

CURRICULUM VITAE

ELIZABETH SWEENEY

Weill Cornell
Biostatistics and Epidemiology Division
Department of Healthcare Policy and Research
402 East 67th Street, LA-245
New York, NY 10065

Email: ems40003@med.cornell.edu
Website: emsweene.github.io
Twitter: [@emsweene57](https://twitter.com/emsweene57)

Education

PH.D. BIostatISTICS, THE JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH,
ADVISOR: DR. CIPRIAN CRAINICEANU, Co-ADVISOR: DR. RUSSELL SHINOHARA, MAY 2016

SC.M. BIostatISTICS, THE JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH,
ADVISOR: DR. CIPRIAN CRAINICEANU, MAY 2012

B.S. MATHEMATICS, WITH HONOR OF DISTINCTION, PURDUE UNIVERSITY, INDIANAPOLIS, 2010

Professional Experience

BIostatISTICS AND EPIDEMIOLOGY DIVISION, DEPARTMENT OF HEALTHCARE POLICY AND RESEARCH,
WEILL CORNELL, NEW YORK

2019 to Present Assistant Professor

COLUMBIA UNIVERSITY, NEW YORK

2018 Lecturer in Biostatistics

SPREEMO HEALTH, NEW YORK

2018 to 2019 Senior Data Scientist

FLATIRON HEALTH, NEW YORK

2018 Senior Quantitative Scientist

2017 Quantitative Scientist

RICE UNIVERSITY, HOUSTON

2016 - 2017 Rice Academy Postdoctoral Fellow working with Dr. Genevera Allen at Rice Statistics and Dr Joshua Shulman at Baylor College of Medicine Neurology

DEPARTMENT OF PUBLIC HEALTH, AMERICAN UNIVERSITY OF ARMENIA, YEREVAN

November 2015 Visiting Faculty in the School of Public Health

CENTER ON AGING AND HEALTH, JOHNS HOPKINS, BALTIMORE

2014 - 2016 Training Grant on the Epidemiology and Biostatistics of Aging (T32AG021334)
 Mentors: Dr. Michelle Carlson and Dr. Karen Bandeen-Roche

DEPARTMENT OF BIOSTATISTICS AND EPIDEMIOLOGY, UNIVERSITY OF PENNSYLVANIA, PHILADELPHIA

2012 - 2016 Associated Researcher with Courtesy Appointment

DEPARTMENT OF BIOSTATISTICS, JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH, BALTIMORE

2012 - 2013 Biostatistics Researcher working with Dr. Ciprian M. Crainiceanu

NATIONAL INSTITUTE OF NEUROLOGICAL DISORDERS AND STROKE (NINDS), BETHESDA

2013 - 2015 Special Volunteer, Neuroimmunology Branch
 2011 - 2013 Technical Intramural Research Training Award Trainee, Neuroimmunology Branch
 Summer 2011 Summer Internship Program, Neuroimmunology Branch

Peer Reviewed Publications

PUBLISHED

Muschelli, J., **Sweeney, E. M.**, and Crainiceanu, C. M. (2018). freesurfer: Connecting the Freesurfer software with R. *F1000Research*, 7.

Muschelli, J., **Sweeney, E. M.**, Ullman, N. L., Vespa, P., Hanley, D. F., and Crainiceanu, C. M. (2017). PIctHPERFeCT: primary intracranial hemorrhage probability estimation using random forests on CT. *NeuroImage: Clinical*, 14, 379-390.

Pomann, G. M., Staicu, A. M., Lobaton, E., Mejia A.F., Dewey B. E., Reich, D. S., **Sweeney, E. M.**, and Shinohara, R. T. (2016). A lag functional linear model for prediction of magnetization transfer ratio in multiple sclerosis lesions. *The Annals of Applied Statistics*, 10(4), 2325-2348.

Dworkin, J. D., **Sweeney, E. M.**, Schindler, M. K., Chahin, S., Reich, D. S., and Shinohara, R. T. (2016). PREVAIL: Predicting Recovery through Estimation and Visualization of Active and Incident Lesions. *NeuroImage: Clinical*, 12, 293-299.

Sweeney, E. M., Crainiceanu, C. M., and Gertheiss, J. (2016) Testing Differentially Expressed Genes in Dose-Response Studies and with Ordinal Phenotypes. *Statistical Applications in Genetics and Molecular Biology*.15.3 (2016): 213-235.

