

Mihai Pătraşcu

Curriculum Vitæ

32 Vassar St., Room G596
Cambridge, MA 02139, USA
<http://web.mit.edu/~mip/www/>
Romanian citizen, F-1 visa
Born: July 17, 1982

mip@mit.edu
Mobile: +1 (857) 253-1282
Office: +1 (617) 253-6182
Fax: +1 (617) 258-8682

EDUCATION

- 2007–2008** Massachusetts Institute of Technology PhD (in progress)
Thesis topic: lower bounds for data structures. Adviser: Erik Demaine
- 2006–2007** Massachusetts Institute of Technology Master of Science
Thesis: “*Computational Geometry through the Information Lens*” Adviser: Erik Demaine
Supported by Akamai Presidential Fellowship.
- 2002–2006** Massachusetts Institute of Technology Bachelor of Science in
GPA: 5.0/5.0. Phi Beta Kappa Honorary Society. Mathematics with Comp. Sci.
- 2001–2002** Univ. of Craiova, Romania Computer Engineering (freshman)
GPA: 10/10. University exceptional fellowship (first time ever awarded to a freshman).
- 1997–2001** C.N. Carol I, Craiova, Romania (high school)
GPA: 9.6/10; Baccalaureate: 9.55. Merit scholarship for outstanding achievement, 1998–2001.

POSITIONS HELD

- Jun–Aug’07** Research intern at IBM Almaden. Mentor: T.S. Jayram. Manager: Ron Fagin.
- Jun–Aug’06** Research intern at AT&T Labs. Mentor: Mikkel Thorup. Manager: David Johnson.
- Feb’03–May’06** Undergraduate researcher at MIT CSAIL. Adviser: Erik Demaine
- Sep–Dec’02** Undergraduate researcher at MIT LCS, Program Compilation and Verification.
Advisers: Viktor Kuncak and Martin Rinard. (theorem provers, logic)
- Sep’01–Mar’02** Research engineer at Softwin Romania. (biometrics)
- Jul–Aug’01** Research intern at SyncRo Soft, Romania. (voice recognition)
- May–Jun’99** Intern at Idaco Systems, Romania. (real-time control)

COMMITTEES

- Program Committee, 11th Scandinavian Workshop on Algorithm Theory (SWAT’08)
- Scientific Committee, 11th Balkan Olympiad in Informatics (2003). Author of 3 contest problems.
- Scientific Committee, Romanian National Olympiad in Informatics, 2002 – 2004; 9 problems.

GRANTS

2007–2008 Google Research Awards, *Data Structures*, Erik Demaine (PI), Mihai Pătraşcu (research personnel).

TEACHING

- Jan’07** Univ. of Bucharest *Geometric Perspectives in Algorithm Design*
Two-day open course. Attended by 55 faculty, students and engineers.
- Aug’06** DIKU (U. Copenhagen) *Lower Bound Techniques for Data Structures*
Two-day summer school, cotaught with Mikkel Thorup.
- Spring’05** MIT, EECS *6.897 Advanced Data Structures* (graduate level)
Teaching Assistant for Prof. Erik Demaine.
Gave 4 lectures. Created and graded problem sets. Advised student final projects.
Rated 6.0/7.0 by students. Student comments included “motivated things well” and “made difficult material easier to understand.”
- Jun’03** Training camp for Romania’s IOI team *Advanced Data Structures* (day course)

AWARDS

Excluding awards given by own school (listed above).

- Outstanding Undergraduate Award from the Computing Research Association (*CRA*), 2005.
Award for best undergraduate research in the US and Canada, received as sophomore.
- Best Student Paper in the 32nd International Colloquium on Automata, Languages and Programming, Track A, for a joint paper with Corina Tarniţă (*ICALP’05*)
- President of Romania’s “Award for Excellence” 2000, 2001
- first prize for age group, Romanian National Olympiad in Informatics 1993–2001
- gold medal, 13th International Olympiad in Informatics, Tampere, Finland (*IOI 2001*)
- gold medal, 12th International Olympiad in Informatics, Bei Jing, China (*IOI 2000*)
- silver medal, 7th Central European Olympiad in Informatics Cluj, Romania (*CEOI 2000*)
- silver medal, 8th Balkan Olympiad in Informatics, Ohrid, Macedonia (*BOI 2000*)
- silver medal, 11th International Olympiad in Informatics, Antalya, Turkey (*IOI 1999*)
- gold medal, 6th Central European Olympiad in Informatics, Brno, Czech Rep. (*CEOI 1999*)
- first prize in informatics, Tuymaada Olympiad, Yakutsk, Russia, 1998
- first prize, individual and team, Applied Math Competition, Chişinău, Rep. Moldova, 1996
- Romanian National Olympiad in Physics, first (1996) and second (1997) prize
- various prizes, regional Romanian competitions in Computer Science and Physics

