Animashree Anandkumar

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Research Interests

Statistical signal processing, networking and information theory with emphasis on inference and learning of graphical models.

Current Appointment

Assistant Professor at Electrical Engineering and Computer Science *Since July 2010*
University of California, Irvine, CA, USA.

Education

Doctor of Philosophy in Electrical Engineering with minor in Applied Mathematics *July 2009*
advised by Prof. Lang Tong, Electrical & Computer Engr, Cornell University, Ithaca, NY, USA.

Bachelor of Technology in Electrical Engineering with minor in Theoretical Comp. Science *May 2004*
Indian Institute of Technology Madras, Department of Electrical Engineering, Chennai, India.

Awards and Honors

1. **ACM SIGMETRICS 2011 Best Paper Award.**
2. **IEEE Signal Processing Society Young Author Best Paper Award 2008**, presented annually to a meritorious paper appearing in a 3-year window in IEEE Transactions on Signal Processing.
3. **Best Thesis Award 2009** by ACM SIGMETRICS Society.
4. 2009 Innovation achievement award by IBM Watson Research
5. **Fran Allen IBM PhD Fellowship 2008-09**, presented annually to one female PhD student in conjunction with the IBM PhD. Fellowship Award.
6. **Student Paper Award,** International Conference on Acoustic, Speech & Signal Processing 2006.
7. **Anita-Borg Google Scholarship** 2007-08 finalist.
8. **Summer Research Fellow 2003**, Jawaharlal Nehru Center for Advanced Scientific Research, India.

Previous Appointments

Post-doctoral Associate at the Laboratory of Information & Decision Systems *July 2009-July 2010*
with Prof. Alan Willsky, MIT, Cambridge, MA, USA.

Visiting Graduate Student at the Laboratory of Information & Decision Systems *Sept. 2009- May 2009*
with Prof. Alan Willsky, MIT, Cambridge, MA.

Graduate Research Intern at IBM Watson Research *Summer 2007 and 2008*
with Dr. Chatschik Bisdikian and Dr. Dakshi Agrawal, Hawthorne, NY, USA.

Submissions

[1] A. Anandkumar, V. Y. F. Tan, and A. S. Willsky. High-Dimensional Structure Learning of Ising Models on Sparse Random Graphs. *Preprint. Available on ArXiv:1011.0129*, Nov. 2010.

[2] Y. Liu, V. Chandrasekaran, A. Anandkumar, and A. Willsky. Feedback Message Passing for Inference in Gaussian Graphical Models. *Submitted, available on Arxiv*, May 2011.

Journal Publications

[3] M.J. Choi, V. Tan, A. Anandkumar, and A. Willsky. Learning Latent Tree Graphical Models. *J. of Machine Learning Research*, 12:1771–1812, May 2011.

[4] V.Y.F. Tan, A. Anandkumar, and A. Willsky. Learning Markov Forest Models: Analysis of Error Rates. *J. of Machine Learning Research*, 12:1617–1653, May 2011.

[5] A. Anandkumar, T. He, C. Bisdikian, and D. Agrawal. Seeing Through Black Boxes: Tracking Transactions through Queues under Monitoring Resource Constraints. *Accepted to Elsevier Performance Evaluation. Available on Arxiv.*, Feb. 2010.

[6] A. Anandkumar, N. Michael, A.K. Tang, and A. Swami. Distributed Algorithms for Learning and Cognitive Medium Access with Logarithmic Regret. *To appear IEEE JSAC on Advances in Cognitive Radio Networking and Communications. Available on Arxiv.*, December 2009.

[7] V. Tan, A. Anandkumar, L. Tong, and A. Willsky. A Large-Deviation Analysis for the Maximum Likelihood Learning of Tree Structures. *IEEE Tran. on Information Theory.*

[8] V. Tan, A. Anandkumar, and A. Willsky. Learning Gaussian Tree Models: Analysis of Error Exponents and Extremal Structures. *IEEE Tran. on Signal Processing*, 58(5):2701–2714, May 2010.

