Dániel Szilágyi

Computer Science PhD student

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Education

2019–present   **PhD**, *Theoretical Computer Science*, IRIF, Université de Paris
Thesis topic: "Quantum Algorithms for Optimization and Machine Learning", supervised by Iordanis Kerenidis

2017–2019   **MSc**, *Theoretical Computer Science*, École Normale Supérieure de Lyon
Thesis topic: "A Quantum Interior-Point Method for Second-Order Cone Programming", supervised by Iordanis Kerenidis

2014–2017   **BSc**, *Mathematics*, University of Primorska, Slovenia
Thesis topic: "Computational Methods for Polypeptide Origami Design", supervised by Andrej Brodnik

2010–2014   **High School**, *Mathematics/Physics/Computer Science*, Gimnazija Jovan Jovanović Zmaj, Novi Sad, Serbia
Final year project: "Some Applications of Group Theory"

Experience

2020–2022   **Teaching assistant**, UFR Informatique, Université de Paris
Computer labs for Introduction to programming in Java (L1), Web development (L1) and Functional programming (L3)

2019   **Research internship**, IRIF, Université de Paris
Internship topic: "A Quantum Interior-Point Method for Second-Order Cone Programming", supervised by Iordanis Kerenidis

2018   **Research internship**, LIP, École Normale Supérieure de Lyon
Internship topic: "Algorithmic Aspects of Quantum Shannon Theory", supervised by Omar Fawzi

2016   **Data science internship**, Microsoft Development Center, Serbia
Worked on modeling and forecasting SQL Server performance in the Azure Cloud

2015–present   **Teaching assistant**, Petnica Science Center, Serbia
Mentoring talented high school students doing year-long research projects

2015   **Teaching assistant**, Summer School of Science (S3), Croatia
Mentored a team of 3 high school students for a Bluetooth indoor positioning science/engineering project

2015   **Student job**, University of Primorska, Slovenia
Worked as the embedded hardware/software specialist on the government-funded project titled "Absorbtion of foreign substances in the sea"

Publications

Simon Apers, Sander Gribling, and Dániel Szilágyi. "Hamiltonian Monte Carlo for Gaussian sampling in $O(\sqrt{\kappa})$ time". In preparation. 2022.

Sander Gribling, Iordanis Kerenidis, and Dániel Szilágyi. *Improving quantum linear system solvers via a gradient descent perspective*. 2021. arXiv: 2109.04248 [quant-ph].

Iordanis Kerenidis, Anupam Prakash, and Dániel Szilágyi. "Quantum algorithms for Second-Order Cone Programming and Support Vector Machines". In: *Quantum* 5 (Apr. 2021), p. 427. ISSN: 2521-327X. DOI: 10.22331/q-2021-04-08-427. URL: https://doi.org/10.22331/q-2021-04-08-427.

Iordanis Kerenidis, Anupam Prakash, and Dániel Szilágyi. "Quantum Algorithms for Portfolio Optimization". In: *Proceedings of the 1st ACM Conference on Advances in Financial Technologies*. ACM. 2019, pp. 147–155. DOI: 10.1145/3318041.3355465.

Omar Fawzi, Johanna Seif, and Dániel Szilágyi. "Approximation algorithms for classical-quantum channel coding". In: *2019 IEEE International Symposium on Information Theory (ISIT)*. IEEE. 2019, pp. 2569–2573. DOI: 10.1109/ISIT.2019.8849617.

Andrej Brodnik et al. "Construction of orthogonal CC-sets". In: *Informatica* 43.1 (2019). DOI: 10.31449/inf.v43i1.2693.

Selected talks

2021 **Workshop**, *Recent Advances on Quantum Computing*, Paris, France
Talk title: "A Gradient Descent Perspective on Quantum Linear System Solvers"

2019 **Workshop**, *QUDATA meeting*, Bordeaux, France
Talk title: "Quantum machine learning"

2019 **Workshop**, *3rd IRIF-IQC join workshop*, Waterloo, Canada
Talk title: "Quantum algorithms for SOCP and SVM"

2019 **Workshop**, *2nd QuantAlgo workshop*, Amsterdam, Netherlands
Talk title: "Quantum algorithms for SOCP and SVM"

Honors and awards

2019–2022 **Scholarship**, *IDEX Scholarship*
PhD scholarship for international students

2017–2019 **Scholarship**, *Ampère Excellence Scholarship*
Awarded to the best international students at ENS Lyon

2016 **Competition**, *NASA SpaceApps challenge*, Slovenia
Won 2nd place as a team at the national round of a 48h data science hackathon

2015–2017 **Competition**, *University Programming Marathon*, Slovenia
Three-times university champion at the national ACM ICPC qualifiers

2014–2017 **Scholarship**, *University of Primorska Excellence Scholarship*
Awarded to the best students at the University

2013–2014 **Scholarship**, *"Energy of Knowledge" Scholarship*, Serbia
Awarded to the most successful competition participants

2011–2014   **Award**, *Dositeja Award*, Serbia
             Awarded to the most successful competition participants

2010–2014   **Competition**, *Serbian national high school competitions*
             Successfully competed at the national level in mathematics, physics and computer science

Languages

Native	Serbian, Hungarian
Fluent	English, French, Slovene
Basic	German, Russian

Skills

Mathematics and Computer Science

Optimization (convex and discrete), quantum computing, numerical analysis and approximation theory, classical data structures and algorithms, machine learning

Programming languages and technologies

Numerics	Julia (+SciML ecosystem), Python (+SciPy ecosystem, PyTorch), MATLAB
General	C++, embedded development, OCaml, LaTeX, Unix administration, Git