Curriculum Vitae
Brian S Caffo

Personal information

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Summary

Brian Caffo, PhD is a professor in the Department of Biostatistics with a secondary appointment in the Department of Biomedical Engineering at Johns Hopkins University. He graduated from the University of Florida Department of Statistics in 2001. He has worked in statistical computing, statistical modeling, computational statistics, multivariate and decomposition methods and statistics in neuroimaging and neuroscience. He led teams that won the ADHD 200 prediction competition and placed 12th in the large Heritage Health competition. He co-directs the SMART statistical group. With other faculty at JHU, he created and co-directs the Coursera Data Science Specialization, a 10 course specialization on statistical data analysis. He has co-directs the JHU Data Science Lab, a group dedicated to open educational innovation and data science. He is the former director of the Biostatistics graduate programs and admissions committees. He is currently the co-director of the Johns Hopkins High Performance Computing Exchange and president-elect of the Bloomberg School of Public Health faculty senate.

Education and training

2006 NIH K25 training grant “A mentored training program in imaging science” emphasizing research and coursework in medical imaging

2001 PhD in statistics from the University of Florida Department of Statistics under Professor James Booth; thesis title “Candidate sampling schemes and some important applications”

1998 MS in statistics from the University of Florida Department of Statistics

1995 BS in mathematics and statistics from the University of Florida’s Departments of Mathematics and Statistics.

Professional experience

Official appointments

2019 **-** Secondary appointment, Department of Biomedical Engineering, Johns Hopkins University

2019 **-** Co-director, Johns Hopkins High Performance Computing Exchange (JHPCE)

2016 - Faculty member, Kavli Neuroscience Discovery Institute

2017 - Faculty member, Malone Center for Engineering and Healthcare

2014 - Co-founding member, Johns Hopkins Data Science Lab

2011 - Founding co-director, SMART research group

2013 - Full professor, Department of Biostatistics, Johns Hopkins University

2007-2013 Associate professor, Department of Biostatistics, Johns Hopkins University

2001-2007 Assistant professor, Department of Biostatistics, Johns Hopkins University

1996-1999 Research assistant for professor Alan Agresti, Department of Statistics, University of Florida

1996, 1999 Intern / database programmer, the Pediatric Oncology Group Statistical Office

Extended visits to other departments

May - August 2006 Department of Biostatistics, Emory University

December - May 2006 Center for Imaging Science, Johns Hopkins University

June 2004 Carnegie Mellon, Department of Statistics

Professional activities

Review of research proposals:

- NIH/NCI 2008; ad hoc study section member for *Quick Trials on Imaging and Image-guided Intervention*
- NIH/BMRD 2009; ad hoc study section member for *the Biostatistical Methods and Research Design Study Section*
- NIH/NIMH 2009 and 2010; ad hoc study section member for *Interventions Committee for Adult Disorders*
- NIH 2011; ad hoc study section member for *Special Emphasis Panel on Epidemiology*
- NIH 2013; invited attendee, BD2K Workshop on Enhancing Training for Biomedical Data
- NIH 2013 x2; ad hoc study section member for *Interventions Committee for Disorders Involving Children and Their Families*
- NIH 2014; ad hoc study section member for *Special Panel on Statistical Modeling*
- NIH/BD2K 2015; ad hoc study section member for *BD2K Short Courses and Open Resource R25*
- NIH/NIMH 2016; ad hoc study section member for *Interventions/Biomarkers*.
- NIH/NIMH 2016; ad hoc study section member for *Research Education Programs*
- NIH/NIMH 2017; ad hoc study section member for *Interventions/Biomarkers*
- NIH 2017; ad hoc study section member for *Neural Basis of Psychopathology, Addictions and Sleep Disorders*
- NIH 2018; ad hoc study section member of *NeuroNEXT 2*

NIH 2018; ad hoc study section member of *Healthcare Delivery and Methodologies*

Professional society positions:

Publications Officer for the Biometrics Section of the American Statistical Association 2005, 2006

Founding member (2010) and secretary (2010-) for the Statistics in Imaging ASA section.

Organizer: Biometrics invited session: Statistical Methodology for the Analysis of Sleep Studies, JSM 2007

Organizer: Biometrics invited session: Statistical Methods for Complex Functional Biological Signals, ENAR 2011

Organizer: Contributed session: Novel developments in statistical blind source separation and independent components analysis, ENAR 2012

Session chair: JSM (2003, 2006, 2007), ENAR (2002, 2007), SAMSI (2013)

Editorial activities

2006-2008 Associate editor Computational Statistics and Data Analysis

2008-2010 Associate editor for the Journal of the American Statistical Association

2009-2012 Associate editor for the Journal of the Royal Statistical Society Series B

2010-2012 Associate editor for Biometrics

Book reviewer for: Springer-Verlag, Wiley

Human Brain Mapping 2009 abstract referee

Senior program committee member for the Fourteenth International Conference on Artificial Intelligence and Statistics

Guest associate editor for Frontiers in Neuroscience special issue on Brain Imaging Methods

