JON FELDMAN

Contact information available upon request.

RESEARCH INTERESTS

Algorithms, coding theory, combinatorial optimization, scheduling, learning theory.

CURRENT POSITION

Senior Research Scientist, Google, Inc., *New York, NY, September 2005 - present.*

- Working in the areas of Algorithms, Mechanism Design and Distributed Computation.

EDUCATION

Massachusetts Institute of Technology, *Cambridge, MA, September 1998 - June, 2003.*
Advisor: David Karger.

- Ph.D. in Computer Science, June, 2003. Thesis: *Decoding Error-Correcting Codes via Linear Programming.*
- S.M. in Computer Science, June, 2000.
- Published several papers on Coding Theory, Approximation Algorithms, Graph Theory, Network Design and Scheduling (listed below).
- Computer Science GPA 5.0/5.0.

Dartmouth College, *Hanover, NH, September 1993 - June 1997.*
Thesis Advisor: Cliff Stein.

- A.B. in Computer Science.
- High Honors given for undergraduate thesis work.
- Received academic citations for course work in Algorithms, Digital Engineering.
- Cum Laude with overall GPA 3.6/4.0.
- Computer Science GPA 3.9/4.0.

TEACHING

Adjunct Lecturer, Columbia U. Dept. of Computer Science, *New York, NY, Sept. 2004 - Dec. 2005*

- Fall 2004, COMS W4995: **Introduction to Coding Theory**. Covers the fundamentals of coding theory from the perspective of a computer scientist: constructions, algorithms, asymptotics, bounds, and hardness. Lectures on modern topics within coding theory, as well as applications to cryptography and complexity theory are also given.

- Spring 2005, COMS W3261: **Computability and models of computation**. Regular languages, finite automata, regular grammars, nondeterminism, regular expressions. Context-free languages, push-down automata, context-free grammars, parsing. Turing machines, general grammars, computability, the Chomsky hierarchy, the Church-Turing thesis, other models of computation.

Teaching Assistant, Massachusetts Institute of Technology, *Cambridge, MA, Sept. 1998 - June 2003.*

- Taught weekly recitation, conducted office hours, designed problem sets and exams.
- Courses: Algorithms; Automata, Computability and Complexity; Theory of Computation.

Experience

NSF Mathematical Sciences Postdoctoral Fellow, *New York, NY, Sept. 2003 - Sept. 2005.*

- Department of Industrial Engineering and Operations Research, Columbia University. Sponsoring Scientist: Cliff Stein.

Visiting Researcher, Vanu, Inc., *Cambridge, MA, Summer 2001, Summer 2002.*

- Designed algorithms for decoding error-correcting codes in a software radio environment.
- Patented and published decoding algorithms for Reed-Muller codes, convolutional codes.
- Implemented and tested algorithms in simulated noise environments.
- Assisted in research projects on various algorithms required for sending and receiving wireless transmissions in software.

Visiting Researcher, Tel Aviv University, *Tel Aviv, Israel, Summer 2000.*

- Conducted original research on algorithms for network design problems with host Guy Even.
- Implemented advanced algorithms for Linear Arrangement, with applications to VLSI layout.
- Tested implementations on benchmark suites and prepared research reports.

Research Assistant, Massachusetts Institute of Technology, *Cambridge, MA, Sept. 1998 - June 2003.*

- Conducted original research under advisor David Karger in the areas of Coding Theory, Network Algorithms, Graph Theory, Approximation Algorithms, Combinatorial Optimization and Scheduling.

Consultant, Moving Providence, Inc., *Concord, MA, September 2001 - January 2002.*

- Designed, implemented and tested original algorithms for seat assignment problems in concert venues.

Consultant, *i*-Cube, *Cambridge, MA, September 1997 - June 1998.*

- Developed custom software for mission-critical client-server applications.
- Worked with clients on the specific requirements for applications.
- Programmed in C, SQL, Powerbuilder, proprietary *i*-Cube tools.
- Tested code and business functionality using automated testing packages.
- Researched development tools to improve infrastructure for future projects.

Lead Developer, Dartmouth College Baker Bells Project, *Hanover, NH, June 1997 - August 1997.*

- Redesigned the system for ringing the bells in Baker Tower at Dartmouth College.
- Developed a song scheduling program to automatically play MIDI files on the bells.

PUBLICATIONS

Conference/Workshop Papers, Submissions

Yield Optimization of Display Advertising with Ad Exchange. Santiago Balseiro, Jon Feldman, Vahab Mirrokni, S. Muthukrishnan. *Submitted to:* , February 2011.

