

# Sarah M. Weinstein

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## Education

- 2023 **Ph.D., Biostatistics**  
Perelman School of Medicine, University of Pennsylvania (Philadelphia, PA)  
*Thesis:* Statistical Methods for Extracting and Comparing Patterns in Multimodal Neuroimaging Studies.  
*Advisors:* Russell (Taki) Shinohara, PhD and Kristin Linn, PhD
- 2020 **M.S., Biostatistics**  
Perelman School of Medicine, University of Pennsylvania (Philadelphia, PA)  
*Thesis:* Using Observational Data and Propensity Score Modeling to Simulate and Improve Design of Trials in Psoriatic Arthritis.  
*Advisors:* Alisa Stephens-Shields, PhD and Alexis Ogdie-Beatty, MD, MSCE
- 2016 **B.A. (Cum Laude), Statistics and Psychology**  
Columbia College, Columbia University (New York, NY)

## Experience

- 2023 – present **Assistant Professor of Biostatistics**  
Department of Epidemiology and Biostatistics, Temple University College of Public Health (Philadelphia, PA).
- 2022 – 2023 **Visiting Instructor of Mathematics and Statistics**  
Department of Mathematics and Statistics, Haverford College (Haverford, PA).
- 2018 – 2023 **Graduate Research Assistant**  
Department of Biostatistics, Epidemiology, and Informatics, Perelman School of Medicine, University of Pennsylvania (Philadelphia, PA).
- 2016 – 2018 **Research Data Analyst**  
Department of Anesthesiology, Critical Care, and Pain Management, Hospital for Special Surgery (New York, NY).

## Publications

- 2023 AR Pines, AS Keller, B Larsen, M Bertolero, A Ashourvan, DS Bassett, M Cieslak, S Covitz, Y Fan, E Feczko, A Houghton, A R Rueter, T Tapera, J Vogel, **SM Weinstein**, RT Shinohara, D Fair, T Satterthwaite. “Development of Top-Down Cortical Propagations in Youth.” *Neuron*.
- 2022 **SM Weinstein**, SN Vandekar, EB Baller, D Tu, A Adebimpe, TM Tapera, RC Gur, RE Gur, JA Detre, A Raznahan, AF Alexander-Bloch, TD Satterthwaite, RT Shinohara, JY Park. “Spatially-enhanced clusterwise inference for testing and localizing intermodal correspondence.” *NeuroImage*.
- 2022 VM Leavitt, AM Keever, **SM Weinstein**, RT Shinohara, H Schmidt, SM Aoun, A Solari, AJ Solomon. “Patient-reported experience of multiple sclerosis diagnosis is associated with subsequent disclosure and concealment.” *Multiple Sclerosis and Related Disorders*.
- 2022 **SM Weinstein**, C Davatzikos, J Doshi, KA Linn, RT Shinohara, for the Alzheimer’s Disease Neuroimaging Initiative (ADNI). “Penalized Decomposition Using Residuals (PeDecURe) for Feature Extraction in the Presence of Nuisance Variables.” *Biostatistics*.
- 2022 **SM Weinstein**, E Reilly, N Garland, V Zimmerman, D Jacobs. “Impact of a Virtual Wellness Program on Quality-of-Life Measures for Patients Living with MS During the COVID-19 Pandemic.” *International Journal of MS Care*.

