

LORENZO ORECCHIA

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Research Interests: Fast Graph Algorithms, Spectral Methods, Graph Partitioning.

Professional Positions

- **Massachusetts Institute of Technology**
Applied Mathematics Instructor since September, 2011
Mentor: Jonathan Kelner

Education

- **University of California, Berkeley**
Ph.D. in Computer Science, May 2011
Advisor: Satish Rao
GPA: 4.0/4.0
- **Princeton University**
A.B. summa cum laude in Computer Science, 2005
GPA: 3.97/4.00

Publications

- **Approximating the Exponential, the Lanczos Method and an $\tilde{O}(m)$ -Time Spectral Algorithm for Balanced Separator.** With Sushant Sachdeva and Nisheeth K. Vishnoi. *STOC'12: Proc. Symp. Theory Computing*, pp. 1141–1160, 2012
- **Spectral Algorithms to Explore Graphs in a Local Manner**
With Michael W. Mahoney and Nisheeth K. Vishnoi. *J. Machine Learning Research*, 13, 2339–2365, 2012.
- **Towards an SDP-Based Approach to Spectral Methods: A Nearly-Linear Time Algorithm for Graph Partitioning and Decomposition**
With Nisheeth K. Vishnoi. *SODA'11: Proc. Symp. on Discrete Algorithms*, pp. 532–545, 2011.
- **Implementing Regularization Implicitly via Approximate Eigenvector Computation**
With Michael W. Mahoney. *ICML'11: Proc. 28th Intl. Conf. Machine Learning*, pp. 121–128, 2011.
- **Empirical Evaluation of Graph Partitioning Using Spectral Embeddings and Flow**
With Kevin J. Lang and Michael W. Mahoney. *SEA'09: Proc. Intl. Symp. Experimental Algorithms*, pp. 197–208, 2009.

- **On Partitioning Graphs via Single Commodity Flows**
With Leonard Schulman, Umesh V. Vazirani, and Nisheeth K. Vishnoi. *STOC'08: Proc. Symp. Theory of Computing*, pp. 461–470, 2008.
- **On a Cut-Matching Game for the Sparsest Cut Problem**
With Rohit Khandekar, Subhash A. Khot, and Nisheeth K. Vishnoi. EECS Dept., UC Berkeley, Tech. Rep. UCB/EECS-2007-177, 2007.
- **Localized Techniques for Broadcasting in Wireless Sensor Networks**
With Devdatt Dubhashi, Olle Häggström, Alessandro Panconesi, Chiara Petrioli, and Andrea Vitaletti. *Algorithmica*, 49-4, pp. 412–446, 2007.
- **Localized Techniques for Broadcasting in Wireless Sensor Networks**
With Alessandro Panconesi, Chiara Petrioli, and Andrea Vitaletti. *DIALM-POMC'04: Joint Workshop on the Foundations of Mobile Computing*, p. 41–51, 2004.
- **Coding Properties of *Oxytricha trifallax* (*Sterkiella histriomuscorum*) Macronuclear Chromosomes: Analysis of a Pilot Genome Project**
With Andre Cavalcanti, Nicholas Stover, Thomas Doak and Laura Landweber, *Chromosoma*, 113-2, pp. 69–76, 2004.

Other Research Experience

- **Intern:** *Microsoft Research Labs*, Bangalore, India. Fall 2009. Mentor: Nisheeth K. Vishnoi. Topic: Nearly-linear time algorithms for balanced graph-partitioning.
- **Intern:** *Stanford University*, Palo Alto, CA. Summer 2009. Mentor: Michael W. Mahoney. Topic: Development of spectral graph-partitioning algorithms and application to the analysis of social networks.
- **Intern:** *Yahoo! Research*, Santa Clara, CA. Summer 2008. Mentors: Kevin J. Lang and Michael W. Mahoney. Topic: Implementation and empirical evaluation of the graph-partitioning algorithm published at STOC 2008.
- **Intern:** *Dipartimento di Informatica, Università La Sapienza*, Rome, Italy. Summer 2004. Mentor: Alessandro Panconesi. Topic: Wireless sensor networks.

Teaching and Other Experience

- **Teaching Assistant:** 18.310C - Principles of Applied Mathematics, Communication-Intensive Class, MIT. Fall 2012. Taught by Michel X. Goemans.
- **Teaching Assistant:** 18.01 - Calculus and 18.02 - Multivariable Calculus, Fall 2011 and Spring 2012, MIT.
- **Teaching Collaborator:** CS294, UC Berkeley. Spring 2010. Taught by Satish Rao and Umesh Vazirani. Gave five original lectures on sparsification and semidefinite-programming-based algorithms for a graduate seminar on recent developments in the theory of algorithms.
- **Teaching Assistant:** CS70 - Discrete Mathematics & Probability Theory; CS170 - Algorithms & Intractable Problems, UC Berkeley. Fall 2006. Taught by Christos Papadimitriou and Umesh Vazirani.

- **Theory Seminar Organizer:** UC Berkeley, Fall 2010. Co-organizer: Umesh Vazirani. Selected and invited speakers, often from outside UC Berkeley, to present significant recent results in Theoretical Computer Science at a weekly seminar.

Awards

- Outstanding Graduate Student Instructor, UC Berkeley, Fall 2006
- Princeton University Shapiro's Prize for Academic Excellence (2001–02) and (2002–03)