Online Stochastic Packing Applied to Display Ad Allocation. Jon Feldman, Monika Henzinger, Nitish Korula, Vahab Mirrokni, Cliff Stein. *In: Sixth Workshop on Ad Auctions (July 2010), European Symposium on Algorithms (ESA)*, September 2010.

Auctions with Intermediaries. Jon Feldman, Vahab Mirrokni, S. Muthukrishnan, Mallesh Pai. *In: ACM Conference on Electronic Commerce (EC), 2010*, June 2010.

Online Ad Assignment with Free Disposal. Jon Feldman, Nitish Korula, Vahab Mirrokni, S. Muthukrishnan, Martin Pl. *In: Workshop on Internet and Network Economics (WINE), 2009*, December 2009.

Online Stochastic Matching: Beating 1 - 1/e. Jon Feldman, Aranyak Mehta, Vahab Mirrokni, S. Muthukrishnan. *In: Proc. IEEE Symposium on Foundations of Computer Science (FOCS). Also in Fifth Workshop on Ad Auctions (2009).*, October 2009.

Online Ad Slotting with Cancellations. Florin Constantin, Jon Feldman, S. Muthukrishnan, Martin Pl. *In: Fourth Workshop on Ad Auctions (July 2008), Symposium on Discrete Algorithms (SODA)*, January 2009.

Sponsored Search Auctions with Markovian Users. Gagan Aggarwal, Jon Feldman, S. Muthukrishnan, Martin Pl. *In: Fourth Workshop on Ad Auctions (July 2008), Workshop on Internet and Network Economics (WINE)*, December 2008.

Position Auctions with Bidder-Specific Minimum Prices. Eyal Even-Dar, Jon Feldman, Yishay Mansour, S. Muthukrishnan. *In: Fourth Workshop on Ad Auctions (July 2008), Workshop on Internet and Network Economics (WINE)*, December 2008.

Algorithmic Methods for Sponsored Search Advertising. Jon Feldman, S. Muthukrishnan. *In: International Conference on Measurement and Modeling of Computer Systems (ACM SIGMETRICS)*, June 2008.

A Truthful Mechanism for Offline Ad Slot Scheduling. Jon Feldman, S. Muthukrishnan, Evdokia Nikolova, Martin Pl. *In: 2008 Symposium on Algorithmic Game Theory (SAGT)*, May 2008.

On Distributing Symmetric Streaming Computations. Jon Feldman, S. Muthukrishnan, Anastasios Sidiropoulos, Cliff Stein, Zoya Svitkina. *In: 2008 ACM-SIAM Symposium on Discrete Algorithms (SODA)*, January 2008.

Budget Optimization in Search-Based Advertising Auctions. Jon Feldman, S. Muthukrishnan, Martin Pl, Cliff Stein. *In: ACM Conference on Electronic Commerce (EC)*, June 2007.

Bidding to the Top: VCG and Equilibria of Position-Based Auctions. Gagan Aggarwal, Jon Feldman, S. Muthukrishnan. *In: Workshop on Approximation and Online Algorithms (WAOA), 2006*, June 2006.

Growth Codes: Maximizing Sensor Network Data Persistence. Abhinav Kamra, Vishal Misra, Dan Rubinstein, Jon Feldman. *In: Proc. Special Interest Group on Data Communication (SIGCOMM)*, September 2006.

PAC Learning Mixtures of Gaussians with No Separation Assumption. Jon Feldman, Ryan O'Donnell, Rocco A. Servedio. *In: Proc. 19th Annual Conference on Learning Theory (COLT)*, June 2006.

Using Many Machines to Handle an Enormous Error-Correcting Code. Jon Feldman. *In: Proc. IEEE Information Theory Workshop (ITW)*, March 2006.

Learning Mixtures of Product Distributions over Discrete Domains. Jon Feldman, Ryan O'Donnell, Rocco A. Servedio. *In: Proc. IEEE Symposium on Foundations of Computer Science (FOCS)*, October 2005.

Local Decoding of Walsh Codes to Reduce CDMA Despreading Computation. Albert Chan, Jon Feldman, Raghu Madyastha, Piotr Indyk, David R. Karger. *In: Software Defined Radio Technical Conference*, November 2005.