JOURNAL PUBLICATIONS

1. Jakub Pawlewicz and Mihai Pătraşcu: **Order Statistics in the Farey Sequences in Sub-linear Time**. *Algorithmica*, to appear. Merging of a paper by Pawlewicz in ESA’07, and my subsequent technical report [arXiv:0706.4107](https://arxiv.org/abs/0706.4107).

2. Timothy Chan and Mihai Pătraşcu: **Point Location in Sublogarithmic Time and Other Transdichotomous Results in Computational Geometry**
SIAM Journal on Computing, to appear. Special issue with selected papers from FOCS'06.
 Based on two independent conference publications by each author, appearing simultaneously.
 - Mihai Pătraşcu: **Planar Point Location in Sublogarithmic Time**
 Proc. 47th IEEE Symposium on Foundations of Computer Science (*FOCS'06*), 325–332.
3. Mihai Pătraşcu and Mikkel Thorup: **Higher Lower Bounds for Near-Neighbor and Further Rich Problems**
SIAM Journal on Computing, to appear. Special issue with selected papers from FOCS'06.
 Also in Proc. 47th IEEE Symposium on Foundations of Computer Science (*FOCS'06*), 646–654.
4. Ilya Baran, Erik Demaine and Mihai Pătraşcu: **Subquadratic Algorithms for 3SUM**
Algorithmica, 50(4), pp. 584–596 (2008). Special issue with selected papers from WADS'05.
 Also in Proc. 9th Workshop on Algorithms and Data Structures (*WADS'05*), pp. 409–421.
5. Mihai Pătraşcu and Corina Tarniţă: **On Dynamic Bit-Probe Complexity**
Theoretical Computer Science 380, pp. 127–142 (2007). Special issue for ICALP'05.
 Also in Proc. 32nd International Colloquium on Automata, Languages and Programming (*ICALP'05*), pp. 969–981. Received *Best Student Paper Award*.
6. Erik Demaine, Dion Harmon, John Iacono, and M. Pătraşcu: **Dynamic Optimality—Almost**
SIAM Journal on Computing, 37(1), pp. 240–251 (2007). Special issue for FOCS'04.
 Also in Proc. 45th IEEE Symposium on Foundations of Computer Science (*FOCS'04*), 484–490.
7. Mihai Pătraşcu and Erik Demaine: **Logarithmic Lower Bounds in the Cell-Probe Model**
SIAM Journal on Computing 35(4), pp. 932–963 (2006). Special issue with selected papers from STOC'04. Preliminary versions appeared as:
 - **Lower Bounds for Dynamic Connectivity**
 Proc. 36th ACM Symposium on Theory of Computing (*STOC'04*), pp. 546–553.
 - **Tight Bounds for the Partial-Sums Problem**
 Proc. 15th ACM–SIAM Symposium on Discrete Algorithms (*SODA'04*), pp. 20–29.
 Invited to special issue of ACM Transactions on Algorithms; declined.
8. Mihai Pătraşcu: **On Two Problems from the National Olympiad in Informatics 2002, New Solutions and Generalizations** (in Romanian)
Gazeta Informatică, February 2003, pp. 13–14.

CONFERENCE PUBLICATIONS

Papers already published in journals are *only* listed above.

9. Amit Chakrabarti, T. S. Jayram, and Mihai Pătraşcu:
Tight Lower Bounds for Selection in Randomly Ordered Streams
 Proc. 19th ACM/SIAM Symposium on Discrete Algorithms (*SODA'08*), pp. 720–729.
10. Mihai Pătraşcu and Mikkel Thorup: **Planning for Fast Connectivity Updates**
 Proc. 48th IEEE Symposium on Foundations of Computer Science (*FOCS'07*), pp. 263–271.
11. Gianni Franceschini, S. Muthukrishnan, and M. Pătraşcu: **Radix Sorting With No Extra Space**
 Proc. 15th European Symposium on Algorithms (*ESA'07*), 194–205. Full version [arXiv:0706.4107](https://arxiv.org/abs/0706.4107).
12. Mihai Pătraşcu: **Lower Bounds for 2-Dimensional Range Counting**
 Proc. 39th ACM Symposium on Theory of Computing (*STOC'07*), pp. 40–46.

