Andrew NAGUIB [IPA:/næˈguːib/]

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(impact ~2.5m)

Education

M.Math. (expected; 04/2025)
Combinatorics and Optimization, University of Waterloo, Grade 89.5%,
(Passed Ph.D. Comprehensive Exams in Cryptography and Continuous Optimization).

M.A.Sc.
Electrical and Computer Engineering, University of Victoria, CGPA 8.0/9.0.
Thesis: "Solving Combinatorial Optimization Problems using Statistical Learning".

Awards
2021: University of Victoria Graduate Award; **$3,443.77**.
2022: International Student Award **$500.00**.

B.Sc.[1] (*Honours*)
Computer Science, Helwan University, with a minor specialization in *information systems*. CGPA 3.49/4.0.
Project: "Learning to imitate writing styles using sequential models and a mixture of autoencoders for supervised and unsupervised settings".

Selected Coursework
Variational Analysis; Linear Algebra; Probability and Statistics; Artificial Intelligence; Computational Complexity; Automated Theorem Proving; Information Theory.

Publications

- Walaa M. Moursi and Andrew Naguib. "On the Range of the Davis-Yin Operator and Convergence of the Shadows in the Inconsistent Case within Infinite-Dimensional Hilbert Spaces" (in progress).
- Andrew Naguib, Waleed A. Yousef, Issa Traoré, and Mohammad Mamun. "On Statistical Learning of Branch and Bound for Vehicle Routing Optimization". URL: https://arxiv.org/abs/2310.09986 *(to be submitted at Elsevier's PRL)*.

Programming Languages & Tools

Python; C++; Rust; Bash; Mathematica; Lean.

PyTorch; JAX; CVX(-PY); OR-tools; CPLEX; SCIP; TorchServe; NetworkX; Ray; Kafka; PostgreSQL; Elasticsearch; WandB; BigQuery; Airflow; GCP; Docker; Envoyproxy; Grafana; HDFS.

(Arch) Linux; Emacs; Git.

Projects

zk-auctions
A zero-knowledge-proof-based toolkit for executing First- and Second-price sealed bid auctions on Blockchains (sponsored by Ethereum Foundation - **24,000 US$**)

principia
Formalized Bertrand Russell's first volume of "Principia Mathematica" using Lean, translating foundational logic into *verifiable* code.

École
Developed integer programs for vehicle routing and bin packing problems to export the Branch and Bound decisions (enables the use of ML to approximate solutions).

GCC-Rust
Contributed to building the High-Level Intermediate Representation in the GCC front-end for Rust.

Online Judge
The plugin grades source code (with support for 60+ programming languages) by testing against pre-defined test cases (ICPC Style) with integration to Moodle LMS.
Used by 16 universities as reported by Moodle Org., Aug 2023

Distributed LP Solving
Developing a back-end solver for SCIP to simultaneously solve multiple linear programs in a mixed integer program (theoretically backed by the ADMM).

Workshops

The International Symposia on Mathematical Programming, Mathematical Optimization Society, Montréal, Canada.

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

Information and Storage Management, DELL EMC, Cairo, Egypt *(certified EMC Associate)*.
(*Topics: RAID levels, cloud deployment models, LVMs, network virtualization, ...)*

[1] First-generation college student.

This résumé can be downloaded at ndrwnaguib.com.
XeLaTeX-ed on November 20, 2024 from git commit 18a3093.

Teaching Experience

Teaching Assistant

University of Waterloo

- (Winter 2025) CO 487: Applied Cryptography
- (Fall 2024)
  (i) CO673: Optimization for Data Science
  (ii) CO456: Introduction to Game Theory *(substituted for the course instructor and delivered two lectures on Myerson's Lemma and Knapsack Auctions)*
- (Spring 2024) CO250: Introduction to Optimization
- (Winter 2024) CO250: Introduction to Optimization

University of Victoria

- (Fall 2023) CSC370: Database Systems.
- (Spring 2022) ECE570: Computer Forensics Methodologies.

Professional Experience

Torchlight AI
(Software Engineer)

- Devising statistical methods for learning to cluster network activities.
- Designing a multi-region RESTful API back-end based on Apigee, GKE, Docker, Cloud Monitoring, Cloud Trace/Logging, and Cloud Load Balancing.
- Maintainer and developer of a network-activity tagging system which includes data cleansing, refinement, and storage as well as user behavior analysis.

Military Service

ICT CUBE
(Software Engineer)

Contributed to building a data analytics platform (which is designed using a microservice architecture) by:

- Developing a distributed tracing, service mesh, monitoring, and alert solution by combining Jaeger, Envoyproxy, and Grafana.
- Developing data normalizers/analyzers to be used in Elasticsearch.
- Developing a container-scaling solution from scratch using Bash and Docker.
- Designing the MLOps pipeline based on HDFS, Kubernetes, Apache Spark, Apache Kafka, ONNX, Memcached, Torch Serve, and JupyterHub.

Interests

game theory, software engineering, **combinatorial optimization**, **machine learning**, type theory, **[modal, temporal, doxastic] logic**, set theory, distributed computing, automated reasoning, languages, open-source.

Member of

The American Mathematical Society , Mathematical Optimization Society , and Canadian Operational Research Society .

Personal Information

Born in Cairo, Egypt, I presently reside in Waterloo, ON, Canada. Proficient in both English and Arabic, I am currently acquiring proficiency in French.