

WEIJIE SU

472 Jon M. Huntsman Hall
3730 Walnut Street
Philadelphia, PA 19104

Phone: 215-746-8565
Fax: 215-898-1280
Email: suw@wharton.upenn.edu
Website: <http://stat.wharton.upenn.edu/~suw/>

APPOINTMENTS

- 7/2020– Assistant Professor (by courtesy), Department of Computer and Information Science, University of Pennsylvania, PA
- 7/2019– Co-Director of Penn Research in Machine Learning, University of Pennsylvania, PA
- 1/2018– Affiliated Faculty, Program in Applied Mathematics and Computational Science, University of Pennsylvania, PA
- 7/2016– Assistant Professor, Department of Statistics, The Wharton School, University of Pennsylvania, PA

EDUCATION

- 2011—2016 Ph.D. in Statistics, Stanford University, CA
- 2007—2011 B.S. in Mathematics, B.A. in Economics, Peking University, Beijing

PUBLICATIONS

Zhiqi Bu, Jason Klusowski, Cynthia Rush, and Weijie Su. *Algorithmic Analysis and Statistical Estimation of SLOPE via Approximate Message Passing*. IEEE Transactions on Information Theory, to appear

Zhiqi Bu, Jinshuo Dong, Qi Long, and Weijie Su. *Deep Learning with Gaussian Differential Privacy*. Harvard Data Science Review, to appear

Jinshuo Dong, Aaron Roth, and Weijie Su. *Gaussian Differential Privacy*. Journal of the Royal Statistical Society: Series B (Methodological) (*with discussion*), to appear

Shuxiao Chen, Hangfeng He, and Weijie Su. *Label-Aware Neural Tangent Kernel: Toward Better Generalization and Local Elasticity*. Neural Information Processing Systems (NeurIPS), 2020

Hua Wang, Yachong Yang, Zhiqi Bu, and Weijie Su. *The Complete Lasso Tradeoff Diagram*. Neural Information Processing Systems (NeurIPS), 2020

Zhun Deng, Hangfeng He, Jiaoyang Huang, and Weijie Su. *Towards Understanding the Dynamics of the First-Order Adversaries*. International Conference on Machine Learning (ICML), 2020

Qinqing Zheng, Jinshuo Dong, Qi Long, and Weijie Su. *Sharp Composition Bounds for Gaussian Differential Privacy via Edgeworth Expansion*. International Conference on Machine Learning (ICML), 2020

Hangfeng He and Weijie Su. *The Local Elasticity of Neural Networks*. International Conference on Learning Representations (ICLR), 2020

- Richard Berk, Andreas Buja, Lawrence Brown, Edward George, Arun Kuchibhotla, Weijie Su, and Linda Zhao. *Assumption Lean Regression*. The American Statistician, to appear
- Bin Shi, Simon Du, Weijie Su, and Michael Jordan. *Acceleration via Symplectic Discretization of High-Resolution Differential Equations*. Neural Information Processing Systems (NeurIPS), 5744–5752, 2019
- Qingyuan Zhao, Dylan Small, and Weijie Su. *Multiple Testing When Many p -values Are Uniformly Conservative, with Application to Testing Qualitative Interaction in Educational Interventions*. Journal of the American Statistical Association, 114(527), 1291–1304, 2019
- Tengyuan Liang and Weijie Su. *Statistical Inference for the Population Landscape via Moment Adjusted Stochastic Gradients*. Journal of the Royal Statistical Society: Series B (Methodological), 81(2), 431–456, 2019
- Damian Brzyski, Alexej Gossmann, Weijie Su, and Małgorzata Bogdan. *Group SLOPE—Adaptive Selection of Groups of Predictors*. Journal of the American Statistical Association, 114(525), 419–433, 2019
- Weijie Su. *When Is the First Spurious Variable Selected by Sequential Regression Procedures?* Biometrika, 105(3), 517–527, 2018
- Weijie Su, Małgorzata Bogdan, and Emmanuel Candès. *False Discoveries Occur Early on the Lasso Path*. The Annals of Statistics, 45(5), 2133–2150, 2017
- Weijie Su, Stephen Boyd, and Emmanuel Candès. *A Differential Equation for Modeling Nesterov’s Accelerated Gradient Method: Theory and Insights*. Journal of Machine Learning Research, 17(153), 1–43, 2016
- Lucas Janson and Weijie Su. *Familywise Error Rate Control via Knockoffs*. Electronic Journal of Statistics, 10(1), 960–975, 2016
- Weijie Su and Emmanuel Candès. *SLOPE is Adaptive to Unknown Sparsity and Asymptotically Minimax*. The Annals of Statistics, 44(3), 1038–1068, 2016
- Małgorzata Bogdan, Ewout van den Berg, Chiara Sabatti, Weijie Su, and Emmanuel Candès. *SLOPE—Adaptive Variable Selection via Convex Optimization*. The Annals of Applied Statistics, 9(3), 1103–1140, 2015