Towards Optimal Encoding for Data Recovery in Sensor Network Failures. Abhinav Kamra, Vishal Misra, Dan Rubinstein, Jon Feldman. *In: Proc. 43rd Annual Allerton Conference on Communication, Control, and Computing*, September 2005.

Non-Linear Approaches to Decoding Low-Density Parity-Check Codes. Kai Yang, Jon Feldman, Xiaodong Wang. *In: Proc. 43rd Annual Allerton Conference on Communication, Control, and Computing*, September 2005.

The Benefit of Thresholding in LP Decoding of LDPC Codes. Jon Feldman, Ralf Koetter, Pascal Vontobel. *In: IEEE International Symposium on Information Theory*, September 2005.

Secure Network Coding via Filtered Secret Sharing. Jon Feldman, Tal Malkin, Cliff Stein, Rocco A. Servedio. *Manuscript*, November 2004.

On the Capacity of Secure Network Coding. Jon Feldman, Tal Malkin, Cliff Stein, Rocco A. Servedio. *In: Proc. 42nd Annual Allerton Conference on Communication, Control, and Computing*, September 2004.

LP Decoding Achieves Capacity. Jon Feldman, Cliff Stein. *In: 2005 ACM-SIAM Symposium on Discrete Algorithms (SODA)*, January 2005.

LP Decoding Corrects a Constant Fraction of Errors. Jon Feldman, Tal Malkin, Cliff Stein, Rocco A. Servedio, Martin J. Wainwright. *In: Proc. IEEE International Symposium on Information Theory (ISIT)*, June 2004.

LP Decoding. Jon Feldman, David R. Karger, Martin J. Wainwright. *In: Proc. 41st Annual Allerton Conference on Communication, Control, and Computing*, October 2003.

Using Linear Programming to Decode Linear Codes. Jon Feldman, David R. Karger, Martin J. Wainwright. *In: Proc. 37th annual Conference on Information Sciences and Systems (CISS '03), Baltimore, MD*, March 2003.

Linear Programming-Based Decoding of Turbo-Like Codes and its Relation to Iterative Approaches. Jon Feldman, David R. Karger, Martin J. Wainwright. *In: Proc. 40th Annual Allerton Conference on Communication, Control, and Computing*, October 2002.

Decoding Turbo-Like Codes via Linear Programming. Jon Feldman, David R. Karger. *In: Proc. IEEE Symposium on Foundations of Computer Science (FOCS)*, November 2002.

A Fast Maximum-Likelihood Decoder for Convolutional Codes. Jon Feldman, Matteo Frigo, Ibrahim Abou-Faycal. *In: Proc. IEEE Vehicular Technology Conference (VTC)*, September 2002.

A Noise-Adaptive Algorithm for First-Order Reed-Muller Decoding. Jon Feldman, Matteo Frigo, Ibrahim Abou-Faycal. *In: Proc. IEEE Vehicular Technology Conference (VTC)*, September 2002.

A 3/2-approximation algorithm for augmenting the connectivity of a graph from 1 to 2 using edges from a given set. Guy Even, Jon Feldman, Guy Kortsarz, Zeev Nutov. *In: 4th International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX '01), Berkeley, CA*, August 2001.

Parallel Processor Scheduling With Delay Constraints. Daniel W. Engles, Jon Feldman, David R. Karger, Matthias Ruhl. *In: Proc. ACM-SIAM Symposium on Discrete Algorithms (SODA)*, January 2001.

The Directed Steiner Network problem is tractable for a constant number of terminals. Jon Feldman, Matthias Ruhl. *In: Proc. IEEE Symposium on Foundations of Computer Science (FOCS)*, October 1999.

Journal Papers

Learning Mixtures of Product Distributions over Discrete Domains. Jon Feldman, Ryan O'Donnell, Rocco A. Servedio. *SIAM J. on Computing*, 37(5), February, 2008.

Nonlinear Programming Approaches to Decoding Low-Density Parity-Check Codes. Kai Yang, Jon Feldman, Xiaodong Wang. *IEEE Journal on Selected Areas In Communications*, 24(8), August, 2006.

LP Decoding Corrects a Constant Fraction of Errors. Jon Feldman, Tal Malkin, Cliff Stein, Rocco A. Servedio, Martin J. Wainwright. *IEEE Transactions on Information Theory*, 53(1), January, 2007.

Using Linear Programming to Decode Binary Linear Codes. Jon Feldman, Martin J. Wainwright, David R. Karger. *IEEE Transactions on Information Theory*, 51(3), pp. 954–972, March, 2005.

