

# Sarah M. Weinstein

[sarah.weinstein@pennmedicine.upenn.edu](mailto:sarah.weinstein@pennmedicine.upenn.edu) • [smweinst.github.io](https://smweinst.github.io)

## Research interests

statistical methods in neuroimaging, spatial statistics, causal inference, clinical trials.

## Education

- 2018 – present     **University of Pennsylvania, Perelman School of Medicine** – Philadelphia, PA  
PhD, Biostatistics (expected 2023)  
Mentors: Russell Shinohara, PhD and Kristin Linn, PhD  
Thesis: Extracting and comparing patterns from multimodal neuroimaging data in the presence of nuisance variables.
- MS, Biostatistics (2020)  
Mentor: Alisa Stephens-Shields, PhD  
Thesis: Using observational data and propensity score modeling to simulate and improve design of trials in psoriatic arthritis.
- 2012 – 2016     **Columbia University, Columbia College** – New York, NY  
BA (Cum Laude), double major in Statistics and Psychology

## Awards and honors

- 2020 – 2023     **National Science Foundation Graduate Research Fellowship Program**  
Recipient of three-year fellowship in Mathematical Sciences (Biostatistics). Awarded in 2018, funding in effect 2020-2023.
- 2021     **American Statistical Association Section on Statistics in Imaging**  
Student Paper Award (runner-up) for “A simple permutation-based test of intermodal correspondence.”
- 2017     **Society for Anesthesia and Sleep Medicine**  
Second place abstract award.
- 2016     **Columbia University (Columbia College)**  
Cum Laude.
- 2012 – 2016     **Columbia University (Columbia College)**  
Dean’s List (every semester).

## Teaching experience

- Spring 2020, Spring 2021     **University of Pennsylvania, Department of Biostatistics, Epidemiology, and Informatics**  
Teaching Assistant for Linear and Generalized Linear Models (BSTA 651)

Fall 2015 – **Columbia University, Department of Statistics**  
 Spring 2016 Peer tutor in Statistics Help Room for undergraduates  
 Private tutor for undergraduate students enrolled in introductory statistics courses

## Research experience

2019 – Present **Univeristy of Pennsylvania** – Philadelphia, PA  
 Statistical analyst in research collaborations in neuroscience, psychiatry, and neurology.

2016 – 2018 **Hospital for Special Surgery** – New York, NY  
 Research Data Analyst in the Department of Anesthesiology, Critical Care, and Pain Management.

2013 – 2016 **Columbia University Medical Center, Department of Psychiatry** – New York, NY  
 Undergraduate Research Assistant in the Perinatal Pathways Lab of Catherine Monk, PhD.

## Peer-reviewed publications

2021 **A simple permutation-based test of intermodal correspondence.**  
**SM Weinstein**, SN Vandekar, A Adebimpe, TM Tapera, T Robert-Fitzgerald, RC Gur, RE Gur, A Raznahan, TD Satterthwaite, AF Alexander-Bloch, RT Shinohara.  
*Human Brain Mapping.*

2021 **Simulation-based design of pragmatic trials in psoriatic arthritis using propensity scores.**  
**SM Weinstein**, LC Coates, PS Helliwell, A Ogdie, AJ Stephens-Shields.  
*Clinical Trials.*

2021 **Multiple sclerosis diagnosis: Knowledge gaps and opportunities for educational intervention in neurologists in the United States.**  
 AJ Solomon, M Kaisey, SC Krieger, S Chahin, RT Naismith, **SM Weinstein**, RT Shinohara, BG Weinshenker.  
*Multiple Sclerosis Journal.*

2020 **Modifiable factors associated with postoperative delirium after hip fracture repair: an age-stratified retrospective cohort study.**  
 J Poeran, C Cozowicz, N Zubizarreta, **SM Weinstein**, SG Deiner, RM Leipzig, JI Friedman, J Liu, M Mazumdar, SG Memtsoudis.  
*European Journal of Anaesthesiology.*

2019 **Risk factors for postoperative delirium in patients undergoing lower extremity joint arthroplasty: a retrospective population-based cohort study.**  
 SG Memtsoudis, C Cozowicz, N Zubizarreta, **SM Weinstein**, J Liu, DH Kim, LA Poultides, MM Berger, M Mazumdar, J Poeran.  
*Regional Anesthesia & Pain Medicine.*

