

Lucas K. Mentch

Assistant Professor
Department of Statistics
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Education	<i>Ph.D.</i> , Statistical Science Cornell University, Ithaca, NY, USA Advisor: Giles Hooker Dissertation: Ensemble Trees and CLTs: Statistical Inference in Machine Learning.	2015
	<i>M.S.</i> , Statistical Science Cornell University, Ithaca, NY, USA	2013
	<i>B.S.</i> , Mathematics Bucknell University, Lewisburg, PA, USA	2010
Professional Positions	Assistant Professor, University of Pittsburgh (On leave 2015 - 2016) Postdoctoral Researcher, SAMSI/NC State Research Assistant, Cornell University Teaching Assistant, Cornell University	2015 - Present 2015 - 2016 2013 - 2015 2011 - 2013
Research Interests	Statistical Learning Theory & Machine Learning, Random Forests and Ensemble Methods, Nonparametric Methods, Statistical Computing. Applications to Crime, Law, Forensic Science, and Sports	
Publications	Lucas Mentch and Giles Hooker. "Formal hypothesis tests for additive structure in random forests." <i>Journal of Computational and Graphical Statistics</i> . (2017): 1-9. Mahya Mehrmohamadi, Lucas Mentch , Andrew Clark, and Jason Locasale. "Integrative modeling of tumor DNA methylation identifies a role for metabolism." <i>Nature Communications</i> . In Press. Giles Hooker and Lucas Mentch . "Bootstrap Bias Corrections for Ensemble Methods." <i>Statistics and Computing</i> . In press. Giles Hooker and Lucas Mentch . "Comments on: <i>A Random Forest Guided Tour</i> ." <i>TEST</i> . 25 (2), pp. 254-260, 2016. Lucas Mentch and Giles Hooker. "Quantifying Uncertainty in Random Forests via Confidence Intervals and Hypothesis Tests." <i>The Journal of Machine Learning</i>	

Research, **17**(26), pp. 1-41, 2016.

Bar, Haim Y. and **Lucas Mentch**. “R-CMap - An Open-Source Software for Concept Mapping. To appear in *Evaluation and Program Planning, Special Issue: Concept Mapping at 25: Development, Applications, and Future Directions*.

Frey, M.R., Miller, A.L., **Mentch, L.K.**, and Grahm, J. “Score Operators of a Qubit with Applications”, *Quantum Information Processing*, **9**(5), 629, 2010.

Frey, M.R., Coffey, L.E., **Mentch, L.K.**, Miller, A.L., and Rubin, S.S. “Correlation Identification in Bipartite Pauli Channels”, *International Journal of Quantum Information*, **8**(7), 2010.

Frey, M.R., Coffey, L.K., **Mentch, L.K.**, Miller, A.L. and Rubin, S.S., “Pauli channels exhibit a transition effect in memory estimation above a parametric threshold”, *Proceedings of SPIE, Quantum Information and Computation VIII*, E.J. Donkor, A.R. Pirich, and H.E. Brandt, eds., April 2010.

Under Review

Maria Cuellar, **Lucas Mentch**, and Cliff Spiegelman. “Flawed Designs Lead to Misdiagnoses and Wrongful Convictions.” *Under Review at The American Scientist*.

Duy Hoang Thai and **Lucas Mentch**. “Multiphase Segmentation for Simultaneously Homogeneous and Textural Images.” *Under Review at Applied Mathematics and Computation*.

Oliver Lindhiem, Isaac T. Petersen, **Lucas Mentch**, and Eric A. Youngstrom. “The Importance of Calibration in Clinical Psychology.” *Under Review at Assessment*.

In Progress

“A Quality Measure for Fingerprints based on Image Decomposition.” *with Robin Richter, Carsten Gottschlich, Stephan Huckemann, Len Stefanski, and Duy Hoang Thai*.

“Hold-out Forests for Consistent Variable Importance in Random Forests.” *with Giles Hooker*.

