GEORGE GIAPITZAKIS TZINTANOS

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EDUCATION

University of Waterloo *Sept. 2024 - present*
MMATH - Computer Science Waterloo, ON, Canada

National and Kapodistrian University of Athens *Oct. 2018 - Sep. 2022*
BSc in Pure Mathematics Athens, Greece
CGPA: 9.93/10 (Rank 1st out of 64)

RESEARCH INTERESTS

Theoretical and practical machine learning ◇ Statistical Learning Theory ◇ Optimization

PUBLICATIONS

1. † De Luca, A. B., **Giapitzakis, G.,** Yang, S., Veličković, P. & Fountoulakis, K. *Positional Attention: Out-of-Distribution Generalization and Expressivity for Neural Algorithmic Reasoning* 2024. arXiv: 2410.01686 [cs.LG].
2. Sapoutzoglou, P., **Giapitzakis, G.,** Terzakis, G. & Pateraki, M. *COBRA - COnfidence score Based on shape Regression Analysis for method-independent quality assessment of object pose estimation from single images* 2024. arXiv: 2404.16471 [cs.CV].

(Co-)first author publications are marked with †

EXPERIENCE

Research Assistant *Apr. 2023 - Mar. 2024*
Centre for Quantum Technologies, NUS Singapore, Singapore

Research outcomes:

1. Implemented state-of-the-art *quantum sieving algorithms* to solve the Shortest Vector Problem in a quantum programming language.
2. Performed *quantum resource estimation* for various quantum attacks on lattice-based cryptosystems in order to gauge their practicality.

Google Summer of Code *May 2019 - Aug. 2019*
https://giorgosgiapis.github.io/GSoC19-Blog/ Remote Work

Google Summer of Code student working with the open source organization SageMath. Implemented a number of advanced graph theoretic algorithms (mostly traversals) in Python and Cython efficiently to improve the graph theory module of the software.

SCHOLARSHIPS & AWARDS

Onassis Foundation Scholarship for Master's students (Onassis Foundation, Sept. 2024)

International Master's Award of Excellence (Univ. of Waterloo, Sept. 2024)

Cheriton Graduate Scholarship for Incoming Students (Univ. of Waterloo, Sept. 2024)

ACHIEVEMENTS

Valedictorian in the Mathematics Department of the Unviversity of Athens *2023*

Bloomberg CodeCon Coding Competition Finalist *2020*

1st in Greece, 3rd in Europe, 19th worldwide out of ∼5000 teams in IEEExtreme 12.0 team coding contest *2019*

6th in Greek International Olympiad in Informatics selection camp *2018*

9th in Greek International Olympiad in Informatics selection camp *2017*

TEACHING

University of Waterloo *Sept. 2024 - present*
Teaching Assistant:

- CS 135: Designing Functional Programs Fall 2024

National and Kapodistrian University of Athens *Oct. 2019 - Jan. 2022*
Teaching Assistant: Computer Science I (First-semester introductory course in programming using Matlab)

PROJECTS

Post-quantum Cryptography Attacks using Qiskit
`https://github.com/giorgosgiapis/pqc-attacks`

Implementation of the quantum GaussSieve algorithm in the quantum programming language Qiskit. GaussSieve is an exponential-time algorithm that aims to solve the Shortest Vector Problem (SVP) on a lattice, which is the key component of all post-quantum cryptographic primitives. The quantum version of the algorithm uses Grover's search to achieve a quadratic speedup.

Travelling Salesman Problem (TSP) on Maps
`https://github.com/giorgosgiapis/TSP-on-map`

Implementation of algorithms to solve and visualize the "traveling salesman problem" (TSP) on Google Maps. Users can add points to a map and select an algorithm to find an approximation of the shortest route passing through every point exactly once and returning to the origin.

TECHNICAL SKILLS

Languages Used: Python; Cython; R; Matlab; C++; Typescript; LaTeX

Frameworks/Libraries: Pytorch; Tensorflow; Pandas; Numpy; Scipy; Qiskit; Pennylane