Mladen Kolar

CONTACT INFORMATION	The University of Chicago Booth School of Business 5807 S. Woodlawn Ave. Suite 338 Chicago, IL 60637 USA

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RESEARCH INTERESTS

Dynamic networks estimation, Theory of estimating varying coefficient models and their applications, High-dimensional statistics, Regulatory networks estimation, Social media analysis

POSITIONS

The University of Chicago Booth School of Business   **October 2017 - present**
Associate Professor of Econometrics and Statistics

The University of Chicago Booth School of Business   **July 2013 - October 2017**
Assistant Professor of Econometrics and Statistics

EDUCATION

Carnegie Mellon University, Pittsburgh, Pennsylvania USA

Ph.D. Candidate, Machine Learning Department, August 2007 - July 2013
- Thesis Title: "Uncovering Structure in High-Dimensions: Networks and Multi-task Learning Problems"
- Advisor: Eric P. Xing

University of Zagreb, Zagreb, Croatia

Faculty of Electrical Engineering and Computing, October 2001 - September 2006
- Diploma [B.Sc] in Computer Engineering (4.00 GPA)
- Thesis topic: correspondence analysis applied to text data

HONORS AND AWARDS

2017-2020, William S. Fishamn Faculty Scholar

2014-2017, IBM Corporation Faculty Scholar

2015, J. T. Oden Faculty Fellow

2014, SIGKDD Dissertation Awards, Honorable mention

2013, Simons-Berkeley Research Fellow

2010–2011, Facebook Fellowship

2006, Rector's Award (University of Zagreb), for work on computer aided document indexing

2006, "SCIENCE" award for the best undergraduate paper in the field of technical sciences

2006, Award Josip Loncar, given for the best student in the class

2005, Winner of the prestigious scholarship "Top Stipendija" (best 25 students in the country)

2002, 7th place in ACM Central Europe Programming Contest (participated 2001, 2003)

2001, Bronze medal in International Olympiad in Informatics, Finland

2000/2001, Participated in American Computer Science League

1998, 2nd place in Regional Chess Competition

RESEARCH EXPERIENCE

Facebook, Inc.   **May 2011 - September 2011**

Software engineering intern
Worked on a large scale system for multi-task learning in the Ads Optimization team.

INRIA Rocquencourt, Paris, France   **September 2010 - December 2010**

Visiting researcher with Willow team (`http://www.di.ens.fr/willow/index.php`)
Worked with Francis Bach and Guillaume Obozinski on the problem of convex matrix factorization and mutli-task learning.

Joint Research Center, Ispra, Italy   **December 2006 - July 2007**

Trainee in the language technology department (`http://langtech.jrc.it`)
Improved a system for indexing of news, coming from 22 languages in EU. The system deals with a huge number of documents on daily basis. (`http://press.jrc.it/`)

Faculty of Electrical Engineering and Computing   **September 2004 - June 2006**
Zagreb, Croatia

Developed application for aided document indexing of Croatian legislative documents. Worked in a team member of seven people. Developed software in C++ and designed the application. Scientific contributions of the project were reported in [1] and [2] and the work was awarded with Rector's award. (`http://textmining.zemris.fer.hr`)

Worked on correspondence analysis for my diploma thesis. Created a module for correspondence analysis for the open source project Orange. (`http://www.ailab.si/orange`)

Laboratory for signals and systems, Zagreb, Croatia   **February 2005 - December 2005**

Developed a web-based application for digital watermarking. Designed the architecture of the system for copyright detection and implemented it in C++. (`http://watermark.lss.hr`)

TEACHING
EXPERIENCE

B41204 Machine Learning   **Fall 2015, Spring 2016, Winter 2017**
The University of Chicago Booth School of Business

B41000 Business Statistics   **Spring 2014, Spring 2015, Spring 2016**
The University of Chicago Booth School of Business

10-601 Machine Learning, Carnegie Mellon University   **Fall 2011**

10-702 Statistical Machine Learning, Carnegie Mellon University   **Spring 2010**

Croatian informatics association, Zagreb, Croatia   **2001 - 2004**

Taught algorithm to high-school students, preparing for Croatian and international competitions in informatics. Other responsibilities included creating puzzles for country competition in informatics.