Honors and awards

1998 William S. Mendenhall Award

1999 Anderson Scholar/Faculty nominee for the University of Florida CLAS

2001 University of Florida CLAS Dissertation Fellowship

2001 University of Florida Statistics Faculty Award

2002 Johns Hopkins Faculty Innovation Award

2006 Johns Hopkins Bloomberg School of Public Health AMTRA award

2008 Johns Hopkins Bloomberg School of Public Health Golden Apple teaching award

2011 Leader and organizer of the declared winning entry of the 2011 ADHD200 prediction competition

2011 Presidential Early Career Award for Scientists and Engineers (PECASE, 2010, awarded in 2011); "The highest honor bestowed by the United States government on science and engineering professionals in the early stages of their independent research careers"

2013 Organizer of the Kaggle/Heritage Health Prize team receiving 14th place out of 1,979 teams

2014 Named a Fellow of the American Statistical Association

2015 Special Invited Lecturer, European Meeting of Statisticians

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Bibliography

Research Articles

[1] Bae S, Massie A, Caffo B, Jackson K, and Segev D. Machine learning to predict transplant outcomes: Helpful or hype? *To appear in Transplant International*, 2020.

[2] Zhao Y, Wang B, Mostofsky S, Caffo B, and Luo R. Covariate assisted principal components regression for covariance matrix outcomes. *Accepted in Biostatistics*, 2020.

[3] Charkhchi P, Wang B, Caffo B, and Yousem D. Bias in neuroradiology peer review: Impact of a "ding" on "dinging" others. *American Journal of Neuroradiology*, 40(1):19–24, 2019.

[4] de Aguiar V, Zhao Y, Faria A, Ficek B, Webster K, Wendt H, Wang Z, Hillis A, Onyike C, Frangakis C, Caffo B, and Tsapkini K. Brain volumes as predictors of tDCS effects in primary progressive aphasia. *To appear in Brain and Language*, 2019.

[5] Lindquist M, Geuter S, Wager T, and Caffo B. Modular preprocessing pipelines can reintroduce artifacts into fMRI data. *Accepted in Human Brain Mapping*, 2019.

[6] Liu C, Padhy S, Ramachandran S, Wang V, Efimov A, Bernal A, Shi L, , Vaillanti M, Ratnanather T, Faria A, Caffo B, Albert M, and Miller M. Using deep siamese neural networks for detection of brain asymmetries associated with Alzheimer's disease and mild cognitive impairment. *Accepted in Magnetic Resonance Imaging*, 2019.

[7] Mejia A, Nebel M, Wang Y, Caffo B, and Guo Y. Template independent component analysis: Targeted and reliable estimation of subject-level brain networks using big data population priors. *To appear in the Journal of the American Statistical Association*, 2019.

[8] Muschelli J, Fortin J, Gherman A, Whitcher B, Clayden J, Caffo B, and Crainiceanu C. Neuroconductor: an r platform for medical imaging analysis. *Biostatistics*, 2019.

[9] Ngufor C, Van Houten H, Caffo B, Shah N, and McCoy R. Mixed effect machine learning: A framework for predicting longitudinal change in hemoglobin A1c. *Journal of biomedical informatics*, 89:56–67, 2019.

[10] Ye C, Albert M, Brown T, M B, Hsu J, Ma T, Caffo B, M M, Mori S, and Oishi K. Extended multimodal whole-brain anatomical covariance analysis: detection of disrupted correlation networks related to amyloid deposition. *Heliyon*, 5, 2019.

[11] Zhao Y, Linduist M, and Caffo B. *To appear in Computational Statistics and Data Analysis*, 2019.

[12] Ficek B, Wang Z, Zhao Y, Webster K, Desmond J, Hillis A, Frangakis C, Faria A M, Caffo B, and Tsapkini K. The effect of tDCS on functional connectivity in primary progressive aphasia. *NeuroImage: Clinical*, 19:703–715, 2018.

[13] Mejia A, Nebel M, Barber A, Choe A, Pekar J, Caffo B, and Lindquist M. Improved estimation of subject-level functional connectivity using full and partial correlation with empirical bayes shrinkage. *NeuroImage*, 172:478–491, 2018.

[14] Chen S, Liu K, Yang Y, Xu Y, Lee S, Lindquist M, Caffo B, and Vogelstein J. An m-estimator for reduced-rank system identification. *Pattern recognition letters*, 86:76–81, 2017.

[15] Coughlin J, Wang Y, Min I, Bienko J, Ambinder E, Xu X, Peters M, Dougherty J, Vranesic M, Lee M, Cottrell C, Sair H, Sawa A, Munro C, Nowinski C, Dannals R, Lyketsos C, Kassiou M, Guilarte T, Smith G, Caffo B, Mori S, and Pomper M. Imaging of glial cell activation and white matter integrity in brains of active and recently retired National Football League players. *JAMA neurology*, 74(1):67–74, 2017.

[16] Jha A, Mena E, Caffo B, Ashrafinia S, Rhamim A, Frey E, and Subramanian R. Practical no-gold-standard evaluation framework for quantitative imaging methods: application to lesion segmentation in positron emission tomography. *Journal of Medical Imaging*, 4(1):011011, 2017.