[9] A. Anandkumar, J.E. Yukich, L. Tong, and A. Swami. Energy Scaling Laws for Distributed Inference in Random Networks. *IEEE J. Selec. Area Comm.*, 27(7):1203–1217, Sept. 2009.

[10] A. Anandkumar, L. Tong, and A. Swami. Detection of Gauss-Markov Random Fields with Nearest-neighbor Dependency. *IEEE Tran. Information Theory*, 55(2):816–827, Feb. 2009.

[11] A. Anandkumar, L. Tong, and A. Swami. Distributed Estimation Via Random Access. *IEEE Tran. Information Theory*, 54(7):3175–3181, July 2008.

[12] A. Anandkumar, L. Tong, and A. Swami. Optimal Node Density for Detection in Energy Constrained Random Networks. *IEEE Tran. Signal Proc.*, 56(10):5232–5245, Oct. 2008.

[13] A. Anandkumar and L. Tong. Type-Based Random Access for Distributed Detection over Multiaccess Fading Channels. *IEEE Tran. Signal Proc.*, 55(10):5032–5043, Oct. 2007. **IEEE Signal Processing Society 2008 Young Author Best Paper Award**.

Conference Publications: Long Papers

[14] A. Anandkumar, A. Hassidim, and J. Kelner. Topology Discovery of Sparse Random Graphs With Few Participants. In *Proc. of ACM SIGMETRICS*, June 2011. **Winner of Best Paper Award**.

[15] T. He, A. Anandkumar, and D. Agrawal. Index-based sampling policies for tracking dynamic networks under sampling constraints. In *Proc. of IEEE INFOCOM*, May 2011. *Acceptance Rate 15.96%.*

[16] P. Balister, B. Bollobas, A. Anandkumar, and A.S. Willsky. Energy-latency tradeoff for in-network function computation in random networks. In *Proc. of IEEE INFOCOM*, May 2011. *Acceptance Rate 15.96%.*

[17] A. Anandkumar, N. Michael, and A.K. Tang. Opportunistic Spectrum Access with Multiple Users: Learning under Competition. In *Proc. of IEEE INFOCOM*, San Deigo, USA, March 2010. *AR 17%.*

[18] A. Anandkumar, M. Wang, L. Tong, and A. Swami. Prize-Collecting Data Fusion for Cost-Performance Tradeoff in Distributed Inference. In *Proc. of IEEE INFOCOM*, Rio De Janeiro, Brazil, April 2009. *AR 20%.*

[19] A. Anandkumar, C. Bisdikian, and D. Agrawal. Tracking in a Spaghetti Bowl: Monitoring Transactions Using Footprints. In *Proc. ACM Intl. Conf. on Measurement & Modeling of Computer Systems (Sigmetrics)*, Annapolis, Maryland, USA, June 2008. *AR 18%.*

[20] A. Anandkumar, L. Tong, A. Swami, and A. Ephremides. Minimum Cost Data Aggregation with Localized Processing for Statistical Inference. In *Proc. of INFOCOM*, pages 780–788, Phoenix, USA, April 2008. *AR 20%.*

Conference Publications: Short Papers (Limited List)

[21] M. Amin Khajehnejad, Juhwan Yoo, Animashree Anandkumar, and Babak Hassibi. Summary Based Structures with Improved Sublinear Recovery for Compressed Sensing. In *Proc. of IEEE ISIT*, July 2011.

[22] M.J. Choi, V. Tan, A. Anandkumar, and A. Willsky. Learning Latent Tree Graphical Models. In *Proc. of Allerton Conf. on Communication, Control and Computing*, Monticello, USA, Sept. 2010.

[23] A. Anandkumar, J.E. Yukich, and A. Willsky. Scaling Laws for Random Spatial Graphical Models. In *Proc. of IEEE ISIT*, Austin, USA, June 2010.

[24] V. Tan, A. Anandkumar, and A.S. Willsky. How do the Structure and the Parameters of Tree Gaussian Graphical Models Affect Structure Learning? In *Proc. of Allerton Conf. on Communication, Control and Computing*, Monticello, USA, Sept. 2009.

