# Alexander S. Tsiatas

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**Research Interests** Spectral graph theory, clustering algorithms, graph diffusion problems, machine learning, and the mathematical analysis of large-scale networks.

**Education**

**University of California, San Diego**, La Jolla, CA
- Ph.D. in Computer Science — June 2012
  Dissertation: Diffusion and Clustering on Large Graphs
  (*Advisor: Fan Chung Graham*)
- M.S. in Computer Science — June 2010

**Cornell University**, College of Engineering, Ithaca, NY
- B.S. in Computer Science, *magna cum laude* — May 2008

**Research Affiliations**

**University of California, San Diego**, La Jolla, CA September 2008 to June 2012
- Research on graph clustering algorithms, voter models, network epidemic schemes, and algorithmic applications of PageRank.

**Alcatel-Lucent Bell Laboratories**, Murray Hill, NJ — Summer 2010
- Collaboration with Iraj Saniee and Matthew Andrews
- Used spectral methods and Dirichlet eigenvalues to analyze bottlenecks and structural properties of communication networks.

**Cornell University**, Ithaca, NY — January 2007 to May 2008
- Independent study with John Hopcroft
- Explored topics in spam detection, local graph clustering algorithms, and phase transitions in satisfiability problems.

**Publications**

- Spectral analysis of communication networks using Dirichlet eigenvalues (with Iraj Saniee, Onuttom Narayan and Matthew Andrews), WWW 2013.
- Spectral clustering of graphs with general degrees and the extended planted partition model (with Kamalika Chaudhuri and Fan Chung), COLT 2012, *Journal of Machine Learning Research Workshops and Conference Proceedings* **23** (2012), 35.1–35.23.
- Hypergraph coloring games and voter models (with Fan Chung), WAW 2012, *Lecture Notes in Computer Science* **7323**, 1–16.
  Journal version in submission.
- Dirichlet PageRank and trust-based ranking algorithms (with Fan Chung and Wensong Xu), WAW 2011, *Lecture Notes in Computer Science* **6732**, 103–114.
  Journal version in *Internet Mathematics* **9**:1 (2013), 113–134.
- Finding and visualizing graph clusters using PageRank optimization (with Fan Chung), WAW 2010, *Lecture Notes in Computer Science* **6516**, 86–97.
  Journal version in *Internet Mathematics* **8**:1-2 (2012), 46–72.
- Distributing antidote using PageRank vectors (with Fan Chung and Paul Horn), *Internet Mathematics* **6**:2 (2009), 237–254.

**Presentations**

- Spectral analysis of communication networks using Dirichlet eigenvalues (joint work with Iraj Saniee, Onuttom Narayan and Matthew Andrews), 22nd International World Wide Web Conference (WWW 2013), May 2013, Rio de Janeiro, Brazil.
- Finding and visualizing graph clusters using PageRank vectors (joint work with Fan Chung), Workshop on Algorithms and Models for the Web Graph (WAW 2010), 16 December 2010, Stanford University.
- Spectrum of communication networks (joint work with Iraj Saniee, Onuttom Narayan and Matthew Andrews), 26 August 2010, Alcatel-Lucent Bell Labs.
- PageRank and diffusion on large graphs, UCSD Research Exam, 14 December 2009.

**Teaching Experience**

**University of California, San Diego**, La Jolla, CA

*Instructor of record*

- CSE 105: Introduction to Theory of Computation — Spring 2012
  Taught 150 students using newly-developed teaching methods in computer science, with an emphasis on peer instruction.

*Teaching assistant*

- CSE 105: Introduction to Theory of Computation — Winter 2010, Fall 2011
- CSE 200: Computability and Complexity — Winter 2011
- CSE 202: Algorithm Design and Analysis — Spring 2010 and 2011, Winter 2012

**Cornell University**, Ithaca, NY

*Undergraduate consultant*

- CS 312: Data Structures and Functional Programming — Fall 2006 to Spring 2008

**Industrial Experience**

**Google, Inc.**, New York, NY and Mountain View, CA

*Software engineer* — September 2012 to present

- Working on the detection and prevention of payment fraud, using machine-learning algorithms to counteract malicious activity, including identity theft and account takeover.

*Software engineering intern* — Summer 2007, 2008, 2009 and 2011

- Designed and implemented parallel sparse vector similarity computations and vector clustering based on affinity propagation.
- Designed and implemented internal services for managing Google Finance news articles and the new Google billing database.
- Developed online filtering algorithms for fighting click spam on advertisements.

**American Power Conversion**, West Kingston, RI

*Software engineering intern* — Summer 2006

**Other Activities**

**Academic paper reviewer**

- American Mathematical Society: Mathematical Reviews
- Journal of Machine Learning Research
- Internet Mathematics