PREPRINTS

- Zhun Deng, Hangfeng He, and Weijie Su. *Toward Better Generalization Bounds with Locally Elastic Stability*. arXiv:2010.13988
- Hongyang Zhang, Fan Yang, Sen Wu, Weijie Su, and Christopher Ré. *Sharp Bias-Variance Tradeoffs of Hard Parameter Sharing in High-dimensional Linear Regression*. arXiv:2010.11750
- Zhu Li, Weijie Su, and Dino Sejdinovic. *Benign Overfitting and Noisy Features*. arXiv:2008.02901
- Asaf Weinstein, Weijie Su, Małgorzata Bogdan, Rina Barber, and Emmanuel Candès. *A Power Analysis for Knockoffs with the Lasso Coefficient-Difference Statistic*. arXiv:2007.15346
- Hua Wang, Yachong Yang, and Weijie Su. *The Price of Competition: Effect Size Heterogeneity Matters in High Dimensions*. arXiv:2007.00566
- Bin Shi, Weijie Su, and Michael Jordan. *On Learning Rates and Schrödinger Operators*. arXiv:2004.06977
- Matteo Sordello, Hangfeng He, and Weijie Su. *Robust Learning Rate Selection for Stochastic Optimization via Splitting Diagnostic*. arXiv:1910.08597
- Weijie Su. *The FDR-Linking Theorem*. arXiv:1812.08965
- Bin Shi, Simon Du, Michael Jordan, and Weijie Su. *Understanding the Acceleration Phenomenon via High-Resolution Differential Equations*. arXiv:1810.08907

Cynthia Dwork, Weijie Su, and Li Zhang. *Differentially Private False Discovery Rate Control*. arXiv:1807.04209

Edgar Dobriban and Weijie Su. *Robust Inference Under Heteroskedasticity via the Hadamard Estimator*. arXiv:1807.00347

Weijie Su and Yuancheng Zhu. *Uncertainty Quantification for Online Learning and Stochastic Approximation via Hierarchical Incremental Gradient Descent*. arXiv: 1802.04876

Jingshu Wang, Lin Gui, Weijie Su, Chiara Sabatti, and Art Owen. *Detecting Multiple Replicating Signals using Adaptive Filtering Procedures*. arXiv:1610.03330

SELECTED AWARDS AND HONORS

Alfred P. Sloan Research Fellowship (2020)

Facebook Faculty Research Award (2020)

NSF CAREER Award (2019)

Stanford Theodore W. Anderson Dissertation Award (2016)

Simons Graduate Research Assistantship (2016)

Outstanding Overseas Chinese Student Scholarship (2015)

Stanford Graduate Fellowship (2011–2015)

Best in Potential Award in Bicoastal Columbia–Stanford DataFest Competition (2013)

Shing-Tung Yau College Student Mathematics Contests in China (2010):

- All-around Gold Medal, placed 1st nationally
- Pao-Lu Hsu Medal in Gold in Applied Mathematics, Probability, and Statistics, placed 1st nationally

Finalist (2010) in the US Mathematical Contest in Modeling, sponsored by SIAM, NSA, and INFORMS

Gold Medal in China National Mathematical Olympiad, placed 2nd nationally (2007)

Peking University Academic Innovation Award (2009, 2010)

Highest Scholarship at Peking University (2008, 2009, 2010)