Decoding Turbo-Like Codes via Linear Programming. Jon Feldman, David R. Karger. *Journal of Computer and System Sciences (FOCS '02 Special Issue)*, 68(4), June, 2004.

Computing an optimal orientation of a balanced decomposition tree for linear arrangement problems. Reuven Bar-Yehuda, Guy Even, Jon Feldman, Seffi Naor. *Journal of Graph Algorithms and Applications*, 5(4), pp. 1–27, June, 2001.

A 3/2-approximation algorithm for augmenting the connectivity of a graph from 1 to 2 using edges from a given set. Guy Even, Jon Feldman, Guy Kortsarz, Zeev Nutov. *Submitted to: SIAM J. on Computing*, February, 2004.

The Directed Steiner Network problem is tractable for a constant number of terminals. Jon Feldman, Matthias Ruhl. *SIAM J. on Computing*, 36(2), August, 2006.

Theses

Decoding Error-Correcting Codes via Linear Programming. Jon Feldman. *Ph.D. thesis, Massachusetts Institute of Technology.* September, 2003. Advisor: David R. Karger.

The Directed Steiner Network problem is tractable for a constant number of terminals. Jon Feldman. *Masters thesis, Massachusetts Institute of Technology.* June, 2000. Advisor: David R. Karger.

The Complexity of Clerkship Scheduling. Jon Feldman. *Undergraduate thesis, Dartmouth College.* June, 1997. Advisor: Cliff Stein.

Technical Reports and Manuscripts

LP Decoding Achieves Capacity. Jon Feldman, Cliff Stein. CORC Technical Report, TR-2004-04, April 2004.

LP Decoding Corrects a Constant Fraction of Errors. Jon Feldman, Tal Malkin, Cliff Stein, Rocco A. Servedio, Martin J. Wainwright. CORC Technical Report, TR-2003-08, October 2003.

PROFESSIONAL ACTIVITIES

- *Speaking Engagements*

Bidding to the Top: VCG and Equilibria of Position-Based Auctions.

Workshop on Approximation and Online Algorithms, Zurich, Switzerland, September 2006.

Using Many Machines to Handle an Enormous Error-Correcting Code.

Information Theory Workshop, Punta Del Este, Uruguay, March 2006.

Learning Mixtures of Product Distributions over Discrete Domains.

NYU Theory Seminar, New York, NY, March 2006.

Linear Programming (LP) Decoding Achieves Capacity.

2005 ACM-SIAM Symposium on Discrete Algorithms (SODA), January 2005.

Secure Network Coding via Filtered Secret Sharing.

NYU Theory Seminar, New York, NY, February 2005.

SUNY Stony Brook Theory seminar, Stony Brook, NY, February 2005.

DIMACS Working Group on Network Coding, Rutgers University, Piscataway, NJ, January 2005.

University of Pennsylvania Algorithms and Complexity Seminar, Philadelphia, PA, November 2004.

2004 Allerton Conference on Communication, Control, and Computing, Urbana, Ill, October 2004.

Linear Programming Decoders.

University of Maryland Coding Theory Seminar, College Park, MD, February 2005.

SIAM Conference on Discrete Mathematics, June 2004.

Proving Strong Error Bounds for LP Decoding using a Dual Witness.

Dartmouth College Theory Seminar, Hanover, NH, October 2004.

Lucent Technologies (Bell Labs) Math Sciences Research Center, Murray Hill, NJ, April 2004.

IBM Research (Watson), Yorktown Heights, NY, July 2004.

Linear Programming (LP) Decoding Corrects a Constant Fraction of Errors.

IEEE International Symposium on Information Theory, June, 2004.

Princeton University Seminar in Theoretical Computer Science, Princeton, NJ, February 2004.

MIT Theory of Computation Seminar, Cambridge, MA, March 2004.

Decoding Error-Correcting Codes via Linear Programming.

Ph.D. thesis defense. MIT Laboratory for Computer Science, Cambridge, MA, June 2003.

Brooklyn Polytechnic Institute Theory of Computation Seminar, New York, NY, October 2003.

DIMACS Theory of Computation Seminar, Rutgers, NJ, October 2003.

Columbia University Theory of Computation Seminar, New York, NY, September 2003.

LP Decoding.

2003 Allerton Conference on Communication, Control, and Computing, Urbana, Ill, October 2003.

Using Linear Programming to Decode Linear Codes.