SUBMITTED WORK [15] B. Kim, S. Liu, M. Kolar. Two-sample inference for high-dimensional Markov networks. arXiv:1905.00466, 2019

[14] Y. Luo, Z. Yang, Z. Wang, M. Kolar. Natural Actor-Critic Converges Globally for Hierarchical Linear Quadratic Regulator. 2019. arXiv:1912.06875

[13] B. Kim, I. Gaynanova, M. Kolar. Inference for the edge differences in networks. 2019.

[12] Y.-L. Chen, M. Kolar, R. S. Tsay. Tensor Canonical Correlation Analysis. 2019. arXiv:1906.05358.

[11] M. Yu, V. Gupta, M. Kolar. Constrained High Dimensional Statistical Inference. 2019. arXiv:1911.07319

[10] M. Yu, V. Gupta, M. Kolar. Simultaneous Inference for Pairwise Graphical Models with Generalized Score Matching. 2019. arXiv:1905.06261

[9] S. Na, M. Kolar. High-dimensional Index Volatility Models via Stein's Identity. Revision at Bernoulli 2018. arXiv:1811.10790

[8] S. Na, M. Ma, M. Kolar. Scalable Peaceman-Rachford Splitting Method with Proximal Terms. 2018. arXiv:1711.04955

[7] W. Wang, J. Wang, M. Kolar, N. Srebro. Distributed Stochastic Multi-Task Learning with Graph Regularization. 2017. arXiv:1802.03830

[6] J. Wang, M. Kolar, N. Srebro. Distributed Multi-Task Learning with Shared Representation. 2016. arXiv:1603.02185

[5] J. Bradic, M. Kolar. Quantifying Uncertainty in High-Dimensional Quantile Regression. 2015. arXiv:1702.06209

[4] T. Zhao, M. Kolar, H. Liu. A General Framework for Robust Testing and Confidence Regions in High-Dimensional Quantile Regression. 2014. arXiv:1412.8724

[3] J. Wang, M. Kolar. Inference for Sparse Conditional Precision Matrices. 2014. arXiv:1412.7638

[2] J. Sharpnack, M. Kolar. Mean and variance estimation in high-dimensional heteroscedastic models with non-convex penalties. 2014. arXiv:1410.7874

[1] M. Kolar, E. P. Xing. Sparsistent Estimation of Time-Varying Discrete Markov Random Fields. 2012.

Publications

[47] M. Yu, V. Gupta, M. Kolar. Estimation of a Low-rank Topic-Based Model for Information Cascades. To appear JMLR 2020.

[46] B. Zhao, Y. S. Wang, M. Kolar. Direct Estimation of Differential Functional Graphical Models. NeurIPS 2019. arXiv:1910.09701

[45] M. Yu, Z. Yang, M. Kolar, Z. Wang. Convergent Policy Optimization for Safe Reinforcement Learning. NeurIPS 2019. arXiv:1910.12156

[44] M. Yu, Z. Wang, V. Gupta, M. Kolar. Recovery of simultaneous low rank and two-way sparse coefficient matrices, a nonconvex approach. EJS 2019. arXiv:1802.06967

[43] J. Lu, M. Kolar, H. Liu. Kernel Meets Sieve: Post-Regularization Confidence Bands for Sparse Additive Model. JASA 2019. arXiv:1503.02978

[42] S. Na, Z. Yang, Z. Wang, M. Kolar. High-dimensional Varying Index Coefficient Models via Stein's Identity. JMLR 2019. arXiv:1810.07128

[41] M. Yu, V. Gupta, M. Kolar. Learning influence-receptivity network structure with guarantee. AISTATS 2019. arXiv:1806.05730

[40] S. Geng, M. Yan, M. Kolar, O. Koyejo. Partially Linear Additive Gaussian Graphical Models. ICML 2019. arXiv:1906.03362

[39] S. Geng, M. Kolar, O. Koyejo. Joint Nonparametric Precision Matrix Estimation with Confounding. UAI 2019. arXiv:1810.07147

[38] M. Yu, Z. Yang, T. Zhao, M. Kolar, Z. Wang. Provable gaussian embedding with one observation. NeurIPS 2018.

