

# Eric Poe Xing

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## Positions

- **Associate Professor with tenure**, Machine Learning Department & Language Technology Institute & Computer Science Department, School of Computer Science, *Carnegie Mellon University*. (June, 2011 – )
- **Visiting Associate Professor**, Department of Statistics, *Stanford University*. (Aug, 2010 – Aug 2011)
- **Visiting Research Professor**, *FaceBook Inc.*. (Aug, 2010 – Aug 2011)
- **Associate Professor**, Machine Learning Department & Language Technology Institute & Computer Science Department, School of Computer Science, *Carnegie Mellon University*. (June, 2009 – 2011)
- **Assistant Professor**, Machine Learning Department & Language Technology Institute & Computer Science Department, School of Computer Science, *Carnegie Mellon University*. (September 1, 2004 – June, 2009)

## Education

- **University of California, Berkeley**, Ph.D. in Computer Science (1999–2004).  
Research advisors: Profs. Richard Karp, Michael Jordan and Stuart Russell
- **Rutgers University**, Ph.D. in Molecular Biology and Biochemistry (1994–1999).  
Research advisor: Prof. Chung S. Yang
- **Rutgers University**, M.Sc. in Computer Science (1996–1998).  
Research advisor: Prof. Casimir Kulikowski
- **Tsinghua University**, B.Sc. in Physics and Biology (dual major, 1988–1993).  
Research advisor: Prof. Jun Zhao

## Awards and Honors

- Member of the DARPA Information Science and Technology (ISAT) Advisory Group, 2011-2014.
- Young Investigator Award, United States Air Force Office of Scientific Research, 2010-2015.
- Alfred P. Sloan Research Fellowship in Computer Science, 2008-2010.
- Career Award, National Science Foundation, 2006-2011.
- Best Paper Award, International Conference on Intelligence Systems for Molecular Biology, 2011.
- Best Paper Award, Association for Computational Linguistics (ACL), 2009.
- Best Paper Award, SIAM International Conference on Data Mining, 2007.
- John Van Ryzin Award for best paper, International Biometric Society-ENAR Annual Meetings, 2006.
- Runner-up Best Student Paper Award, 18th Conference on Uncertainty in Artificial Intelligence, 2003.
- Regents Fellowship, UC Berkeley, 1999.
- *Anthony Lu* Best Paper Award, Rutgers University, 1999.

## Principal External Grants and Awards

1. Commonwealth of Pennsylvania Tobacco Settlement Grant (co-PI): “Computational Analysis of Integrated Multivariate Protein Data”, Sep 1, 2004 – Jun 30, 2006, \$237,443.

2. Glaxo-Smith-Kline (PI): Gift for Discretionary Project, Nov 1, 2005 – Dec 31, 2015, \$ 150,000.
3. NSF CCF-0523757 (PI): "Nonparametric Bayesian Models for Genetic Variations and Their Associations to Diseases and Population Demography", Aug 1, 2005 – Jul 31, 2008, \$ 300,000.
4. NSF DBI-0546594, Career Award (PI): "CAREER: Uncovering the Process and Mechanism of Regulatory Evolution – Novel Statistical Models and Computational Algorithms for Evolutionary Genomics", Mar 1, 2006 – Feb 28, 2011, \$1,312,321.
5. NIH 1 R01 GM078622-01 (co-PI, with R. Murphy and W. Cohen): "Probabilistic Modeling of Information from Images and Text in Online Journals", Jul 1, 2006 – Jun 30, 2009, \$791,891.
6. NSF DBI- 0640543 (PI, with co-PI Christos Faloutsos): "Indexing, Mining and Modeling Spatio-Temporal Patterns of Gene Expressions", Aug 15, 2007 – July 30, 2010, \$1,331,995.
7. NSF IIS-0713379 (PI): "Novel Statistical Models and Algorithms for Network Modeling, Mining, and Reverse Engineering", Sep 15, 2007 – Aug 30, 2010, \$429,000.
8. DARPA NBCH1080007 (PI): "Computer Science Futures II-Engaging Young Scholars in Computer Science", July 1, 2008 – July 1, 2010, \$360,000.
9. Alfred P. Sloan Foundation: "2008 Sloan Research Fellowship in Computer Science", Sep 16, 2008 – Sep 15, 2010, \$50,000.
10. ONR N000140910758 (PI): "Toward a Unified Theory of Real-time Dynamic Network Analysis", Apr 1, 2009 – Mar 31, 2012, \$630,207.
11. NIH 1R01GM087694 (PI): "Genome-Transcriptome-Phenome-Wide Association: a new paradigm for association studies of complex diseases", May 15, 2009 – Mar 31, 2014, \$3,169,089.
12. NIH 1RC2HL101487-01 (co-PI): "Linking Genetics, Genomics and Phenomics to better understand Asthma Severity", Sep 1, 2009 – Aug 31, 2011, \$214,520.
13. AFOSR FA95501010247 (PI): "SocioScope: Real-time Analysis and Mining of Dynamic Heterogeneous Networks in Complex Socio-Cultural Systems", June 1, 2010 – June 1, 2015, \$600,000.
14. NIH 1R01GM093156 (PI): "Time/Space-Varying Networks of Molecular Interactions: A New Paradigm for Studying Dynamic Biological Regulation and Pathways", July 1, 2010 – Jun 30, 2015, \$2,237,288.
15. NSF IIS-1111142 (PI, with Scott Kiesling): "Collaborative Research: Discovering and Exploiting Latent Communities in Social Media", Aug 1, 2011 – July 31, 2014, \$547,805.
16. NSF IIS-1115313 (PI, with Fei-Fei Li): "Collaborative Research: Using Large-Scale Image Data for Online Social Media Analysis", Sep 15, 2007 – Aug 30, 2010, \$204,202.

## Research Interests

**Machine learning**, with emphasis on theory and algorithms for learning complex probabilistic models, learning with prior knowledge, and reasoning and decision-making in open, evolving and uncertain possible worlds. Of particular interest are:

- Theory and algorithms for estimating time/space varying-coefficient models with evolving structures
- Learning sparse structured input/output models and multi-task models in ultra high-dimensional space
- Nonparametric Bayesian analysis, infinite mixture models, algorithms and applications of Bayesian nonparametrics for data mining and object/topic/event tracking in open, evolving possible worlds

- Statistical modeling and analysis of network and relational data, especially reverse engineering and meta-analysis of temporally evolving social and biological networks
- Statistical machine learning models and algorithms for image/text/relational information retrieval
- Probabilistic and optimization-theoretic methods for learning in structured input/output space, and for sparse structure learning

**Computational biology**, with emphasis on developing probabilistic models and algorithms that address problems of practical biological and medical concerns. Problems of primary focus include:

- Modeling evolution of gene expression, cis-regulatory code and transcriptional regulatory network in metazoan organisms
- Modeling genome-microenvironment interactions in cancer development and embryogenesis via joint analysis of genomic, proteomic, cytogenetic and pathway signaling data
- Statistical inference on genetic fingerprints, pedigrees, and their associations to diseases and other complex traits; application to clinical diagnosis and forensic analysis
- Modeling substitution, recombination, selection and genome rearrangement for comparative genomic analysis
- Biological image and text mining

## Teaching

- **Instructor**, *Machine Learning* (15-781/10-701).  
CMU, Fall 2006, Spring 2008, Fall 2008, Spring 2010, Fall 2011.  
This is a core-curriculum course for SCS graduate students, focusing on fundamental algorithms and theory for statistical machine learning, pattern recognition and information retrieval.
- **Co-Instructor**, *Computational Genomics* (10-810) (formally known as Computational Molecular Biology: a Machine Learning Approach).  
CMU, Spring 2005, 2006, 2007, 2009.  
This course focuses on modern machine learning methodologies for computational problems in molecular biology and genetics. This is a core-curriculum course for CMU-Pitt computational biology Ph.D. program.
- **Instructor**, *Probabilistic Graphical Models* (10-708).  
CMU, Fall 2005, Fall 2007, Fall 2009, Spring 2011.  
This is an advanced machine learning course covering probabilistic graphical models for efficient inference, decision-making and learning in problems with a very large number of attributes, complex stochastic dependencies, and huge datasets.
- **Instructor**, *Advanced Topics in Graphical Models* (10-801).  
CMU, Spring 2007.  
This course covers advanced topics in approximate inference, model selection, Bayesian nonparametrics, and their applications.

## Papers and Publications

### Journal Papers

#### Published

- [1] R.E. Curtis, A. Yuen, L. Song, A. Goyal, and **E. P. Xing**, *TVNViewer: An interactive visualization tool for exploring networks that change over time or space*.  
Bioinformatics, doi: 10.1093/bioinformatics/btr273.