“Customized Training for Bias Reduction in Random Forests.”

“Ensemble Tests for Factors Impacting Early Species Arrivals.” *with Timothy Coleman, Dan Fink, David Winkler, Wesley Hochachka, Frank La Sorte, Giles Hooker*.

“Investigating Racial Bias in Recent Police Shootings.”

“Generalized Variance Estimation for Resampled Estimators.” *with Len Stefanski*.

“Accuracy and Efficiency in Estimating the Variance of a Conditional Expectation.” *with Wuxin Yang*.

“On the role of Hba1c in Predicting Hospital Readmissions for Diabetes Patients.” *with Nicholas Kissel*.

“SuRFIn: An R Package for **S**ubsampled **R**andom **F**orest **I**nference.” with Sarah Tan and Giles Hooker.

Non Peer-Reviewed

Lucas Mentch, Maria Cuellar, William Thompson, and Cliff Spiegelman. “The Next Page: Four experts explain why forensic analysis of crime scenes is not as reliable as you might think.” *OpEd, Pittsburgh Post Gazette*. March 13, 2016.

William Thompson, **Lucas Mentch**, Maria Cuellar, and Cliff Spiegelman. “Who should control Houston’s crime lab?” *OpEd, Houston Chronicle*. May 31, 2016.

Frey, M.R., Graham, J., **Mentch, L.K.**, and Miller, A.L., “Robust Probe for the Quantum Pauli Channel”, *Proceedings of the Physical and Engineering Sciences Section, 2010 Joint Statistical Meetings*, Vancouver, August 3-7, 2010.

Talks & Presentations

CMStatistics, University of London, Invited Session	December 2017
Joint Statistical Meetings, Invited Session	August 2017
Department of Forensic and Investigative Sciences, West Virginia University	February 2017
Center for Statistics and Application in Forensic Evidence Carnegie Mellon University	November 2016
University of Pittsburgh Statistics Seminar	September 2016
Statistics and Machine Learning Research Group Carnegie Mellon University	September 2016
Joint Statistical Meetings, Topic Contributed Session	August 2016
IMS New Researchers Conference	July 2016
SAMSI Undergraduate Workshop	May 2016
SAMSI Transition Workshop	May 2016
SAMSI Postdoc Seminar	April 2016
SAMSI Undergraduate Workshop	February 2016
SAMSI Undergraduate Tutorial	February 2016
SAMSI Postdoc Seminar	October 2015
ENAR Spring Meeting, Invited Session	March 2015
NC State University Statistics Seminar	March 2015
University of Pittsburgh Statistics Seminar	February 2015
Kansas State University Statistics Seminar	February 2015
University of Central Florida Statistics Seminar	February 2015
College of William and Mary Statistics Seminar	January 2015
Wake Forest University Statistics Seminar	January 2015
University of Arkansas Statistics Seminar	December 2014
University of Michigan Statistics Seminar	November 2014
Artificial Intelligence Seminar, Cornell University	September 2014
Graduate Student Seminar, Cornell University	September 2014
Cornell Lab of Ornithology Seminar	September 2014
Joint Statistical Meetings 2014, Contributed Session	August 2014
Joint Statistical Meetings 2013, Contributed Session	August 2013
Graduate Student Seminar, Cornell University	April 2013
Biostatistics Research Group, Cornell University	March 2013

Grants & Contracts

PI: NSF DMS-1712041, 2017-2020: “Collaborative Research: Statistical Inference Using Random Forests and Related Methods”, \$335,078 (\$119,802), with Giles Hooker.

PI: dB-SERC Course Transformation Award, 2017-2018. “An Interdisciplinary Data Science Design for Undergraduate Students.” \$10,000.

Teaching

Primary Instructor

(* Indicates a new course that was newly developed)

*STAT 1361** - *Statistics and Data Science, University of Pittsburgh* Spring 2018
Upper-level undergraduate course designed to be a regular offering in the same vein as STAT 1291.