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[18] Mejia A, Nebel M, Eloyan A, Caffo B, and Lindquist M. Pca leverage: outlier detection for high-dimensional functional magnetic resonance imaging data. *Biostatistics*, 18(3):521–536, 2017.

[19] Oliver C, Crainiceanu C, Ogburn E, Caffo B, Wager T, and Martin M. High-dimensional multivariate mediation with application to neuroimaging data. *Biostatistics*, 19(2):121–136, 2017.

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[58] Shou H, Eloyan A, Nebel M, Pekar J, Mostofsky S, Caffo B, Lindquist M, and Crainiceanu C. Shrinkage prediction of seed-voxel brain connectivity using resting-state fMRI. *Neuroimage, PMCID: PMC4247825*, 102:938–944, 2014.

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Letters and Editorials

[170] Kang J, Caffo B, and Liu H. Recent advances and challenges on big data analysis in neuroimaging. *Frontiers in Brain Imaging Methods*, 2016.

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Other publications

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[176] Kang J, Caffo B, and Liu H. Recent advances and challenges on big data analysis in neuroimaging. *Frontiers in Neuroscience*, 10, 2016.

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Software

Software and subroutines relevant to my research can be downloaded at

`http://www.bcaffo.com`
`http://www.smart-stats.org`

The software `exactLoglinTest` is listed at the Comprehensive R Archive Network.
github repository is at `github.com/bcaffo`.

Curriculum Vitae
Brian S. Caffo
Part II

Teaching

Advisees

2005 PhD Leena Choi, Johns Hopkins Biostatistics, *Modelling biomedical data and the foundations of bioequivalence*; assistant professor, Vanderbilt University, Department of Biostatistics

2006 ScM Lijuan Deng, Johns Hopkins Biostatistics, *Spline-based curve fitting with applications to kinetic imaging*; researcher, Harvard University

2006 MS Bruce Swihart, University of Colorado Biostatistics, *Quantitative characterization of sleep architecture using multi- state and log-linear models* (jointly advised with Naresh Punjabi and Gary Grunwald); PhD student, Johns Hopkins Department of Biostatistics

2007 MPH Jeong Yun, Johns Hopkins Bloomberg School of Public Health, *Incidence of hypertension in high risk groups of the Sleep Heart Health Study*

2008 PhD Xianbin Li, Johns Hopkins Biostatistics, *Modeling composite outcomes and their component parts*; researcher, US Food and Drug Administration

2008 PhD Shu-Chih Su, Johns Hopkins Biostatistics, *Structure/function relationships in the analysis of anatomical and functional neuroimaging data*; researcher, Merck Pharmaceuticals

2010 ScM John Muschelli, Johns Hopkins Biostatistics, *An iterative approach to hemodynamic response function temporal derivatives in statistical parametric mapping for functional neuroimaging*; PhD student, Johns Hopkins Department of Biostatistics

2011 PhD Haley Hedlin, Johns Hopkins Biostatistics, *Statistical methods for inter-subject analysis of neuroscience data*; post doctoral student, Department of Mathematics and Statistics, University of Massachusetts

2011 PhD Bruce Swihart, Johns Hopkins Biostatistics, *From individuals to populations: application and insights concerning the generalized linear mixed model*; post doctoral student, Johns Hopkins University Department of Biostatistics

2012 PhD Jeff Goldsmith (co-advised with primary advisor Ciprian Crainiceanu), *Cross-Sectional and longitudinal penalized functional regression*; assistant professor, Department of Biostatistics, Columbia University

2012 MPH Tiziano Marovino, *The concurrent validity of musculo-skeletal ultrasound imaging in comparison to MRI for detecting rotator cuff tears in the shoulder when performed in a physical therapy setting*

2013 ScM Rawan Al-Lozi, *An evaluation of statistical modeling methods for predicting recovery time from post-traumatic amnesia following moderate or severe traumatic brain injury in children*.

2013 PhD Shanshan Li (co-advised with primary advisor Mei-Cheng Wang) *Statistical Methods for Evaluating Diagnostic Accuracy of Biomarkers*; assistant professor Indiana University-Purdue University Indianapolis Biostatistics.

2013 MHS Xiaoqiang Xu, *Parallel Voxel Level Anything*

2015 PhD Juemin Yang *Statistical Methods for Brain Imaging and Genomic Data Analysis*; researcher Citibank

2015 PhD Shaojie Chen *Statistical Methods to Analyze Massive High-Dimensional Neuroimaging Data.*

2015 PhD Fang Han (Co-advised with Han Liu) *Large-scale nonparametric and semiparametric inference for large complex and noisy datasets*

2016 PhD Chen Yue (co-advised with Vadim Zipunnikov) *Generalizations, extensions and applications for principal component analysis.*

2016 PhD Amanda Mejia (co-advised with primary advisor Martin Lindquist) *Statistical Methods for Functional Magnetic Resonance Imaging Data.*

