

Earl Lawrence
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Education

University of Michigan: PhD Statistics 2000-2005

- Dissertation: Models and Inference in Network Tomography.
- Advisors: George Michailidis and Vijay Nair.

University of Michigan: BS Statistics 1996-2000

- Honors Thesis: Analysis of Tonal Matching in Adult Acquisition of Mandarin Chinese.
- Received High Honors for my thesis work.
- Graduated with Distinction
- Class Honors (1996-2000).

Research Interests

My research falls in the general area of computational statistics. My doctoral research is in the field of *network tomography* where I am doing work on the deconvolution of network link delay distributions and loss rates from measurements made over paths containing several links. I have done additional work, motivated by microchip testing, developing an MCMC technique to fit models for correlated multivariate ordinal data. These problems have deepened my interest in the broader areas of *inverse problems*, *missing data*, and *latent variable modeling*. In general, I enjoy interdisciplinary research of this type that involves collaboration and study with researchers in other fields.

Publications

1. Lawrence, E. Michailidis, G., Nair, V. N. "Fast Estimation for Active Network Tomography." Planned for *IEEE Transactions on Signal Processing*. In Progress. 2006
2. Lawrence, E. Michailidis, G., Nair, V. N. "Statistical Inverse Problems in Active Network Tomography." *IMS Volume in honor of Yehuda Vardi*. Submitted 2006.
3. Gattiker, J. R., Lawrence, R., Higdon, D. "Analysis of Multi-Domain Complex Simulation Studies." *Computational Science and It's Applications - ICCSA 2006*. 2006.
4. Lawrence, E., Bingham, D. R., Nair, V. N. "Multivariate Probit Analysis." *Technometrics*. Submitted. 2005.
5. Lawrence, E., Michailidis, G., Nair, V. N. "Flexicast Delay Tomography." *Journal of the Royal Statistics Society Series B*. To Appear. 2006.

6. Lawrence, E., Michailidis, G., Nair, V. N., Xi, B. "Network Tomography: A Review and Recent Developments." *Frontiers of Statistics* (in honor of Peter Bickel). 2005.
7. Lawrence, E., Michailidis, G., Nair, V. N. "Local Area Network Analysis Using End-to-End Delay Tomography." *Performance Evaluation Review and Sigmetrics '05 Workshop on Large Scale Network Inference*. 2005.
8. Lawrence, E., Michailidis, G., Nair, V. N. "Maximum Likelihood Estimation of Internal Network Link Delay Distributions Using Multicast Measurements." *Proceedings of the 37th Conference on Information Sciences and Systems*. 2003.

Presentations

1. New Priors for Complex System Reliabilities and Trends. Joint with Scott Vander Wiel. *Joint Statistical Meetings*. Seattle, WA. August 2006.
2. Mixture Modeling for Active Delay Tomography. Joint with G. Michailidis and V. N. Nair. *INFORMS 2006 International Meeting*. Hong Kong. June 2006. (invited)
3. EOS Calibrations by Fast Computing Machines. Joint with James R. Gattiker, David Higdon, and Doran Greening. *Valencia International Meetings on Bayesian Statistics*. Benidorm, Spain. June 2006. (poster)
4. Flexicast Network Tomography. Joint with G. Michailidis and V. N. Nair. *INFORMS 2005 Annual Meeting*. San Francisco, CA. November 2005. (invited)
5. Network Tomography. Joint with G. Michailidis and V. N. Nair. *Joint Statistical Meetings*. Minneapolis, MN. August 2005 (invited)
6. Flexicast Network Tomography. Joint with G. Michailidis and V. N. Nair. *Spring Research Conference on Statistics in Industry and Technology*. Park City, UT. June 2005. (invited)
7. Estimation of Network Link Characteristics Based on Time Series Data. Joint with G. Michailidis and V. N. Nair. *Joint Statistical Meetings*. Toronto, ON. August 2004. (contributed)
8. Net Delay Tomography. Join with G. Michailidis and V. N. Nair. *SAMSI Closing Workshop for Network Modeling for the Internet*. Research Triangle Park, NC. June 2004. (invited)
9. Active Network Tomography and the Design of Efficient Probing Experiments. Joint with G. Michailidis and V. N. Nair. *Mathematical Methods in Reliability Conference*. Santa Fe, NM. June 2004 (invited)
10. Statistical Issues in Network Tomography. Joint with G. Michailidis and V. N. Nair. *Spring Research Conference on Statistics in Industry and Technology*. Gaithersburg, MD. May 2004 (invited)
11. Tomography Based Network Monitoring and Control. Joint with G. Michailidis and V. N. Nair. *Spring Research Conference on Statistics in Industry and Technology*. Gaithersburg, MD. May 2004 (invited)
12. Network Tomography. Joint with G. Michailidis and V. N. Nair. *IISA Conference*. Athens, GA. May 2004. (invited)
13. Designing Efficient Network Tomography Procedures for Large Topologies. Joint with G. Michailidis and V. N. Nair. *IMA Meeting*. Minneapolis, MN. January 2004. (invited)
14. Tutorial on Internet Tomography. Joint with G. Michailidis and V. N. Nair. *SAMSI Workshop on Internet Tomography*. Research Triangle Park, NC. October 2003. (invited)