[25] A. Anandkumar, L. Tong, and A. Willsky. Detection Error Exponent for Spatially Dependent Samples in Random Networks. In *Proc. of IEEE ISIT*, Seoul, S. Korea, July 2009.

[26] A. Anandkumar, J.E. Yukich, L. Tong, and A. Swami. Scaling Laws for Statistical Inference in Random Networks. In *Proc. of Allerton Conf. on Communication, Control and Computing*, Monticello, USA, Sept. 2008.

[27] A. Anandkumar, L. Tong, and A. Swami. Detection of Gauss-Markov Random Fields under Routing Energy Constraint. In *Proc. of 45-th Allerton Conf. on Communication, Control and Computing*, pages 1234–1238, Monticello, USA, Sept. 2007.

[28] A. Anandkumar and L. Tong. A Large Deviation Analysis of Detection over Multi-Access Channels with Random Number of Sensors. In *Proc. of ICASSP'06*, volume IV, pages 1097–1101, Toulouse, France, May 2006. **Best Paper Award**.

Book Chapters

[29] A. Anandkumar, A. Ephremides, A. Swami, and L. Tong. Routing for Statistical Inference in Sensor Networks. In S. Haykin and R. Liu, editors, *Handbook on Array Processing and Sensor Networks*, chapter 23. John Wiley & Sons, 2009.

Invention Disclosures

[30] A. Anandkumar and D. Agrawal and C. Bisdikian and T. He, and S. Perelman. Selective Instrumentation For Distributed Applications For Transaction Monitoring, Filed Aug. 2009.

Teaching

Random Processes, Instructor, Winter 2011

Detection Theory, Instructor, Spring 2011.

Detection & Estimation, Co-instructor, Spring 2008.

Affiliations at UCI

Center for Pervasive Communications and Computing.

California Institute for Telecommunications and Information Technology.

Center for Machine Learning.

Service

Recipient of IBM grant of $30,000 as part of Fran Allen award to mentor female students at Cornell University.

TPC for ACM MOBIHOC 2011, IEEE INFOCOM 2011, MILCOM 2010-2011, IEEE ICC 2010, IEEE PIMRC 2010.

Reviewer for IEEE Transactions on Signal Processing, IEEE Transactions on Information Theory, IEEE Transactions on Wireless Communications and IEEE JSAC.

Speaker at the CRA-W Grad Cohort 2008 at Seattle, USA on *Preparing your PhD Proposal.*

In the News

Article on Sizing Samples in ACM Technews and MIT news September 2010.

http://technews.acm.org/archives.cfm?fo=2010-09-sep/sep-01-2010.html

http://web.mit.edu/newsoffice/2010/sizing-samples-0825.html

Article on Fran Allen Fellowship in Cornell News December 2008.

http://www.news.cornell.edu/stories/Dec08/AnandkumarAward.html

Article on Anita Borg Scholars in Google Press Release March 2007.

http://www.google.com/intl/en/press/pressrel/anitaborg07.html

Invited Talks (Limited List)

Review Meeting, HSN MURI, University of California, Berkeley, Jan. 2011.

Probability and Network Sciences Seminar at U.C. San Diego, Jan 2011.

Spotlight talk at the NIPS workshop on Robust Statistical Learning, Dec. 10th

Seminar, EE Dept., UIUC, Champaign, October 2010.

Seminar, EE Dept., Caltech, Pasadena, October 2010.

Systems Seminar, EE Dept., USC, LA, October 2010.

Seminar, Dept. of Statistics, Yale University, New Haven, CT, April 2010.

Invited talk at the New England Statistics Symposium, Harvard University, Apr. 2010.

Seminar, Microsoft Research, Cambridge, UK, March 2010.

Combinatorics Seminar, Univ. of Memphis, Nov. 2009

Seminar, Worcester Polytechnic Institute, Sept. 2009.

SSG Seminar, MIT, Sept. 2009.

Review Meeting, HSN MURI, Vanderbilt University, Jul. 2009.

Seminar, Washington University at St. Louis, May 2009.

ISN Seminar, Cornell University, Jan. 2009.

SSG Seminar, MIT, Dec. 2008.

Applied Probability Lunch, IBM Watson Research, July 2008.