- 2022 F Hu, **SM Weinstein**, EB Baller, AM Valcarcel, A Adebimpe, A Raznahan, DR Roalf, TE Robert-Fitzgerald, V Gonzenbach, RC Gur, RE Gur, S Vandekar, JA Detre, KA Linn, A Alexander-Bloch, TD Satterthwaite, RT Shinohara. "Voxel-wise Intermodal Coupling Analysis of Two or More Modalities using Local Covariance Decomposition." *Human Brain Mapping*.
- 2022 AR Pines, B Larsen, Z Cui, VJ Sydnor, MA Bertolero, A Adebimpe, AF Alexander-Bloch, C Davatzikos, DA Fair, RC Gur, RE Gur, H Li, MP Milham, TM Moore, K Murtha, L Parkes, SL Thompson-Schill, S Shanmugan, RT Shinohara, **SM Weinstein**, DS Bassett, Y Fan, TD Satterthwaite. "Dissociable multi-scale patterns of development in personalized brain networks." *Nature Communications*.
- 2021 **SM Weinstein**, SN Vandekar, A Adebimpe, TM Tapera, T Robert-Fitzgerald, RC Gur, RE Gur, A Raznahan, TD Satterthwaite, AF Alexander-Bloch, RT Shinohara. "A simple permutation-based test of intermodal correspondence." *Human Brain Mapping*.
- 2021 **SM Weinstein**, LC Coates, PS Helliwell, A Ogdie, AJ Stephens-Shields. "Simulation-based design of pragmatic trials in psoriatic arthritis using propensity scores." *Clinical Trials*.
- 2021 AJ Solomon, M Kaisey, SC Krieger, S Chahin, RT Naismith, **SM Weinstein**, RT Shinohara, BG Weinschenker. "Multiple sclerosis diagnosis: Knowledge gaps and opportunities for educational intervention in neurologists in the United States." *Multiple Sclerosis Journal*.
- 2020 J Poeran, C Cozowicz, N Zubizarreta, **SM Weinstein**, SG Deiner, RM Leipzig, JI Friedman, J Liu, M Mazumdar, SG Memtsoudis. "Modifiable factors associated with postoperative delirium after hip fracture repair: an age-stratified retrospective cohort study." *European Journal of Anaesthesiology*.
- 2019 SG Memtsoudis, C Cozowicz, N Zubizarreta, **SM Weinstein**, J Liu, DH Kim, LA Poultsides, MM Berger, M Mazumdar, J Poeran. "Risk factors for postoperative delirium in patients undergoing lower extremity joint arthroplasty: a retrospective population-based cohort study." *Regional Anesthesia & Pain Medicine*.
- 2019 L Pichler, **SM Weinstein**, C Cozowicz, J Poeran, J Liu, LA Poultsides, JN Saleh, SG Memtsoudis. "Perioperative impact of sleep apnea in a high-volume specialty practice with a strong focus on regional anesthesia: a database analysis." *Regional Anesthesia & Pain Medicine*.
- 2019 C Cozowicz, J Poeran, N Zubizarreta, J Liu, **SM Weinstein**, L Pichler, M Mazumdar, SG Memtsoudis. "Non-opioid analgesic modes of pain management are associated with reduced postoperative complications and resource utilisation: a retrospective study of obstructive sleep apnoea patients undergoing elective joint arthroplasty." *British journal of anaesthesia*.
- 2018 **SM Weinstein**, JT YaDeau, SG Memtsoudis. "Lack of association between levels and length of intraoperative controlled hypotension and acute kidney injury in total hip arthroplasty patients receiving neuraxial anesthesia." *Regional Anesthesia & Pain Medicine*.
- 2018 **SM Weinstein**, LR Baaklini, J Liu, LA Poultsides, C Cozowicz, J Poeran, JN Saleh, SG Memtsoudis. "Neuraxial anaesthesia techniques and postoperative outcomes among joint arthroplasty patients: is spinal anaesthesia the best option?" *British journal of anaesthesia*.
- 2018 **SM Weinstein**, LA Poultsides, LR Baaklini, EE Mörwald, C Cozowicz, JN Saleh, MB Arrington, J Poeran, N Zubizarreta, SG Memtsoudis. "Postoperative delirium in total knee and hip arthroplasty patients: a study of perioperative modifiable risk factors." *British journal of anaesthesia*.
- Under review:*
- 2023+ AA Chen, **SM Weinstein**, A Adebimpe, RC Gur, RE Gur, KR Merikangas, TD Satterthwaite, RT Shinohara, H Shou. "Similarity-Based Multimodal Regression." *bioRxiv*.
- 2023+ VM Leavitt, C Bae, RT Shinohara, **SM Weinstein**, H Schmidt, SM Aoun, A Solari, AJ Solomon. "Diagnosis Concealment Behaviors and Disclosure Beliefs are Associated with Quality of Life and Overall Health in People with Multiple Sclerosis."

## Fellowships, Awards, and Honors

- 2023 **Saul Winegrad Award for Outstanding Dissertation**  
Biomedical Graduate Studies Program, University of Pennsylvania.
- 2020 – 2023 **National Science Foundation Graduate Research Fellowship Program** (total \$138,000)
- 2021 – 2023 **Graduate Student Travel Award** (total \$2,000)  
Biomedical Graduate Studies Program, University of Pennsylvania.
- 2022 **Award for Flash Talk at Annual Research Day (first place)**  
Department of Biostatistics, Epidemiology, and Informatics, University of Pennsylvania.
- Student Paper Award (runner-up)**
- 2021 American Statistical Association, Section on Statistics in Imaging.
- 2017 **Abstract Award (second place)**  
Society for Anesthesia and Sleep Medicine.
- 2016 **Cum Laude**  
Columbia College, Columbia University.
- 2012 – 2016 **Dean's List (every semester)**  
Columbia College, Columbia University.

