ABRAHAM D. FLAXMAN

Curriculum Vitae

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Nationality:	United States of America.

Education:

2006	Carnegie Mellon University Pittsburgh, PA Ph.D. in Mathematics specializing in Algorithms, Combinatorics, and Optimization. Thesis title: "Average-case analysis for combinatorial problems". Advisor: Alan Frieze.
2000	Massachusetts Institute of Technology Cambridge, MA B.S. in Mathematics.

Research Experience:

2010-present	Assistant Professor, University of Washington, Institute for Health Metrics and Evaluation, Seattle, WA Research in descriptive epidemiology and health intervention coverage.
2008-2010	Post-Graduate Fellow, University of Washington, Institute for Health Metrics and Evaluation, Seattle, WA Advisors: Christopher Murray and Stephen Lim.
2006-2008	Microsoft Research, Theory Group, Redmond, WA Research in random graph theory and complex networks. Advisors: Christian Borgs and Jennifer Chayes.

Summer 2005	Summer Research Intern, Microsoft Research, Silicon Valley Campus, Mountainview, CA Research in the theory of auctions and mechanism design. Advisor: Jason Hartline.
Early Summer 2004	Summer Research Intern, Toyota Technical Institute, Chicago, IL Research in theory of machine learning, on-line algorithms, and Markov Chain Monte Carlo. Advisors: Adam Kalai and Eric Vigoda.
November 2005 Late Summer 2004 Summer 2003	Research Intern, IBM, T. J. Watson Research Center White Plains, NY Research in extremal combinatorics and average case analysis of on-line and approximation algorithms. Advisor: Gregory Sorkin.
Summer 2000	Summer Research Intern, E-Ink Corporation, Cambridge, MA Design of high resolution display drivers for a novel addressable display technology. Advisor: Peter Kazlas.
Summers 1997-2000	Research Intern, Los Alamos National Laboratory, T-DOT Group, Los Alamos, NM Research on Basis Pursuit, Independent Component Analysis, and spectral estimation. Advisor: George Zweig.

Teaching and Advising Experience:

Spring 2011 — University of Washington, Seattle, WA

- Master's Thesis Committee for: Kyle Foreman, title "Modeling causes of death: an integrated approach using CODEm"; Alison Levin-Rector, title "Investigating the sex differential in reporting on the survival of siblings"; Jacob Marcus "PAHSM: a new tool for simulating populations and health systems".

Spring 2007 — University of Washington, Seattle, WA

- Algorithms and Economics of Networks (CS grad topics course). Co-lecturer with Vahab Mirrokni.

- Master's Thesis Co-Advisor for Elisa Celis, title: "Bias in the Indegree Distribution in a Snowball Sample of a Large Random Network," defended June 2007.

Fall 2001-Fall 2007 — Carnegie Mellon University, Pittsburgh, PA

- Opportunities for Undergraduate Research in Computer Science (OurCS), Oct. 5-7, 2007.
  Co-leader of an intensive research experience for female computer science majors (9 students).

- Matrix Algebra, Fall 2003.
  Lecturer for one section of 30 students.

- Operations Research I, Spring 2002.
  Teaching assistant for two sections of 10 students each.

- Calculus in 3 Dimensions, Fall 2001.
  Teaching assistant for two sections of 30 students each.

Summer 2001 Hampshire College Summer Studies in Mathematics, Amherst, MA

- Junior staff.

Honors and Awards:

2006	NSF Post-doctoral Fellowship (declined)
2005-2006	IBM Graduate Student Fellowship
2000-2003	NSF VIGRE Fellowship.

Research Currently Under Review and in Preparation:
Flaxman AD, Vos T, Murray C (Editor). Integrated Meta-Regression Framework for Descriptive Epidemiology, Book in preparation.

Hagopian A, **Flaxman AD**, Takaro TK, et al. Mortality in Iraq associated with the 2003-2011 U.S. invasion and occupation. Manuscript submitted for publication.