*STAT 1291** - *Statistics and Data Science, University of Pittsburgh* Spring 2017
Topics course designed to provide students a thorough overview of the emerging field data science, focusing particularly on the development of statistical and machine learning procedures.

STAT 1151 - Introduction to Probability, University of Pittsburgh Fall 2016
Standard undergraduate calculus-based probability course.

ST 371 - Introduction to Probability, NC State University Summer 2016
Standard undergraduate calculus-based probability course.

Teaching Assistant

*BTRY 3520** - *Statistical Computing, Cornell University* Spring 2012, Spring 2013
Upper-level undergraduate statistical computing course using R. Topics included simulation, nonparametric density estimation and testing, optimization and root-finding, numerical integration, and MCMC.

ORIE 6700 - Statistical Principles, Cornell University Fall 2012
Mathematical statistics course required for first year Ph.D. students in statistics and operations research. Frequentist and Bayesian estimation methods, types of convergence, and statistical inference are covered in detail, at the level of *Bickel and Doksum, Mathematical Statistics, 2006*.

ILRST 2100 - Introductory Statistics, Cornell University Fall 2011
A standard introductory statistics course designed for non-math majors.

Software

- *SuRFIn*: An R package to conduct statistical inference procedures via subsampled ensembles. Joint work with Sarah Tan, David Miller, and Giles Hooker.
- *R-CMap*: An R package to conduct and illustrate concept mapping procedures. Joint work with Haim Bar.
- *Statistical Software*: R (expert); experience with SAS, SPSS, Minitab, JMP, STATA
- *Other Languages and Software*: Experience with JAVA, C, C++, Pascal, Matlab, Python, Maple, Mathematica, Microsoft Office

Activities & Service

- Seminar Committee Chair (2017 - Present)
- Faculty Sponsor: DATAs Statistics and Machine Learning Club, University of Pittsburgh (2017 - Present)

- Graduate Admissions Committee: University of Pittsburgh, Department of Statistics PhD Program (2016 - Present)
- Lecturer Hiring Committee: Department of Statistics, University of Pittsburgh (2016-2017)
- Workshop Organizer: Banff International Research Station for Mathematical Innovation and Discovery (BIRS), January 2018 (co-organizer with Giles Hooker, Gerard Biau, and Stefan Wager)
- Invited Session Organizer: 2017 Joint Statistical Meetings
- Delegate: NSF & NIH/BD2K Data Science Innovation Lab 2016: Mobile Health
- Session Chair: 2016 Joint Statistical Meetings
- Research Track Program Committee Member: 2016 ACM SIGKDD
- Panel Discussant: SAMSI Undergraduate Workshops, October 2015
- Research Competition Judge: Statistics in Sports Undergraduate Research Competition, Joint Statistical Meetings 2017
- Reviewer: The American Statistician, Annals of Statistics (2), Biometrika (2), Journal of Machine Learning Research (5), Statistical Analysis and Data Mining (2), Statistics and Public Policy, SIGKDD (5)

Students

Role: Advisor

Timothy Coleman	University of Pittsburgh	PhD	2021 (Expected)
Wei Peng	University of Pittsburgh	PhD	2020 (Expected)
Wuxin Yang	University of Pittsburgh	PhD	2019 (Expected)

Role: Committee Member

Madonna Nobel	West Virginia University	MS	2017 (Expected)
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Awards & Fellowships

SAMSI Postdoctoral Research Fellowship	2015
SUNY Graduate Fellowship	2010
Phi Beta Kappa	2010
<i>Bucknell University Chapter</i>	
Pi Mu Epsilon	2008
<i>Mathematics Honor Society, Bucknell University Chapter</i>	
William Bucknell Scholarship	2008
The President's Award for Distinguished Academic Achievement	2007
Alpha Lambda Delta	2006
<i>Freshman Honor Society, Bucknell University Chapter</i>	

Last Update

August 11, 2017