Silver Medal in China National Mathematical Olympiad, receiving early admission to Tsinghua University (2005)

GRANTS

Facebook Faculty Research Award, PI, 2020–2021

Alfred P. Sloan Research Fellowship, PI, 2020–2022

NSF CCF-1934876 (HDR TRIPODS), co-PI, with Shivani Agarwal: “Penn Institute for Foundations of Data Science,” 2019–2022

Wharton Dean’s Research Fund, PI, 2019–2021

Wharton Dean’s Fund for Post-Doctoral Research, PI, 2019–2020

NSF CAREER DMS-1847415, PI: “A Statistical Inferential Framework for Online Learning Algorithms,” 2019–2024

NSF CCF-1763314, co-PI, with Aaron Roth: “Foundations of Adaptive Data Analysis,” 2018—2021

PROFESSIONAL ACTIVITIES

Organizer and Chair	Invited Session: <i>Statistical Inference with Deep Learning</i> , CMStatistics, London, December 2020
Organizer and Chair	Topic-contributed Session: <i>Emerging Topics in Private Data Analysis</i> , JSM, Philadelphia, August 2020
Co-Organizer	Invited Conference Session: <i>Recent Developments in Privacy-Preserving Data Analysis</i> , CMStatistics, London, December 2019
Organizer and Chair	Invited Conference Session: <i>Uncertainty Quantification for Stochastic Optimization Methods in Machine Learning</i> , JSM, Denver, July 2019
Co-Organizer	Workshop: <i>Adaptive Data Analysis</i> , the Simons Institute at Berkeley, July 2018

INVITED TALKS

Local Elasticity: A Phenomenological Approach Toward Understanding Deep Learning. IAS Workshop on Theory of Deep Learning (10/2019); INFORMS, Seattle (10/2019); Berkeley–Penn Joint Seminar (9/2020, online)

Understanding Learning Rates in Deep Learning. JSM, Philadelphia (8/2015, online); INFORMS, National Harbor (11/2020, online)

Gaussian Differential Privacy. Columbia University Statistics Seminar (4/2019); Renmin University Statistics Seminar (6/2019); SWUFE Data Science Workshop in Chengdu (7/2019); Ant Financial (7/2019); Workshop on Higher-Order Asymptotics and Post-Selection Inference in St. Louis (8/2019); University of Virginia Statistics Seminar (9/2019); Yale Statistics Seminar (10/2019); Wharton Statistics Seminar (11/2019); Miami Herbert Business School (11/2019); Harvard CS (2/2020); MIT IDSS (2/2020); HKUST Math Seminar (4/2020, online); Peking University Applied Math Seminar (5/2020, online); International Seminar on Selective Inference (6/2020, online); Young Scientists Forum on Machine Learning Frontiers, BAAI Conference (6/2020, online); Facebook Core Data Science (8/2020, online); University of Arizona Math Colloquium (9/2020, online); INFORMS, National Harbor (11/2020, online)

Taming the Devil of Gradient-based Optimization Methods with the Angel of Differential Equations. NIPS Spotlight, Montreal (12/2014); Penn AMCS Colloquium (10/2018); Joint Stanford EE Colloquium and OR Seminar (11/2018); Northwestern University IEMS Seminar (11/2018); Duke Math Seminar (11/2018); Simons Workshop on Operator Splitting Methods in Data Analysis (3/2019); Peking University Applied Math Seminar (6/2019); JSM, Denver (7/2019); Columbia IEOR-DRO Seminar (9/2019); Tsinghua Math Seminar (7/2020, online)

