

Mohsen Bayati's Curriculum Vitae

Stanford University Graduate School of Business
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ACADEMIC & INDUSTRY EXPERIENCE

Stanford University	Stanford, CA
<i>Associate Prof. of Operations, Information and Technology</i>	
<i>With tenure</i>	2018-Present
<i>Without tenure</i>	2015-2018
<i>Assistant Prof. of Operations, Information and Technology</i>	2011- 2015
<i>Graduate School of Business</i>	
<i>Courtesy appointment in Electrical Engineering</i>	2013-Present
<i>Advising Faculty in Biomedical Informatics</i>	2011-Present
<i>Postdoctoral Scholar in Electrical Engineering</i>	2009- 2011
Microsoft Research	Redmond, WA, Cambridge, MA
<i>Postdoctoral Researcher</i>	2007- 2009
<i>Intern – theory group</i>	Summer 2006
IBM Watson Research	Summer 2005
<i>Intern</i>	

EDUCATION

Stanford University	Stanford, CA
<i>Ph.D. in Electrical Engineering</i>	2003-2007
<i>M.Sc. and Ph.D. minor in Mathematics</i>	2000-2003
Sharif University of Technology	Tehran, Iran
<i>B.Sc. in Mathematics</i>	1997-2000

RESEARCH INTERESTS

Healthcare management, Personalized decision-making, Graphical models and message-passing algorithms

AWARDS & DISTINCTIONS

NSF CAREER award	2016
INFORMS Health Applications William Pierskalla best paper award	2014 & 2016
INFORMS Applied Probability best paper award	2015
Gold Medal in International Mathematics Olympiad (IMO)	1997

JOURNAL PAPERS

M.A. Erdogdu, M. Bayati and L.H. Dicker, “Scaled Least Squares Estimator for GLMs in Large-Scale Problems”, accepted to *Journal of Machine Learning Research*, 2018.

- Short version in 2016 Neural Information Processing Systems (NeurIPS) conference.
- <https://arxiv.org/abs/1611.06686>

H. Bastani, J. Goh, and M. Bayati, “Evidence of Upcoding in Pay-for-Performance Programs”, accepted to *Management Science*, 2018.

- INFORMS Health Applications Society best student (H. Bastani) paper in 2015.

J. Goh, M. Bayati, S. Zenios, S. Singh, and D. Moore, “Data Uncertainty in Markov Chains: Application to Cost-effectiveness Analyses of Medical Innovations”, *Operations Research*, Vol. 66, No. 3, 2018.

- [INFORMS Health Applications Society William Pierskalla best paper in 2014.](#)

M. Bayati, A. Montanari, and A. Saberi, “Generating Random Network without Short Cycles”, *Operations Research*, Vol. 66, No. 5, 2018.

M. Bayati, S. Bhaskar, and A. Montanari, “Statistical Analysis of a Low-cost Method for Multiple Disease Prediction”, *Statistical Methods for Medical Research*, Aug; 27(8):2312-2328, 2018.

E. Ang, S. Kwasnick, M. Bayati, and E Plambeck, and M. Aratow, “Accurate ED Wait Time Prediction”, *Manufacturing and Service Operations Management*, 18(1), 141-156, 2016.

- [Implemented at San Mateo Medical Center.](#)

J. Goh, M. Bjarnadottir, M. Bayati, and S. Zenios, “Active Postmarketing Drug Surveillance for Multiple Adverse Events”, *Operations Research*, 63(6), 1528-1546, 2015.

M. Bayati, C. Borgs, J. Chayes, Y. Kanoria, and A. Montanari, “Bargaining dynamics in exchange networks”, *Journal of Economic Theory*, 156, 417-454, 2015.

M. Bayati, M. Lelarge and A. Montanari, “Universality in polytope phase transitions and message passing algorithms”, *Annals of Applied Probability*, 25(2), 753-822, 2015.