## Presentations and talks

★ *invited*

- ★ 08/2023 “Network enrichment of brain-phenotype associations in neuroimaging studies.” Joint Statistical Meetings (JSM), Topic-Contributed Paper Session (Toronto, ON).
- ★ 07/2023 “Spatially enhanced clusterwise inference for testing and localizing intermodal correspondence.” Organization for Human Brain Mapping: Neuroimaging Statistics Satellite, Montreal Neurological Institute (Montreal, QC).
- 03/2023 “Hypothesis Tests of Spatial Enrichment in Brain-Behavior Association Studies.” Eastern North American Region of the International Biometric Society (ENAR), Contributed Oral Presentation (Nashville, TN).
- ★ 02/2023 “Penalized Decomposition Using Residuals for Feature Extraction in Observational Studies of Alzheimer’s Disease.” University of Pittsburgh StatsEye Seminar (virtual).
- 12/2022 “Hypothesis testing and spatial localization of associations in multi-modal neuroimaging studies.” Computational and Methodological Statistics (CMStatistics), Contributed Oral Presentation (London, UK).
- ★ 10/2022 “Statistical methods for extracting and comparing patterns in multi-modal neuroimaging studies.” Bi-College Math/Stat joint colloquium at Haverford and Bryn Mawr Colleges (Haverford, PA).
- ★ 08/2022 “Nuisance variable-adjusted feature extraction through penalized decomposition using residuals.” Joint Statistical Meetings (JSM), Topic-Contributed Session (Washington, DC).
- 06/2022 “Penalized decomposition using residuals for confounding mitigation in multivariate pattern analysis.” Organization for Human Brain Mapping (OHBM), Poster Presentation (Glasgow, Scotland).
- 05/2022 “Adjusting for nuisance variables in neuroimaging studies via penalized decomposition using residuals.” Statistical Methods in Imaging (SMI), Poster Presentation (Nashville, TN).
- 03/2022 “Penalized decomposition using residuals for confounding control and enhanced pattern extraction in neuroimaging.” Eastern North American Region of the International Biometrics Society (ENAR) conference, Contributed Oral Presentation (Houston, TX).
- 12/2021 “Permutation testing of network enrichment in neuroimaging.” Computational and Methodological Statistics (CM-Statistics), Contributed Oral Presentation (virtual).
- ★ 08/2021 “A simple permutation-based test of intermodal correspondence.” JSM Section on Statistics in Imaging Topic Contributed Session for Student Paper Award Recipients (virtual).

- ★ 08/2021 “Permutation-based tests of intermodal similarity within functional brain networks.” Vanderbilt University Statistical Imaging Collective Seminar (Nashville, TN).
- 06/2021 “Permutation-based testing of intermodal correspondence within large-scale functional networks.” Organization for Human Brain Mapping (OHBM), Poster Presentation (virtual).
- 03/2021 “A simple permutation-based test of intermodal correspondence.” Eastern North American Region of the International Biometrics Society (ENAR), Contributed Oral Presentation (virtual).
- 08/2020 “Two-stage stratified PCA for dimension reduction and nuisance variable mitigation.” JSM Poster Presentation (virtual).
- 03/2020 “Two-stage PCA for dimension reduction and mitigation of nuisance variable associations.” Eastern North American Region of the International Biometrics Society (ENAR), Contributed Oral Presentation (virtual).
- 04/2018 “Is subtype of neuraxial anesthesia associated with risk for adverse perioperative outcomes in hip and knee arthroplasty patients?” World Congress on Regional Anesthesia & Pain Medicine, Oral Presentation (New York, NY).
- 10/2017 “Delirium After Unilateral Total Hip and Knee Arthroplasty: A Retrospective Analysis of Modifiable Risk Factors.” American Society of Anesthesiologists Annual Meeting, Oral Presentation (Boston, MA).

## Teaching and mentorship

- 2022 – 2023 **Senior Thesis Mentor**, Department of Mathematics and Statistics, Haverford College.  
*Primary advisor:* Alfredo Ortiz de la Rosa (Winner of Thesis Prize)  
*Committee member:* Li Fan
- 2022 **Guest Lecturer**, Statistical Methods in Neuroimaging (BSTA 7510), Department of Biostatistics, Epidemiology, and Informatics, University of Pennsylvania.
- 2020-2021 **Teaching Assistant** (Spring 2020 and Spring 2021), Linear and Generalized Linear Models (BSTA 651), Department of Biostatistics, Epidemiology, and Informatics, University of Pennsylvania.
- 2015-2016 **Teaching Assistant/Tutor** in Statistics Help Room, Columbia University.

## Additional activities

- 2023 **Session Organizer** (*scheduled*), Computational and Methodological Statistics (CMStatistics): “Analysis of spatial patterns in neuroimaging” (Berlin, Germany).
- 2023 **Reviewer**, NeuroImage.
- 2022 – 2023 **Co-founder/co-chair**, Hypothesis Testing Sub-group, Penn Statistics in Imaging and Visualization Center (PennSIVE).
- 2022 **Session Organizer**, Joint Statistical Meetings (JSM): “Statistical Advances in Dimension Reduction and Feature Interpretability in Neuroimaging” (Washington, DC).
- 2022 **Session Chair**, Statistical Methods in Imaging (SMI): “Statistical Analysis of High-dimensional Neuroimaging Data” (Nashville, TN).
- 2021 **Session Chair**, Eastern North American Region (ENAR) of the International Biometric Society: “Contributed Papers: Machine Learning” (virtual).
- 2016 – 2018 **Member**, Columbia University Alumni Recruitment Committee.

## Professional memberships

- 2020 – present Organization for Human Brain Mapping (OHBM)
- 2019 – present American Statistical Association (ASA)
- 2019 – present ASA Section on Statistics in Imaging
- 2019 – present Eastern North American Region of the International Biometric Society (ENAR/IBS)