Uncertainty Quantification for Stochastic Gradient Descent in Online Learning. Rutgers University Statistics Seminar (10/2017); Penn ESE Colloquium (10/2017); Binghamton University Statistics Seminar (11/2017); New Jersey Institute of Technology Statistics Seminar (11/2017); Stanford Statistics Seminar (12/2017); Berkeley Neyman Statistics Seminar (12/2017); Fudan Economics Seminar (12/2017); Tsinghua IIS Seminar (12/2017); Young Mathematician Forum, Peking University (12/2017); Fudan Data Science Conference (12/2017); Penn Research in Machine Learning Seminar (1/2018); Princeton CISS (3/2018); Workshop Series in Isaac Newton Institute, UK (4/2018); Princeton Data Science Workshop (5/2018); ICOSA (6/2018); ECNU Statistics Seminar, China (6/2018); SHUFE Statistics Seminar, China (6/2018); IMS-APRM, Singapore (6/2018); JSM, Vancouver (8/2018); UIUC Statistics Seminar (9/2018); Harvard Statistics Seminar (9/2018); University of Minnesota Statistics Seminar (10/2018); University of Chicago Statistics Seminar (11/2018); University of Wisconsin Statistics Seminar (11/2018); NCSU Statistics Seminar (11/2018); UNC Statistics Seminar (11/2018); Xiamen University Statistics Seminar (7/2019); SHUFE Optimization Seminar, China (8/2020, online)

False Discoveries of Sequential Regression Procedures. JSM, Seattle (8/2015); ICOSA, Chicago (6/2017); Workshop on Higher-Order Asymptotics and Post-Selection Inference (8/2017)

Private False Discovery Rate Control/The Robustness of Controlling the False Discovery Rate. World Congress in Probability and Statistics, Toronto (7/2016); IAS/Park City Mathematics Program (PCMI), Park City, Utah (7/2016); NIPS Workshop on Adaptive Data Analysis, Barcelona (12/2016); Fudan International Conference on Data Science, Shanghai (12/2016); MCP, UC Riverside (6/2017); Simons Workshop on Adaptive Data Analysis at Berkeley (7/2018); Simons Workshop on Robust and High-Dimensional Statistics at Berkeley (10/2018)

Multiple Testing and Adaptive Estimation via the Sorted L-One Norm. IMS-China, Kunming, China (7/2015); UC Davis Statistics Seminar (1/2016); UCSD Mathematics Colloquiums (1/2016); IT-Forum, Stanford, CA (1/2016); MIT Operations Research and Statistics Group Seminar (1/2016); Rutgers University Statistics Seminar (1/2016); Wharton Statistics Seminar (1/2016); Columbia University Statistics Seminar (1/2016); Yale Statistics Seminar (2/2016); NYU Stern Statistics Seminar (2/2016); Georgia Tech ISyE Seminar (2/2016); UC Berkeley Biostatistics Seminar (2/2016); Cornell Joint Statistics and ORIE Seminar (2/2016); USC Marshall Statistics Seminar (2/2016); UW Statistics Seminar (2/2016); CMU Statistics Seminar (2/2016); Conference on Statistical Learning and Data Science, Chapel Hill, NC (6/2016); ICOSA Conference on Data Science, Dali, China (7/2016); Temple Fox Statistics Seminar (11/2016); CMStatistics, Seville (12/2016); Princeton ORFE Wilks Memorial Seminar in Statistics (2/2017); Purdue Research Colloquium in Statistics (3/2017); Peking University Statistics Seminar (7/2017); Tsinghua University Statistics Seminar (7/2017); Chinese University of Hong Kong in Shenzhen Statistics Seminar (7/2017); East China Normal University Statistics Seminar (7/2017); Fudan University Statistics Seminar (7/2017)

INDUSTRIAL EXPERIENCE

Summer 2014 Research Intern, Microsoft Research, Silicon Valley
Summer 2013 Research Intern, Microsoft Research, Redmond
Summer 2010 Research Intern, Microsoft Research Asia, Beijing

TEACHING

Fall 2020 STAT 991: Optimization Methods in Machine Learning
Fall 2020 STAT 405/705: Statistical Computing with R
Spring 2019 STAT 991: Optimization Methods in Machine Learning

Spring 2019 STAT 431/511: Statistical Inference
Spring 2018 STAT 431/511: Statistical Inference
Spring 2017 STAT 431/511: Statistical Inference

SOFTWARE

[gdp_accountant](#) TensorFlow implementation for Gaussian differential privacy
[higrad](#) R package for implementing the HiGrad algorithm
[grpSLOPE](#) R package for selecting groups of variables via the sorted ℓ_1 -penalized estimation
[SLOPE](#) R package for fitting the sorted ℓ_1 -penalized estimation