- [2] S. Kim and **E. P. Xing**, *Exploiting Genome Structure in Association Analysis*.  
Journal of Computational Biology, in press.
- [3] S. Hanneke, W. Fu and **E. P. Xing**, *Discrete Temporal Models of Social Networks*.  
Electronic Journal of Statistics, Vol. 4, 585 – 605, 2010. (arXiv:0908.1258).
- [4] **E. P. Xing**, W. Fu, L. Song, *A State-Space Mixed Membership Blockmodel for Dynamic Network Tomography*.  
Annals of Applied Statistics Vol. 4, No. 2, 535 – 566, 2010 (arXiv:0901.0138).
- [5] M. Kolar, L. Song, A. Ahmed, and **E. P. Xing**, *Estimating Time-Varying Networks*.  
Annals of Applied Statistics, Vol. 4, No. 1, 94 – 123, 2010 (arXiv:0812.5087).
- [6] J. Zhu and **E. P. Xing** *Maximum Entropy Discrimination Markov Network*.  
Journal of Machine Learning Research, 10(Nov):2531-2569, 2009.
- [7] S. Kim and **E. P. Xing**, *Statistical Estimation of Correlated Genome Associations to a Quantitative Trait Network*.  
PLoS Genetics, 5(8):e1000587, 2009.
- [8] A. Ahmed and **E. P. Xing**, *Recovering Time-Varying Networks of Dependencies in Social and Biological Studies*.  
Proc. Natl. Acad. Sci., vol. 106, no. 29, 11878-11883, 2009.
- [9] S. Shringarpure and **E. P. Xing**, *mStruct: Inference of Population Structure in Light of Both Genetic Admixing and Allele Mutations*.  
Genetics, Vol 182, Issue 2, 2009. (Journal version of [97].)
- [10] A. Martins, M. Figueiredo, P. Aguiar, N.A. Smith, and **E. P. Xing**, *Nonextensive Entropic Kernels*.  
Journal of Machine Learning Research, Vol 10, pp935-975, 2009. (Journal version of [96].)
- [11] K-A Sohn and **E. P. Xing**, *A Hierarchical Dirichlet Process Mixture Model For Haplotype Reconstruction From Multi-Population Data*.  
Annals of Applied Statistics, Vol. 3, No. 2, 791821, 2009.
- [12] E. Airodi, D. Blei, S. Fienberg and **E. P. Xing**, *Mixed Membership Stochastic Blockmodels*.  
Journal of Machine Learning Research, Vol 9:1981–2014, 2008. (Journal version of [91].)
- [13] P. Ray, S. Shringarpure, M. Kolar and **E. P. Xing**, *CSMET: Comparative Genomic Motif Detection via Multi-Resolution Phylogenetic Shadowing*.  
PLoS Computational Biology, vol. 4, issue 6, p1-20, 2008.
- [14] H. Kamisetty, **E. P. Xing** and C. J. Langmead, *Free Energy Estimates of All-Atom Protein Structures Using Generalized Belief Propagation*.  
Journal of Computational Biology, 15(7): 755-766, 2008.
- [15] J. Yang, R. Yan, Y. Liu, and **E. P. Xing**, *Harmonium Models for Video Classification*.  
Statistical Analysis and Data Mining, vol. 1, issue 1, p23-37, 2008. (Journal version of [111].)
- [16] K-A Sohn and **E. P. Xing**, *Spectrum: Joint Bayesian Inference of Population Structure and Recombination Event*.  
Bioinformatics, 23: i479-i489, 2007. (Journal version of [105].)
- [17] **E. P. Xing**, M. Jordan and R. Sharan, *Bayesian Haplotype Inference via the Dirichlet Process*.  
Journal of Computational Biology, Volume 14, Number 3, Pp. 267-284, 2007. (Journal version of [129].)
- [18] **E. P. Xing** and K-A Sohn *Hidden Markov Dirichlet Process: Modeling Genetic Recombination in Open Ancestral Space*.  
Journal of Bayesian Analysis, vol. 2, Number 2, 2007. (Journal version of [115].)

- [19] T. Lin, E.W. Myers and **E. P. Xing**, *Interpreting Anonymous DNA Samples From Mass Disasters — probabilistic forensic inference using genetic markers*.  
Bioinformatics, 22(14): e298-e306, 2006. (Journal version of [116].)
- [20] W. Wu, N. Dave, G.C. Tseng, T. Richards, **E. P. Xing**, and N. Kaminski, *Comparison of normalization methods for CodeLink Bioarray data*.  
BMC Bioinformatics, vol. 6, no. 309, 2005.
- [21] W. Wu, **E. P. Xing**, C. Myers, I. Mian and M. Bissell, *Evaluation of normalization methods for cDNA microarray data by k-NN classification*.  
BMC Bioinformatics, vol. 6, no. 191, 2005.
- [22] **E. P. Xing** and R. Karp *MotifPrototyper: a profile Bayesian model for motif family*.  
Proc. Natl. Acad. Sci., vol. 101, no. 29, 10523-10528, 2004.
- [23] **E. P. Xing**, D. Wolf, I. Dubchak, S. Spengler, M. Zorn, I. Muchnik and C. Kulikowski, *Automatic discovery of sub-molecular sequence domains in multi-aligned sequences: a dynamic programming algorithm for multiple alignment segmentation*.  
J Theor Biol, 212(2):129-39, 2001.
- [24] **E. P. Xing** and R. Karp, *CLIFF: clustering of high-dimensional microarray data via iterative feature filtering using normalized cuts*.  
Bioinformatics, 17 Suppl 1:S306-15, 2001. (Journal version of [136].)
- [25] Y. Cai, G. Yang, Y. Nie, L. Wang, X. Zhao, Y. Song, D. Seril, J. Liao, **E. P. Xing** and C. Yang, *Molecular alterations of p73 in human esophageal squamous cell carcinomas: loss of heterozygosity occurs frequently; loss of imprinting and elevation of p73 expression may be related to defective p53*.  
Carcinogenesis, 21(4):683-9, 2000.
- [26] **E. P. Xing**, Y. Nie, Y. Song, G. Yang, Y. Cai, L. Wang and S. Yang, *Mechanisms of inactivation of p14<sup>ARF</sup>, p15<sup>INK4b</sup>, and p16<sup>INK4a</sup> genes in human esophageal squamous cell carcinoma*.  
Clin Cancer Res, 5(10):2704-13, 1999.
- [27] **E. P. Xing**, G. Yang, L. Wang, S. Shi and S. Yang, *Loss of heterozygosity of the Rb gene correlates with pRb protein expression and associates with p53 alteration in human esophageal cancer*.  
Clin Cancer Res, 5(5):1231-40, 1999.
- [28] T. Shi, G. Yang, L. Wang, Z. Xue, B. Feng, W. Ding, **E. P. Xing** and S. Yang, *Role of p53 gene mutations in human esophageal carcinogenesis: results from immunohistochemical and mutation analyses of carcinomas and nearby non-cancerous lesions*.  
Carcinogenesis, 20(4):591-7, 1999.
- [29] **E. P. Xing**, Y. Nie, L. Wang, G. Yang, and S. Yang, *Aberrant methylation of p16<sup>INK4a</sup> and deletion of p15<sup>INK4b</sup> are frequent events in human esophageal cancer in Linxian, China*.  
Carcinogenesis, 20(1):77-84, 1999.

#### Invited

- [30] **E. P. Xing**, W. Wu, M. Jordan and R. Karp, *LOGOS: A modular Bayesian model for de novo motif detection*.  
Journal of Bioinformatics and Computational Biology, 2(1), 127-154, 2004. Invited to a special issue devoted to CSB2003 (expanded from [131] and peer reviewed again).

#### Submitted

- [31] M. Kolar, and **E. P. Xing**, *Estimating Time-Varying Networks With Jumps*.  
submitted, 2010 (arXiv:1012.3795).
- [32] M. Kolar, and **E. P. Xing**, *Sparsistent Estimation of Time-Varying Discrete Markov Random Fields*.

submitted, 2009 (arXiv:0907.2337).

- [33] S. Kim, J. Howrylak, B. Raby, S. Weiss, and **E. P. Xing**, *Association Analysis of Dynamic-Traits via Temporally-Smoothed Lasso*. PLoS Computational Biology (under review), 2010.
- [34] X. Chen, Q. Lin, S. Kim, J. Pena, J. G. Carbonell, and **E. P. Xing**, *An Efficient Proximal Gradient Method for General Structured Sparse Learning*. submitted, 2010 (arXiv:1005.4717).
- [35] J. Zhu, A. Ahmed, and **E. P. Xing** *MedLDA: Maximum Margin Supervised Topic Models*. Journal of Machine Learning Research (submitted), 2010 (arXiv:0912.5507).

## Books and Book Chapters

- [36] W. Wu and **E. P. Xing**, A Survey of cDNA Microarray Normalization and a Comparison by k-NN Classification, in S. Phillip ed., *Methods in Microarray Normalization*, p81-120, CRC Press, 2008.
- [37] E. Airodi, D. Blei, S. Fienberg, A. Goldenberg, **E. P. Xing**, and A. Zheng, Eds. *Statistical Network Analysis: Models, Issues & New Directions*, Lecture Notes in Computer Science, volume no. 4503. Springer-Verlag, 2007.
- [38] **E. P. Xing**, Feature Selection in Microarray Analysis, in D. Berrar, W. Dubitzky and M. Granzow eds., *A Practical Approach to Microarray Data Analysis*, Kluwer, 2002.