Fullman N, **Flaxman AD**, and Lozano R. Measuring the World's Health: How Good Are Our Estimates? Manuscript in preparation for *Handbook of Global Health Policy*.

Bell BM and **Flaxman AD**. Robust Estimation of Disease Rates as Stochastic Functions of Age and Time. Manuscript submitted for publication.

Peer-reviewed Journal Publications:

1. Galway LP, Bell N, Hagopian A, Burnham G, **Flaxman AD**, et al. A two-stage cluster sampling method using gridded population data, a GIS, and Google EarthTM imagery in a

population-based mortality survey in Iraq. International Journal of Health Geographics 2012, 11:12.
2. Hanafiah KM, **Flaxman AD**, Groeger J, Wiersma ST. Global epidemiology of hepatitis C virus infection: New estimates of age-specific antibody to hepatitis C virus seroprevalence. Manuscript accepted for publication in *Hepatology*.
3. Angel O, **Flaxman AD**, and Wilson DB. A sharp threshold for minimum bounded-depth and bounded-diameter spanning trees and Steiner trees in random networks.*Combinatorica*. 2012; 1-33.
4. Feige U, **Flaxman AD**, and Vilenchik D. On the diameter of the set of satisfying assignments in random satisfiable *k*-CNF formulas. *SIAM Journal on Discrete Mathematics.* 2011; 25 (2) 736-749.
5. Lozano R, Freeman M, James S, Campbell B, Lopez A, **Flaxman AD**, Murray C, the Population Health Metrics Research Consortium (PHMRC). Performance of InterVA for assigning causes of death to verbal autopsies: multisite validation study using clinical diagnostic gold standards. *Population Health Metrics.* 2011; 9:50.
6. **Flaxman AD**, Vahdatpour A, Green S, James S, Murray C, the Population Health Metrics Research Consortium (PHMRC). Random forests for verbal autopsy analysis: multisite validation study using clinical diagnostic gold standards. *Population Health Metrics*. 2011; 9:29
7. **Flaxman AD**, Vahdatpour A, James S, Birnbaum J, Murray C, the Population Health Metrics Research Consortium (PHMRC). Direct estimation of cause-specific mortality fractions from verbal autopsies: multisite validation study using clinical diagnostic gold standards. *Population Health Metrics.* 2011; 9:35.
8. Murray C, Lozano R, **Flaxman AD**, Vahdatpour A, Lopez A. Robust metrics for assessing the performance of different verbal autopsy cause assignment methods in validation studies. *Population Health Metrics.* 2011; 9:28.
9. James S, **Flaxman AD**, Murray C, The Population Health Metrics Research Consortium (PHMRC). Performance of the Tariff Method: validation of a simple additive algorithm for analysis of verbal autopsies. *Population Health Metrics*, 2011; 9:35.
10. Lozano R, Lopez A, Atkinson C, Naghavi M, **Flaxman AD**, Murray C, the Population Health Metrics Research Consortium (PHMRC). Performance of physician-certified verbal autopsies: multisite validation study using clinical diagnostic gold standards. *Population Health Metrics* 2011; 9:32.
11. Murray C, Lopez A, Black R, Ahuja R, Ali S, Baqui A, Dandona L, Dantzer E, Das V, Dhingra U, Dutta A, Fawzi W, **Flaxman AD**, *et al*. Population Health Metrics Research Consortium gold standard verbal autopsy validation study: design, implementation, and development of analysis datasets. *Population Health Metrics* 2011; 9:27.
12. **Flaxman AD**, Fullman N, Otten MW, Jr., Menon M, Cibulskis RE, Ng M, et al. Rapid scaling up of insecticide-treated bed net coverage in Africa and its relationship with development assistance for health: a systematic synthesis of supply, distribution, and household survey data. PLoS Med. 2010;7(8):e1000328. PMCID: 2923089.
13. Rajaratnam JK, Marcus JR, **Flaxman AD**, Wang H, Levin-Rector A, Dwyer L, et al. Neonatal, postneonatal, childhood, and under-5 mortality for 187 countries, 1970-2010: a systematic analysis of progress towards Millennium Development Goal 4. Lancet. 2010;375(9730):1988-2008.