13. Timothy Chan and Mihai Pătrașcu: **Voronoi Diagrams in $n \cdot 2^{O(\sqrt{\lg \lg n})}$ Time**
Proc. 39th ACM Symposium on Theory of Computing (*STOC'07*), pp. 31–39.
14. Erik Demaine and M. Pătrașcu: **Tight Bounds for Dynamic Convex Hull Queries (Again)**
Proc. 23rd ACM Symposium on Computational Geometry (*SoCG'07*), pp. 354–363.
15. Nicholas Harvey, Mihai Pătrașcu, Yonggang Wen, Sergey Yekhanin, and Vincent Chan:
Non-Adaptive Fault Diagnosis for All-Optical Networks via Combinatorial Group Testing on Graphs,
Proc. 26th IEEE Conference on Computer Communications (*INFOCOM'07*), pp. 697–705.
16. M. Pătrașcu and Mikkel Thorup: **Randomization Does Not Help Searching Predecessors**
Proc. 18th ACM–SIAM Symposium on Discrete Algorithms (*SODA'07*), pp. 555–564.
17. Alexandr Andoni, Piotr Indyk, and Mihai Pătrașcu: **On the Optimality of the Dimensionality Reduction Method**
Proc. 47th IEEE Symposium on Foundations of Computer Science (*FOCS'06*), pp. 449–458.
18. Mette Berger, Esben Rune Hansen, Rasmus Pagh, M. Pătrașcu, Milan Ružić, and Peter Tiedemann:
Deterministic Load Balancing and Dictionaries in the Parallel Disk Model
Proc. 18th ACM Symposium on Parallelism in Algorithms and Architectures (*SPAA'06*), 299–307.
19. Mihai Pătrașcu and Mikkel Thorup: **Time-Space Trade-Offs for Predecessor Search**
Proc. 38th ACM Symposium on Theory of Computing (*STOC'06*), pp. 232–240.
20. Erik Demaine, Friedhelm Meyer auf der Heide, Rasmus Pagh, and Mihai Pătrașcu: **De Dictionariis Dynamicis Pauco Spatio Utentibus** (On Dynamic Dictionaries Using Little Space)
Proc. 7th Latin American Theoretical Informatics (*LATIN'06*), pp. 349–361. Full version available as [arXiv:cs.DS/0512081](https://arxiv.org/abs/cs.DS/0512081).
21. Micah Adler, Erik Demaine, Nicholas Harvey, and Mihai Pătrașcu: **Lower Bounds for Asymmetric Communication Channels and Distributed Source Coding**
Proc. 17th ACM–SIAM Symposium on Discrete Algorithms (*SODA'06*), pp. 251–260.
22. Christian Worm Mortensen, Rasmus Pagh, and Mihai Pătrașcu: **On Dynamic Range Reporting in One Dimension,** in Proc. 37th ACM Symposium on Theory of Computing (*STOC'05*), pp. 104–111. Full version available as [arXiv:cs.DS/0502032](https://arxiv.org/abs/cs.DS/0502032).
23. Corina Tarniță and Mihai Pătrașcu: **Computing Order Statistics in the Farey Sequence**
Proc. 6th Algorithmic Number Theory Symposium (*ANTS'04*), pp. 358–366.
24. Stelian Ciurea, Erik Demaine, Corina Tarniță, and Mihai Pătrașcu:
Finding a Divisible Pair and a Good Wooden Fence
Proc. 3rd International Conference on Fun with Algorithms (*FUN'04*), pp. 206–219.
A poster on the divisible pair problem was displayed at the 6th Algorithmic Number Theory Symposium (*ANTS'04*). An invited extended abstract of the divisible-pair material appeared in the *ACM SIGSAM Bulletin*, volume 38:3, September 2004, pp. 98–100.
25. Erik Demaine, Thouis Jones, and M. Pătrașcu: **Interpolation Search for Non-Independent Data**
Proc. 15th ACM–SIAM Symposium on Discrete Algorithms (*SODA'04*), pp. 522–523.

OTHER PUBLICATIONS

26. Timothy Chan, Mihai Pătrașcu, and Liam Roditty: **Dynamic Connectivity: Connecting to Networks and Geometry.** Manuscript.