Fortin, J. P., **Sweeney, E. M.**, Muschelli, J., Crainiceanu, C. M., Shinohara, R. T., and the Alzheimer's Disease Neuroimaging Initiative. (2016) Removing inter-subject technical variability in magnetic resonance imaging studies. *NeuroImage*, 132, 198-212.

Mejia A.F., **Sweeney E. M.**, Dewey B. E., Nair G., Sati P., Shea C. D., Reich D. S. and Shinohara R. T. (2016) Statistical estimation of T1 relaxation time using conventional magnetic resonance imaging. *NeuroImage*.

George, I. C., Sati, P., Absinta, M., Cortese, I. C., **Sweeney, E. M.**, Shea C. D., and Reich, D. S (2016). Clinical 3-tesla FLAIR* MRI improves diagnostic accuracy in multiple sclerosis. *Multiple Sclerosis Journal*. 22(12), 1578-1586.

Sweeney, E. M., Shinohara, R. T., Dewey, B. E., Schindler, M. K., Muschelli, J., Reich, D. S., Crainiceanu, C. M., and Eloyan, A. (2015) Relating multi-sequence longitudinal intensity profiles and clinical covariates in new multiple sclerosis lesions. *NeuroImage: Clinical*.

Roy, S., He, Q., **Sweeney, E. M.**, Carass, A., Reich, D. S., Prince, J. L., and Pham, D. L. (2015). Subject specific sparse dictionary learning for atlas based brain MRI segmentation. *IEEE Journal of Biomedical and Health Informatics*.

Muschelli, J., Ullman, N. L., **Sweeney, E. M.**, Eloyan, A., Martin, N., Vespa, P., Awad, I., Hanley, D. F., and Crainiceanu, C. M. (2015). Quantitative Intracerebral Hemorrhage Localization. *Stroke*.

Muschelli, J., **Sweeney, E. M.**, Lindquist, M. A., and Crainiceanu, C. M. (2015). fsR: Connecting the FSL Software with R. *The R Journal*.

Pomann, G. M., **Sweeney, E. M.**, Reich, D. S., Staicu, A. M., and Shinohara, R. T. (2015). Scan-stratified case-control sampling for modeling blood-brain barrier integrity in multiple sclerosis. *Statistics in Medicine*.

Eloyan, A., Shou, H., Shinohara, R. T., **Sweeney, E. M.**, Nebel, M. B., Cuzzocreo, J. L., Reich, D. S., Lindquist, M. A., and Crainiceanu, C. M. (2014) Health effects of lesion localization in multiple sclerosis: Spatial registration and confounding adjustment. *PLoS ONE*.

Shinohara, R. T., **Sweeney, E. M.**, Goldsmith, J., Shiee, N., Mateen, F. J., Calabresi P. A., Jarso, S., Pham, D. L., Reich, D. S., and Crainiceanu, C. M. (2014). Statistical normalization technique for magnetic resonance imaging. *NeuroImage: Clinical*.

Sweeney, E. M., Thakur, K. T., Lyons, J. T., Smith, B. R., Wiley, J. Z., Cervantes-Arslanian, A. M., Schwamm, L. H., Elkind, M. S. V., Shinohara, R. T., Mateen, F. J. (2014). IV-TPA for acute ischemic stroke in HIV-infected adults. *European Journal of Neurology*.

Muschelli, J., **Sweeney, E. M.**, and Crainiceanu, C. M. (2014). BrainR: Interactive 3 and 4d images of high resolution neuroimage data. *The R Journal*.

Sweeney, E. M., Vogelstein, J. T., Cuzzocreo, J. L., Calabresi P. A., Reich, D. S., Crainiceanu, C. M., and Shinohara, R. T. (2014). A comparison of supervised machine learning algorithms and feature vectors for MS lesion segmentation using multimodal structural MRI. *PLoS ONE* 9(4): e95753.

Sweeney, E. M., Shinohara, R. T., Shiee, N., Mateen, F. J., Chudgar, A. A., Cuzzocreo, J. L., Calabresi P. A., Pham, D. L., Reich, D. S., and Crainiceanu, C. M. (2013). OASIS is Automated Statistical Inference for Segmentation with applications to multiple sclerosis lesion segmentation in MRI. *NeuroImage Clinical*, 2, 402-413.