14. **Flaxman AD**, Gamarnik D, and Sorkin GB. First-passage percolation on a ladder graph, and the path cost in a VCG auction. *Random Structures and Algorithms*, online Jun. 2010, DOI: 10.1002/rsa.20286; (extended abstract appeared in *Proc. of the 2nd International Workshop on Internet and Network Economics* (2006) 99-111).
15. Bailly-Bechet M, Bradde S, Braunstein A, **Flaxman AD**, Foini L, and Zecchina R. Clustering with shallow trees. *Journal of Statistical Mechanics* (2009) P12010.
16. **Flaxman AD**. A spectral technique for random satisfiable 3CNF formulas. *Random Structures and Algorithms*, 32 (4) (2008) 519-534; (extended abstract appeared in *Proc. 14th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)* (2003) 357-363).
17. Yu H, Kaminsky M, Gibbons PB, and **Flaxman AD**. Defending against Sybil attacks via social networks. *IEEE/ACM Transactions on Networking*, 16 (3) (2008) 576-589; (extended abstract appeared in *Proc. of the 2006 conference on applications, technologies, architectures, and protocols for computer communications (SIGCOMM)*, (2006) 267-278).
18. **Flaxman AD**, Frieze AM, and Vera J. A geometric preferential attachment model of networks II. *Internet Mathematics* 4 (1) (2007) 87-111; (extended abstract appeared in *Proc. of the 5th International Workshop on Algorithms and Models for the Web-Graph (WAW)* (2007) 41-55).
19. **Flaxman AD**, Frieze AM, and Vera JC. Adversarial deletions in a scale-free random graph process. *Combinatorics, Probability, and Computing* 16 (2007) 261-270; (extended abstract appeared in *Proc. of the 16th Symposium on Discrete Algorithms (SODA)* (2005) 287-292).
20. **Flaxman AD**. A lower bound on the large deviation probability for the lower tail of the random minimum spanning tree. *Electronic Journal of Combinatorics* 14 (1) (2007) N3.
21. **Flaxman AD** and Hoory S. Maximum matchings in regular graphs of high girth. *Electronic Journal of Combinatorics* 14 (1) (2007) N1.
22. **Flaxman AD**. Expansion and lack thereof in perturbed random graphs. *Internet Mathematics* 4 (2-3) (2007) 131-147; (extended abstract appeared in *Proc. of 4th International Workshop on Algorithms and Models for the Web-Graph (WAW)* (2006) 24-35).
23. **Flaxman AD**, Frieze AM, and Vera JC. A geometric preferential attachment model of networks. *Internet Mathematics* 3 (2) (2007); (extended abstract appeared in *Proc. of 3rd International Workshop on Algorithms and Models for the Web-Graph (WAW)* (2004) 44-55).
24. **Flaxman AD**, Frieze AM, and Vera JC. On the average case performance of some greedy approximation algorithms for the uncapacitated facility location problem. *Combinatorics, Probability, and Computing* 16 (2007) 713-732; (extended abstract appeared in *Proc. of the 37th ACM Symposium on the Theory of Computing (STOC)* (2005) 441-449).
25. **Flaxman AD** and Frieze AM. The diameter of randomly perturbed digraphs and some applications. *Random Structures and Algorithms* 30 (4) (2007) 484-504; (extended abstract appeared in *Proc. of the 7th International Workshop on Approximation Algorithms for Combinatorial Optimization Problems and 8th International Workshop on Randomization and Computation (RANDOM-APPROX)* (2004) 345-356).
26. Dyer M, **Flaxman AD**, Frieze AM, and Vigoda E. Randomly coloring sparse random graphs with fewer colors than the maximum degree. *Random Structures and Algorithms* 29, (2006) 450-465.
27. **Flaxman AD**, Frieze AM, and Krivelevich M. On the random 2-stage minimum spanning tree. *Random Structures and Algorithms* 28 (2) (2006) 24-36; (extended abstract appeared in *Proc. of the 16th Symposium on Discrete Algorithms (SODA)* (2005) 919-928).