## Refereed Conference Papers

### Published

- [39] R.E. Curtis, J. Yin, P. Kinnaird and **E. P. Xing**, *Finding Genome-Transcriptome-Phenome Association With Structured Association Mapping And Visualization In Genamap*. Pacific Symposium on Biocomputing 2012, (PSB '12).
- [40] L. Song, A. Parikh and **E. P. Xing**, *Kernel Embeddings of Latent Tree Graphical Models*. Advances in Neural Information Processing Systems 25 (eds. Peter Bartlett and Fernando Pereira), MIT Press, Cambridge, MA, 2011. (NIPS '11).
- [41] J. Zhu, N. Chen and **E. P. Xing**, *Infinite Latent SVM for Classification and Multi-task Learning*. Advances in Neural Information Processing Systems 25 (eds. Peter Bartlett and Fernando Pereira), MIT Press, Cambridge, MA, 2011. (NIPS '11).
- [42] B. Zhao, L. Fei-Fei and **E. P. Xing**, *Large-Scale Category Structure Aware Image Categorization*. Advances in Neural Information Processing Systems 25 (eds. Peter Bartlett and Fernando Pereira), MIT Press, Cambridge, MA, 2011. (NIPS '11).
- [43] X. Chen, Q. Lin, S. Kim, J. Carbonell and **E. P. Xing**, *Smoothing Proximal Gradient Method for General Structured Sparse Learning*. Proceedings of the 27th International Conference on Conference on Uncertainty in Artificial Intelligence, 2011. (UAI '11).
- [44] J. Zhu and **E. P. Xing**, *Sparse Topical Coding*. Proceedings of the 27th International Conference on Conference on Uncertainty in Artificial Intelligence, 2011. (UAI '11).
- [45] R.E. Curtis, P. Kinnaird and **E. P. Xing**, *GenAMap: Visualization Strategies for Structured Association Mapping*. 1st IEEE Symposium on Biological Data Visualization, (BDV 2011).

- [46] G. Kim, **E. P. Xing**, L. Fei-Fei and T. Kanade, *Distributed Cosegmentation via Submodular Optimization on Anisotropic Diffusion*.  
Proceedings of 13th International Conference on Computer Vision, 2011. (ICCV '11).
- [47] J. Zhu, N. Lao, N. Chen and **E. P. Xing**, *Conditional Topical Coding: an Efficient Topic Model Conditioned on Rich Features*.  
Proceedings of The 17th ACM SIGKDD Conference on Knowledge Discovery and Data Mining, 2011. (KDD '11)
- [48] J. Zhu, N. Chen and **E. P. Xing**, *Infinite SVM: a Dirichlet Process Mixture of Large-margin Kernel Machines*.  
Proceedings of the 28th International Conference on Machine Learning, 2011. (ICML '11)
- [49] A.F.T. Martins, M.A.T. Figueiredo, P.M.Q. Aguiar, N.A. Smith and **E. P. Xing**, *An Augmented Lagrangian Approach to Constrained MAP Inference*.  
Proceedings of the 28th International Conference on Machine Learning, 2011. (ICML '11)
- [50] A. Parikh, L. Song and **E. P. Xing**, *A Spectral Algorithm for Latent Tree Graphical Models*.  
Proceedings of the 28th International Conference on Machine Learning, 2011. (ICML '11)
- [51] H. Kamisetty, **E. P. Xing**, and C. J. Langmead *Approximating Correlated Equilibria using Relaxations on the Marginal Polytope*.  
Proceedings of the 28th International Conference on Machine Learning, 2011. (ICML '11)
- [52] J. Eisenstein, A. Ahmed and **E. P. Xing**, *Sparse Additive Generative Models of Text*.  
Proceedings of the 28th International Conference on Machine Learning, 2011. (ICML '11)
- [53] A. Parikh, W. Wu, R. Curtis and **E. P. Xing**, *Reverse Engineering Tree-Evolving Gene Networks Underlying Developing Biological Lineages*.  
Proceedings of the Nineteenth International Conference on Intelligence Systems for Molecular Biology, 2011. (ISMB '11) **Recipient of the BEST PAPER Award**.
- [54] S. Shringarpure, D. Won and **E. P. Xing**, *StructHDP: Automatic inference of number of clusters from admixed genotype data*.  
Proceedings of the Nineteenth International Conference on Intelligence Systems for Molecular Biology, 2011. (ISMB '11)
- [55] Q. Ho, A. Parikh, L. Song and **E. P. Xing**, *Multiscale Community Blockmodel for Network Exploration*.  
Proceedings of the 14th International Conference on Artificial Intelligence and Statistics, 2011. (AISTATS '11)
- [56] Q. Ho, L. Song and **E. P. Xing**, *Evolving Cluster Mixed-Membership Blockmodel for Time-Evolving Networks*.  
Proceedings of the 14th International Conference on Artificial Intelligence and Statistics, 2011. (AISTATS '11)
- [57] A.F.T. Martins, M.A.T. Figueiredo, P.M.Q. Aguiar, N.A. Smith and **E. P. Xing**, *Online Learning of Structured Predictors with Multiple Kernels*.  
Proceedings of the 14th International Conference on Artificial Intelligence and Statistics, 2011. (AISTATS '11)
- [58] M. Kolar and **E. P. Xing**, *On Time Varying Undirected Graphs*.  
Proceedings of the 14th International Conference on Artificial Intelligence and Statistics, 2011. (AISTATS '11)
- [59] A. Ahmed, Q. Ho, J. Eisenstein, A. Smola and C. H. Teo and **E. P. Xing**, *The Online Infinite Topic-Cluster Model: Storylines from Streaming Text*.

- Proceedings of the 14th International Conference on Artificial Intelligence and Statistics, 2011. (AISTATS '11)
- [60] B. Zhao, L. Fei-Fei and **E. P. Xing**, *Online Detection of Unusual Events in Videos via Dynamic Sparse Coding*.  
Proceedings of the 24th IEEE Conference on Computer Vision and Pattern Recognition, 2011. (CVPR '11)
- [61] J. Eisenstein, N. Smith and **E. P. Xing**, *Discovering Sociolinguistic Associations with Structured Sparsity*.  
Proceedings of The 49th Annual Meeting of the Association for Computational Linguistics, 2011. (ACL '11)
- [62] A. Ahmed, Q. Ho, J. Eisenstein, **E. P. Xing**, A. Smola and C.H. Teo, *Unified Analysis of Streaming News*.  
Proceedings of the International World Wide Web Conference. (WWW '11).
- [63] S. Lee, J. Zhu, and **E. P. Xing**, *Detecting eQTLs using Adaptive Multi-task Lasso*.  
Advances in Neural Information Processing Systems 24 (eds. Richard Zemel and John Shawe-Taylor), MIT Press, Cambridge, MA, 2011. (NIPS '10).
- [64] N. Chen, J. Zhu, and **E. P. Xing**, *Predictive Subspace Learning for Multi-view Data: a Large Margin Approach*.  
Advances in Neural Information Processing Systems 24 (eds. Richard Zemel and John Shawe-Taylor), MIT Press, Cambridge, MA, 2011. (NIPS '10).
- [65] J. Zhu, J. Li, L. Fei-Fei, and **E. P. Xing**, *Large Margin Learning of Upstream Scene Understanding Models*.  
Advances in Neural Information Processing Systems 24 (eds. Richard Zemel and John Shawe-Taylor), MIT Press, Cambridge, MA, 2011. (NIPS '10).
- [66] J. Li, H. Su, **E. P. Xing**, and L. Fei-Fei, *Object Bank: A High-Level Image Representation for Scene Classification and Semantic Feature Sparsification*.  
Advances in Neural Information Processing Systems 24 (eds. Richard Zemel and John Shawe-Taylor), MIT Press, Cambridge, MA, 2011. (NIPS '10).
- [67] A. Ahmed and **E. P. Xing**, *Staying Informed: Multi-view Topical Analysis of Ideological Perspective*.  
Proceeding of the 2010 Conference on Empirical Methods on Natural Language Processing. (EMNLP '10).
- [68] J. Eisenstein, B. O'Connor, N. A. Smith, and **E. P. Xing**, *A Latent Variable Model for Geographic Lexical Variation*.  
Proceeding of the 2010 Conference on Empirical Methods on Natural Language Processing. (EMNLP '10).
- [69] A. F. T. Martins, N. A. Smith, **E. P. Xing**, M. Figueiredo, and P. Aguiar, *Dependency Parsing by Approximate Variational Inference*.  
Proceeding of the 2010 Conference on Empirical Methods on Natural Language Processing. (EMNLP '10).
- [70] B. Zhao, L. Fei-Fei, and **E. P. Xing**, *Image Segmentation with Topic Random Fields*.  
Proceeding of the 12th European Conference of Computer Vision, 2010. (ECCV '10).
- [71] G. Kim, **E. P. Xing**, and A. Torralba, *Modeling and Analysis of Dynamic Behaviors of Web Image Collections*.  
Proceeding of the 12th European Conference of Computer Vision, 2010. (ECCV '10).
- [72] A. Ahmed and **E. P. Xing**, *Timeline: A Dynamic Hierarchical Dirichlet Process Model for Recover-*

*ing Birth/Death and Evolution of Topics in Literature.*

Proceedings of the 26th International Conference on Conference on Uncertainty in Artificial Intelligence, 2010. (UAI '10).

