S. Le Digabel and C. Tribes (2025). "CatMADS: Mesh adaptive direct-search for constrained blackbox optimization with categorical variables". *Submitted to SIAM Journal of Optimization (SIOPT)*. Pre-print: arXiv.

3. E. Hallé-Hannan, C. Audet, Y. Diouane, S. Le Digabel and P. Saves (2025). "A distance for mixed-variable and hierarchical domains with meta variables". *Neurocomputing* 653, 131208. doi: 10.1016/j.neucom.2025.131208

4. C. Audet, E. Hallé-Hannan et S. Le Digabel (2023). "A General Mathematical Framework for Constrained Mixed-variable Blackbox Optimization Problems with Meta and Categorical Variables". *Operations Research Forum* 4.12. doi: 10.1007/s43069-022-00180-6

Co-author publications

1. P. Saves, E. Hallé-Hannan, J. Bussemaker, Y. Diouane and (2025). "Hierarchical Modeling and Architecture Optimization: Review and Unified Framework". *Submitted to Advances in Engineering Software*. Pre-print: arXiv.

Technical reports

1. E. Hallé-Hannan, C. Audet, Y. Diouane, S. Le Digabel and C. Tribes (2025). "Cat-Suite: A collection of optimization problems with categorical and quantitative variables for benchmarking". Rapport technique, *Les cahiers du GERAD*. Manuscript: G-2025-39.

Conference presentations

1. *CatMADS: categorical variables with the MADS algorithm – Canadian Mathematical Society Summer Meeting*. International conference in Quebec City (June 2025).

2. *CatMADS: categorical variables with the MADS algorithm* – Optimization Days (JOPT) organized by GERAD and CIRRELT. International conference in Montreal (May 2025).

3. *A graph-structured distance for heterogeneous datasets with meta variables* – 25th International Symposium on Mathematical Programming (ISMP). International conference in Montreal (July 2024). Session chair: *Challenging derivative-free optimization and simulation-based optimization 2*.

4. *A graph-structured distance for heterogeneous datasets with meta variables* – Optimization Days (JOPT) organized by GERAD and CIRRELT. International conference in Montreal (May 2024).

5. *A General Blackbox Optimization Framework for Hyperparameter Optimization in Deep Learning* – 10th International Congress on Industrial and Applied Mathematics (ICIAM 2023 Tokyo). International conference in Tokyo (August 2023).

6. *A General Blackbox Optimization Framework for Hyperparameter Optimization in Deep Learning* – Optimization Days (JOPT) organized by GERAD and CIRRELT. International conference in Montreal (May 2023). Session chair: *Derivative-free and blackbox optimization V.*

7. *A General Blackbox Optimization Framework for Hyperparameter Optimization in Deep Learning* – SIAM Conference on Computational Science and Engineering (CSE23). International conference in Amsterdam (March 2023).

8. *Notation framework for hyperparameter tuning in deep learning* – Optimization Days (JOPT) organized by GERAD and CIRRELT. International conference in Montreal (May 2022).

9. *Cadre mathématique pour l'optimisation des hyperparamètres en I.A* – Octobre numérique organized by IVADO. Provincial conference (October 2021).

Supervision

1. Noam Charette (*2nd year, Electrical Engineering*) for an NSERC–FRQNT undergraduate research internship at Polytechnique Montréal and GERAD. *Development of hyperparameter optimization problems for mixed and hierarchical optimization* – May 2025 to August 2025.

2. Elie Boulanger (*4th year, Computer Engineering*) for an undergraduate research internship at Polytechnique Montréal and GERAD. *Design of realistic blackboxes for hyperparameter optimization with categorical variables* – May 2025 to August 2025.

3. Amaury Diopus'kin (*Master 2*) for a research internship at GERAD. *Implementation of a code architecture to address hyperparameter optimization problems in deep learning* – April 2022 to September 2022.

Teaching Experience

Department of Mathematics and Industrial Engineering, Polytechnique Montréal — Montreal, QC

Lab Instructor

Teaching laboratory sessions: theoretical exercises and computer lab sessions.

- MTH1115 – Differential Equations (Fall 2025)
- MTH2302B – Probability and Statistics (Summer 2022)
- MTH2402 – Operations Research (Winter 2022)
- MTH2312 – Advanced Statistical Methods (Winter 2022)

Teaching Assistant

- MTH8418 – Derivative-Free Optimization (Fall 2021 – present)
  - Develop and supervise a course project on challenging blackbox optimization
  - Teach two to three lectures related to the project
  - Grade the project across two deliverables

Reviewer for academic journals

1. Journal of Optimization Theory and Applications

2. Optimization Methods and Software