28. **Flaxman AD**, Gamarnik D, and Sorkin GB. Embracing the giant component. *Random Structures and Algorithms* 27 (3) (2005) 277-289; (extended abstract appeared in *Proc. of the 6th Conference of Latin American Theoretical Informatics (LATIN)* (2004) 69-79.
29. **Flaxman AD**, Frieze AM, and Fenner T. High degree vertices and eigenvalues in the preferential attachment graph, *Internet Mathematics* 2 (1) (2005) 1-19; (extended abstract appeared in *Proc. 7th International Workshop on Randomization and Approximation Techniques in Computer Science (RANDOM-APPROX)* (2003) 264-274).
30. **Flaxman AD**. A sharp threshold for a random constraint satisfaction problem. *Discrete Math.* 285/1-3 (2004) 301-305.
31. **Flaxman AD**, Frieze AM, and Upfal E. Efficient communication in an ad-hoc network. *J. Algorithms* 52 (1) (2004) 1-7.
32. **Flaxman AD**, Harrow AW, and Sorkin GB. Strings with maximum numbers of distinct subsequences and substrings. *Elec. J. Combinatorics* 11 (1) R8 (2004).

Other Publications:

33. Birnbaum B, DeRenzi B, **Flaxman AD**, and Lesh N. Automated quality control for mobile data collection. *Proc. of the 2nd ACM Symposium on Computing for Development* (ACM DEV) (2012).
34. Feinberg SE and **Flaxman AD**. Population size estimation and Internet link structure. *Neural Information Processing Systems workshop on Networking Across Disciplines: Theory and Applications* (2010).
35. Green ST and **Flaxman AD**. Machine learning methods for verbal autopsy in developing countries. *AAAI Spring Symposium on Artificial Intelligence for Development (AI-D)* (2010).
36. Constantine PG, **Flaxman AD**, Gleich DF, and Gunawardana A. Tracking the random surfer: Empirically measured teleportation parameters in PageRank. *Proc. of the 19th international conference on World Wide Web (WWW)*, (2010) 381-390.
37. **Flaxman AD**. Algorithms for random 3-SAT. *The Encyclopedia of Algorithms* (2008) 742-744.
38. Andersen R, Borgs C, Chayes J, Feige U, **Flaxman AD**, Kalai A, Mirrokni V, and Tennenholtz M. Trust-based recommendation systems: an axiomatic approach. *Proc. of the 17th international conference on World Wide Web (WWW)* (2008) 199-208.
39. Carey M, **Flaxman AD**, Hartline J, and Karlin A. Auctions for structured procurement. *Proc. of the 19th Symposium on Discrete Algorithms (SODA)* (2008) 204-313.
40. **Flaxman AD** and J. Vera J. Bias reduction in traceroute sampling: towards a more accurate map of the Internet. *Proc. of the 5th International Workshop on Algorithms and Models for the Web-Graph (WAW)* (2007) 1-15.
41. Feige U, **Flaxman AD**, Hartline JD, and Kleinberg R. On the competitive ratio of the random sampling auction. *Proc. of the 1st International Workshop on Internet and Network Economics* (2005) 878-886.
42. **Flaxman AD** and Przydatek B. Solving medium-density subset sum problems in expected polynomial time. *Proc. of the 22nd Symposium on Theoretical Aspects of Computer Science (STACS)* (2005) 305-314.

