

MASSINISSA MEROUANI

Ph.D. Candidate at New York University

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Google Scholar Profile 

RESEARCH INTERESTS

Broad Interests: Applied Machine Learning, Computer Systems, High-Performance Computing

Focus Areas: ML for Systems Optimization, AI-Driven Code Optimization, Efficient Deep Learning Systems, Generative AI for Automated Performance Engineering.

EDUCATION

New York University - NYU Tandon School of Engineering

Sept. 2022 - Present

Ph.D. in Computer Science (GPA: 4.0/4.0)

New York, USA

- Advisor: Professor Riyadh Baghdadi.
- Honors: Recipient of the NYUAD Global Ph.D. Fellowship.
- Expected Graduation: Fall 2026.

École Nationale Supérieure d'Informatique

Sept. 2015 - Dec. 2020

Master's Degree in Computer Systems

Algiers, Algeria

- Joint B.S. & M.S. 5-year Integrated Program.
- Graduation Thesis: A Deep Learning Based Cost Model for Automatic Code Optimization in Tiramisu.

EXPERIENCE

New York University Abu Dhabi (NYUAD)

Sept. 2022 - Present

Graduate Research Assistant

Abu Dhabi, UAE

- Conducting doctoral research on AI-driven code optimization within the Modern Compilers Lab.
- Designed end-to-end pipelines for automatic program scheduling, utilizing techniques ranging from supervised learning to LLM-based reasoning agents.
- Mentored undergraduate and master's students on systems and compiler optimization projects.

New York University Abu Dhabi (NYUAD)

Jan. 2021 - Aug. 2022

Research Engineer

Abu Dhabi, UAE

- Led engineering efforts to integrate ML optimization techniques into the Tiramisu compiler.
- Designed a distributed data collection framework to profile thousands of code schedules, generating large-scale labeled datasets to address data scarcity in automatic optimization.
- Architected and optimized deep learning models for code performance prediction, contributing to multiple research projects within the group.

Massachusetts Institute of Technology (MIT)

Aug. 2019 - July 2020

Research Intern (CSAIL - COMMIT Group)

Cambridge, USA (Remote)

- Developed the first LSTM-based cost model for the Tiramisu compiler, formulating the scheduling as a ranking problem; this approach significantly reduced search time and won the **Outstanding Paper Award** at MLSys 2021.

SELECTED PUBLICATIONS

A Deep Learning Based Cost Model for Automatic Code Optimization

Mar. 2021

4th Conference on Machine Learning and Systems 2021 (MLSys 2021) [AR: 24%]

R. Baghdadi, M. Merouani, H. Leghettas, et al.

- **Outstanding Paper Award**
- Selected for oral presentation at the **NeurIPS 2020 Machine Learning for Systems** workshop.
- Invited presentation at **MLSH'21** (Int. Workshop on Machine Learning for Software Hardware Co-Design).

A Deep Learning Guided Exploration of Affine Unimodular Loop Transformations <i>12th Int. Workshop on Polyhedral Compilation Techniques (IMPACT 2022)</i> M. Merouani, K. Boudaoud, N. Aouadj, et al.	June 2022
A Deep Learning Model for Loop Interchange <i>32nd Int. Conference on Compiler Construction (CC 2023)</i> L. Mezdour, K. Kadem, M. Merouani, et al.	Feb. 2023
LOOPer: A Learned Automatic Code Optimizer For Polyhedral Compilers <i>34th Int. Conference on Parallel Architectures and Compilation Techniques (PACT 2025) [AR: 28%]</i> M. Merouani, A. Boudaoud, N. Aouadj, et al.	Nov. 2025
Agentic Auto-Scheduling: A Study of LLM-Guided Loop Optimization <i>34th Int. Conference on Parallel Architectures and Compilation Techniques (PACT 2025) [AR: 28%]</i> M. Merouani, I. Kara Bernou, and R. Baghdadi.	Nov. 2025
LOOPerSet: A Large-Scale Dataset for Data-Driven Compiler Optimization <i>Under Review</i> M. Merouani, A. Boudaoud, and R. Baghdadi.	Oct. 2025
Fine-Tuning Large Language Models for Polyhedral Auto-Scheduling <i>Under review</i> • Distills a teacher LLM via SFT, then refines with GRPO to directly optimize runtime.	

AWARDS AND HONORS

- **Outstanding Paper Award**, Conference on Machine Learning and Systems (MLSys) 2021
- **NYUAD Global Ph.D. Fellowship**, New York University, 2022 - Present
- **1st Place Rank National, Top 7.5% Worldwide**, Google HashCode Qualification Round, 2021
- **Top 6% Individual Rank**, AI Hack Tunisia, 2019

TECHNICAL SKILLS

Languages	Python, C/C++, Java, Prolog, Lisp, SQL
ML & Data Science	Pytorch, Tensorflow, Scikit-learn, Weights & Biases, TensorBoard, RAPIDS
HPC & Opt	CUDA, JAX, OpenMP, OpenMPI, Tiramisu, Polyhedral Model
Systems & Cloud	Docker, Kubernetes, Git, Slurm, AWS/GCP, OpenStack, Spark, Hadoop

SERVICE & TEACHING

Teaching Assistant - Machine Learning <i>New York University Abu Dhabi</i> • Prepared and led lab/tutorial sessions, guiding students through practical ML exercises and theoretical reviews.	Spring & Fall 2025
Invited Speaker <i>MLSH Workshop (ML for Software Hardware Co-Design)</i> • Presented lab research as an invited speaker at MLSH '21 and '23 editions.	Sept. 2021 & Oct. 2023
Co-Organizer <i>GDG Algiers (Google Developers Group)</i> • Led organization of 12+ events and delivered Tech Talks on Docker and Kubernetes.	2018 - 2020
Research Mentor <i>New York University Abu Dhabi</i> • Supervised undergraduate and Master's student research projects on ML for compilers.	Sept. 2021- Present
Service for Conferences and Journals • CC 2024 Artifact Evaluation Committee; Journal Reviewer (TACO, ParCo).	