

Lucas K. Mentch

Assistant Professor
Department of Statistics
University of Pittsburgh
1807 Wesley W. Posvar Hall
230 S Bouquet Street
Pittsburgh, PA 15260

✉ lkm31@pitt.edu

🌐 stat.pitt.edu/person/lucas-mentch
lucasmentch.com

☎ (412) 624-8730

Education *Ph.D.*, Statistical Science 2015
Cornell University, Ithaca, NY, USA
Advisor: Giles Hooker
Dissertation: Ensemble Trees and CLTs: Statistical Inference in Machine Learning.

M.S., Statistical Science 2013
Cornell University, Ithaca, NY, USA

B.S., Mathematics 2010
Bucknell University, Lewisburg, PA, USA

Professional Positions Assistant Professor, University of Pittsburgh 2015 - Present
(On leave 2015 - 2016)
Postdoctoral Researcher, SAMSI/NC State 2015 - 2016
Research Assistant, Cornell University 2013 - 2015
Teaching Assistant, Cornell University 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 * *Graduate Student*
** *Undergraduate Student*

Oliver Lindhiem, Isaac T. Petersen, **Lucas Mentch**, and Eric A. Youngstrom. (2018+). "The Importance of Calibration in Clinical Psychology." *Assessment*. In Press.

Giles Hooker and **Lucas Mentch**. (2018). "Bootstrap bias corrections for ensemble methods." *Statistics and Computing*, 28(1), 77-86.

Lucas Mentch and Giles Hooker. "Formal hypothesis tests for additive structure in random forests." *Journal of Computational and Graphical Statistics*. (2017): 1-9.

Mahya Mehrmohamadi*, **Lucas Mentch**, Andrew Clark, and Jason Locasale. (2016). "Integrative modelling of tumour DNA methylation quantifies the contribution of

metabolism.” *Nature communications*, 7, 13666.

Giles Hooker and **Lucas Mentch**. “Comments on: *A Random Forest Guided Tour*.” *TEST*. **25**(2), pp. 254-260, 2016.

Lucas Mentch and Giles Hooker. “Quantifying Uncertainty in Random Forests via Confidence Intervals and Hypothesis Tests.” *The Journal of Machine Learning 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. “Association Does not Imply Discrimination: Flawed Analyses that Lead to Misdiagnoses and Wrongful Convictions.” *Handbook of Forensic Statistics*. Chapman & Hall / CRC Handbooks of Modern Statistical Methods. Eds David Banks, Karen Kafadar, and David Kaye. *Under Review*.

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

Robin Richter*, Carsten Gottschlich, **Lucas Mentch**, Duy H. Thai, and Stephan Huckemann. “A Quality Estimator for Fingerprints and its Validation Scheme.” *Under Review at IEEE Transactions on Information Forensics & Security*.

In Progress

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

“Statistical Inference on Tree Swallow Migration using Random Forests.” *with Timothy Coleman, Dan Fink, Frank La Sorte, David Winkler, Giles Hooker, and Wesley Hochachka*.

“Investigating Racial Bias in Recent Police Shootings.”

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

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

Conference Publications, Technical Reports & OpEds

Kim Beals, Karen A. Keenan, Nicholas J. Kissel**, **Lucas Mentch**, Wuxin Yang*, Bradley C. Nindl, and Qi Mi. “Prediction of Lower Extremity Musculoskeletal Injuries for Naval Special Warfare Operators: A Machine Learning Approach.” *Medicine and Science in Sports and Exercise*, Volume 50:5 Supplement. *Presented at: World Congress on Exercise is Medicine and World Congress on the Basic Science of Muscle Hypertrophy and Atrophy of the American College of Sports Medicine.* Minneapolis, MN, June 1, 2018.

Nicholas J. Kissel** and **Lucas Mentch**. “The Role of HbA1c in Hospital Readmission of Diabetic Patients.” *Presented at the ACC Meeting of the Minds Conference.* Boston College University, Chestnut Hill, MA, April 6-8, 2018.

Zachary Fulker**, Tyler Folta*, and **Lucas Mentch**. “Investigation of Advanced NBA Metrics.” *Carnegie Mellon University Sports Analytics Conference.* Abstract Accepted. October 28, 2017.

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

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.

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

Joint Statistical Meetings, Invited Session	August 2018
Department of Mathematics, Indiana University of Pennsylvania	March 2018
Department of Biostatistics, University of Pittsburgh	March 2018
Banff International Research Station	January 2018
CMStatistics, University of London, Invited Session	December 2017
Department of Industrial Engineering, University of Pittsburgh	September 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

co-I: NIH R01EB025024, 9/2017-6/2020: “QuBBD: Statistical & Visualization Methods for PGHD to Enable Precision Medicine”, \$917,806 (\$149,788), with Arlene Chung & David Gotz (University of North Carolina at Chapel Hill), Nils Gehlenborg & Kimberly Glass (Harvard University).

PI: NSF DMS-1712041, 9/2017-8/2020: “Collaborative Research: Statistical Inference Using Random Forests and Related Methods”, \$335,078 (\$119,802), with Giles Hooker (Cornell University).

PI: dB-SERC Course Transformation Award, 8/2017-7/2018. “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 sim-

ulation, 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

- ACM SIGKDD 2018 Program Committee Member: Research Track
- NSF Reviewer & Panel Member: Division of Mathematical Sciences, Statistics (Feb. 2017)
- Senior Faculty Hiring Committee: Department of Statistics, University of Pittsburgh (2017-2018)
- NSF Reviewer & Panel Member: Graduate Research Fellowship Program (Jan. 2017)
- 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
- ACM SIGKDD 2016 Program Committee Member: Research Track

- 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 (4), Biometrika (2), ESAIM Probability & Statistics (2), Handbook of Forensic Statistics (Chapter Review), Journal of Computational and Graphical Statistics, Journal of Machine Learning Research (7), Statistical Analysis and Data Mining (2), Statistics and Public Policy, SIGKDD (10)

Students

Role: Thesis Advisor

Timothy Coleman	University of Pittsburgh	PhD	2021 (Expected)
Wei Peng	University of Pittsburgh	PhD	2020 (Expected)
Jacob Leisey-Bartsch	University of Pittsburgh	PhD	2021 (Expected)

Role: Committee Member

Madonna Nobel	West Virginia University	MS	2018 (Expected)
---------------	--------------------------	----	-----------------

Role: Research Advisor

Tyler Folta	University of Pittsburgh	MS	2018 (Expected)
Zachary Fulker	University of Pittsburgh	BS	2018 (Expected)
Nicholas Kissel	University of Pittsburgh	BS	2018 (Expected)

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

February 19, 2018