2016 PhD Aaron Fisher *Methods for High Dimensional Analysis, Multiple Testing, and Visual Exploration*

2016 PhD Huitong Qiu *Statistical Methods and Theory for Analyzing High Dimensional Time Series*.

2020 PhD Zeyi Wang *Statistical Analysis of Functional Connectivity in Brain Imaging: Measurement Reliability and Clinical Applications*

2020 MSE Luchao Qi *Associations between Body Mass Index (BMI) and Physical Activity: National Health and Nutritional Examination Survey (NHANES) 2005-2006*

Postdoctoral advisees

2009-2012 Vadim Zipunnikov (co-advising with primary advisor Ciprian Crainiceanu)

2010-2013 Ani Eloyan (co-advising with Ciprian Crainiceanu)

2011-2013 Seonjoo Lee (co-advising with primary advisor Dzung Pham)

2017-2020 Yi Zhao (co-advising with Stewart Mostofsky and Martin Lindquist)

2017-2020 Heather Shappell (co-advising with Martin Lindquist and Jim Pekar)

Advisees in progress

Huan Chen

Bohao Tang

Bingkai Wang (Primary advisor Michael Rosenblum)

Interns

2013 Nick Carchedi, Ethan Schwartz, Lauren Williams

2010 Katie Phelan

K award mentees

Ying Cao, Madhav Goyal, Daniel Harrison, Abhinav Kumar Jha, Saman Nazarian, Sheryl Rimrodt, Adam Spira, Stacy Suskauer

Academic advisees

Doctoral students Xianbin Li, Yun Lu, Huitong Qiu

ScM students Lijuan Deng

MHS students Nan Guo, Juleen Lam, Fengmin Zhao, Jiemin Ma, Carolyn Scrafford

MPH students Hana Lee, Tiziano Marovino, Sri-sujanthy Rajaram, Elizabeth Wheler, Jeong Yun

Master's thesis reader

2014 Clair Rock (U MD Epi)

2012 Rawan Al-Lozi, Francisco Leva

2011 Jiawei Bai (Biostat), Pohan Chen (Biostat)

2010 Ben Althouse (Biostat)

2009 Catherine Thomas (Biostat), Ros Reside (Epi)

2006 Ricardo Carvalho (GTPCI), Bruce Swihart (UC Denver Biostatistics)

2005 Brendan Click (Biostat), Jennifer Ryea (Biostat)

2004 Meh Fen Yeh (Biostat)

Preliminary oral participation

2020 Huan Chen (Biostat), Bohao Tang (Biostat)

2019 Vikram Chandrashekhar (BME, GBO), Lacey Etzkorn (Biostat)

2018 Joshua Cappe (AMS), Celia Carp (PFRH), Bingkai Wang (Biostat), Zeyi Wang (Biostat)

2017 Runze Tang (AMS)

2016 Eugenie Shieh (GTPCI)

2015 John Muschelli (Biostat)

2014 Hiwot Hiruy (GTPCI)

2014 Shaojie Chen (Biostat), Aaron Fisher (Biostat), Huitong Qiu (Biostat)

2013 Fang Han (Biostat), Sarah Khasawinah, Gwenyth Lee (IH), Jenna Riis (PFRP), Chen Yue (Biostat)

2012 Andrew Pike (MMI), Tom Prior (Biostat), Haochang Shou (Biostat), Zhenke Wu (Biostat), Juemin Yang (Biostat)

2011 Melania Bembea (GTPCI), Yifang Chuang (MH), Jenna Krall (Biostat), Shanshn Li (Biostat), Saman Nazarian (Epi), Adrienne Tin (Epi)

2010 Bradley Foerster (GTPCI), Jeff Goldsmith (Biostat), Attia Goheer (Epi), Xiaoxu Kang (BME), Maggie Kuo (BME), Yan Ning (Biostat), Carolyn Scrafford (IH), Yajing Yang (BME)

2009 Vikram Aggarwal (BME)

2008 Soumyadipta Acharya (BME), Haley Hedlin (Biostat), Alan Huang (BME), Yang Hui (HPM) , Jun Hua (EE), Zhiliang Ma (AMS), Gila Neta (Epi), Adam Stakenas (AMS), Bruce Swihart (Biostat), James Williams (MH),

2007 Gabriel Lai (Epi), Issel Lim (BME), Greta Mok (EHS), Erin Rand-Giovanetti (HPM), Hilary Schwandt (PFH), Kenneth Shermock (HPM), Stella Yi (Epi)

2006 Ying Cao (GTPCI), Yu-Jen Chen (Biostat), Alison Laffan (Epi), Taek Soo Lee (EHS), Xianbin Li (Biostat), Shu-Chih Su (Biostat)

