

Alexandr Andoni

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EDUCATION

- 09/05–present **Massachusetts Institute of Technology** **Cambridge, MA**
Candidate for PhD in Computer Science.
Research adviser: Prof. Piotr Indyk, Theory of Computation Group, CSAIL.
Interests: high-dimensional computational geometry, embeddings, stringology, sublinear algorithms, massive data sets, theoretical machine learning.
- 09/04–06/05 Master of Engineering in Electrical Engineering and Computer Science.
Thesis title: Approximate Nearest Neighbor Problem in High Dimensions. Under the supervision of Prof. Piotr Indyk.
- 09/01–06/04 Bachelor of Science degree in Computer Science and Engineering, and Bachelor of Science degree in Mathematics. GPA: 4.9/5.0. Departmental GPA: 5.0/5.0.
- 10/99–07/01 **Politehnica University of Bucharest** **Bucharest, Romania**
Department of Computer Science and Automated Control. GPA: 9.89/10.0. Transferred to MIT.

RESEARCH EXPERIENCE

Excluding graduate student appointments at CSAIL, MIT.

- 05/07–08/07, 06/06–08/06 **IBM Almaden Research Center, Theory Group** **San Jose, CA**
Mentors: Prof. Robert Krauthgamer and Dr. Ken Clarkson. Research on upper and lower bounds for problems on computational geometry and similarity search, including sketching for the edit distance and the Earth-Mover Distance (EMD) over high-dimensional spaces.
- 06/04–08/04 **Palo Alto Research Center, Computer Science Lab** **Palo Alto, CA**
Mentor: Dr. Jessica Staddon, manager of the Security Group. Research on designing new protocols for broadcast encryption, specifically, developing a new notion, “graceful degradation”, that permits a slow revocation of subscribers, instead of an instant one.
- 02/04–06/04 **MIT, CSAIL** **Cambridge, MA**
Undergraduate researcher for Prof. Piotr Indyk. Designed and implemented E²LSH, a software package for the high dimensional near neighbor problem. Website with more information: <http://web.mit.edu/andoni/www/LSH> .
- 06/02 Undergraduate researcher for Prof. Piotr Indyk. Evaluated the lower bound for the distortion of embedding string edit distance into normed spaces.
- 10/01–09/02 Undergraduate researcher for Prof. Martin Rinard. In a team of 4, worked on automated testing of Java programs using the Korat framework. Developed tools for mutation testing and measuring code coverage.

INDUSTRY EXPERIENCE

- 06/05–08/05 **Google Inc.** **Mountain View, CA**
Summer Intern (software engineer). Member of a team developing “Google Checkout”. Designed and implemented a prototype for similarity search in a large database. Contributed to other parts of the product including backend and frontend.

Microsoft Corporation

Redmond, WA

06/03–08/03 Software Design Engineer intern in the Security Group. Designed and implemented a prototype that detects anomalies of a general system based on its different parameters. Also, analyzed performance of a kernel driver, proposing improvements to the algorithms and code.

TEACHING

MIT, EECS Department

Cambridge, MA

09/07–12/07 Teaching Assistant for 6.046, Introduction to Algorithms, taught by Prof. Ronitt Rubinfeld and Prof. Madhu Sudan. As Head TA, my duties included recitations, review sessions, creation of problems sets and exams, office hours, help with class administration.

09/04–12/04 Teaching Assistant for 6.854, Advanced Algorithms, taught by Prof. David Karger. Held office hours, created problem sets, graded solutions, taught one lecture, helped administer the class.

10/04–09/06 Coach of MIT's team for the ACM International Collegiate Programming Contest (in a committee of 2-4 coaches). Organizing team selection and practice contests, advising the team.

CNTI

Chişinău, Moldova

10/98–2/99, 8/99, 8/00 Coach of Moldova's team for International Olympiads in Informatics (usually in a committee of 2-3 coaches). Gave lectures and organized training contests.

HONORS AND AWARDS

- National Honor Societies: Phi Beta Kappa, Tau Beta Pi, Eta Kappa Nu (member of).
- MIT Presidential Fellowship: awarded to first-year PhD students (in total 125 recipients across all MIT first-year PhD students).
- MIT ACM/IEEE Programming Competition: Third place. In a team of 3 persons, designed and implemented autonomous control for virtual robots in a simulated world. 01/03.
- Letter of Commendation in 6.001 (Structure and Interpretation of Computer Programs). 2001.
- Excellence scholarship of the Politehnica University of Bucharest (awarded to the best 2 to 5 students from a department). 2000.
- ACM Southeastern Europe Programming Contest: First place (in a team of 3). 10/00.
- Silver Medal at IOI'99 (International Olympiad in Informatics), Turkey, 10/99.
- Silver Medal at IOI'98, Portugal, 9/98.
- Bronze Medal at IOI'97, Republic of South Africa, 12/97.
- Romania's National Olympiads in Informatics: first-degree prize each year during 1995–1999.
- Moldova's National Olympiads in Informatics: first place each year during 1995–1999.
- Moldova's National Olympiads in Mathematics: first place in 1999.