- [73] J. Zhu, N. Lao and **E. P. Xing**, *Grafting-Light: Fast, Incremental Feature Selection and Structure Learning of Markov Random Fields.*  
Proceedings of The 16th ACM SIGKDD Conference on knowledge Discovery and Data Mining, 2010. (KDD '10)
- [74] M. Kolar, A. Parikh and **E. P. Xing**, *On Sparse Nonparametric Conditional Covariance Selection.*  
Proceedings of the 27th International Conference on Machine Learning, 2010. (ICML '10)
- [75] J. Zhu and **E. P. Xing**, *Conditional Topic Random Fields.*  
Proceedings of the 27th International Conference on Machine Learning, 2010. (ICML '10)
- [76] S. Kim and **E. P. Xing**, *Tree-Guided Group Lasso for Multi-Task Regression with Structured Sparsity.*  
Proceedings of the 27th International Conference on Machine Learning, 2010. (ICML '10)
- [77] K. Puniyani, S. Kim and **E. P. Xing**, *Multi-Population GWA Mapping via Multi-Task Regularized Regression.*  
Proceedings of the Eighteenth International Conference on Intelligence Systems for Molecular Biology, 2010. (ISMB '10)
- [78] K. Puniyani, C. Faloutsos and **E. P. Xing**, *SPEX<sup>2</sup>: Automated Concise Extraction of Spatial Gene Expression Patterns from Fly Embryo ISH Images.*  
Proceedings of the Eighteenth International Conference on Intelligence Systems for Molecular Biology, 2010. (ISMB '10)
- [79] M. Kolar and **E. P. Xing**, *Ultra-high Dimensional Multiple Output Learning With Simultaneous Orthogonal Matching Pursuit.*  
Proceedings of the 13th International Conference on Artificial Intelligence and Statistics, 2010. (AISTATS '10)
- [80] S. Lee, **E. P. Xing** and M. Brudno, *MoGUL: Detecting Common Insertions and Deletions in a Population*  
Proceedings of the Fourteenth Annual International Conference on Research in Computational Molecular Biology, 2010. (RECOMB '10)
- [81] M. Kolar and **E. P. Xing**, *Sparsistent Learning of Varying-coefficient Models with Structural Changes.*  
Advances in Neural Information Processing Systems 23 (eds. J. Lafferty and C. Williams), MIT Press, Cambridge, MA, 2010. (NIPS '09).
- [82] L. Song, M. Kolar and **E. P. Xing**, *Time-Varying Dynamic Bayesian Networks.*  
Advances in Neural Information Processing Systems 23 (eds. J. Lafferty and C. Williams), MIT Press, Cambridge, MA, 2010. (NIPS '09).
- [83] X. Yang, S. Kim and **E. P. Xing**, *Heterogeneous Multitask Learning with Joint Sparsity Constraints.*  
Advances in Neural Information Processing Systems 23 (eds. J. Lafferty and C. Williams), MIT Press, Cambridge, MA, 2010. (NIPS '09).
- [84] J. Zhu, A. Ahmed and **E. P. Xing**, *MedLDA: Maximum Margin Supervised Topic Models for Regression and Classification.*  
Proceedings of the 26th International Conference on Machine Learning, 2009. (ICML '09)
- [85] J. Zhu and **E. P. Xing**, *On the Primal and Dual Sparsity in Markov Networks.*  
Proceedings of the 26th International Conference on Machine Learning, 2009. (ICML '09)
- [86] W. Fu, L. Song and **E. P. Xing**, *Dynamic Mixed Membership Block Model for Evolving Networks.*  
Proceedings of the 26th International Conference on Machine Learning, 2009. (ICML '09)

- [87] A. Martins, N. Smith and **E. P. Xing**, *Polyhedral Outer Approximations with Application to Natural Language Parsing*.  
Proceedings of the 26th International Conference on Machine Learning, 2009. (ICML '09)
- [88] A. Martins, N. Smith and **E. P. Xing**, *Concise Integer Linear Programming Formulations for Dependency Parsing*.  
Proceedings of The 47th Annual Meeting of the Association for Computational Linguistics, 2009. (ACL '09) **Recipient of the BEST PAPER Award**.
- [89] J. Zhu, **E. P. Xing** and B. Zhang, *Primal Sparse Max-Margin Markov Networks*.  
Proceedings of The 15th ACM SIGKDD Conference on knowledge Discovery and Data Mining, 2009. (KDD '09)
- [90] A. Ahmed, **E. P. Xing**, W. Cohen, and R. Murphy, *Structured Correspondence Topic Models for Mining Captioned Figures in Biological Literature*.  
Proceedings of The 15th ACM SIGKDD Conference on knowledge Discovery and Data Mining, 2009. (KDD '09)
- [91] S. Kim, K-A Sohn and **E. P. Xing**, *A Multivariate Regression Approach to Association Analysis of Quantitative Trait Network*.  
Proceedings of the Seventeenth International Conference on Intelligence Systems for Molecular Biology, 2009. (ISMB '09)
- [92] L. Song, M. Kolar and **E. P. Xing**, *KELLER: Estimating Time-Evolving Interactions Between Genes*.  
Proceedings of the Seventeenth International Conference on Intelligence Systems for Molecular Biology, 2009. (ISMB '09)
- [93] W. Fu, P. Ray and **E. P. Xing**, *DISCOVER: A feature-based discriminative method for motif search in complex genomes*.  
Proceedings of the Seventeenth International Conference on Intelligence Systems for Molecular Biology, 2009. (ISMB '09)
- [94] S. Hanneke and **E. P. Xing**, *Network Completion and Survey Sampling*.  
Proceedings of the 12th International Conference on Artificial Intelligence and Statistics, 2009. (AISTATS '09)
- [95] J. Zhu, **E. P. Xing**, and B. Zhang, *Partially Observed Maximum Entropy Discrimination Markov Networks*.  
Advances in Neural Information Processing Systems 22 (eds. Y. Bengio and D. Schuurmans), MIT Press, Cambridge, MA, 2009. (NIPS '08).
- [96] E. Airodi, D. Blei, S. Fienberg and **E. P. Xing**, *Mixed Membership Stochastic Blockmodels*.  
Advances in Neural Information Processing Systems 22 (eds. Y. Bengio and D. Schuurmans), MIT Press, Cambridge, MA, 2009. (NIPS '08).
- [97] A.F.T. Martins, D. Das, N. A. Smith, and **E. P. Xing**, *Stacking Dependency Parser*.  
Proceedings of Conference on Empirical Methods in Natural Language Processing, 2008. (EMNLP '08).
- [98] A. Ahmed, K. Yu, W. Xu, Y. Gong, and **E. P. Xing**, *Training Hierarchical Feed-forward Visual Recognition Models Using Transfer Learning from Pseudo-Tasks*.  
Proceeding of the 10th European Conference of Computer Vision, 2008. (ECCV '08).
- [99] S. Kim and **E. P. Xing**, *Sparse Feature Learning in High-Dimensional Space via Block Regularized Regression*.  
Proceedings of the 24th International Conference on Conference on Uncertainty in Artificial Intelligence, 2008. (UAI '08).

- [100] J. Zhu, **E. P. Xing**, and B. Zhang, *Laplace Maximum Margin Markov Networks*.  
Proceedings of the 25th International Conference on Machine Learning, 2008. (ICML '08).
- [101] A. Martins, M. Figueiredo, P. Aguiar, N.A. Smith, and **E. P. Xing**, *Nonextensive Entropic Kernels*.  
Proceedings of the 25th International Conference on Machine Learning, 2008. (ICML '08).
- [102] S. Shringarpure and **E. P. Xing**, *mStruct: A New Admixture Model for Inference of Population Structure in Light of Both Genetic Admixing and Allele Mutations*.  
Proceedings of the 25th International Conference on Machine Learning, 2008. (ICML '08).
- [103] W. Lin, **E. P. Xing**, and A. Hauptmann, *A Joint Topic and Perspective Model for Ideological Discourse*.  
Proceedings of European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases, 2008. (ECML/PKDD '08).
- [104] R. Nallapati, A. Ahmed, **E. P. Xing**, and W. Cohen, *Joint Latent Topic Models for text and citations*.  
Proceedings of The Fourteen ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, 2008. (KDD '08).
- [105] A. Ahmed and **E. P. Xing**, *Dynamic Non-Parametric Mixture Models and the Recurrent Chinese Restaurant Process*.  
Proceedings of The Eighth SIAM International Conference on Data Mining, 2008. (SDM '08).
- [106] Z. Guo, Z. Zhang, **E. P. Xing** and C. Faloutsos, *Semi-supervised Learning Based on Semiparametric Regularization*.  
Proceedings of The Eighth SIAM International Conference on Data Mining, 2008. (SDM '08).
- [107] T. Lin, P. Ray, G. K. Sandve, S. Uguroglu, and **E. P. Xing**, *BayCis: a Bayesian hierarchical HMM for cis-regulatory module decoding in metazoan genomes*  
Proceedings of the Twelfth Annual International Conference on Research in Computational Molecular Biology, 2008. (RECOMB '08)
- [108] B. Zhao and **E. P. Xing** *HM-BiTAM: Bilingual Topic Exploration, Word Alignment, and Translation*.  
Advances in Neural Information Processing Systems 21 (eds. D. Koller and Y. Singer), MIT Press, Cambridge, MA, 2008. (NIPS '07).
- [109] L. Chang, N. Pollard, T. Michell and **E. P. Xing** *Feature selection for grasp recognition from optical markers*.  
Proceedings of the 2007 IEEE/RSJ Intl. Conference on Intelligent Robots and Systems, 2007. (IROS '07).
- [110] K-A Sohn and **E. P. Xing**, *Spectrum: Joint Bayesian Inference of Population Structure and Recombination Event*.  
Proceedings of the Fifteenth International Conference on Intelligence Systems for Molecular Biology, 2007. (ISMB '07)
- [111] F. Guo, S. Hanneke, W. Fu and **E. P. Xing**, *Recovering Temporally Rewiring Networks: A model-based approach*.  
Proceedings of the 24th International Conference on Machine Learning (ed. Zoubin Ghahramani), Omni Press, 321-329, 2007. (ICML '07)
- [112] Z. Guo, Z. Zhang, **E. P. Xing**, and C. Faloutsos, *Enhanced Max Margin Learning on Multimodal Data Mining in a Multimedia Database*.  
Proceedings of The Thirteen ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, 2007. (KDD '07)
- [113] L. Gu, **E. P. Xing**, and T. Kanade, *Learning GMRF Structures for Spatial Priors*.  
Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition, 2007. (CVPR