2019 **Perioperative impact of sleep apnea in a high-volume specialty practice with a strong focus on regional anesthesia: a database analysis**  
 L Pichler, **SM Weinstein**, C Cozowicz, J Poeran, J Liu, LA Poultides, JN Saleh, SG Memtsoudis.  
*Regional Anesthesia & Pain Medicine.*

- 2019 **Non-opioid analgesic modes of pain management are associated with reduced post-operative complications and resource utilisation: a retrospective study of obstructive sleep apnoea patients undergoing elective joint arthroplasty.**  
C Cozowicz, J Poeran, N Zubizarreta, J Liu, **SM Weinstein**, L Pichler, M Mazumdar, SG Memtsoudis.  
*British journal of anaesthesia.*
- 2018 **Lack of association between levels and length of intraoperative controlled hypotension and acute kidney injury in total hip arthroplasty patients receiving neuraxial anesthesia.**  
**SM Weinstein**, JT YaDeau, SG Memtsoudis.  
*Regional Anesthesia & Pain Medicine.*
- 2018 **Neuraxial anaesthesia techniques and postoperative outcomes among joint arthroplasty patients: is spinal anaesthesia the best option?**  
**SM Weinstein**, LR Baaklini, J Liu, LA Poultides, C Cozowicz, J Poeran, JN Saleh, SG Memtsoudis.  
*British journal of anaesthesia.*
- 2018 **Postoperative delirium in total knee and hip arthroplasty patients: a study of peri-operative modifiable risk factors.**  
**SM Weinstein**, LA Poultides, LR Baaklini, EE Mörwald, C Cozowicz, JN Saleh, MB Arrington, J Poeran, N Zubizarreta, SG Memtsoudis.  
*British journal of anaesthesia.*

### Manuscripts under review

- 2022 **Voxel-wise Intermodal Coupling Analysis of Two or More Modalities using Local Covariance Decomposition**  
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.  
*bioRxiv.*
- 2022 **Penalized Decomposition Using Residuals (PeDecURe) for Nuisance Variable Adjustment in Multivariate Pattern Analysis.**  
**SM Weinstein**, C Davatzikos, J Doshi, KA Linn, RT Shinohara, for the Alzheimer's Disease Neuroimaging Initiative (ADNI).  
*bioRxiv.*
- 2021 **Dissociable Multi-scale Patterns of Development in Personalized Brain Networks.**  
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.  
*bioRxiv.*

- 2021 **Impact of a Virtual Wellness Program on Quality-of-Life Measures for Patients Living with MS During the COVID-19 Pandemic.**  
D Jacobs, N Garland, V Zimmerman, SM Weinstein, E Reilly.

## Select presentations

- 12/2021 **Permutation testing of network enrichment in neuroimaging.**  
Computational and Methodological Statistics (London, UK; virtual talk to hybrid audience).
- 08/2021 **A simple permutation-based test of intermodal correspondence.**  
Joint Statistical Meetings student paper award session (virtual talk).
- 08/2021 **Permutation-based tests of intermodal similarity within functional brain networks.**  
Invited Seminar Speaker at Vanderbilt Biostatistics Department's neuroimaging research group (Nashville, TN)
- 06/2021 **Permutation-based testing of intermodal correspondence within large-scale functional networks.**  
Organization for Human Brain Mapping conference (virtual poster presentation).
- 03/2021 **A simple permutation-based test of intermodal correspondence.**  
Eastern North American of the International Biometric Society conference (virtual talk).
- 08/2020 **Two-stage stratified PCA for dimension reduction and nuisance variable mitigation.**  
Joint Statistical Meetings (virtual poster presentation).
- 03/2020 **Two-stage PCA for dimension reduction and mitigation of nuisance variable associations.**  
Eastern North American of the International Biometric Society conference (virtual talk).

## Professional memberships

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

## Professional activity

- 08/2022 Topic-Contributed Session Organizer at upcoming Joint Statistical Meetings  
*Session:* Statistical Advances in Dimension Reduction and Feature Interpretability in Neuroimaging (Washington, DC)

03/2021      Session Chair at ENAR IBS conference  
*Session:* Contributed Papers: Machine Learning (virtual)

## Technical skills

R, Python, MATLAB