2005 Leslie Cromwell (HPM), Bin He (EHS)

2004 Kenneth Brenneman (EHS), Elizabeth Johnson (Biostat), Rongheng Lin (Biostat)

2003 Yi Huang (Biostat), Lin Zhang (Epi)

2002 Dongmei Liu (Biostat), Samuel Mills (PFH)

Final oral participation

2020 Michelle Hawks Cuellar (PFRH), Celia Karp (PFRH), Zeyi Wang (Biostat),

2019 Courtenay Holscher (GTPCI), Eugenie Shieh (GTPCI), Ethel Weld (GTPCI)

2018 Roxanne Mirabal-Beltran (PFRH)

2016 Yue Chen (Biostat), Aaron Fisher (Biostat), Amanda Mejia (Biostat), John Muschelli (Biostat), Huitong Qiu (Biostat)

2015 Hiwot Hiruy (GTPCI)

2014 Shaojie Chen (Biostat), Juemin Yang (Biostat)

2014 Sarah Kashwinah (MH), Jenna Krall (Biostat), Haochang Shou (Biostat), Zhenke Wu (Biostat)

2013 Bradley Forster (GTPCI), Shanshan Li (Biostat), Carolyn Scrafford (IH)

2012 Yifang Chang (MH), Nan Guo (Epi), Jing Hua (Epi), Gwenyth Lee (IH), Allan Massie (Epi), Caroline Min (PFHS), Saman Nazarian (Epi)

2011 Haley Hedlin (Biostat), Jennifer Schrack (Epi), Jennifer Feder (Biostat), Bruce Swihart (Biostat)

2009 Kenneth Brenneman (EHS), Greta Mok (EHS), Alison Mondul (Epi) James R Williams (MH)

2008 Ying Cao (GTPCI), Ingrid Frieberg (IH), Alison Laffan (Epi), Xianbin Li (Biostat), Chi Liu (EHS), Shu-Chih Su (Biostat)

2007 Leslie Conwell (HPM), Yue Yin (Biostat)

2006 Hongfei Guo (Biostat), Bin He (EHS), Bruce Swihart (UC Denver Master's thesis defense)

2005 Leena Choi (Biostat), Mike Griswold (Biostat), Dongmei Liu (Biostat), John Majnu (AMS), Susan Milner (2005)

2004 Samuel Mills (PFH), Judy Ng (HPM), Lin Zhang (Epi)

Classroom Instruction

Johns Hopkins

2001-2005 Primary instructor, Advanced Statistical Computing Biostatistics PhD elective 10-20 students

2003-2004 Primary instructor, Advanced Methods in Biostatistics IV Biostatistics PhD and ScM core requirement 10-20 students

2003-2004 Guest lecturer, Advanced Methods in Biostatistics II Biostatistics PhD and ScM core requirement (Two weeks of lectures on linear mixed models) 10-20 students

2003-2008 Guest lecturer, Computing orientation and student computing club

2003-2004, 2008 Lead instructor, Statistical Computing Biostatistics elective 20-30 students

2004-2005 Primary instructor, Advanced Methods in Biostatistics III Biostatistics PhD and ScM core requirement 20 students

2005-2010 Primary instructor, Methods in Biostatistics I Biostatistics PhD, ScM core requirement 60 students

2005-2010 Primary instructor, Methods in Biostatistics II Biostatistics PhD, ScM core requirement 60 students

2008 Primary instructor, Medical Imaging Statistics, Biostatistics PhD and ScM elective lectures 10 students

2010-2017 Guest lecturer, Public Health Perspectives Biostatistics Module

2011-2014 Primary instructor, Advanced Methods in Biostatistics I and II, Biostatistics PhD requirement 15 students

2013 Guest instructor, ICTR training program

2015-2018 Primary instructor, Advanced Linear Models I and II

2019 Primary instructor, Data Science for Biomedical Engineering

Open Education

Coursera

Mathematical Biostatistics Boot Camp - 7 week course

Mathematical Biostatistics Boot Camp 2 - 7 week courses

Advanced Linear Models for Data Science 1: Least Squares

Advanced Linear Models for Data Science 2: Statistical Linear Models

Data Specialization (with Roger Peng and Jeff Leek); 9 one month classes run monthly plus a capstone project class; primary instructor for:

- Statistical Inference
- Regression Models

Developing Data Products

Executive Data Science Specialization (with Roger Peng and Jeff Leek); 4 one month classes plus a capstone project

PI (roll of executive producer, non-instructor) for the BD2K R25 Genomic Data Science Specialization, fMRI 1 and 2 (Lindquist / Wager), Neurohacking in R (Crainiceanu, Sweeney, Muschelli), Neuroscience for Neuroimaging (Baker)

Leanpub (e-books)

Statistical Inference

Regression Models

Developing Data Products

Advanced Linear Models for Data Science

Methods in Biostatistics with R (with John Muschelli and Ciprian Crainiceanu)

Executive Data Science (with Roger Peng and Jeff Leek)

Short courses and hackathons

2011 ENAR Statistical methods for new high throughput technological measurements; with Ciprian Crainiceanu

2015 Data Science Hackathon Co-organizer with Leah Jager, Jeff Leek and Roger Peng. Funded by the NIH

2017-2019 quarterly MRICloud and R Johns Hopkins tutorial series

Other

swirl: Mentored project by Nick Carchedi intiated during his internship

Infinity University: leader and executive producer; in progress early childhood data science education; co-lead with Jessica Crowell (director) and Michael Orzekowski (script writer, voice talent)

Course notes for Biostatistics 140.651-2 listed on the Johns Hopkins Open Courseware project

Primary instructor, TA, and tutor for introductory and intermediate statistics and remedial mathematics courses at the University of Florida; primary instructor course enrollments ranged from 20 to 400 students

Created a statistics course for the McNair's Scholar program, a minority recruitment and retention program at the University of Florida.

