Aaron Bernstein

Ph.D. Student in Computer Science
Columbia University
Department of Computer Science
500 W. 120 St. New York, NY 10027

phone: (857) 544–5027
bernstei@gmail.com

Research Interests

Design and analysis of algorithms, with a focus on network algorithms, dynamic algorithms, and approximation algorithms.

Education

Columbia University
>   Ph.D. in Computer Science, Fall 2010 – Present.
>   Advisor: Cliff Stein.

Columbia University
>   M.S. in Computer Science, June 2013.
>   Advisor: Cliff Stein.

Massachusetts Institute of Technology
>   B.S. Summa cum Laude in Mathematics, May 2009.

Honors and Awards

NSF Graduate Research Fellowship, 2010 – Present
Danny Lewin Best Student Paper Award, STOC 2013
Best Student Paper Award, SODA 2012
Best Student Paper Award, SODA 2010
MIT Morais and Rosenblum Award for Outstanding Undergraduate Research, 2008

Publications

REFEREED CONFERENCE ARTICLES (in reverse chronological order)
(Each paper below was accompanied with a 25 minute conference presentation)

C1.   *Maintaining Shortest Paths Under Deletions in Weighted Directed Graphs.*
       In the proceedings of *45th Symposium on Theory of Computing*, 2013 (Won Danny Lewin Best Student Paper Award).

C2.   *Near Linear Time (1+ε)-Approximation for Restricted Shortest Paths in Undirected Graphs.*
        In the proceedings of *23rd ACM-SIAM Symposium on Discrete Algorithms*, 2012 (Won Best Student Paper Award).

C3.   *Improved Dynamic Algorithms for Maintaining Approximate Shortest Paths Under Deletions.*
        with Liam Roditty. In the proceedings of *22nd ACM-SIAM Symposium on Discrete Algorithms*, 2011.

C4.   *A Nearly Optimal Algorithm for Approximating Replacement Paths and k Shortest Simple Paths in General Graphs.*
        In the proceedings of *21st ACM-SIAM Symposium on Discrete Algorithms*, 2010 (Won Best Student Paper Award).

C5.   *Fully Dynamic $(2 + \epsilon)$-Approximate All-Pairs Shortest Paths with Fast Query and Close to Linear Update Time.*
        In the proceedings of *The 50th Annual Symposium on Foundations of Computer Science*, 2009.

C6.   *A Nearly Optimal Oracle for Avoiding Failed Vertices and Edges.*
        with David Karger. In the proceedings of *41st Symposium on Theory of Computing*, 2009.

C7.   *Improved Distance Sensitivity Oracles via Random Sampling.*
        with David Karger. In the proceedings of *19th ACM-SIAM Symposium on Discrete Algorithms*, 2008.

SUBMITTED JOURNAL ARTICLES

S1.   *Maintaining Shortest Paths Under Deletions in Weighted Directed Graphs.*
        Submitted to the special issue of *Siam Journal of Computing* for STOC 2013.

Experience

Teaching Assistant   *Columbia University*
        Fall 2011, Fall 2013. Teaching Assistant for Analysis of Algorithms I.

Summer Research   *Massachusetts Institute of Technology*
        Summer 2007, Summer 2008. Designed fault tolerant network algorithms with David Karger.

Summer Intern   *Harvard University*
        Summer 2006. Interned under David Parkes and Adrian Petcu. Helped design and code parts of M-DPOP, an algorithm for multi-agent constraint optimization.