[37] R. Foygel Barber, M. Kolar. ROCKET: Robust Confidence Intervals via Kendall's Tau for Transelliptical Graphical Models. AOS 2018. arXiv:1502.07641

[36] J. Lu, M. Kolar, H. Liu. Post-Regularization Inference for Time-Varying Nonparanormal Graphical Models. JMLR 2017. arXiv:1512.08298

[35] J. Wang, J. D. Lee, M. Mahdavi, M. Kolar, N. Srebro. Sketching Meets Random Projection in the Dual: A Provable Recovery Algorithm for Big and High-dimensional Data. EJS, 2017.

[34] A. S. Suggala, M. Kolar, P. Ravikumar. The Expxorcist: Nonparametric Graphical Models Via Conditional Exponential Densities. NIPS 2017.

[33] M. Yu, V. Gupta, M. Kolar. An Influence-Receptivity Model for Topic based Information Cascades. ICDM 2017.

[32] S. Balakrishnan, M. Kolar, A. Rinaldo and A. Singh. Recovering Block-structured Activations Using Compressive Measurements. EJS 2017.

[31] J. Wang, M. Kolar, N. Srebro, T. Zhang. Efficient Distributed Learning with Sparsity. ICML 2017.

[30] J. Wang, J. D. Lee, M. Mahdavi, M. Kolar, N. Srebro. Sketching Meets Random Projection in the Dual: A Provable Recovery Algorithm for Big and High-dimensional Data. AISTATS 2017.

[29] M. Yu, V. Gupta, M. Kolar. Statistical Inference for Pairwise Graphical Models Using Score Matching. NIPS 2016.

[28] M. Kolar, M. Taddy. Comment: Coauthorship and Citation Networks for Statisticians, AOAS 2016.

[27] J. Wang, M. Kolar. Inference for High-dimensional Exponential Family Graphical Models. AISTATS 2016

[26] J. Wang, M. Kolar, N. Srebro. Distributed Multi-Task Learning. AISTATS 2016

[25] S. Sun, M. Kolar, J. Xu. Learning Structured Densities via Infinite Dimensional Exponential Families. NIPS 2015

[24] I. Gaynanova, M. Kolar. Optimal Variable Selection in Multi-Group Sparse Discriminant Analysis. EJS 2015

[23] M. Kolar, H. Liu. Optimal ROAD For Feature Selection in High-Dimensional Classification. IEEE Information Theory, 2014

[22] L. Wasserman, M. Kolar, A. Rinaldo. Berry-Esseen Bounds for Estimating Undirected Graphs. Electronic Journal of Statistics 2014.

[21] M. Kolar, H. Liu, E. P. Xing. Graph Estimation From Multi-attribute Data. Journal of Machine Learning Research 2014.

[20] M. Kolar, H. Liu, E. P. Xing. Markov Network Estimation From Multi-attribute Data. ICML 2013.

[19] M. Kolar, H. Liu. Feature Selection in High-Dimensional Classification. ICML 2013.

[18] M. Kolar, E. P. Xing. Estimating Networks with Jumps. Electronic Journal of Statistics, 2012.

[17] M. Kolar, J. Sharpnack. Variance Function Estimation in High-dimensions. ICML 2012.

[16] M. Kolar, E.P. Xing. Consistent Covariance Selection From Data With Missing Values. ICML 2012.

[15] M. Kolar, H. Liu. Marginal Regression for Multitask Learning. AIStats 2012 (oral presentation)

[14] S. Balakrishnan, M. Kolar, A. Rinaldo, A. Singh, and L. Wasserman. Statistical and computational tradeoffs in biclustering. NIPS 2011 – Computational Trade-offs in Statistical Learning.

[13] M. Kolar, S. Balakrishnan, A. Rinaldo, and A. Singh. Minimax Localization of Structural Information in Large Noisy Matrices. NIPS 2011.

[12] M. Kolar, E.P. Xing. On Time Varying Undirected Graphs. AIStats, 2011.

[11] M. Kolar, J. Lafferty and L. Wasserman. Union Support Recovery in Multi-task Learning. Journal of Machine Learning, 2010.