- [INFORMS Applied Probability best paper in 2015.](#)
- [Solved a conjecture by David Donoho and Jared Tanner.](#)

M. Bayati, M. Braverman, M. Gillam, K. Mack, G. Ruiz, M. Smith, and E. Horvitz, “Data-Driven Decisions for Reducing Readmissions for Heart Failure: General Methodology and Case Study”, *Public Library of Science (PLOS ONE)*, 9(10), 2014.

- Implemented in several hospitals around the world (the product is evolved to be hosted within [Cortana Intelligence Platform](#)), [Link to the GitHub repository](#)

M. Bayati, D. Gamarnik, and P. Tetali, “Combinatorial approach to the interpolation method and scaling limits in sparse random graphs”, *Annals of Probability*, 41(6), 4080-4115, 2013.

- [Solved an open problem by David Aldous](#)

M. Bayati, D. F. Gleich, A. Saberi, Y. Wang, “Message-passing algorithms for sparse network alignment”, *ACM Transactions of Knowledge Discovery and Data mining*, 7, 3:1-3:31, 2013

M. Bayati, A. Montanari, “The LASSO risk for Gaussian matrices”, *IEEE Transactions on Information Theory*, 58(4), 1997-2017, 2012.

M. Bayati, C. Borgs, J. Chayes, and R. Zecchina, “Belief-Propagation for Weighted b-Matchings on Arbitrary Graphs and its Relation to Linear Programs with Integer Solutions”, *SIAM Journal in Discrete Mathematics*, 25, 989-1011, 2011.

M. Bayati, A. Montanari, “The dynamics of message passing on dense graphs, with applications to compressed sensing”, *IEEE Transactions on Information Theory*, 57(2), 764-785, 2011.

M. Bayati, J. H. Kim and A. Saberi, “A sequential algorithm for generating random graphs”, *Algorithmica*, 58(4), 860-910, 2010.

M. Bayati, A. Braunstein, and R. Zecchina, “A rigorous analysis of the cavity equations for the minimum spanning tree”, *Journal of Mathematical Physics*, 49, 125206, 2009.

M. Bayati, C. Borgs, J. Chayes, and R. Zecchina, “On the exactness of the cavity method for weighted b-matching on arbitrary graphs and its relation to linear programs”, *Journal of Statistical Physics*, L06001, 2008.

M. Bayati, C. Borgs, A. Braunstein, J. Chayes, A. Ramezanzpour, and R. Zecchina, “Statistical Mechanics of Steiner Trees”, *Physical Review Letters*, 101, 037208, 2008.

M. Bayati, D. Shah and M. Sharma, “Max-product for maximum weight matching: convergence, correctness, and LP duality”, *IEEE Transactions on Information Theory*, 54(3), 1241-1251, 2008.

SUBMITTED PAPERS

H. Bastani, M. Bayati, and Khashayar Khosravi, “Mostly Exploration-Free Algorithms for Contextual Bandits”, Submitted to *Management Science*.

- <https://arxiv.org/abs/1704.09011>

S. Athey, M. Bayati, N. Doudchenko, G. Imbens, and K. Khosravi, “Matrix Completion Methods for Causal Panel Data Models”, Submitted to Journal of American Statistical Association.

- <https://arxiv.org/abs/1710.10251>
- [Link to the GitHub repository](#)

H. Bastani and M. Bayati, “Online Decision Making with High Dimensional Covariates”, Submitted to *Operations Research*.

- [INFORMS Health Applications William Pierskalla best paper award in 2016.](#)
- [Nicholson, MSOM, and IBM Service science best student \(H. Bastani\) paper in 2016.](#)
- https://papers.ssrn.com/sol3/Papers.cfm?abstract_id=2661896

WORKING PAPERS & REVISIONS

N. Hamidi, M. Bayati, and K. Gupta, “Contextual Bandits with Low-rank Structure”.

M. Bayati, S. Kwasnick, D. Luo, and E. Plambeck, “Low-Acuity Patients Delay High-Acuity Patients in an Emergency Department”.

