

Luke W. Miratrix

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PROFESSIONAL EXPERIENCE

Assistant Professor, Department of Statistics, Harvard University July 2012–Present

EDUCATION

Ph.D., Statistics, U.C. Berkeley Spring, 2012
Advisors: Prof. Bin Yu, Statistics and EECS, and Prof. Jasjeet Sekhon, Political Science and Statistics.

Mathematics Education *Ph.D.* Program, U.C. Berkeley Fall 2006–Spring 2009
In the Graduate Group in Science and Mathematics Education (SESAME)
Switched to Statistics Program *A.B.D.*

M.S., Computer Science, Massachusetts Institute of Technology 1999
Thesis: A foundation for intelligent multi-modal drawing environments
Advisor: Prof. Randall Davis

B.S. with Honors, Computer Science, California Institute of Technology 1997

B.A., Mathematics, Reed College 1997

RESEARCH INTERESTS

I am interested in applying minimal-assumption methods to applied problems, with a current focus on several areas: causal effect analysis, graphical models, nonparametric analysis of randomized experiments, discretizing data as a non-parametric approach, and sparse regression methods. I am also interested in the issues that arise with high-dimensional data, in particular large text corpora. I have also worked with random effect models and survival models.

PUBLICATIONS

- 1) Heller, J.I., Daehler, K.R., Wong, N., Shinohara, M., & Miratrix, L.W. (2012, In Press). Differential effects of three professional development models on teacher knowledge and student achievement in elementary science. *Journal of Research in Science Teaching*.
- 2) Miratrix, L.W., Sekhon, J.S., Yu, B. (2012, in press). Adjusting treatment effect estimates by post-stratification in randomized experiments. *JRSS Series B*.
- 3) Gawalt, B., Jia, J., Miratrix, L.W., Ghaoui, L., Yu, B., & Clavier, S. (2010). Discovering word associations in news media via feature selection and sparse classification. In *Proceedings of the 11th ACM SIGMM International Conference on Multimedia Information Retrieval*.
- 4) Miratrix, L.W., Stark, P.B. (2009). Election audits using a Trinomial Bound. *IEEE Transactions on Information Forensics and Security*, 4(4) 974-981.

- 5) Ranney, M., Rinne, L.F., Yarnall, L., Munnich, E., Miratrix, L.W., & Schank, P. (2007). Designing and assessing numeracy training for journalists: toward improving quantitative reasoning among media consumers. In *Proceedings of the Eighth International Conference of the Learning Sciences*.
- 6) Lackner, T.M., Dobson, K., Rodenstein, R., & Weisman, L.* (1999). Sensory puzzles. In *Extended Abstracts of the Conference of Human Factors in Computing Systems* (pp. 270-271). New York, NY: ACM Press.
- 7) Chandy, K.M., Dimitrov, B., Le, H., Mandleson, J., Richardson, M., Rifkin, A., et al. (1996). A world-wide distributed system using Java and the internet. In *Proceedings of the Fifth IEEE International Symposium on High Performance Distributed Computing* (pp. 11-18). Syracuse, NY: IEEE Computer Society Press.

CONFERENCE PAPERS

- 1) Heller, J. I., Shinohara, M., Daehler, K. R., Rabe-Hesketh, S., & Miratrix, L. (2012, April). Effects of Making Sense of SCIENCE professional development on the science achievement of middle school students. In N. Finkelstein (Chair), *Implementing randomized controlled trials in local education settings: Design, methods, findings and practical research realities*. Symposium conducted at the annual meeting of the American Educational Research Association, Vancouver.
- 2) Heller, J.I., Shinohara, M., Miratrix, L.W., Rabe-Hesketh, S., & Daehler, K.R. (2010). Learning Science for Teaching: Effects of professional development on elementary teachers, classrooms, and students. Paper presented at the *2010 Conference of the Society for Research on Educational Effectiveness (SREE)*, Washington, D.C.
- 3) Hall, J.L., Miratrix, L.W., Stark, P.B., Briones, M., Ginnold, E., Oakley, F., et al. (2009). Implementing risk-limiting post-election audits in California. Paper presented at the *2009 Electronic Voting Technology Workshop/Workshop on Trustworthy Elections (USENIX EVT/WOTE)*, Montreal, Canada.
- 4) Ranney, M.A., Miratrix, L.W., & Martinez, C.A. (2009). Relationships among beliefs about evolution, creation, nationalism, theism, and global warming. Paper presented at the *Annual Meeting of the Psychonomic Society*, Boston.
- 5) Heller, J. I., Shinohara, M., Daehler, K.R., Miratrix, L.W., & Rabe-Hesketh, S. (2009). Impact of content-focused and practice-based professional development models on elementary electric circuits teaching and learning. In J. W. Little (Chair), *Learning Science for Teaching: A study of highly-designed professional development and its effects on teacher knowledge, classroom practice, and student learning*. Symposium conducted at the *Annual Meeting of the American Educational Research Association*, San Diego.
- 6) Gajos, K., Weisman, L.*, & Shrobe, H. (2001). Design principles for resource management systems for intelligent spaces. Paper presented at the *Second International Workshop on Self-Adaptive Software*, Budapest, Hungary.
- 7) Coen, M., Phillips, B., Warshawsky, N., Weisman, L.*, Peters, S., & Finin, P. (1999). Meeting the computational needs of intelligent environments: the Metagluue System. Paper presented at the *1st International Workshop on Managing Interactions in Smart Environments (MANSE)*.

