Andrew Paul Bray

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Five College Post-doctoral Fellow
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Visiting Assistant Professor
Mt. Holyoke College
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Education

Ph.D. Statistics, University of California, Los Angeles, 2013.

Research Area: Spatial-temporal models, point processes, residual analysis

Advisor: Frederic Paik Schoenberg

M.S. Statistics, University of California, Los Angeles, 2010.

B.S. Earth & Ocean Sciences and History, minor in Political Science, Duke University, 2005.

Publications

Refereed Articles

Bray A., Wong K., Barr C., & Schoenberg F.P. (2014). *Using the Voronoi tessellation to calculate residuals for spatial point process models*. Annals of Applied Statistics.

Baumer B., Çetinkaya-Rundel M., Bray A., Loi L., & Horton N. (2014). *R Markdown: Integrating a reproducible analysis tool into introductory statistics*. Technology Innovations in Statistics Education, 8(1).

Bray A., Schoenberg F.P. (2013). *Assessing point process models for earthquake forecasting*. Statistical Science, 28(4), 510-520.

Nichols K., Schoenberg F.P., Keeley J.E., Bray A., & Diez D. (2011). *The application of prototype point processes for the summary and description of California wildfires*. Journal of Time Series Analysis, 32, 420-429.

Bray A.P., Mullin P., Schoenberg F.P., Mac Gibbon K., Romero R., Goodwin T.M., & Fejzo M.S. (2011). *Prenatal exposure to hyperemesis gravidarum linked to increased risk of psychological/behavioral disorders in adulthood*. Journal of Developmental Origins of Health and Disease, 2(4), 200-204.

Khan H.D., Rosati J.A., & Bray A.P. (2011). *Statistical evaluation of data from multi-laboratory testing of a measurement method intended to indicate the presence of dust resulting from the collapse of the world trade center*. Environmental Monitoring and Assessment.

Unrefereed Articles

Bray A. (2014). *A festival of data: student perspectives*, President's Corner, Amstat News, September Issue.

Bray A., Çetinkaya-Rundel M., & Stangl D. (2014). *Five concrete reasons your students should be learning to analyze data in the reproducible paradigm*. Taking a Chance in the Classroom, Chance Magazine, September Issue.

Gould R., Baumer B., Çetinkaya-Rundel M., and Bray A. (2014). *Big data goes to college*, Amstat News, June issue.

Technical Reports

Bray, A. (2012). *Power analysis for residual testing of spatial point process models based on a fine regular grid*. UCLA Statistics Preprint Series.

Bray, A.P. (2010). *Investigation of the effect of conductivity on the number of mayfly genera: Poisson regression and parameter stability*. Office of Research and Development, US EPA.

Bray, A.P. (2010). *Spatial correlation of residuals from a regression model of mayfly genera in West Virginia streams*. Office of Research and Development, US EPA.

Bray, A.P. (2010). *Analysis of oil dispersant application rates and VOC levels*. Office of Research and Development, US EPA.

Presentations

Conferences

Bray A.P. *Putting the Data in DataFest*. Panel discussion, Joint Statistics Meetings, Boston, August 2014.

Çetinkaya-Rundel M., Bray A.P. *Teaching data analysis in R through the lens of reproducibility*, useR! Conference, June 2014.

Çetinkaya-Rundel M., Bray A.P. *Planting seeds of reproducibility in the introductory statistics course with R markdown*, Electronic Conference on Teaching Statistics, May 2014.

Bray A.P. *R Markdown: Bringing Reproducible Analysis into the Classroom*. Panel discussion, New England Statistics Symposium, Boston, April 2014.

Bray A.P., Wong K., Schoenberg F.P., & Barr C. *Using the Voronoi tessellation to calculate residuals for spatial point process models*. Young Researchers Presentation at Southern California American Statistical Association Annual Meeting, November 2012.

Bray A.P., Wong K., Schoenberg F.P., & Barr C. *Residuals for spatial point processes based on Voronoi tessellations*. Contributed paper to the Joint Statistical Meeting, San Diego, July 2012.

Çetinkaya M., Bray A.P. *Integrating R into introductory statistics*. Contributed paper to the Joint Statistical Meeting, San Diego, July 2012.