- https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3095039

H. Bastani, M. Bayati, M. Braverman, R. Gummadi, and R. Johari, Analysis of Medicare Pay-for-Performance Contracts.

- https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2839143

M. Bayati, M. A. Erdogdu, A. Javanmard, and A. Montanari, “Estimating LASSO risk and noise level”.

- Short version in 2013 Neural Information Processing Systems (NeurIPS) conference.
- <https://papers.nips.cc/paper/4948-estimating-lasso-risk-and-noise-level.pdf>

REFEREED CONFERENCE PAPERS

H. Bastani, M. Bayati, M. Braverman, R. Gummadi, and R. Johari, Analysis of Medicare Pay-for-Performance Contracts, *EC Workshop on Mechanism Design for Social Good*, 2017.

M.A. Erdogdu, M. Bayati and L.H. Dicker, “Scaled Least Squares Estimator for GLMs in Large-Scale Problems”, *Proceedings of Neural Information Processing Systems (NeurIPS)*, 2016.

- M. Bayati, S. Bhaskar, and A. Montanari, “A Low-cost Method for Multiple Disease Prediction”, *Proceedings of American Medical Informatics Associations (AMIA)* 2015.
- N.C. Baker, M. Bayati, R. Torguson, K. Mack, H. Rappaport, E. Horvitz, R. Waksman, “Identifying Patients at High Risk for Readmission following Treatment for Acute Myocardial Infarction: a Data-Centric Approach”, *American Heart Association Conference*, November 2014.
- M. Bayati, M. A. Erdogdu, and A. Montanari, “Estimating LASSO risk and noise level”, *Proceedings of Neural Information Processing Systems (NeurIPS)*, 2013.
- M. Bayati, M. Lelarge and A. Montanari, “Universality in Polytope Phase Transitions and Iterative Algorithms”, *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, 2012
- Y. Kanoria, M. Bayati, C. Borgs, J. Chayes, and A. Montanari, “Fast Convergence of Natural Bargaining Dynamics for Exchange Networks”, *Proceedings of ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2011.
- M. Bayati, J. Bento, A. Montanari, “The LASSO risk for Gaussian matrices: asymptotic results and real world examples”, *Proceedings of Neural Information Processing Systems (NeurIPS)*, 2010.
- M. Bayati, A. Montanari, “The dynamics of message passing on dense graphs, with applications to compressed sensing”, *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, 2010.
- M. Bayati, D. Gamarnik, and P. Tetali, “Combinatorial approach to the interpolation method and scaling limits in sparse random graphs”, *Proceedings of ACM Symposium on Theory of Computing (STOC)*, 2010.
- M. Bayati, M. Gerritsen, D. Gleich, A. Saberi, and Y. Wang, “Algorithms for Large, Sparse Network Alignment”, *Proceedings of IEEE International Conference on Data Mining (ICDM)*, 2009.
- M. Bayati, A. Montanari, and A. Saberi, “Generating random graphs with large girth”, *Proceedings of ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2009.
- M. Bayati, J. H. Kim and A. Saberi, “A sequential algorithm for generating random graphs”, *International Workshop on Randomized Techniques in Computation (RANDOM)*, 2007.
- M. Bayati, D. Gamarnik, D. Katz, C. Nair and P. Tetali, “Simple deterministic approximation algorithms for counting matchings”, *ACM Symposium on Theory of Computing (STOC)*, 2007.
- M. Bayati, B. Prabhakar, D. Shah and M. Sharma, “Iterative Scheduling Algorithms”, *IEEE Conference on Computer Communications (INFOCOM)*, 2007.

M. Bayati, Chandra Nair, “A rigorous proof of the cavity method for counting matchings”, *(Allerton) conference on communication, control and computing*, 2006.

M. Bayati, D. Shah and M. Sharma, “A simpler max-product maximum weight matching algorithm and the auction algorithm”, *IEEE International Symposium on Information Theory (ISIT)*, 2006.