27. Alexandr Andoni, Dorian Croitoru, and Mihai Pătrașcu: **Hardness of Nearest-Neighbor Search under ℓ_∞** . Manuscript.
28. Mihai Pătrașcu: **Searching the Integers**
Invited survey in *Encyclopedia of Algorithms* (Springer Reference Works).
29. Mihai Pătrașcu: **Lower Bounds for Dynamic Connectivity**
Invited survey in *Encyclopedia of Algorithms* (Springer Reference Works).

RESEARCH VISITS AND TALKS

Excluding conference talks.

- Apr'08** U.I.U.C. / Sariel Har-Peled / *(Data) STRUCTURES*
- Apr'08** Toyota Tech. Inst., Chicago / Prahlahd Harsha / *(Data) STRUCTURES*
- Apr'08** Tufts Univ. / Lenore Cowen / *Succincter*
- Spring 2008** U.C. San Diego, IBM Almaden, U. Chicago, AT&T Labs, U.T. Austin, GA.Tech, Google NY / *Limits of Data Structures*
- Feb'08** Dagstuhl meeting on *Data Structures / Hard Data-Structure Problems; Onlinifying Ian*
- Feb'08** Univ. de Vest, Timișoara / Gabriel Istrate / *Dynamic Graph Algorithms*
- Nov'07** MIT / *A Perspective on Slepian-Wolf Coding*
- Oct'07** U.L. Bruxelles / Stefan Langerman / *Farey Sequences & Counting Primitive Lattice Points*
- Oct'07** U. Bonn / Yakov Nekrich / *Dynamic Graph Algorithms invade Geometry*
- Sep'07** Tsinghua U. / China Theory Week / *Round Elimination: A Proof, A Concept, A Direction*
- Jul'07** IBM Almaden / *Dynamic Optimality—Almost*
- May'07** U. Washington / Paul Beame / *Lower Bounds for 2-Dimensional Range Counting*
- May'07** Microsoft Research, Redmond / Asaf Shapira / *Planning for Fast Connectivity Updates*
- Apr'07** MIT / Piotr Indyk / *Geometric Searching with Bounded Precision*
Guest lecture in 6.850 Geometric Computation (graduate level).
- Apr'07** MIT / Erik Demaine / *Tight Lower Bounds for Predecessor Search*
Guest lecture in 6.851 Advanced Data Structures (graduate level).
- Mar'07** Brown Univ. / Crystal Kahn / *“Dynamic Connectivity”: Questions and Some Answers*
- Feb'07** UPenn / Sanjeev Khanna / *On the Optimality of the Dimensionality Reduction Method*
- Feb'07** MIT / Crypto & Complexity / *Information Complexity and High-dimensional Geometry*
- Dec'06** Tel Aviv U. / Uri Zwick / *C.G. Through the Information Lens: Dynamic Convex Hull*
- Dec'06** Weizmann Inst. / Liam Roditty / *C.G. Through the Information Lens: Voronoi Diagrams*
- Dec'06** The Technion, Haifa / Yuval Ishai / *C.G. Through the Information Lens: Point Location*
- Aug'06** Bell Labs / Lisa Zhang / *Planar Geometry on the Grid*
- Aug'06** AT&T Labs / *Communication Complexity and Data-Structure Lower Bounds*
- Jul'06** NEC Labs, New Jersey / Pranab Sen
- Jun'06** IBM Almaden / T.S. Jayram / *Data-Structure Lower Bounds*
- Apr'06** Stanford / Theory Lunch / *Searching in an Integer Universe*
- Apr'06** MIT / Algorithms & Complexity / *Hardness Results for Near-Neighbor Problems*
- Mar'06** U. Washington / Paul Beame / *Cell-Probe Complexity and Predecessor Search*

Oct'05 MIT / ToC Student Seminar / *Cell-Probe versus Communication Complexity*

Jun'05 Max Planck Institut für Informatik, Saarbrücken / Seth Pettie / *The Saga of Dynamic Lower Bounds around the Logarithmic Barrier*

Jun'05 Oberwolfach meeting on *Complexity Theory*

Sep'04 IT U. Copenhagen / Rasmus Pagh / *Logarithmic Lower Bounds in the Cell-Probe Model*

SCIENTIFIC SERVICE

Journal Referee: JACM, SICOMP, TAlg, Algorithmica, Information & Computation, IPL, Computers & Graphics

Conference Referee: STOC, FOCS, SODA, SoCG, WADS, ESA, STACS, FSTTCS, IEEE Globecom

Developed the software system used for grading the 11th Balkan Olympiad in Informatics (*BOI'03*), the Romanian National Olympiad, and several regional olympiads