'07)

- [114] Z. Guo, Z. Zhang, **E. P. Xing**, and C. Faloutsos, *A Max Margin Framework on Image Annotation and Multimodal Image Retrieval*.  
Proceedings of IEEE International Conference on Multimedia & Expo, 2007. (ICME '07)
- [115] A. Ahmed and **E. P. Xing**, *On tight approximate inference of logistic-normal admixture model*.  
Proceedings of the Eleventh International Conference on Artificial Intelligence and Statistics, 2007. (AISTATS '07)
- [116] J. Yang, Y. Liu, **E. P. Xing** and A. Hauptmann, *Harmonium-Based Models for Semantic Video Representation and Classification*.  
Proceedings of The Seventh SIAM International Conference on Data Mining, 2007. (SDM '07).  
**Recipient of the BEST PAPER Award.**
- [117] H. Kamisetty, **E. P. Xing** and C. J. Langmead, *Free Energy Estimates of All-atom Protein Structures Using Generalized Belief Propagation*.  
Proceedings of the Eleventh Annual International Conference on Research in Computational Molecular Biology, 2007. (RECOMB '07)
- [118] Y. Shi, F. Guo, W. Wu and **E. P. Xing**, *GIMscan: A New Statistical Method for Analyzing Whole-Genome Array CGH Data*.  
Proceedings of the Eleventh Annual International Conference on Research in Computational Molecular Biology, 2007. (RECOMB '07)
- [119] F. Guo, W. Fu, Y. Shi and **E. P. Xing** *Reverse engineering temporally rewiring gene networks*.  
Workshop on New Problems and Methods in Computational Biology, Conference on Neural Information Processing Systems. 2006.
- [120] K-A Sohn and **E. P. Xing** *Hidden Markov Dirichlet Process: Modeling Genetic Recombination in Open Ancestral Space*.  
Advances in Neural Information Processing Systems 20 (eds. Y. Weiss and B. Schölkopf and J. Platt), MIT Press, Cambridge, MA, 2007. (NIPS '06).
- [121] T. Lin, E.W. Myers and **E. P. Xing**, *Interpreting Anonymous DNA Samples From Mass Disasters — probabilistic forensic inference using genetic markers*.  
Proceedings of the Fourteenth International Conference on Intelligent Systems for Molecular Biology, 2006. (ISMB '06)
- [122] J-Y. Pang, A. Balan, **E. P. Xing**, A. Traina and C. Faloutsos, *Automatic Mining of Fruit Fly Embryo Images*.  
Proceedings of The Twelfth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, 2006. (KDD '06)
- [123] B. Zhao and **E. P. Xing**, *BiTAM: Bilingual Topic AdMixture Models for Word Alignment*.  
Proceedings of the 44th Annual Meeting of the Association for Computational Linguistics, 969-976, 2006. (ACL '06)
- [124] **E. P. Xing**, K-A. Sohn, M. Jordan and Y-W Teh, *Bayesian Multi-Population Haplotype Inference via a Hierarchical Dirichlet Process Mixture*.  
Proceedings of the 23rd International Conference on Machine Learning (eds. W. Cohen and A. Moore), ACM Press, 1049-1057, 2006. (ICML '06)
- [125] E. Airodi, D. Blei, S. Fienberg and **E. P. Xing**, *Combining Stochastic Block Models and Mixed Membership for Statistical Network Analysis*.  
Proceedings of the Workshop on Statistical Network Analysis, the 23rd International Conference on Machine Learning, 2006. (SNA-ICML '06)

- [126] S. Hanneke and **E. P. Xing**, *Discrete Temporal Models of Social Networks*. Proceedings of the Workshop on Statistical Network Analysis, the 23rd International Conference on Machine Learning, 2006. (SNA-ICML '06)
- [127] E. Airodi, D. Blei, S. Fienberg and **E. P. Xing**, *Latent mixed-membership allocation models of relational and multivariate attribute data*. Bayesian Statistics 8, Proceedings of the Valencia & ISBA Eighth World Meeting on Bayesian Statistics, 2006.
- [128] E. Airodi, D. Blei, **E. P. Xing** and S. Fienberg, *Mixed membership stochastic block models for relational data, with applications to protein-protein interactions*. Proceedings of International Biometric Society-ENAR Annual Meetings, 2006. **Recipient of the John Van Ryzin Award**.
- [129] F. Li, Y. Yang and **E. P. Xing**, *From Lasso regression to Feature vector machine*. Advances in Neural Information Processing Systems 19 (eds. Y. Weiss and B. Schölkopf and J. Platt), MIT Press, Cambridge, MA, 779–786, 2006. (NIPS '05)
- [130] E. Airoldi, D. Blei, **E. P. Xing** and S. Fienberg, *A Latent Mixed Membership Model for Relational Data*. Proceedings of the 3rd international workshop on Link discovery, ACM Press, New York, NY, USA, 82–89, 2005. (LinkKDD '05)
- [131] Y. Liu, **E. P. Xing** and J. Carbonell, *Predicting Protein Folds with Structural Repeats Using a Chain Graph Model*. Proceedings of the 22nd international conference on Machine learning (eds. L. De Raedt and S. Wrobel, ACM Press, New York, NY, USA, 513–520, 2005. (ICML '05)
- [132] **E. P. Xing**, R. Yan and A. Hauptmann, *Mining Associated Text and Images with Dual-Wing Harmoniums*. Proceedings of the 21st Annual Conference on Uncertainty in Artificial Intelligence (eds. F. Bacchus and T. Jaakkola), AUAI Press, Arlington, Virginia, 633–642, 2005. (UAI '05)
- [133] B. Zhao, **E. P. Xing** and A. Waibel, *Bilingual Word Spectral Clustering for Statistical Machine Translation*. Proceedings of the Second ACL Workshop on Effective Tools and Methodologies for Teaching NLP and CL, 2005.
- [134] **E. P. Xing**, R. Sharan and M. Jordan, *Bayesian Haplotype Inference via the Dirichlet Process*. Proceedings of the 21st International Conference on Machine Learning (eds. R. Greiner and D. Schuurmans), ACM Press, 879–886, 2004. (ICML '04)  
An earlier version of this paper also appeared as a book chapter in Lecture Notes in Bioinformatics, Special issue for 2nd RECOMB Satellite Workshop on Computational Methods for SNPs and Haplotypes, 2004.
- [135] **E. P. Xing**, M. Jordan and S. Russell, *Graph partition strategies for generalized mean field inference*. Proceedings of the 20th Annual Conference on Uncertainty in Artificial Intelligence (eds. M. Chickering and J. Halpern), AUAI Press, Arlington, Virginia, 602–611, 2004. (UAI '04)
- [136] **E. P. Xing**, W. Wu, M. Jordan and R. Karp, *LOGOS: A modular Bayesian model for de novo motif detection*. Proceedings of the 2nd IEEE Computer Society Bioinformatics Conference, IEEE Computer Society, Washington, DC, USA, 2:266–76, 2003. (CSB '03)
- [137] **E. P. Xing**, M. Jordan and S. Russell, *A generalized mean field algorithm for variational inference in exponential families*.