M. Bayati, M. Squillante and M. Sharma, “Optimal scheduling in multi-server queuing network”, *ACM (SIGMETRICS)*, 2006.

M. Bayati, D. Shah and M. Sharma, “Maximum weight matching via max-product belief propagation”, *IEEE International Symposium on Information Theory (ISIT)*, 2005.

N. Kumar, S. Nabar, M. Bayati, A. Keshavarzian, “Achieving stability in networks of input queued switches using a local online scheduling policy”, *IEEE (GLOBECOM)*, 2005.

M. Bayati, N. Beheshti, “Stability of the maximum size matching in input queued switches”, *(Allerton) conference on communication, control and computing*, 2004.

PATENTS

M. Bayati, M. Braverman, M. Gillam, and E. Horvitz, Health care policy development and execution, Filed 2010, Published 2012, Pub. number: US20120004925 A1.

M. Bayati, M. Braverman, S. Kale and Y. Makarychev, Predicting web advertisement click success by using head-to-head ratings, Filed & Published 2010, Pub. number: US20100198685 A1.

M. Bayati, C. Borgs, A. Braunstein, J. Chayes, and R. Zecchina, Network analysis with Steiner trees, Filed 2009, Granted 2011, Pub. Number: US20090222782 A1.

TEACHING

Winters 2013-2019, OIT 367: Business Intelligence from Big Data (MBA Core)

Designed a new Advanced Applications track for Data and Decisions that introduces students to real-world situations where significant competitive advantage can be obtained through large-scale data analysis, with special attention to what can be done with the data and where the potential pitfalls lie. Students will acquire a working knowledge of machine learning, R, and SQL.

Springs 2018-2019, OIT 604: Data, Learning, and Decision-Making (PhD)

Designing this course to cover latest research topics at the intersection of machine learning and data-driven decision-making.

Winters 2015-2017, Fall 2018, OIT 536: Data for Action: From Insights to Applications (MBA)

Co-designed (with Guido Imbens) a new compressed course that covers a broad set of topics that managers of data-driven enterprises should know. It deals with the technical, legal, regulatory and business strategic decisions that must be considered when delivering solutions to customers.

Spring 2015, OIT 637: Data-driven Decision Making in Healthcare (PhD)

Spring 2012, OIT 267: Data and Decisions – Accelerated (MBA Core)

PhD THESIS SUPERVISION

Advising: Wanning Chen (GSB), Nima Hamidi (Statistics), Khashayar Khosravi (Electrical Engineering), Carolyn Kim (Computer Science), and Danqi Lou (GSB-OIT, co-advising with E. Plambeck), Ali Reza Sharafat (Electrical Engineering, co-advising with E. Plambeck)

Advised: Erjie Ang (GSB-OIT, co-advised with E. Plambeck), data scientist at Facebook

Hamsa Bastani (Electrical Engineering), faculty at the Wharton Business School

Sonia Bhaskar (Electrical Engineering, co-advised with A. Montanari), data scientist at Netflix

Murat Erdogdu (Statistics, co-advised with A. Montanari), faculty at University of Toronto Computer Science and Statistics

Joel Goh (GSB-OIT, co-advised with S. Zenios), faculty of Harvard Business School (currently on leave at National University of Singapore)

Sara Kwasnick (GSB-OIT co-advised with E. Plambeck), data scientist at Airbnb

Sheng Qiang (GSB-OIT), entrepreneur

Erika Strandberg (Biomedical Informatics), Program Director of Data Science and AI Affiliates Programs, Stanford University Data Science Institute

PROFESSIONAL SERVICE

Associate Editor Management Science (2018-Present), Mathematics of Operations Research (2018-Present), Operations Research (2016-Present), Stochastic Systems (2017-Present)