Potter R., Musgrave D., Bray A., D'Aoust T., & Weingartner T. *Using HF radar to map surface currents in the beaufort sea*. Alaska Marine Sci. Symposium, Anchorage, AK, Jan 2007.

Potter R., Bray A., D'Aoust T., Musgrave D., & Weingartner T. *An application of HF radar in the coastal Beaufort Sea*. 7th International Conference on Global Climate Change: Connections to the Arctic, Fairbanks, AK, Feb 2007.

Seminars

Bray A.P., Reich N. *Update on the cutting edge of R and RStudio*. Western Mass Data Science, Stats, and R Meetup Group, April 2014.

Bray A.P., Reich N. *Open resources for teaching statistics*. Statistics Seminar Series, University of Massachusetts, Amherst, April 2014.

Smith M., Bray A., & Johnston C. *Statistical sample design for coalbed methane industry survery: projects vs wells*. Presentation to the Federal Committee on Stats. Methodology, Washington, DC, November 2009.

Honors

Collegium of University Teaching Fellow, competitive university-wide fellowship through UCLA Office of Instructional Development (2012).

Teaching Assistant Consultant, competitive position funded through UCLA Office of Instructional Development (2011-2012).

Teaching Assistant of the Year, UCLA Department of Statistics (2011).

Academic and Professional Experience

NSF Post Doctoral Fellow, Five Colleges Consortium Fall 2013 - present

Conducting original research under the supervision of Michael Lavine at the University of Massachusetts while teaching one class per semester at one of the four nearby liberal arts colleges. At the University of Massachusetts my research focuses on point process data in ecological applications.

Board of Advisors, MassMutual Data Labs Summer 2014 - present

Provide academic oversight and advising for the students in the data science development program at MassMutual in Amherst.

Graduate Research Assistant, UtopiaCompression Corporation Summer 2011 - Summer 2013

Worked with a team of engineers to improve range detection of unmanned aerial vehicles using passive sensing. Improved algorithm performance by residual analysis and modeling.

Statistician Intern, Office of Research and Development, US EPA Summer 2010

Worked on several projects in the Quantitative Risk Methods Group including assessing the effect of oil dispersants in the Gulf of Mexico, modeling child soil ingestion, and classifying dust from the World Trade Center collapse.

Statistician Intern, Office of Water, US EPA Summer 2009

Collaborated with a team of engineers, economists, and statisticians to set water pollution guidelines. Created the sample design used to collect information related to the pollutants generated by the coalbed methane industry.

Research Technician, SALMON Project, University of Alaska Feb. 2006 - Jul. 2007

Set-up and maintained 6 High Frequency Radars as part of a research project to measure Alaskan ocean surface currents for oil spill risk assessments with implications for arctic ice. Developed a software suite to analyze oceanic and meteorological data using MATLAB.

Teaching

Mount Holyoke College, as Visiting Assistant Professor

Applied Regression Methods, Fall 2014

Smith College, as Visiting Assistant Professor

Introduction to Probability and Statistics, Spring 2014

Introduction to the Practice of Statistics, co-taught with Katherine Halvorsen, Fall 2013

UCLA Department of Statistics, as primary instructor

Burden of Proof: Data and Scientific Reasoning, undergraduate honors seminar, Spring 2013

Statistical Content Helping to Empower Mathematicians at Two-Year Colleges, with Robert Gould, Summer 2012

Teaching College Statistics, pedagogy course for new graduate teaching assistants, Winter 2012

UCLA Department of Statistics, as teaching assistant

Mathematical Statistics (upper div), teaching assistant for Juana Sanchez, Spring 2012

Introduction to Statistical Methods for Life and Health Sci. (lower div), teaching assistant for Mark Hansen, Spring 2011

Regression Analysis: Model Building, Fitting, and Criticism (grad), teaching assistant for Mark Hansen, Winter 2011

Introduction to Data Analysis and Regression (upper div), teaching assistant for Robert Gould, Winter 2010 & 2011

Introduction to Statistical Reasoning (lower div), teaching assistant for Robert Gould, Spring & Fall 2010

Student Research Advisees

Ana Moreno-Mesa (2014): *Investigation and visualization of trends in Smith College statistics enrollment*

Mariah Mullens (2014): *Exploring sensitivity of linear regression assumptions through simulation*

Statistics Education Work

OpenIntro

Co-authored a book of ten labs to accompany *OpenIntro Statistics, Second Edition* (Diez et al. 2012). Students gain experience and insight into concepts in statistics by analyzing real data in the R computing language. Available free and open-source at http://www.openintro.org/stat/labs and on github. The labs have been used at many institutions including Duke, Mt. Holyoke College, University of Chicago, Oregon State University, Vanderbilt, and Reed College. Instructional videos to compliment labs are in development.