Proceedings of the 19th Annual Conference on Uncertainty in Artificial Intelligence (eds. Meek and Kjærff), Morgan Kaufmann Publishers, San Francisco, CA, 583–591, 2003. (UAI '03). **Recipient of the Runner-up Best Student Paper Award.**

- [138] **E. P. Xing**, *An expressive modular probabilistic model for de novo motif detection.*  
Workshop on Learning Graphical Models for Computational Genomics, 18th International Joint Conference on Artificial Intelligence (IJCAI '03), 2003.
- [139] **E. P. Xing**, A. Ng, M. Jordan and S. Russell, *Distance Metric Learning, with application to Clustering with side-information.*  
Advances in Neural Information Processing Systems 15 (eds. S. Becker, S. Thrun and K. Obermayer), MIT Press, Cambridge, MA, 505–512, 2003. (NIPS 02)
- [140] **E. P. Xing**, M. Jordan, R. Karp and S. Russell, *A Hierarchical Bayesian Markovian Model for Motifs in Biopolymer Sequences.*  
Advances in Neural Information Processing Systems 15 (eds. S. Becker, S. Thrun and K. Obermayer), MIT Press, Cambridge, MA, 1489–1496, 2003. (NIPS 02)
- [141] **E. P. Xing** and R. Karp, *CLIFF: clustering of high-dimensional microarray data via iterative feature filtering using normalized cuts.*  
Proceedings of the Ninth International Conference on Intelligent Systems for Molecular Biology, 2001. (ISMB '01)
- [142] **E. P. Xing**, M. Jordan and R. Karp, *Feature selection for high-dimensional genomic microarray data.*  
Proceedings of the Eighteenth International Conference on Machine Learning (eds. C. E. Brodley and A. P. Danyluk), Morgan Kaufmann Publishers Inc., San Francisco, CA, USA, 601–608, 2001. (ICML '01)
- [143] **E. P. Xing**, C. Kulikowski, I. Muchnik, I. Dubchak, D. Wolf, S. Spengler and M. Zorn, *Analysis of ribosomal RNA sequences by combinatorial clustering.*  
Proceedings of the Seventh International Conference on Intelligent Systems for Molecular Biology, AAAI Press, 287–296, 1999. (ISMB '99)

**Submitted**

### **Unrefereed Technical Reports**

- [144] **E. P. Xing** and M. Jordan, *On semidefinite relaxation for normalized k-cut and connections to spectral clustering.*  
Technical Report CSD-03-1265, Computer Science Division, UC Berkeley, 2003.
- [145] **E. P. Xing**, *Dynamic Nonparametric Bayesian Models and the Birth-Death Process..*  
Technical Report CMU-CALD-05-114, Carnegie Mellon University, 2005.
- [146] **E. P. Xing**, *On Topic Evolution.*  
Technical Report CMU-CALD-05-115, Carnegie Mellon University, 2005.
- [147] F. Guo and **E. P. Xing**, *Bayesian Exponential Family Harmoniums.*  
Technical Report CMU-ML-06-103, Carnegie Mellon University, 2006.
- [148] F. Li, Y-M. Yang and **E. P. Xing**, *Inferring regulatory networks using a hierarchical Bayesian graphical Gaussian model.*  
Technical Report CMU-ML-06-117, Carnegie Mellon University, 2006.

## Invited Talks

- [1] *Feature Selection for High-Dimensional Genomic Microarray Data in Concept Learning and Clustering Analysis*,  
Statistics in Functional Genomics, Joint Summer Research Conference of AMS/IMS/SIAM, Mount Holyoke, June 10-14, 2001.
- [2] *Feature Selection for High-Dimensional Genomic Microarray Data*,  
NIPS 2001 Workshop on Machine Learning Techniques for Bioinformatics, Whistler, Dec 8, 2001.
- [3] *Expressive Statistical Models for Motifs*,  
Intel Workshop on Machine Learning and Life Sciences, Berkeley, Nov 3-4, 2003.
- [4] *Application of nonparametric Bayesian methods in genetic inference*  
NIPS 2003 Workshop on Nonparametric Bayesian Methods and Infinite Models, Whistler, Dec 13, 2003.
- [5] *Generalized Mean Field Inference in Graphical Models*,  
The 2004 joint WJAR/IMS meeting, Albuquerque, June 27-30, 2004.
- [6] *Generalized mean field inference in graphical models, and applications to computational biology*,  
AI Seminar, Carnegie Mellon University, Pittsburgh, PA, February 3, 2004.
- [7] *Mining Associated Text and Images with Dual-Wing Harmoniums*,  
UC BERKELEY CIS (Center for Intelligent Systems) SEMINAR, Berkeley, CA, April 20, 2005.
- [8] *In silico motif detection under complex genomic and evolutionary context - new Bayesian models motivated from biological principles*,  
UC Irvine ICS Seminar CIS, Irvine, CA, April 22, 2005.
- [9] *Probabilistic Graphical Models and Algorithms for Genomic Analysis*,  
Department of Molecular and Computational Biology, University of Southern California, Los Angeles, CA, April 23, 2005.
- [10] *Variational methods for inference in graphical models*,  
Workshop on Random Graphs & Stochastic Computation, Statistical and Applied Mathematical Sciences Institute, Research Triangle Park, NC, June 13-14, 2005.
- [11] *Nonparametric Bayesian Models for Haplotype Inference*,  
Section on Bayesian Statistical Science, The Joint Statistical Meetings, Minneapolis, Aug 6-11, 2005.
- [12] *Combinatorial and Statistical Approaches to Analyzing Biological Networks*,  
Tutorial Program, 2005 IEEE Computational Systems Bioinformatics Conference, Stanford, Aug 8-11, 2005.
- [13] *Mining Associated Text and Images with Dual-Wing Harmoniums and A Latent Mixed Membership Model for Relational Data*,  
Computer Science Department, Stanford University, Stanford, CA, Aug 12, 2005.
- [14] *In silico detection of cis-regulatory elements under complex genomic and evolutionary context: a probabilistic graphical model approach*,  
DIMACS Workshop on Machine Learning Approaches for Understanding Gene Regulation, Rutgers University, Aug 15-17, 2005.
- [15] *How many founders shall we assume for haplotype reconstruction?*  
Center for Information Theory and Its Applications, Inaugural Workshop, University of California, San Diego, February 6-10, 2006.
- [16] *How many founders shall we assume for haplotype reconstruction? — on coalescence, Dirichlet processes, and nonparametric Bayes*,

- Invited Lecture (hosted by Prof. Andrew Yao), Computer Science Department, Tsinghua University, Beijing, China, April 25, 2006.
- [17] *Machine Learning, and the Role of Machine Learning in Computational Biology*  
Keynote, Symposium of the 80th Anniversary Of the Physics Department, Tsinghua University, Beijing, China, April 29, 2006.
- [18] *How many founders shall we assume for haplotype reconstruction? — on coalescence, Dirichlet processes, and nonparametric Bayes*,  
Invited Lecture, Workshop on Learning with Nonparametric Bayesian Methods, International Conference on Machine Learning, Pittsburgh, Pennsylvania, 25-29 June, 2006.
- [19] *Reasoning in open possible worlds: on A New Class of Nonparametric Bayesian Models for Haplotype Phasing, LD Modeling and Demographic Inference in Open Ancestral Space*,  
Department of Computer Science, National University of Singapore, Singapore, 16 November, 2006.
- [20] *A New Class of Nonparametric Bayesian Models for Haplotype Phasing, LD Modeling and Demographic Inference in Open Ancestral Space*,  
College of Life Sciences, Fudan University, Shanghai, China, 12 November, 2006.
- [21] *Modeling and reasoning the temporal evolution of networks*  
The 2007 Information Theory and Applications Workshop, University of California, San Diego, Jan 29- Feb 2, 2007.
- [22] *A Hidden Markov Dirichlet Process Model for Joint Inference of Population Structure, Linkage Disequilibrium, and Recombination Hotspots*,  
Invited talk, International Biometric Society-ENAR Annual Meetings, Atlanta, Georgia, 2007.
- [23] *Statistical network analysis and inference: methods and applications*,  
UC BERKELEY CIS (Center for Intelligent Systems) SEMINAR, Berkeley, CA, April 19, 2007.
- [24] *Probabilistic Graphical Models and Algorithms for Integrative Bioinformatics*,  
Keynote, Workshop on Bioinformatics, Graybill Conference (on Statistics and Probability) VI, Colorado State University, Fort Collins, Colorado, June 12-13, 2007.
- [25] *Probabilistic Graphical Models and Algorithms for Integrative Bioinformatics*,  
Computational Biology Seminar, Department of Molecular and Computational Biology, University of Southern California, Los Angeles, California, October 4, 2007.
- [26] *Statistical network analysis and inference*,  
Invited talk, Workshop on Gene Co-Expression Network Analysis and its Applications in Systems Biology, 8th International Conference on Systems Biology, Long Beach, California, October 5, 2007.
- [27] *Probabilistic Graphical Models and Algorithms for Integrative Bioinformatics*,  
Computer Science Department Colloquia, Princeton University, Princeton, New Jersey, October 10, 2007.
- [28] *Statistical Network Analysis and Inference: Methods and Applications*,  
Invited talk, Workshop III: Social Data Mining and Knowledge Building, Institute for Pure and Applied Mathematics (IPAM), Los Angeles, California, November 5-9, 2007.
- [29] *Nonparametric Bayesian Methods for Genetic Inference*,  
Computational Biology Seminar, Department of Integrative Biology, UC Berkeley, Berkeley, California, November 7, 2007.
- [30] *Nonparametric Bayesian Methods for Genetic Inference*,  
Biostatistics Seminar, Department of Statistics, Stanford University, Stanford, California, November 8, 2007.
- [31] *Probabilistic Graphical Models — theory, algorithm, and application*,