Research support

Principal investigator or Co-PI

8/27/12 - 8/26/14 Johns Hopkins Brain Science Institute *The Center for Quantitative Neuroscience: a core for population neuroanalytics and translational systems neuroscience* as part of the RFA *Traumatic brain injury: mechanisms and treatment*.

09/30/2010-8/31/2014 NIH NIBIB R01 EB012547 *Statistical methods for hierarchical large n large p problems* Modern observational data is often longitudinal or multilevel functional biological signals. We propose a foundational approach for the analysis of such data, including scalable computing to next-generation data sets.

05/01/06-04/30/09 NIH NIBIB K25 EB003491 *A mentored training program in imaging science* The aims of this proposal are to accelerate EM based iterative reconstruction algorithms and to theoretically and empirically investigate intra-iteration smoothing. All of the developed algorithms will be extensively tested using Monte Carlo and actual patient data.

12/01/14-11/30/17 NIH R25EB020378 *Big Data Education for the Masses: MOOCs, Modules and Intelligent Tutoring Systems* We propose two Massive Open Online Course series in neuroimaging and genomic Big Data analysis as well as the creation of modular Big Data statistics content and content creation for an intelligent tutoring system.

09/01/11- 08/31/16 NIH NIBIB P41 EB015909 *Resource for quantitative functional MRI* R01 component of a P41 grant. R01 PIs Caffo/Pekar, P41 PI Van Zijl. The work in this subaim will consider research in statistical models for the analysis of functional MRI-based connectivity.

3/14/2012-3/14/2014 Amazon AWS Research Grant for Cloud Development of Neuroimaging Software.

Co-investigator

Available by request.

Academic service

Major committee involvement

JHSPH Faculty senate president-elect 2019-2020

JHSPH Honors and Awards committee 2017-2019

JHSPH Faculty Innovation Fund grant referee 2017-

BME faculty hiring committee 2016

Biostat faculty hiring committee 2016

Malone Center Steering Committee 2016 -

Biostatistics admissions committee member 2002 - 2009, 2010 -

Biostatistics co-director of the graduate program 2010 - 2012

Biostatistics director of the graduate program 2012 - 2016

Biostatistics information technology committee member 2001 - 2009

Biostatistics seminar coordinator 2001 - 2002

Co-director Biostatistics/Epidemiology MPH concentration 2008 - 2010

Co-organizer Junior Faculty Meetings 2003

Committee on Affirmative Action member 2007 - 2010

Faculty Senate representative 2002 - 2004

MPH Admissions Committee member 2009 - 2011

MPH Executive Board member 2009 - 2011

Example other service work

Biostatistics faculty representative to CEPH site visit 2006

Biostatistics second year examination committee 2003-2005

Biostatistics self study committee 2007

Developmental Disabilities Task Force representative 2007-2009

Member of cancer/epi search committee 2008

Member of ad hoc committee to review faculty hiring for the Committee on Affirmative Action 2008

Johns Hopkins statistical consulting

Leader of the IDRC biostatistics consulting core for Kennedy Krieger

Member of the CTSA biostatistics consulting core

Member of the DSMB for *Effect of n-CPAP Treatment on Glycemic Control in patients with Type 2 Diabetes Mellitus and Obstructive Sleep Apnea GLYCOSA*

External statistical consulting

d8alab 2016, co-founder and consultant

Sapphire consulting, July 2008, October 2010, January 2011

Creative Business Strategies International, July 2008

Pfizer Pharmaceuticals, one year research contract (PI Dr. Bruno Jedynak), 2011

Merck Pharmaceuticals, one year research contract (PI Dr. Ciprian Crainiceanu), 2011

AgeneBio, October 2011

Presentations

Invited seminars or seminars with peer reviewed applications

2001 *ESUP accept/reject sampling*, North Carolina State University Department of Statistics, Raleigh, North Carolina.

Monte Carlo exact conditional hypothesis tests for loglinear models, AT&T Labs, Florham Park, New Jersey.

Monte Carlo exact conditional hypothesis tests for loglinear models, Fifth Workshop on Groebner Bases and Statistics (GROSTAT V), Tulane University, New Orleans, Louisiana.

Monte Carlo exact conditional hypothesis tests for loglinear models, Johns Hopkins University Department of Biostatistics, Baltimore, Maryland.

Monte Carlo exact conditional hypothesis tests for loglinear models, University of Michigan Department of Statistics, Ann Arbor, Michigan.

Monte Carlo exact conditional hypothesis tests for loglinear models, Ohio State University Department of Statistics, Columbus, Ohio.