43. **Flaxman AD**, Kalai AT, and McMahan HB. Online convex optimization in the bandit setting: gradient descent without a gradient. *Proc. of the 16th Symposium on Discrete Algorithms (SODA)* (2005) 385-394.

Selected Presentations:

March 14-17, 2011	Global Health Metric and Evaluation Conference Seattle, Washington Title: "Methods for synthesizing data from multiple sources"
Feb. 15-19, 2011	Global Congress on Verbal Autopsy: State of the Science Denpasar, Bali, Indonesia Titles: "Machine Learning: Validation of the Random Forest Model for Verbal Autopsy Cause Assignment" and "Ranking, Raking and Combined Methods"
Oct. 26, 2010	Howard University, Washington, D.C. Title: Computational Social Science in Medicine
Oct. 19, 2010	Computer Science Department Colloquium University of Washington, Seattle, WA Title: Computational Social Science in Medicine
Aug. 23, 2010	Microsoft Research New England, Cambridge, MA Title: Computational Social Science in Medicine
Aug. 1-4, 2010	Joint Statistical Meetings, American Statistical Association Vancouver, British Columbia, Canada Title: The Long Tail of Disease Modeling
Oct. 21-24, 2009	Gates Grand Challenge 13 Project-Wide Meeting Dar es Salaam, Tanzania Title: Computational Algorithms for Verbal Autopsy
March 27-29, 2009	Foo Camp East Cambridge, MA Ignite Talk: What is the Global Burden of Disease?
Dec. 6, 2008	Midwest Theory Day Evanston, IL Invited Talk: Theoretical Computer Science for Global Health
Sept. 29, 2007	Harvey Mudd College Mathematics Conference on Public Sector Operations Research Claremont, CA Poster: Identifying entitlement to share in a class action settlement.
Nov. 30-Dec. 1, 2006	4th Workshop on Algorithms and Models for the Web-Graph Banff, BC Title: Expansion and lack thereof in randomly perturbed graphs.

May 21-24, 2005	37th Annual ACM Symposium on Theory of Computing Baltimore, MD Title: On the average case performance of some greedy approximation algorithms for the uncapacitated facility location problem.
January 23-25, 2005	16th Annual ACM-SIAM Symposium on Discrete Algorithms Vancouver, BC Title: Online convex optimization in the bandit setting: gradient descent without a gradient. Title: Two-stage stochastic programming on average: minimum spanning trees.
August 22-24, 2004	8th International Workshop on Randomization and Approximation Techniques in Computer Science Cambridge, MA Title: The diameter of randomly perturbed digraphs and some applications.
April 5-8, 2004	6th Conference of Latin American Theoretical Informatics Buenos Aires, Argentina Title: Embracing the giant component | Competitive ratio on average.
August 24-26, 2003	7th International Workshop on Randomization and Approximation Techniques in Computer Science Princeton, NJ Title: High degree vertices and eigenvalues in the preferential attachment graph.
January 12-14, 2003	14th Annual ACM-SIAM Symposium on Discrete Algorithms Baltimore, MD Title: A spectral technique for random satisfiable 3CNF formulas.

Research Support:

Ongoing

#48046
Bill and Melinda Gates Foundation (7/01/2007-6/30/2017)
Institute for Health Metrics and Evaluation (IHME)
IHME at the University of Washington monitors global health conditions and health systems, as well as evaluates interventions, initiatives, and reforms and as such provides high quality and timely information on health so that policymakers, researchers, donors, practitioners, local

decision-makers, and others can better allocate limited resources to achieve optimal results. Role: Co-Investigator

#51229
Bill and Melinda Gates Foundation (04/01/09-3/31/16)
Disease Control Priorities Network (DCPN)
The DCPN project aims to improve the allocation of health resources across a wide range of investment options, including interventions, services delivery platforms, and research and development of new health technologies. Role: Co-Investigator