- Keynote, The Sixth International Conference on Machine Learning and Applications (ICMLA'07), Cincinnati, Ohio, USA, December 13-15, 2007 .
- [32] *Nonparametric Bayesian Methods for Genetic Inference*,  
Statistics Seminar, Department of Statistics, University of Chicago, Chicago, Illinois, USA, March 10, 2008.
- [33] *Computational analysis of eukaryotic transcriptional regulatory sequence and its evolution*,  
Natural History Seminars, Department of Ecology and Evolution, University of Chicago, Chicago, Illinois, USA, March 11, 2008.
- [34] *Statistical Network Analysis and Inference: Methods and Applications*,  
Yahoo!-Dais Seminar, Department of Computer Science, University of Illinois, Urbana-Champaign, Illinois, USA, March 12, 2008.
- [35] *Nonparametric Bayesian Methods for Genetic Inference*,  
Computational Biology Seminar, Department of Computer Science, University of Illinois, Urbana-Champaign, Illinois, USA, March 13, 2008.
- [36] *Nonparametric Bayesian Methods for Genetic Inference*,  
Bioinformatics Seminar Series, CSAIL, MIT, Boston, Massachusetts, USA, April 9, 2008.
- [37] *Discrete Temporal Models for Evolving Graphs*,  
Invited Speaker, Workshop on Future Directions in High-Dimensional Data Analysis: New Methodologies: New Data Types and New Applications, Isaac Newton Institute for Mathematical Sciences, Cambridge University, Cambridge, UK, June 23-27, 2008.
- [38] *Genome-Phenome Association: Computational Challenges and new Algorithms*,  
Invited Speaker, DIMACS Workshop on Computational Issues in Genetic Epidemiology, DIMACS Center, Rutgers University, Piscataway, NJ, Aug 21-22, 2008.
- [39] *Bayesian Methods for Genetic Inference*,  
Invited Speaker, Program of Population Genetics and Genomics, Kavli Institute for Theoretical Physics, UC Santa Barbara, CA, Sep 15 - Dec 12 (talk took place on 9/23), 2008.
- [40] *Fitting Stochastic Models to Empirical Data*,  
Plenary Talk, Workshop on Statistical Inference for Complex Networks, Santa Fe Institute, Santa Fe, NM, Dec 3-5, 2008.
- [41] *Time (and Space)-Varying Networks: Reverse engineering rewiring social and genetic interactions*,  
Invited Speaker, Workshop on Statistical Inference for Complex Networks, Santa Fe Institute, Santa Fe, NM, Dec 3-5, 2008.
- [42] *Recent Advances in Learning Sparse Structured Input/Output Model: Models, Algorithms, and Applications*,  
Keynote, NIPS 2008 Workshop on "Structured Input, Structured Output", Vancouver, BC, Canada, Dec 8-14, 2008.
- [43] *A State-Space Mixed Membership Blockmodel for Dynamic Network Tomography*,  
Invited Speaker, Workshop on Statistical Methods for the Analysis of Network Data in Practice, University College Dublin", Dublin, Ireland, June 15-17, 2009.
- [44] *Estimating Time-Varying Networks*,  
Invited Speaker, Workshop on Statistical Methods for the Analysis of Network Data in Practice", University College Dublin, Dublin, Ireland, June 15-17, 2009.
- [45] *On the Primal and Dual Sparsity of Structured Input/Output Models*,  
Invited Speaker, Sino-USA Summer School in Vision, Learning, and Pattern Recognition", Peking University, Beijing, China, July 20-27, 2009.

- [46] *On the Primal and Dual Sparsity of Structured Input/Output Models*,  
Invited Speaker, Joint Statistics Meeting (JSM)", Washington D. C., Aug 1-6, 2009.
- [47] *Time Varying Networks: reverse engineering and analyzing rewiring social and genetic interactions*,  
Center for Statistics and the Social Sciences Seminar, Department of Statistics, University of Washington, Seattle, WA, Sep 28, 2009.
- [48] *Time Varying Networks: reverse engineering and analyzing rewiring genetic interactions*,  
Neyman Seminar, Department of Statistics, University of California, Berkeley, CA, Oct 14, 2009.
- [49] *Jointly Maximum Margin and Maximum Entropy Learning of Graphical Models*,  
Distinguished Seminar, NEC Research, CA, Oct 16, 2009.
- [50] *Time Varying Graphical Models: reverse engineering and analyzing rewiring networks*,  
Keynote, NIPS 2009 Mini-Symposium on "Machine Learning in Computational Biology", Vancouver, BC, Canada, Dec 10, 2009.
- [51] *Jointly Maximum Margin and Maximum Entropy Learning of Graphical Models*,  
Invited Speaker, NIPS 2009 Workshop on "Approximate Learning of Large Scale Graphical Models", Vancouver, BC, Canada, Dec 11-12, 2009.
- [52] *Modeling Dynamic Network Tomography*,  
Invited Speaker, NIPS 2009 Workshop on "Applications for Topic Models: Text and Beyond", Vancouver, BC, Canada, Dec 11-12, 2009.
- [53] *Dynamic Network Tomography*,  
Invited Speaker, NIPS 2009 Workshop on "Analyzing Networks and Learning with Graphs", Vancouver, BC, Canada, Dec 11, 2009.
- [54] *Time Varying Graphical Models: Reverse engineering and analyzing evolving genetic and social networks*,  
BME Departmental Seminar, Department of Biomedical Engineering, Johns Hopkins University, MD, Jan 25, 2010.
- [55] *Dynamic Network Tomography*,  
Computer Science Colloquia, Department of Computer Science, Purdue University, IN, Feb 11, 2010.
- [56] *Dynamic Network Tomography*,  
2009/2010 EPSRC Symposium on the Mathematics of Complexity Science and Systems Biology, Systems Biology Centre, The University of Warwick, UK, Mar 9, 2010.
- [57] *Dynamic Network Tomography: Model, Algorithm, Theory, and Application*,  
Machine Learning Seminar, Department of Engineering, Cambridge University, UK, Mar 11, 2010.
- [58] *Structured Sparse Regression and Genome-Phenome Association Analysis In Complex Diseases*,  
Statistics Seminar, Department of Statistics, Oxford University, UK, Mar 12, 2010.
- [59] *Dynamic Network Tomography: Model, Algorithm, Theory, and Application*,  
Machine Learning Seminar, Gatsby Computational Neuroscience Unit, University College London, UK, Mar 12, 2010.
- [60] *Time Varying Networks: Reverse Engineering and Analyzing Rewiring Social and Genetic Interactions*,  
Invited talk, International Biometric Society-ENAR Annual Meetings, New Orleans, LA, Mar 22, 2010.
- [61] *Dynamic Network Analysis: Model, Algorithm, Theory, and Application*,  
CSAIL Seminar, CSAIL, MIT, MA, Apr 14, 2010.
- [62] *Dynamic Network Analysis: Model, Algorithm, Theory, and Application*,  
Statistics Colloquium, Department of Statistics, Harvard University, MA, Apr 15, 2010.

- [63] *Genome-Phenome Association Analysis of Complex Diseases – a Structured Sparse Regression Approach*,  
BioStatistics Seminar, Department of BioStatistics, Harvard University, MA, Apr 16, 2010.
- [64] *Genome-Phenome Association Analysis of Complex Diseases – a Structured Sparse Regression Approach*,  
Bioinformatics Seminar, University of California, Los Angeles, CA, May 10, 2010.
- [65] *Dynamic Network Analysis: Model, Algorithm, Theory, and Application*,  
Invited talk, International Conference on Statistics and Society, Beijing, China, July 10-12, 2010.
- [66] *Dynamic Network Analysis: Model, Algorithm, Theory, and Application*,  
Invited talk, Eighth Workshop on Mining and Learning with Graphs 2010 (MLG-2010), Washington DC, July 24-25, 2010.
- [67] *Genome-Phenome Association Analysis of Complex Diseases – a Structured Sparse Regression Approach*,  
Keynote: The Tenth Annual International Workshop on Bioinformatics and Systems Biology, Kyoto, Japan, 26-28 July 2010.
- [68] *Statistical Analysis of Complex Networks: A SAMSI Preview*,  
Invited talk, Joint Statistics Meeting, Vancouver, Canada, Aug 1-5, 2010.
- [69] *Statistical Analysis of Complex Networks*  
Invited talk, Opening Workshop for the SAMSI program on Complex Networks, Research Triangle Park, NC, August 29-September 1, 2010.
- [70] *TBA*,  
Columbia Statistics Seminar, Columbia University, New York, October 11, 2010.
- [71] *Genome-Phenome Association Analysis of Complex Diseases – a Structured Sparse Regression Approach*,  
Distinguished speaker, 4th Annual Program in Quantitative Genomics (PQG) Conference, Harvard University, Boston, November 15-16, 2010.