2002 *Model selection and fitting for empirical Bayes analysis of microarray data*, Joint Statistical Meetings New York, New York.

Ascent-based MCEM, Yale University Division of Biostatistics, New Haven, Connecticut.

ESUP accept/reject sampling, Johns Hopkins University Department of Biostatistics, Baltimore Maryland.

2003 *A tour of biostatistics*, Drexel University Department of Mathematics, Philadelphia, Pennsylvania.

ESUP accept/reject sampling, Duke University Institute of Statistics and Decision Sciences, Durham, North Carolina .

Missing data and air pollution, Drexel University Department of Mathematics, Philadelphia, Pennsylvania.

Monte Carlo conditional analysis for loglinear and logistic models, Joint Statistical Meetings, San Francisco, California.

Monte Carlo conditional analysis for loglinear and logistic models, Statistics and Applied Mathematical Sciences Institute, Workshop on Exact Categorical Methods, Research Triangle Park, North Carolina

2004 *Multilevel models with applications in genomics*, University of Minnesota Department of Statistics, Minneapolis, Minnesota.

Ascent-based MCEM, Cornell University Department of Statistics, Ithaca, New York.

2005 *Ascent-based MCEM*, Johns Hopkins University Department of Applied Math and Statistics, Baltimore, Maryland.

ESUP accept/reject sampling, Pennsylvania State Department of statistics, University, College Station, Pennsylvania.

A tutorial on statistical power calculations, Johns Hopkins University Center for Mind Bind Research, Baltimore, Maryland.

Discussion of: characterizing experimentally induced neuronal processing by DuBois Bowman, Department of Biostatistics Grand Rounds, Johns Hopkins University, Department of Biostatistics.

Quantitative characterization of chloroquine and aspirin in the male genital tract, with Craig Hendrix, Johns Hopkins Division of Clinical Pharmacology, Baltimore, Maryland.

2006 *Ascent-based MCEM*, Department of Statistics, Carnegie Mellon University, Pittsburgh, Pennsylvania.

Is MRI based structure a mediator for lead's effect on cognitive function, MICE meeting, Welch Center for Prevention, Epidemiology and Clinical Research, Baltimore, Maryland.

2007 *A Bayesian hierarchical framework for spatial modeling of fMRI data*, Center for Statistics in the Social Sciences, University of Washington, Seattle, Washington.

A case study in pharmacologic imaging using single photon emission computed tomography, UMBC Prob/Stat Day, Baltimore, Maryland.

Age, lead exposure and neuronal volume, ENAR, Atlanta, Georgia.

Generalized linear mixed model analysis of multistate sleep transition data: the Sleep Heart Health Study, Joint Statistical Meetings, Salt Lake City, Utah.

Statistical methods for indirect estimation of physiological parameters: case studies in viral kinetics, Department of Statistics University of Minnesota, Minneapolis, Minnesota.

Statistical methods in functional medical imaging, Department of Biostatistics, University of Florida, Gainesville, Florida.

2008 *A Bayesian hierarchical framework for spatial modeling of fMRI*, Human Brain Mapping, Melbourne, Australia.

Conditional and marginal models for binary outcomes, Department of Statistics University of Minnesota, Minneapolis, Minnesota.

Lead exposure, neuronal volume and cognitive function, Department of Biostatistics University of Florida, Gainesville, Florida.

Non-linear curve fitting in the analysis of medical imaging data, Department of Biostatistics Grand Rounds, Johns Hopkins University, Baltimore, Maryland.

Pharmacologic imaging using principal curves in single photon emission computed tomography, ENAR, Arlington, Virginia.

Quantifying the hypnogram and sleep stage transitions: novel approaches and applications to sleep disorders, Annual Meeting of the Associated Professional Sleep Societies, Baltimore, Maryland.

Statistical methods for indirect estimation of physiological parameters: case studies in viral kinetics, Department of Biostatistics, Columbia University, New York, New York.

Statistical methods for indirect estimation of physiological parameters: case studies in viral kinetics, Department of Biostatistics, Emory University, Atlanta, Georgia.

Statistical methods for indirect estimation of physiological parameters: case studies in viral kinetics, Department of Biostatistics, Vanderbilt University, Nashville, Tennessee.

2009 *Non-linear curve fitting in the analysis of medical imaging data*, Center for Imaging Science, Department of Biomedical Engineering, Johns Hopkins University, Baltimore, Maryland.

Non-linear curve fitting in the analysis of medical imaging data, University of Pittsburgh, Department of Biostatistics, Pittsburgh, Pennsylvania.

Non-linear regression, an overview, Statistics Without the Agonizing Pain Series, Johns Hopkins University, Baltimore, Maryland.

On the analysis of multiple sleep hypnograms, International Statistical Institute, Durban, South Africa.

Statistical methods for studying connectivity in the human brain, International Workshop on Statistical Modeling, Ithaca, New York.

2010 *Functional principal components for high dimensional brain volumetrics*, International Workshop on Statistical Modeling, Glasgow, Scotland.

Statistical methods for evaluating connectivity in the human brain, ENAR, New Orleans, Louisiana.