* Changed name to Miratrix from Weisman in 2006

TECHNICAL REPORTS

Miratrix, L.W., Jia, J., Gawalt, B., Yu, B., El Ghaoui, L. (2011). What is in the news on a subject: automatic and sparse summarization of large document corpora. UC Berkeley Dept. of Statistics Technical Report #801.

SELECTED INVITED TALKS & POSTERS

Random Weight Estimators: Adjusting Randomized Trials Without Using Observed Outcomes. Talk given at the Department of Statistics, Stanford, 2012.

Adjusting treatment effect estimates with post-stratification. Poster presented at *POL-METH '11*, Princeton, NJ.

Implementing Risk-Limiting Audits in California. Talk given at the *Joint Statistical Meeting (JSM) 2009*, Washington, DC.

TEACHING EXPERIENCE

GSI for Stat 20: Introduction to Statistics Summer 2010; Fall 2011

- Gave section discussions, developed and graded quizzes, held office hours.

GSI for Stat 215B: Ph.D.-Level Applied Statistics Spring, 2010

- Designed and gave two-hour weekly section lectures
- Graded complex labs and homework
- Office hours.

AP Statistics Teacher Summer 2007; Summer 2008
ATDP Summer Program, UC Berkeley, Berkeley, CA

- Modified AP Statistics curriculum to accommodate accelerated 6-week schedule for gifted high school students.
- Incorporated results from analogies literature and estimation literature into teaching methodology.

High-School Mathematics and Computer Science Teacher 2004–2007
Sonoma Academy, Santa Rosa, CA

- Taught calculus, AP statistics, computer programming, AP Computer Science, pre-calculus, and several electives.
- Designed a project- and writing-based stats course that included research projects.
- Advisor.

High-School Mathematics and Computer Science Teacher 1999–2004
The Commonwealth School, Boston, MA

- Taught first and second year Calculus, Java Programming, Data Structures & Algorithms, Advanced Java Programming, AP Computer Science, Abstract Algebra, Geometry, and Algebra II
- Created three-year computer curriculum from scratch. Wrote Computers 1 textbook and support code for teaching Java programming.
- Advisor. Jobs coordinator.

Teaching Assistant: Upper Division Computer Graphics Course Fall, 1997
MIT, Cambridge, MA

- Advised several student teams on their final graphics programming projects.
- Designed and wrote assignments and support material.

Teaching Assistant: Upper Division Distributed Algorithms Course Fall, 1996
Caltech, Pasadena, CA

- Gave some of the lectures.
- Designed and wrote assignments and support material.
- Held open lab/office hours.

WORK EXPERIENCE

Statistical Consultant 2008–Present
Heller Research Associates, Oakland

- Data analyst for large randomized teacher professional development trials.

Statistical Consultant 2007–2009
Community Resources for Science, Berkeley

- Data analyst and designer for impact and satisfaction surveys.

Research Intern Summer, 2008
Genentech, South San Francisco, CA

- Adapted survival analysis techniques to Phase II trials of personalized cancer medicines.

Part-Time Researcher for the Intelligent Room Project 1997–2000
AI Lab (CSAIL), M.I.T.

- Designed and implemented agent systems to support embedded computer systems

Programming Consultant 1997
CfMC, San Francisco, CA

- Consultant on the redesign of Survent, a telemarketing software package written in C.
- Helped bring Survent onto the web, and advised on how to make it more robust and optimized.

Infospheres Research Assistant 1996–1997
Caltech, Pasadena, CA with Prof. Mani Chandy

- Designed support structure for distributed agent systems.
- Wrote underlying robust message passing layer and agent frameworks in Java.

HONORS AND AWARDS

National Science Foundation Graduate Research Fellowship 2007
Berkeley Graduate Fellowship 2006
Rensselaer Polytechnic Institute Award for Excellence 1995
Deans List, Reed College 1993–1995

TECHNICAL SKILLS AND ACCOMPLISHMENTS

Software packages developed:

- R package 'elec' for planning and analyzing audits of election returns. On CRAN.
- Matlab and C package 'statnews' for summarizing large text corpora.
- Java package 'bots' for teaching Java programming with accompanying textbook.

Languages: R, Python, C/C++, Matlab, Java, Sql

Software Development Skills:

- Experience managing multi-person coding projects
- Experience with programming environments, version control systems, etc.

REFEREE EXPERIENCE

The American Journal of Political Science

The Journal of Statistical Software

PEW Research Center

The International Society of Learning Sciences

MEMBERSHIPS

ASA (American Statistical Association)

IMS (Institute of Mathematical Statistics)

Tau Beta Pi (Undergraduate Engineering Honor Society, Joined 1997)