Aleksandar Makelov

Education

Sep 2016– Sep 2022	**PhD**, *MIT EECS*, Mądry lab. Robust machine learning, spectral graph theory, mathematical optimization
Oct 2015–June 2016	**Part III Mathematical Tripos**, *Emmanuel College*, University of Cambridge, with distinction. Coursework in combinatorics and algebra. Part III Essay: 'The graph isomorphism problem', supervised by Prof. Timothy Gowers
Sep 2011–May 2015	**BA in Honors Mathematics and Computer Science**, *Harvard University*, summa cum laude. Undergraduate thesis: 'Expansion in lifts of graphs', supervised by Prof. Salil Vadhan

Awards and Honors

2015	**Akamai fellowship for first-year graduate students**, *MIT*, (declined).
2015	**Thomas Temple Hoopes Prize**, *Harvard University*. For undergraduate thesis 'Expansion in lifts of graphs'
2015	**Herchel Smith fellowship**, *Harvard University*. To support graduate studies at the University of Cambridge
2015	**Certificate of Teaching Excellence**, *Harvard University*. For 'Algorithms and complexity', Fall 2014
2014	**Phi Beta Kappa Junior 24**, *Harvard University*.
2012	**Honorable mention**, *William Lowell Putnam Mathematical Competition*.
2010	**AMC Medal**, *Australian Mathematics Competition*.
2010	**Silver medal**, *International Mathematical Olympiad*, Kazakhstan. Representing Bulgaria
2010	**Gold Medal**, *Balkan Mathematical Olympiad*, Moldova. Representing Bulgaria
2009, 2010	**Bronze & Silver medal**, *International Physics Olympiad*, Mexico & Croatia. Representing Bulgaria

Teaching and Service

Fall 2019	**6.854: Advanced Algorithms**, *MIT*, Teaching Assistant.
Spring 2019	**6.046: Design and Analysis of Algorithms**, *MIT*, Teaching Assistant.
July 2017	**International Mathematical Olympiad**, *Brazil*, Observer A for Bulgaria, With support from 'American Foundation for Bulgaria'.

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July 2016	**International Mathematical Olympiad**, *Hong Kong*, Observer A for Bulgaria, With support from 'American Foundation for Bulgaria'.
Fall 2014	**CS 125: Algorithms and Complexity**, *Harvard University*, Teaching Fellow.
Fall 2013	**Math 131: Topology**, *Harvard University*, Teaching Fellow.
2010-2017	**International Mathematics Olympiad Preparation**, *With Bulgarian national team*, Delivered lectures on topics in olympiad mathematics.

Publications

2023	**Backdoor or Feature? A New Perspective On Data Poisoning**, *A. Khaddaj, G. Leclerc, A. Makelov, K. Georgiev, A. Ilyas, H. Salman, A. Mądry*, International Conference on Machine Learning.
2018	**Towards Deep Learning Models Resistant to Adversarial Attacks**, *A. Madry, A. Makelov, L. Schmidt, D. Tsipras, A. Vladu.*, International Conference on Learning Representations (poster).
2015	**Expansion in Lifts of Graphs**, *A. Makelov*, Undergraduate thesis.

Open source software projects

2023	**mandala**.
	A high-level data management language for computational experiments, integrated with Python

Open source software contributions

2017	**CIFAR10 Adversarial Examples Challenge**.
	A benchmark for training neural networks on the CIFAR10 dataset robust to adversarial examples
2012	**sympy**, *Google summer of code*.
	Contributed algorithms for computational group theory, advised by Prof. David Joyner, United States Naval Academy

Coursework

Advanced Algorithms, *MIT*.

Math 231a&b: Algebraic Topology, *Harvard University*.

Graduate courses in CS Theory, *Harvard University*.
CS221 (Complexity), CS225 (Pseudorandomness), CS228 (Learning Theory), 2xCS229r (Topics in the Theory of Computation)

Physics 16, *Harvard University*.

Math 55a&b, *Harvard University, with Prof. Yum-Tong Siu*.

Technical skills

Programming Languages.
Proficient in Python. Extensive experience with the PyData stack (numpy, pandas, scikit-learn, dask, matplotlib), Pytorch

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Databases.
SQL (Postgres, sqlite) and ORMs (SQLAlchemy)

OS.
Linux/Unix

Personal

In my free time I enjoy cycling, playing guitar/singing, hiking, and reading sci-fi.