[10] M. Kolar, A. Parikh and E.P. Xing. On Sparse Conditional Covariance Selection. ICML 2010.

[9] M. Kolar, E.P. Xing. Ultra-high Dimensional Multiple Output Learning With Simultaneous Orthogonal Matching Pursuit: Screening Approach. AIStats 2010.

[8] L. Song, M. Kolar, E.P. Xing. Time-Varying Dynamic Bayesian Networks. NIPS 2009.

[7] M. Kolar, L. Song, E.P. Xing. Sparsistent Learning of Varying-coefficient Models with Structural Changes. NIPS 2009.

[6] L. Song, M. Kolar, E.P. Xing. Estimating time-evolving interactions between genes. The Sixteenth International Conference on Intelligence Systems for Molecular Biology (ISMB 2009). Bioinformatics 2009 25(12):i128-i136.

[5] M. Kolar, L. Song, A. Ahmed, E.P. Xing. Estimating time-varying networks. Annals of Applied Statistics, 2010.

[4] M. Kolar, E.P. Xing. Time varying ising models. NIPS 2008 – Analyzing Graphs: Theory and Applications.

[3] P. Ray, S. Shringarpure, M. Kolar, E.P. Xing, CSMET: Comparative Genomic Motif Detection via Multi-Resolution Phylogenetic Shadowing, PLoS Computational Biology (2008), Vol 4 (6), June 2008

[2] S. Petrovic, B. Dalbelo Basic, J. Snajder, M. Kolar. Comparison of Collocation Extraction Measures for Document Indexing. Journal of Computing and Information Technology – CIT 14 (2006), 4, (**best student papers**, ITI 2006)

[1] M. Kolar, I. Vukmirovic, B. Dalbelo Basic, J. Snajder. Computer-Aided document Indexing Systems. Journal of Computing and Information Technology - CIT. 13 (2005), 4; 299-305, (**awarded with the "SCIENCE" award**)

BOOK CHAPTERS   [1] E. P. Xing, M. Kolar, S. Kim, X. Chen. High-Dimensional Sparse Structured Input-Output Models, with Applications to GWAS. In Practical Applications of Sparse Modeling, edited by I. Rish, G. A. Cecchi, A. Lozano, A. Niculescu-Mizil.

INVITED TALKS   [99] International Symposium on Nonparametric Statistics. Paphos, Cyprus. June 2020.

[98] Symposium on Data Science and Statistics. Pittsburgh, PA. June 2020.

[97] Statistical Learning and Data Science. Irvine, CA. May 2020.

[96] Texas A&M, Department of Statistics. College Station, TX. April 2020.

[95] University of Zurich. Zurich, Switzerland. April 2020.

[94] 2020 Information Theory and Applications Workshop, San Diego, CA. February 2020.

[93] ICSA International Conference. Zhejiang, China. December 2019.

[92] National Tsing Hua University. Hsinchu, Taiwan. December 2019.

[91] Workshop on High-dimensional Statistical Analysis. *(keynote speaker)* Taipei, Taiwan. December 2019.

[90] University of Illinois at Urbana-Champaign, Department of Computer Science. Champaign, IL. November 2019.

[89] Illinois Institute of Technology, Department of Applied Mathematics. Chicago, IL. November 2019.

[88] Workshop on Higher-Order Asymptotics and Post-Selection Inference. St. Louis, MO. August 2019.

[87] Symposium on Data Science and Statistics. Seattle, WA. May 2019.

[86] New England Statistics Symposium. Hartford, CT. May 2019.

[85] Analysis of Non-Euclidean Data. Davis, CA. May 2019.

[84] New York University. New York City, NY. April 2019.

[83] RIKEN Center for Advanced Intelligence. Tokyo, Japan. April 2019.

[82] Machine Learning Seminar. Chicago, IL. March 2019.

[81] University of California San Diego. San Diego, CA. November 2018.

[80] University of Illinois at Chicago. Chicago, IL. October 2018.

[79] Argon National Laboratories. Lemont, IL. October 2018.

[78] Computational strategies for large-scale statistical data analysis. Edinburgh, UK. July 2018

[77] IMS Annual Meeting on Probability and Statistics. Vilnius, Lithuania. July 2018.