Program Co-chair	INFORMS Health Applications Pierskalla Competition (2015, 2017)
Cluster Chair	Personalized Medicine and Disease Modeling (INFORMS Healthcare 2019), Healthcare Data Analytics and Machine Learning (INFORMS Healthcare 2017)
Reviewer and Panelist	National Science Foundation (2014-2016)
Member of Program Committee	Nicholson Competition (2013-Present), American Medical Informatics Conference (2013), MSOM SIG Healthcare 2015.
Organizer & Session chair:	Session on Data, Learning, and Decision-Making (INFORMS 2018) Session on Dynamic Learning and Decision-Making (INFORMS APS 2017) Session on Statistical Decision-Making with Applications in Healthcare (INFORMS 2016) Session on High-dimensional Data Models in Operations (INFORMS 2015) Session on Data-Driven Decisions in Healthcare (INFORMS 2014, INFORMS HAS 2015, INFORMS APS 2015) Session on Applied Probability in Healthcare (INFORMS APS 2013) Session on Learning and Marketing in Social Networks (INFORMS 2011) Session on Message-passing Algorithms and Network Optimization (INFORMS 2008).
Seminar Co-organizer:	OIT Seminar (2011-2016), Data Society and Inference Seminar (2013-present).
Referee for journals:	Operations Research, Management Science, Manufacturing & Services Operations Management (MSOM), Annals of Probability, Annals of Applied Probability, Random Structures and Algorithms, IEEE/ACM Transactions on Networking, IEEE Transactions on Information Theory, SIAM Journal in Discrete Math (SIDMA)

INVITED TALKS

Reducing Exploration in Personalized Decision-Making

April 2018, NYC Data Science Seminar, Cornell-Tech, NY.

December 2018, IMA Workshop "From Theory to Practice: Data-driven Supply Chain Management", Minneapolis, MI

November 2018, MIT Operation Research Center Seminar, Cambridge, MA

September 2018, University of Michigan Ross school of Business, Ann Arbor, MI

August 2018, Microsoft Research, Redmond, WA

Avoiding the Exploration-Exploitation Tradeoff in Personalized Decision-Making

November 2017, London Business School, Management Science and Operations Seminar, London, UK

September 2017, Yale SoM, Operations Management Seminar, New Haven, CT

May 2017, Stanford RAINS Seminar, Stanford, CA

May 2017, POMS Conference, Seattle, WA

March 2017, Duke Fuqua School of Business, Decision Sciences Seminar, Durham, NC

Online Decision-Making with High-Dimensional Covariates

August 2017, Joint Statistical Meeting, Baltimore, MD

October 2016, Workshop on Data-driven Management Science, Eindhoven, Netherlands

September 2016, NYU Stern IOMS Seminar, New York, NY

September 2016, Northwestern IEMS Seminar, Evanston, IL

June 2016, UNC Emerging Topics & Methods Workshop, Chapel Hill, NC

May 2016, Stanford Statistics Seminar, Stanford, CA

May 2016, INSEAD Technology and Management Seminar, Fontainebleau, France

June 2015, MSOM Conference, Toronto, ON

July 2015, INFORMS Applied Probability Conference, Istanbul, Turkey

Accurate ED Wait Time Prediction

September 2015, Wharton Empirical Workshop, Philadelphia, PA

July 2015, INFORMS Applied Probability Conference, Istanbul, Turkey

Optimizing Healthcare Decisions using High Dimensional Data

June 2015, Mostly OM workshop, Tsinghua University, Beijing, China

Statistical Analysis of a Low-cost Method for Multiple Disease Prediction

November 2014, Operations/Management Science Workshop, Chicago Booth, Chicago, IL

