

Andrew NAGUIB [IPA: /næ'gu:ib/]

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Education

M.Math.
(01/2024-01/2026)

Combinatorics and Optimization, University of Waterloo.
(research area: monotone operator theory).

M.A.Sc.
(05/2021-05/2023)

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)
(09/2015-09/2019)

Computer Science, Helwan University, with a minor specialization in *information systems*. CGPA 3.49/4.0.

Project: "Learning writing styles using sequential models and a mixture of auto-encoders for supervised and unsupervised settings".

Selected
Coursework

Artificial Intelligence; Linear Algebra; Probability and Statistics; Machine Learning with Graphs; Reinforcement Learning; Convex and Non-Linear Optimization; Algorithms.

Publications

- Andrew Naguib, Waleed A. Yousef, Issa Traoré, and Mohammad Mamun. "On Statistical Learning of Branch and Bound for Vehicle Routing Optimization". (2023). URL: <https://arxiv.org/abs/2310.09986> (under review at Elsevier's AIJ).
- Waleed A. Yousef and Andrew Naguib. "Imaging Tabular Data on an Ensemble of Parallel Coordinates using Deep Neural Networks." (in progress).

Programming Languages & Tools

Python; C++; Java; Bash; Mathematica; Lean4.

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; SVN.

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\$**)

Molecule
Reconstruction

Trained and designed a Graph Auto-Encoder to reconstruct molecules representation, properties, bonds, and atoms (as an extension to [chemprop](#)).

Distributed LP
Solving

Developing a back-end solver for SCIP to simultaneously solve multiple linear programs in a MIP (theoretically backed by the ADMM).

Deep Learning
on CPU

Leveraged the SLIDE algorithm (which exploits locally-sensitive hashing) together with Fourier Transform to train ResNet on an FPGA processor.

[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

Workshops

[The International Symposia on Mathematical Programming](#), Mathematical Optimization Society, Virtual.

(Topics: Optimization with Least Constraint Violation, Online Linear Programming, ...)

[Deep Reinforcement Learning](#), Vrije Universiteit (VU ) 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, ...)

Professional Experience

Torchlight AI
(Software Engineer)
(07/2022-11/2023)

- Devising 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
(10/2019-12/2020)

ICT CUBE
(Software Engineer)
(09/2018-09/2019)

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.

Teaching Experience

University of Waterloo



- (Fall 2024) CO673: Optimization for Data Science
- (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.

Teaching Assistant

Interests

game theory, software engineering, **combinatorial optimization**, **machine learning**, **reinforcement learning**, graph theory, **modal logic**, distributed computing, automated reasoning, languages, open-source   (; impact ~2.4m).

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.

Member of

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