Five College DataFest 2014

Organized (with Ben Baumer of Smith College) the first annual Five College DataFest: an undergraduate data analysis competition in which teams of up to 5 students work for 48 hours to extract insight from a rich and complex data set. The event draws in undergraduates from across the Five Colleges, with 65 students attending the 2014 event. Responsibillities include finding and preparing the data set, fundraising, coordinating faculty/grad student volunteers, and recruitment of participants.

MassMutual Data Science Development Program

Designed (with Ben Baumer of Smith College) the prospectus for a new program at MassMutual to recruit undergraduates and train them over three years in the methods and principles of data science. The program's first cohort of seven students began summer 2014 and the program is expected to grow to about 30 students.

Active Learning Workshop

Planned and facilitated a workshop to help graduate teaching assistants incorporate active learning strategies into the classroom. The workshop was held for students from across campus as part of the UCLA TA Conference and again for students from the Department of Statistics. Funded by the UCLA Office of Instructional Development (Fall 2012).

AP Readiness Program

Developed and led discussions and computer lab activities for LA-area high school students in preparation for the AP Statistics exam (2010 - 2013).

CSUSM Office for Biomedical Research and Training:

Developed a series of workshops to prepare underrepresented students for the quantitative portion of the GRE at California State University, San Marcos (Fall 2008).

Scientific Software - R Packages

Diez D., Bray A.P. *bootci*. An R package to allow easy simulation of the coverage rates of various bootstrap and theoretical confidence intervals. The goal is to encourage informed use of these methods by practioners and educators.

Bray A.P., Diez D. *oidata*. An R package with data sets from several sources that may be useful for teaching, practice, or other purposes. Functions have also been included to assist in the retrieval of table data from websites or in visualizing sample data.

Bray A.P., Çetinkaya, M. *oilabs*. An R package of data sets and functions to facilitate statistics education through computing.

Bray A.P. *uav*. An R package of functions to visualize and analyze navigation data from unmanned aerial vehicles.

Professional Service

Member of the ASA DataFest national organizing committee

Contributor to the OpenIntro Project

Reviewer for the Journal of Statistical Education

Co-organizer of the Western Mass Data Science, Stats, and R meetup group

Secretary/Treasurer of the Five Colleges Statistics Program (2014-2015)

Member of the MassMutual Data Labs Board of Advisors

University Involvement

Five College Early Music Ensemble (Fall 2014 - present).

UCLA Datafest, helped plan and run a 48 hour event where teams of undergraduates compete for who can provide the best insights into a large and complex dataset (Spring 2011, Spring 2012, Spring 2013).

Collegium of University Teaching Fellows Selection Committee, student rep. on the seven member committee that evaluated 43 course proposals to award the 2013-2014 CUTF fellowships.

UCLA Campus Sustainability Committee, member of committee that unites students, faculty, and administrators to pursue long-range planning and implementation related to sustainability (2008-2010).

Department of Statistics Graduate Orientation, organized four days of events and workshops for incoming graduate students (Fall 2011).

UCLA Early Music Ensemble, rehearsed and performed renaissance vocal music (Fall 2012 - Spring 2013).

Skills

Programming Languages

R, MATLAB, markdown, LaTeX, git, Python, SQL, SAS, Unix shell, C++

Languages

English (native), Spanish (intermediate), Norwegian (basic).

Membership

Fellow, OpenIntro, a non-profit supporting free and open-source education, (2011 - present).

Member, American Statistical Association (2011 - present), Boston Chapter.

Member, American Mathematical Society (2014 - present).

Member, Statistical Education section (ASA) and section on Statistics and the Environment (ASA)

Non-Academic Interests

Hiking, backpacking, cross-country skiing, renaissance music.

References

Frederic Paik Schoenberg
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Department of Statistics
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