15. Active Probing for Link Delay Tomography. *SAMSI Workshop on Internet Tomography*. Research Triangle Park, NC. September 2003. (poster)
16. Active Network Tomography and Bicast Probing Experiments. Joint with G. Michailidis and V. N. Nair. *ISI Biennial Meeting*. Berlin, Germany. August 2003. (invited)
17. Network Delay Estimation Using Bicast Probing. *Joint Statistical Meetings*. San Francisco, CA. August 2003. (contributed)
18. Bayesian Inference for Multivariate Ordinal and Binary Data. *Joint Statistical Meetings*. New York, NY. August 2002. (contributed)
19. Multivariate Probit Analysis. *Spring Research Conference on Statistics in Industry and Technology*. Ann Arbor, MI. May 2002 (contributed)

Research Experience

Los Alamos National Laboratory: Technical Staff Member 2005-Present

- Started work on modeling computer experiments with spatial processes.
- Worked in model evaluation for system reliability.

University of Michigan, Department of Statistics: Research Assistant 2002-2005

- Conducted research in the field of network tomography, particularly in the development of link delay distribution estimators based on end-to-end probing experiments.
- Wrote software for link delay distribution estimation in C and Matlab.
- Designed and conducted network tomography experiments on the University of North Carolina campus network using Avaya's Voice-Over-IP Expertnet tool.
- Coordinated the development of a network data visualization tool with an undergraduate research assistant.

Bell Labs, Lucent Technologies: Summer Intern Summer 2002

- Worked with Dr. Chuanhai Liu on degradation modeling and statistical decoding.

University of Michigan, Department of Statistics: Research Assistant 2000-2001

- Researched a Bayesian latent variable model for correlated multivariate ordinal data. (Fall 2001)
- Developed web-based interactive tools in Java to provide an experiential learning environment for undergraduates. (Summer and Fall 2000)

University of Michigan, Department of Psychiatry: Research Assistant Summer 2001

- Statistical consultant on a study of the relationship between human motion and depression.
- Advised on the development of the experimental protocol.
- Performed statistical analysis of motion data.

Educational and Teaching Experience

University of Michigan, Department of Statistics: Graduate Student Instructor 2001-Present

- Teaching assistant for graduate courses in Reliability and Applied Multivariate Analysis.
- Lab instructor for undergraduate courses in Linear Models and Statistical Computing.
- Duties included teaching lab and discussion sections, holding office hours, and grading.

University of Michigan, Honors Program: Undergraduate Peer Advisor 1997-2000

- Advised incoming freshman individually and in groups regarding Honors requirements and class selection.
- Served as coordinator from 1998-2000.

University of Michigan, Department of Mathematics: Undergraduate Tutor 1998-1999

- Tutored students on a walk-in basis on subjects including Calculus, Linear Algebra, Differential Equations, and Probability.

Awards

- Student Scholarship from the Organizing Committee of the Spring Research Conference on Statistics in Industry and Technology (2005)
- Department of Statistics Outstanding Graduate Student Instructor Award (2003)
- Student Scholarship from the Organizing Committee of the Spring Research Conference on Statistics in Industry and Technology (2002)
- University of Michigan Departmental Fellowship (2000)
- University of Michigan Regents Scholarship (1996)

Computing

- Extensive experience with C/C++, Java, Perl, Matlab, S-Plus/R including software development for research projects.
- Experience with Maple, MySQL, SAS, Shell Programming, SPSS.

Professional Memberships

- American Statistical Association
- INFORMS