November 2015, INFORMS 2015, INFORMS Healthcare 2015

On Sequential Methods for Generating Random Graphs

June 2014, Stanford Probability Seminar, Stanford, CA

Estimation of LASSO Risk and Noise Level from Data

October 2013, INFORMS, Minneapolis, MN

Incentive Mechanisms in Healthcare

October 2013, INFORMS, Minneapolis, MN

Automated Risk Predictions for Clinical Decision Making

October 2013, USC Operations Management Seminar, Los Angeles, CA

April 2013, Columbia University DRO Seminar, New York, NY

October 2012, INFORMS, Phoenix, AZ

Machine Learning Methods from Statistical Physics Analysis and Applications

October 2012, INFORMS, Phoenix, AZ

Analysis of Approximate Message Passing and the Risk of LASSO

April 2013, Google Research, New York, NY

January 2012, Institute for Pure and Applied, Los Angeles, CA

November 2011, INFORMS, Charlotte, NC

July 2011, INFORMS Applied Probability Society conference, Stockholm, Sweden

February 2011, Berkeley Probability seminar, Berkeley, CA

November 2010, INFORMS, Austin, TX

Data-driven decision making with applications to healthcare systems

November 2011, INFORMS, Charlotte, NC

October 2011, Kellogg Operations Seminar Series, Evanston, IL

October 2011, UT Austin Seminar, Austin TX

September 2011, Microsoft Research 20th Anniversary, Cambridge, MA

July 2011, INFORMS Applied Probability Society conference, Stockholm, Sweden

February 2011, Information Theory and Applications workshop, UCSD, San Diego, CA

February 2011, Stanford GSB Operations, Information, and Technology seminar, Stanford, CA

December 2010, MIT Sloan School of Management, Cambridge, MA

November 2010, Berkeley Networking, Communications, and DSP seminar, Berkeley, CA

Analysis of Approximate Message Passing and the Risk of LASSO

November 2011, INFORMS, Charlotte, NC

July 2011, INFORMS Applied Probability Society conference, Stockholm, Sweden

February 2011, Berkeley Probability seminar, Berkeley, CA

November 2010, INFORMS, Austin, TX

Predicting and Minimizing Re-hospitalizations through Machine Learning

November 2010, INFORMS, Austin, TX

November 2010, Biomedical Informatics Colloquium, Stanford, CA

April 2010, Information Systems Colloquium, Stanford University, CA

Generating Random Graphs with Large-Girth

October 2009, Information Theory Workshop (ITW), Taormina, Italy

October 2008, DIMACS workshop on message-passing algorithms, Rutgers University, Piscataway, NJ

Algorithms for Large, Sparse Network Alignment

September 2009, Physics of Algorithms workshop, Santa Fe, NM

Graphical Models And Message Passing Algorithms: Theory and Applications

March 2009, Yahoo! Research, Sunnyvale, CA

May 2008, Google Research, Mountain View, CA

February 2007, Theory group at Microsoft research, Redmond, WA

A Sequential Algorithm for Generating Random Graphs

March 2009, MIT Stochastic Seminar, Cambridge, MA

October 2008, INFORMS, Washington, DC

July 2007, Common Concepts in Statistical Physics and Computer Science, Trieste, Italy

May 2006, Theory Seminar, University of Washington, Seattle, WA

Matching Wikipedia categories to the library of congress subject headings with network alignment

February 2009, Information Theory and Applications Workshop, San Diego, CA

November 2008, Microsoft Search Labs Tech Talk, Mountain View, CA

Belief Propagation and Linear Programming

October 2008, INFORMS, Washington, DC

June 2008, Workshop on: Phase Transitions, Hard Combinatorial Problems and Message Passing Algorithms, Banff, CA

Sequential Importance sampling and message-passing algorithms

February 2008, Theory Seminar, University of Washington, Seattle, WA

Message-passing scheduling algorithms

January 2008, Information Theory and Applications workshop, UCSD, San Diego, CA

July 2007, Applied Probability Society of INFORMS, Eindhoven, Netherlands

A rigorous analysis of the Cavity Method for counting matchings

May 2007, 1st Canadian Discrete and Algorithmic Mathematics Conference, Calgary, Canada

April 2007, 3rd Kailath Lecture and Colloquium, Stanford, CA

December 2006, Theory seminar, Berkeley, CA

Maxim Weight Matching via Max-Product Belief Propagation

January 2006, Stanford Theory Lunch, Stanford, CA

August 2005, Applied probability lunch, IBM Watson, Yorktown Heights, NY

Solving Switching Problem via Auction Algorithm

May 2005, Cisco systems, San Jose, CA