Statistical methods for high dimensional imaging studies of populations, Department of Psychiatry and Behavioral Science, Johns Hopkins Bayview Medical Center, Baltimore, Maryland.

2011 *fMRI functional connectivity in subjects at high familial risk for Alzheimer's disease: new approaches to analysis*, Dementia Consortium, Johns Hopkins, Baltimore, Maryland

Indirect estimation of kinetic parameters in dual isotope single photon emission computed tomography studies of microbicide lubricants, ENAR, Miami, Florida.

Statistical methods for studying connectivity in the human brain, Division of Biostatistics, University of Maryland, Baltimore, Maryland.

Statistical methods for studying connectivity in the human brain, Department of Biostatistics, University of Washington, Seattle, Washington.

Statistical methods for studying connectivity in the human brain, Department of Statistics, Cornell University, Ithaca, New York.

Statistical methods for studying connectivity in the human brain, Dementia Consortium, Johns Hopkins, Baltimore, MD.

An overview of EEG research at Hopkins Biostatistics, Regional EEG/ERP Conference, Kennedy Krieger Institute, Baltimore, MD.

Statistical methods for evaluating human brain connectivity, Statistical Methods for Very Large Data Sets Conference, Baltimore, MD.

Statistical methods for evaluating human brain connectivity, The Brad Efron Honorary Symposium on Large-Scale Inference, Silver Springs, MD.

Statistical methods for evaluating human brain connectivity, ISDS, Duke University, Durham, NC.

2012 *Predicting neurological disorders using functional and structural brain imaging data*, ENAR, Washington DC.

Predicting neurological disorders using functional and structural brain imaging data, Department of Statistics, University of Virginia, Charlottesville, Va.

Panelist at the 2012 NIH/NIBIB training grantee meeting, National Institutes of Health, Bethesda, MD.

Resting state brain functional connectivity: progress, future challenges and data, SAMSI opening workshop on massive data, Raleigh, NC.

Statistical analysis of functional MRI resting state brain connectivity data, Departments of Statistics and Biostatistics, University of Wisconsin, Madison, Wisconsin

Statistical analysis of functional MRI resting state brain connectivity data, Departments of Biostatistics, Yale University, New Haven, Connecticut.

2013 *Large scale decompositions for functional imaging studies*, ENAR, Orlando, Florida.

Homotopic group ICA for resting state fMRI, SAMSI NDA workshop, Raleigh, North Carolina.

Analyzing neurological disorders using functional and structural brain imaging data, Department of Child and Adolescent Psychiatry, NYU, New York, New York.

Analyzing neurological disorders using functional and structural brain imaging data, Department of Statistics, Virginia Tech, Blacksburg Virginia.

Analyzing neurological disorders using functional and structural brain imaging data, Microsoft Research, Redmond, Washington.

2014 *Teaching statistics for the future: the MOOC revolution and beyond*, Division of Biostatistics, Washington University, Saint Louis, Missouri

Developmental Disorders and Neuroimaging: Tools, Results and Issues, ENAR, Baltimore, MD

Teaching statistics for the future: the MOOC revolution and beyond, Department of Epi and Biostat Grand Rounds, U of MD, Baltimore, MD

Teaching statistics for the future: the MOOC revolution and beyond, Dean's Lecture, Bloomberg School of Public Health, Baltimore, MD

Analyzing neurological disorders using functional and structural brain imaging data, ISBIS SLDM joint meetings, Durham, NC

Statistical methods for the study of human brain functional connectivity, JSM, Boston, MA

Panelists for *Great Expectations: Training Future Biostatisticians for Careers in Interdisciplinary Biomedical Research*, JSM, Boston MA

2015 *Analyzing neurological disorders using functional and structural brain imaging data*, University of Pennsylvania, Philadelphia, PA

Discussion of: Statistical Quantitative Magnetic Resonance Imaging by Dr Taki Shinohara, Johns Hopkins Department of Biostatistics, Baltimore, MD

2016 *Bar Codes, Fingerprints and Reproducibility in Functional and Structural Brain Imaging Data* , Maryland Neuroimaging Retreat, Baltimore, MD

Hypothesis Driven Research, Society for Neuroscience Webinar

EDA, NIH BD2K Training Program Webinar

2017 *Bar Codes, Fingerprints and Reproducibility in Functional and Structural Brain Imaging Data* , Department of Biostatistics, McGill University, McGill, Canada.

2018 *Bar Codes, Fingerprints and Reproducibility in Functional and Structural Brain Imaging Data*, Department of Biomedical Engineering, Johns Hopkins University, Baltimore, Maryland.

Will the doctor of the future be a human, robot or cyborg Mayo Clinic, Rochester, Minnesota.

Overcoming statistical paralysis Society for Neuroscience webinar.

The future of data science education, Keynote talk for the STEM Powered Education conference at the University of Florida.

The future of data science education, Becton Dickinson, Franklin Lakes, New Jersey.

Deep learning in public health and personalized medicine Johns Hopkins Bloomberg School of Public Health, Baltimore, MD.