## Professional Service

- **Editorial Board of**
  - *Annals of Applied Statistics* (associate editor)
  - *Machine Learning Journal* (action editor)
  - *IEEE Transactions on Pattern Analysis and Machine Intelligence* (associate editor)
  - *PLoS Computational Biology* (guest associate editor)
- **Member of**
  - DARPA Information Science and Technology (ISAT) Advisory Group
  - NIH Biodata Management and Analysis (BDMA) Study Section
- **Invited panelist/participant of**
  - DARPA CS Futures II, 2007-2008.
  - International Expert Review Committee of the Doctoral Plus Program (DK-plus) Population Genetics of University of Vienna (October 22nd, 2008, and November 5, 2009), invited by the Austrian Science Fund (FWF) Board of Trustees.
- **Organizer or Co-Organizer for**
  - Workshop on Analyzing Graphs: Theories and Applications. *Advances in Neural Information*

Processing Systems 22, NIPS-08 (2008)

- Workshop on Statistical Models of Networks. Advances in Neural Information Processing Systems 21, NIPS-07 (2007)
- Workshop on Learning in Structured Output Spaces. The 24th International Conference on Machine Learning, ICML-07 (2007)
- Institute of Mathematical Statistics (IMS) Session on Dynamic Network Models. International Biometric Society-ENAR Annual Meetings, Atlanta, Georgia, 2007
- Workshop on Learning in Structured Output Spaces. The 23rd International Conference on Machine Learning, ICML-06 (2006)
- Workshop on Statistical Network Analysis: Models, Issues and New Directions. The 23rd International Conference on Machine Learning, ICML-06 (2006)
- **Chair, co-Chair, or Senior Program Committee** member for
  - Area Chair: Advances in Neural Information Processing Systems 25 NIPS-11, (2011).
  - Area Chair: The 28th International Conference on Machine Learning ICML-11, (2011).
  - Area Chair: The 19th International Conference on Intelligent Systems for Molecular Biology ISMB-11, (2011).
  - SPC: The Seventeenth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, KDD-11 (2011).
  - Area Chair: The 18th International Conference on Intelligent Systems for Molecular Biology ISMB-10, (2010).
  - Tutorial Chair: The 7th Asia Pacific Bioinformatics Conference, APBC09 (2009)
  - Publication Chair, and SPC, The Twenty-Fifth International Conference on Conference on Uncertainty in Artificial Intelligence, UAI'09 (2009)
  - SPC, The Fourteenth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, KDD-08 (2008)
  - SPC, The Fourteenth Annual International Conference on Research in Computational Molecular Biology, RECOMB-10 (2010).
  - SPC, The Thirteenth Annual International Conference on Research in Computational Molecular Biology, RECOMB-09 (2009).
  - SPC, The Twelfth Annual International Conference on Research in Computational Molecular Biology, RECOMB-08 (2008).
  - SPC, The Twenty-Fourth International Conference on Machine Learning, ICML-07 (2007)
- **Program Committee** member for
  - The 24th International Conference on Conference on Uncertainty in Artificial Intelligence, UAI'08 (2008)
  - European Conference on Computer Vision, ECCV-08 (2008)
  - The NIPS workshop on Machine Learning in Computational Biology, NIPS (2007)
  - Joint Conference on Empirical Methods in Natural Language Processing and Computational Natural Language Learning, EMNLP-CoNLL (2007)
  - The 11th IEEE International Conference on Computer Vision, ICCV (2007)
  - IEEE Conference on Computer Vision and Pattern Recognition Program, CVPR (2007, 2008)
  - SIAM International Conference on Data Mining, SDM (2007)

- Workshop on Multimodal Information Retrieval. The Twentieth International Joint Conference of Artificial Intelligence, IJCAI (2007)
- Workshop on Learning with Nonparametric Bayesian Methods. The Twenty-Third International Conference on Machine Learning, ICML (2006)
- The Twenty-Third International Conference on Machine Learning, ICML (2006)
- The Twenty-First, Twenty-Third, National Conference on Artificial Intelligence, AAAI (2006, 2008), and and AAAI-08 Nectar track (2008)
- The Fourth and Seventh Asia-Pacific Bioinformatics Conference, APBC (2006, 2009)
- The Sixteenth, Seventeenth and Eighteenth International Conference on Genome Informatics (2005, 2006, 2007)
- The Tenth and Eleventh International Conference on Artificial Intelligence and Statistics, AIS-TAT (2005, 2007)
- The First, Second, Third, and Fifth Annual RECOMB Satellite Workshop on Regulatory Genomics (2004, 2005, 2006, 2008)

- **Reviewer** for

- *American Journal of Human Genetics*,
- *Annals of Applied Statistics*,
- *Proc. Natl. Acad. Sci.*,
- *PLOS Computational Biology*,
- *PLOS Genetics*,
- *ACM Transactions on Knowledge Discovery from Data*,
- *Bioinformatics*,
- *BMC Bioinformatics*,
- *International Journal of Computer Vision*,
- *Journal of American Statistical Association*,
- *Journal of Computational Biology*,
- *Journal of Machine Learning Research*,
- *Journal of Artificial Intelligence Research*,
- *IEEE Transactions on Information Theory*,
- *Genome Research*,
- *Knowledge and Information Systems*,
- *Machine Learning*,
- *Nature, Methods*,
- *Nucleic Acid Research*,
- *Social Networks*,
- *Statistica Sinica*,
- Annual Conference on Advances in Neural Information Processing Systems (*NIPS*),
- Annual Conference on Uncertainty in Artificial Intelligence (*UAI*),
- Annual Conference on International Conference on Machine Learning (*ICML*),

- Annual IEEE Conference on Computer Vision and Pattern Recognition (*CVPR*),
- Annual Conference on Research in Computational Molecular Biology (*RECOMB*),
- Annual Conference on Intelligent Systems for Molecular Biology (*ISMB*),
- Annual Pacific Symposium on Biocomputing (*PSB*),
- National Conference on Artificial Intelligence (*AAAI*).
- **Grant Panelist** for
  - Biological Databases & Informatics, National Science Foundation, 2005
  - Information & Knowledge Management panel, IIS, National Science Foundation, 2005
  - Plant Genome Research Program, National Science Foundation, 2006
  - NSF Career Panel, 2007
  - NSF IIS Panel, 2008
- **Grant and Award Reviewer/Panelist** for
  - Austrian Science Fund (FWF)
  - British Computer Society (BCS), Distinguished Dissertation Award
  - Canada Foundation for Innovation (CFI)
  - Israel Science Foundation
  - National Science Foundation
  - The Research Grants Council (RGC) of Hong Kong
  - The Wellcome Trust
- **Professional organizations:**
  - Institute of Mathematical Statistics (IMS),
  - Institute of Electrical and Electronics Engineers (IEEE),
  - International Society for Bayesian Analysis (ISBA),
  - American Association for Artificial Intelligence (AAAI),
  - American Association for Cancer Research (AACR),
  - International Society for Computational Biology (ISCB).

## University Services (A partial listing)

- Annual Machine Learning Summer School, co-organizer (2005, 2006), Machine Learning Department, CMU.
- Faculty Search Committee, member (2006, 2007, 2008), Machine Learning Department, CMU.
- Admissions Committee, member (2006), Machine Learning Department, CMU.
- Admissions Committee, member (2005), Language Technology Institute, CMU.
- Admissions Committee, member (2006), chair (2007, 2008), Joint CMU-Pitt Ph.D. Program in Computational Biology.
- Curriculum Committee, member (2006, 2007), Joint CMU-Pitt Ph.D. Program in Computational Biology.
- ACM Doctoral Dissertation Award and SCS Best Thesis Award Committee, member (2007), chair (2008), SCS, CMU.

- New Collaborations Competition, Reviewer (2007), Language Technology Institute, CMU.

## Advising

Current students and Postdocs:

**Graduate Student:** Advising 11 Ph.D. students: Ross Curtis (CompBio), Qirong Ho (MLD), Mladen Kolar (MLD), Seunghak Lee (CSD), Ankur Parikh (MLD), Kriti Punyani (LTI), Kyung-Ah Sohn (CSD), Suyash Shringarpure (MLD), Matt Wytock (MLD), Jing Xiang (MLD), Bin Zhao (MLD); co-advising 3 graduate students: Judie Howrylak (M.D./Ph.D.), Gunhee Kim (CSD), Andre Martins (LTI).

**Post Doctoral Fellow:** Jacob Eisenstein (Ph.D. MIT, soon to join Georgia Tech as Asst Prof.), Sinead Williamson (Ph.D. University of Cambridge), Junming Yin (Ph.D. UC Berkeley)

Students graduated:

Henry Lin (LTI, M.S. 2006)

Bing Zhao (LTI, Ph.D. 2007, now at IBM Research)

Steve Hanneke (MLD, Ph.D. 2009, now Asst. Prof. stat@CMU)

Wenjie Fu (CSD, MS. 2009, now at Facebook)

Pradipta Ray (LTI, Ph.D. 2010, now Postdoc at U. of Texas)

Amr Ahmed (LTI, Ph.D. 2011, now at Yahoo! Research)

Hetunandan Kamichetty (CSD, Ph.D. 2011, now Postdoc at U. of Washington).

Postdoc graduated:

Seyoung Kim (2010, Asst. Prof. cs@CMU)

Le Song (2011, Asst. Prof. cs@ Georgia Tech)

Jun Zhu (2011, Asso Prof. cs@Tsinghua Univ.).

Served or serving on the thesis committee of:

Edoardo Airoldi (CSD), Anton Chechetka (RI), Shay Cohen (LTI), Jason Ernest (ML), Kevin Gimpel (LTI), Weihao Lin (LTI), Yan Liu (LTI), Yong Lu (CSD), Pradeep Ravikumar (ML), Indrayana Rustandi (CSD), Chenhe Yuan (Pitt, CS), Yu-Chiang Frank Wang (ECE).