Andrew NAGUIB [IPA:/næˈguːib/] AMS American Mathematical Society

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(impact ~2.6m)

Researcher focused on optimization and learning for high-dimensional, noisy, and partially observed systems.

Education

Ph.D. (09/2025-09/2029)
Combinatorics and Optimization, Faculty of Mathematics, University of Waterloo.
Research Area: Optimal Transport; Advisors: Stephen A. Vavasis and Henry Wolkowicz.

M.Math. (01/2024-05/2025)
Combinatorics and Optimization, Faculty of Mathematics, University of Waterloo,
Thesis: "Analysis of the Three-operator Davis-Yin Splitting in the Inconsistent Case".
URI: https://hdl.handle.net/10012/21757; Advisor: Walaa Moursi.
(Passed Ph.D. Comprehensive Exams in Continuous Optimization and Cryptography.)

B.Sc. (*Honours*) (09/2015-09/2019)
Computer Science and Information Systems, Helwan University.
(Graduated in the *top 1%* of the class.)

Selected Coursework
Convex Analysis; Probability and Statistics; Continuous Optimization; Artificial Intelligence; Discrete Mathematics; Reinforcement Learning; Machine Learning with Graphs.

Interests

Operations Research; Cryptography; Automated Reasoning; Machine Learning.

Preprints

Moursi, W. M., *Naguib, A.*, Pavlovic, V., Vavasis, S. A. *Accelerated Proximal Gradient Methods in the affine-quadratic case: Strong convergence and limit identification.* arXiv:2511.06560.

Naguib, A., Yousef, W. A., Traoré, I., Mamun, M. *On Statistical Learning of Branch and Bound for Vehicle Routing Optimization.* arXiv:2310.09986.

Projects

(C++, Python, Rust, Lean, PyTorch, JAX, Slurm, PostgreSQL, Docker)

zk-auctions
Sealed-bid auction toolkit for first- and second-price auctions, using zero-knowledge proofs over zkVM execution to identify auction winner while keeping bids private using RISC Zero.
*Recipient of a **24,000 US$** grant from Ethereum Foundation (Grant ID: FY24-1412).*

GCC-Rust
Contributed to building the High-Level Intermediate Representation in the GCC front-end for Rust, including a new hir-pretty dump option and a pretty-printing visitor skeleton.

principia
Lean4 formalization of Russell & Whitehead's *Principia Mathematica* (Vol. I), including a metaprogrammed `Syll` tactic to mirror Principia's syllogistic reasoning.

ml4vrp
Learning-to-branch for CVRP/BPP in SCIP: trained GCNN/GraphSAGE/GAT to imitate Strong Branching (SB); matched or improved SB with 2×–8× speedups.

École
Developed integer programs for vehicle routing and bin packing problems to export the Branch and Bound decisions.

Online Judge
ICPC-style online judge plugin for Moodle; auto-grades code submissions via sandboxed local execution or Sphere Engine (40+ programming languages).
***Used by 10 universities** as reported by Moodle Org., Jan 2026.*

Workshops

Strategies for Handling Applications with Nonconvexity, BIRS , Banff, Canada.

The International Symposia on Mathematical Programming, MOS, Montréal, Canada.
(*Topics: Optimization with Least Constraint Violation, Online Linear Programming, ...)*

Deep Reinforcement Learning, Vrije Universiteit (VU University Amsterdam), Amsterdam, Netherlands.
(*Topics: Symmetry in RL, Model-based RL, Temporal Difference Methods, Hierarchical RL, ...).*

Professional Experience

University of Waterloo

Research Associate (05/2025-09/2025)
- Worked on convergence theory for accelerated proximal gradient methods, including FISTA, proving weak iterate convergence and identifying the limit point in affine settings.

Teaching Assistant (01/2024-05/2025)
- CO687: Applied Cryptography; CO673: Optimization for Data Science; CO372: Portfolio Optimization; CO250: Intro. to Optimization; MATH136: Linear Algebra.

English (Fluent); Arabic (Native); French (Elementary).

This résumé can be downloaded at ndrwnaguib.github.io.
XeLaTeX-ed on February 3, 2026 from git commit 969e55d.