PUBLICATIONS

- Alexandr Andoni and Robert Krauthgamer. The Smoothed Complexity of Edit Distance. To appear in *International Colloquium on Automata, Languages and Programming (ICALP'08)*, 2008.
- Alexandr Andoni and Piotr Indyk. Near-Optimal Hashing Algorithms for Approximate Nearest Neighbor in High Dimensions. *Communications of the ACM (CACM)*, vol. 51, no. 1, 2008, pp. 117-122.
- Alexandr Andoni, Piotr Indyk, Robert Krauthgamer. Earth Mover Distance over High-Dimensional Spaces. To appear in *the Symposium on Discrete Algorithms (SODA'08)*, 2008.

- Alexandr Andoni, Robert Krauthgamer, The Computation Hardness of Estimating Edit Distance. To appear in *the Symposium on Foundations of Computer Science (FOCS'07)*, 2007. Invited to the special issue of SICOMP.
- Noga Alon, Alexandr Andoni, Tali Kaufman, Kevin Matulef, Ronitt Rubinfeld, Ning Xie. Testing k -wise and Almost k -wise Independence. In the *Proceedings of the Symposium of Theory of Computation (STOC'07)*, 2007.
- Alexandr Andoni, Mayur Datar, Nicole Immorlica, Piotr Indyk, Vahab Mirrokni. Locality-sensitive hashing using stable distributions. Book chapter in *Nearest Neighbor Methods in Learning and Vision: Theory and Practice*, T. Darrell and P. Indyk and G. Shakhnarovich (eds.), MIT Press, 2006.
- Alexandr Andoni, Piotr Indyk. Near-optimal Hashing Algorithms for Approximate Nearest Neighbor in High Dimensions. In the *Proceedings of the Symposium on Foundations of Computer Science (FOCS'06)*, 2006.
- Alexandr Andoni, Piotr Indyk, Mihai Pătraşcu. On Optimality of the Dimensionality Reduction Method. In the *Proceedings of the Symposium on Foundations of Computer Science (FOCS'06)*, 2006.
- Alexandr Andoni, Piotr Indyk. Efficient Algorithms for Substring Near Neighbor Problem. In the *Proceedings of ACM-SIAM Symposium on Discrete Algorithms (SODA'06)*, 2006.
- Alexandr Andoni, Jessica Staddon. Graceful Service Degradation (or, How to Know your Payment is Late). In the *Proceedings of ACM Conference on Electronic Commerce (EC'05)*. Vancouver, June 2005.
- D. Marinov, A. Andoni, D. Daniliuc, S. Khurshid, M. Rinard. An evaluation of exhaustive testing for data structures. *Technical Report MIT-LCS-TR-921, MIT CSAIL, Cambridge, MA*, September 2003.
- A. Andoni, M. Deza, A. Gupta, P. Indyk, S. Raskhodnikova. Lower Bounds for Embedding of Edit Distance into Normed Spaces. In the *Proceedings of the 14th ACM-SIAM Symposium on Discrete Algorithms (SODA'03)*, 2003.

INVITED TALKS

Excluding conference presentations.

- Princeton, Princeton NJ. Title: *The Computational Hardness of Estimating Edit Distance*. March 2008.
- Algorithms&Complexity Seminar. MIT, Cambridge MA. Title: *Overcoming the L_1 non-embeddability barrier: choose your host space wisely*. March 2008.
- China Theory Week 2007, Tsinghua University, Beijing, China. Title: *Lower Bounds for Edit Distance Estimation*. September 2007.
- IBM Almaden Research Center, San Jose, CA. Title: *Lower Bounds for Edit Distance Estimation*. May 2007.
- Penn State University, State College, PA. Title: *Approximate Nearest Neighbor Problem: Near-Optimal Hashing Algorithms*. May 2007.
- MIT, Cambridge, MA. Title: *Lower bounds for Edit Distance Estimation*. March 2007.
- AT&T Research, Florham Park, NJ. Title: *Approximate Nearest Neighbor Problem: Near-Optimal Hashing Algorithms*. September 2006.
- IBM Almaden Research Center, San Jose, CA. Title: *Approximate Nearest Neighbor Problem: Near-Optimal Hashing Algorithms*. August 2006.
- Palo Alto Research Center, Palo Alto, CA. Title: *Some are not thieves!*. July 2005.
- DIMACS Workshop on Theft in E-Commerce: Content, Identity, and Service. Title: *Some are not thieves!*. April 2005.

SERVICE

Referee for: STOC, FOCS, SODA, SoCG, ESA, PODS, CT-RSA; SICOMP, Information & Computation, IEEE Info. Theory, IPL, Algorithmica, IEEE Trans. on Computers.