Conference on Information Sciences and Systems (CISS '03), Baltimore, MD, March 2003.

Harvard University Theory of Computation Seminar, Cambridge, MA, March 2003.

Vanu, Inc., Cambridge, MA, April 2003.

Decoding Turbo-Like Codes via Linear Programming.

IEEE Symposium on Foundations of Computer Science (FOCS '02), Vancouver, CA, Nov. 2002.

Princeton University Seminar in Theoretical Computer Science, Princeton, NJ, December 2002.

Linear Programming-Based Decoding of Turbo-Like Codes and its Relation to Iterative Approaches.

2002 Allerton Conference on Communication, Control, and Computing, Urbana, Ill, October 2002.

A Primer on Turbo-Codes and Low-Density Parity-Check Codes

MIT Theory of Computation Student Seminar, October, 2002.

A Fast Maximum-Likelihood Decoder for Convolutional Codes.

Fall 2002 IEEE Vehicular Technology Conference (VTC), Vancouver, CA, September 2002.

A Noise-Adaptive Algorithm for First-Order Reed-Muller Decoding.

Fall 2002 IEEE Vehicular Technology Conference (VTC) Vancouver, CA, September 2002.

A Comparison of Iterative Decoding Algorithms for Turbo Codes.

Vanu, Inc., August, 2002.

Using Dijkstra's Algorithm for Convolutional Decoding.

MIT Theory of Computation Student Seminar, October, 2001.

The Heap Decoder for Convolutional Codes.

Vanu, Inc., August, 2001.

A 3/2-Approximation Algorithm for Augmenting the Connectivity of a Graph from 1 to 2 using Edges from a Given set.

4th International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX '01), Berkeley, CA, August 2001.

A Polynomial-Time Algorithm for the Directed Steiner Network Problem.

Masters Thesis Defense, June, 2000.

The Directed Steiner Network Problem is Tractable for a Constant Number of Terminals.

IEEE Symposium on Foundations of Computer Science (FOCS), New York, NY, October 1999.

Master's Thesis Defense, Cambridge, MA, June 2000.

The Three-Processor Scheduling Problem.

MIT Theory of Computation Student Seminar, September, 1998.

- *Refereeing*

Symposium on the Theory of Computing (STOC), 2005.
Journal of Heuristics, 2004
International Symposium on Information Theory and its Applications (ISITA), 2004
IEEE Symposium on Foundations of Computer Science (FOCS), 2004.
IEEE Transactions on Communications, 2004.
IEEE Transactions on Information Theory, 2004.
Symposium on the Theory of Computing (STOC), 2004.
Symposium on Theoretical Aspects of Computer Science (STACS), 2004.
Symposium on Discrete Algorithms (SODA), 2004.
Trans. of the Institute of Electronics, Information and Communication Engineers (IEICE), 2003.
Symposium on Parallel Algorithms and Architectures (SPAA), 2003.
AI/LCS Student Oxygen Workshop, 2003.

- *Patents*

A Fast Maximum-Likelihood Decoder for Convolutional Codes. Vanu, Inc., Fish & Richardson P.C. Inventors: Jon Feldman, Matteo Frigo, Ibrahim Abou-Faycal. Application submitted November 2001, pending approval.

A Noise-Adaptive Algorithm for First-Order Reed-Muller Decoding. Vanu, Inc., Fish & Richardson P.C. Inventors: Jon Feldman, Matteo Frigo, Ibrahim Abou-Faycal. Application submitted June 2002, pending approval.

REFERENCES

Prof. David Karger	MIT Computer Science and Artificial Intelligence Laboratory Cambridge, MA `karger@theory.lcs.mit.edu`
Prof. Cliff Stein	Columbia University Dept. of Industrial Engineering and Operations Research New York, NY `cliff@ieor.columbia.edu`
Prof. Madhu Sudan	MIT Computer Science and Artificial Intelligence Laboratory Cambridge, MA `madhu@mit.edu`
Prof. Guy Even	Tel-Aviv University Department of Electrical Engineering Tel-Aviv, Israel `guy@eng.tau.ac.il`
Prof. Piotr Indyk	MIT Computer Science and Artificial Intelligence Laboratory Cambridge, MA `indyk@theory.lcs.mit.edu`
Prof. David Forney	MIT Laboratory for Information and Decision Systems Cambridge, MA `forney@lids.mit.edu`
Dr. Matteo Frigo	Vanu, Inc. Cambridge, MA `athena@vanu.com`