[76] Conference of the International Society for Nonparametric Statistic. Salerno, Italy. June 2018.

[75] Midwest Machine Learning Symposium 2018. Chicago, IL. June 2018.

[74] Data, Learning and Inference 2018. Lanzarote, Spain. April 2018.

[73] Carnegie Mellon University, Machine Learning Department. March 2018.

[72] Oberwolfach workshop on Statistical Inference for Structured High-dimensional Models, Oberwolfach, Germany. March 2018.

[71] Workshop on Functional Inference and Machine Intelligence at ISM. Tokyo, Japan. February 2018.

[70] CMStatistics 2017. London, UK. December 2017.

[69] Allerton 2018. Urbana, IL. October 2017.

[68] Workshop on High-dimensional Statistical Analysis. *(keynote speaker)* Taipei, Taiwan. August 2017.

[67] ISI 2017. Marrakesh, Morocco. July 2017.

[66] Microsoft Research. Boston, MA. May 2017.

[65] University of California at Santa Barbara, Department of Statistics. Santa Barbara, CA. May 2017.

[64] University of Illinois at Urbana-Champaign, Coordinated Science Laboratory. Champaign, IL. April 2017.

[63] ETH Zurich, Seminar for Statistics. Zurich, Switzerland. April 2017.

[62] Carnegie Mellon University, Machine Learning Department. March 2017.

[61] Graphical Model Workshop at ISM. Tokyo, Japan. February 2017.

[60] Northwestern University, Department of Statistics. Evanston, IL. February 2017.

[59] Fudan International Conference on Data Science. Shanghai, China. December 2016.

[58] CMStatistics 2016. Sevilla, Spain. December 2016.

[57] Oxford University, Department of Statistics. Oxford, UK. November 2016.

[56] University of California at Davis, Department of Statistics. Davis, CA. November 2016.

[55] Toyota Technology Institute. Chicago, IL. October 2016.

[54] Carnegie Mellon University, Department of Statistics. Pittsburgh, PA. October 2016.

[53] Machine Learning: What's in it for Economics? Chicago, IL. September 2016.

[52] Joint Statistical Meeting 2016. Chicago, IL. August

[51] PCMI Summer Session 2016: The Mathematics of Data. Park City, UT. July 2016.

[50] 2016 ICSA Applied Statistics Symposium. Atlanta, GA. June 2016.

[49] Conference on Statistical Learning and Data Science. Durham, NC. June 2016.

[48] Michigan State University, Department of Statistics & Probability. East Lansing, MI. April 2016.

[47] Carnegie Mellon University, Machine Learning Department. March 2016.

[46] 2016 Information Theory and Applications Workshop, San Diego, CA. February 2016.

[45] Purdue University, Department of Statistics. West Lafayette, IN. January 2016.

[44] Workshop on Structured Multivariate Data. College Station, TX. January 2016.

[43] UCL Workshop on the Theory of Big Data. London, UK. January 2016.

[42] University of California, Los Angeles, Department of Statistics. Los Angelese, CA. November 2015.

[41] University of Indiana, Department of Statistics. Bloomington, IN. November 2015.

[40] INFORMS. Philadelphia, PA. November 2015.

[39] Illinois Institute of Technology, Department of Applied Mathematics. Chicago, IL. October 2015.

[38] Carnegie Mellon University, Department of Statistics. Pittsburgh, PA. September 2015.

[37] ETH, Computer Science Department, Zurich, Switzerland. June 2015.

[36] Toulouse School of Economics, Toulouse, France. June 2015.

[35] ENAR Spring Meeting, Miami, Florida. March 2015.

[34] 2015 Information Theory and Applications Workshop, San Diego, CA. February 2015.

[33] Statistics & Computational Interface to Big Data at IAS, HKUST, Hong-Kong. *(keynote speaker)* January 2015.

[32] Simons-Berkeley Research Institute, Big Data Reunion Workshop. Berkeley, CA. December 2014

[31] UT Austin, Department of Statistics and Data Sciences. Austin, TX. November 2014.

[30] University of Iowa, Department of Statistics and Actuarial Science. Iowa City, IA. November 2014.

[29] Conference on "Big Data Marketing Analytics", Chicago Booth. Chicago, IL. *(discussant)* October 2014.

[28] Cornell University, Department of Biological Statistics and Computational Biology. Ithaca, NY. October 2014.

[27] Microsoft Research, Cambridge, UK. September 2014.

[26] University College of London, The Gatsby Computational Neuroscience Unit. London, UK. September 2014.

[25] University College of London, Department of Statistics. London, UK. September 2014.

[24] Joint Statistical Meeting. Boston, MA. August 2014.

[23] ISBIS 2014/SLDM meeting on Data Mining in Business and Industry. Durham, NC. June 2014.

[22] Carnegie Mellon University, Tepper School Of Business. Pittsburgh, PA. January 2014.

[21] Georgia Tech, H. Milton Stewart School of Industrial & Systems Engineering at Georgia Tech. Atlanta, GA. January 2014.

[20] University of Washington, Computer Science Department. Seattle, WA. January 2014.

[19] University of Washington, Department of Statistics. Seattle, WA. January 2014.

[18] Simons-Berkeley Research Institute. Workshop on "Unifying Theory and Experiment for Large-Scale Networks." Berkeley, CA. November 2013

[17] University of California, San Diego, Mathematics Department. San Diego, CA. October 2013.

[16] University of Toronto, Department of Computer Science. Toronto, Canada. April 2013.

[15] Toyota Technology Institute. Chicago, IL. March 2013.

[14] Stanford University, Department of Statistics. Stanford, CA. March 2013.

[13] Colorado School of Mines, Department of Electrical Engineering and Computer Science. Golden, CO. March 2013.

[12] Columbia University, Department of Statistics. New York, NY. February 2013.

[11] Rice University, Department of Statistics. Houston, TX. February 2013.

[10] Rutgers, Department of Statistics and Biostatistics. Piscataway, NJ. February 2013.

[9] University of Chicago Booth School of Business. Chicago, IL. February 2013.

[8] Pennsylvania State University, Department of Statistics. State College, PA. February 2013.

[7] University of Illinois at Urbana-Champaign, Department of Statistics. Champaign, IL. February 2013.

[6] University of California at Davis, Department of Statistics. Davis, CA. January 2013.

[5] University of North Carolina at Chapel Hill, Department of Statistics and Operations Research. Chapel Hill, NC. January 2013.

[4] INRIA - Grenoble, November 2010

[3] SMILE - Statistical Machine Learning in Paris, October 2010

[2] INRIA - Willow Team, September 2010

[1] Facebook Inc., August 2010

PROFESSIONAL SERVICE

Organizer or Co-organizer
- Workshop on Advances in Modeling and Learning Interactions from Complex Data, NIPS 2017
- Modern Nonparametric Methods in Machine Learning Workshop, Neural Information Processing Systems 2012, 2013, 2014, 2016
- Structured Sparsity: Learning and Inference Workshop, International Conference on Machine Learning 2011
- Machine Learning Lunch seminar at Carnegie Mellon University (2009 - 2013)

Committee and services:
- Senior Program Committee, Artificial Intelligence and Statistics 2015, 2016, 2017
- Area Chair, International Conference for Machine Learning 2014, 2015, 2016
- Program Committee, WWW 2014 Workshop on Big Graph Mining
- Joint Statistical Meeting 2011 - Session chair - New Tools for the Analysis of Large-Scale, Complex Data Sets
- Machine Learning Department Social Committee member (Jan 2010 - Dec 2010)
- Machine Learning Department Admission Committee (Dec 2009 - Apr 2010)

Reviewer
- Annals of Statistics, Annals of Applied Statistics, Journal of American Statistical Association, Biometrika, Journal of Machine Learning Research, Machine Learning Journal, IEEE Transactions on Signal Processing, IEEE Transactions on Pattern Analysis and Machine Intelligence, Statistics and Computing, Statistica Sinica, Journal of Computational and Graphical Statistics, Electronic Journal of Statistics, Transactions on Knowledge and Data Engineering, Bernoulli,

AIStats, NIPS, ICML, UAI, Marketing Science, Journal of Econometrics