Sweeney, E. M., Shinohara, R. T., Shea, C. D., Reich, D. S., and Crainiceanu, C. M. (2013). Automatic lesion incidence estimation and detection using multi-modality longitudinal MRIs. *American Journal of Neuroradiology* 34(1), 68-73.

Book Chapters

Crainiceanu, C. M., **Sweeney, E. M.**, Eloyan, A., and Shinohara, R. T. The Statistical Analysis of Structural MRI Neuroimaging Data. *Handbook of Modern Statistical Methods: Neuroimaging Data Analysis*. CRC Press, 2017.

Supervision

WEILL CORNELL

2020 Roland Hentz (Master's Capstone Research Project)

Project Title: Segmentations of Multiple Sclerosis Lesions on Structural MRI

COLUMBIA UNIVERSITY

- 2020 Haowei Ni (Master's Practicum Research Project)
 Project Title: Novel Clustering Exploration on Multiple Sclerosis Lesions

RICE UNIVERSITY

- 2016 Kiryl Novikau and Richard Huang (Undergraduate Thesis Research Project)
 Thesis Title: Predictive Power of Brain Structure on Mental Disorders

Teaching

WEILL CORNELL

- 2019 – Present Instructor for Data Science I (R and Python), 40 students
Sole instructor for new graduate-level course for biostatistics and data science masters program. Responsible for developing materials for the course and delivering lectures each week.

JOHNS HOPKINS

- 2020 Instructor for Multilevel Modeling
One week course as part of the Epidemiology & Biostatistics Summer Institute Program

COLUMBIA UNIVERSITY

- 2019 Guest Lecturer for P8157: Longitudinal Data Analysis (2 weeks)
 2018 Instructor for P8157: Longitudinal Data Analysis, 75 students, (Student Evaluations: Course 4.19/5, Instructor: 4.38/5)
Sole instructor for graduate-level course for biostatistics masters program. Responsible for developing materials for the course and delivering lectures each week.

COURSERA

- 2016 Instructor, Coursera, Neurohacking with R
Co-developed a massive open online course (MOOC) for Coursera on neuroimage data, pre-processing and statistical analysis performed completely within the statistical software R. Developed half of the code and slides for the course, recorded lectures delivering slides, and answered student questions during the course.

AMERICAN UNIVERSITY OF ARMENIA
YUERVAN, ARMENIA

- 2015 Instructor for Public Health 321: Inferential Biostatistics, 17 students, (Student Evaluations: Course: 4.7/5, Instructor: 4.8/5)
Sole instructor for graduate-level course in introductory biostatistics for the masters of public health program. Responsible for preparing and teaching daily lectures, lab sessions, and STATA lab sessions.

WORKSHOPS

- 2019 **Sweeney E.M.** “Introduction to Survival Analysis ”. New York R Conference, New York, NY.
- 2019 **Sweeney E.M.** “Neuroconductor for Structural Magnetic Resonance Imaging Processing & Analysis ”. New York City R/ Bioconductor for Genomics, New York, NY.
- 2015 Crainiceanu, C. M., **Sweeney, E. M.**, and Muschelli, J. “A Tutorial for Multisequence Clinical Structural Brain MRI ”. 2015 Eastern North America Region of the International Biometric Society Meeting, Miami, FL.
- 2013 **Sweeney, E. M.** “MIPAV + R for analysis of structural MRI data ”. SAMSI Neuroimaging Data Analysis Workshop, Multisequence Structural MRI Working Group, Research Triangle Park, NC.

DEPARTMENT OF BIostatISTICS, JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH
BALTIMORE, MD

Teaching assistant responsibilities included grading student homework and exams, answering student emails, and holding weekly office hours unless noted otherwise.

- 2016 Lead Teaching Assistant for Statistical Methods in Public Health III, 500 students, (Prof: Dr. Marie Diener-West), *Responsible for teaching a weekly lab session*
- 2015 Teaching Assistant for Biostatistics in Medical Product Regulation, Online Course, 20 students (Prof: Dr. Simon Day and Dr. Mary Foulkes)
- 2015 Teaching Assistant for Statistical Methods in Public Health IV, 300 students, (Prof: Dr. James Tonascia)
- 2015 Teaching Assistant for Statistics for Laboratory Scientists I, 50 students, (Prof Dr. Ingo Ruczinski)
- 2014 Teaching Assistant for Methods in Biostatistics I & II, 50 students, (Prof: Dr. Ciprian Crainiceanu), *Responsible for writing and teaching a weekly lab session.*
- 2012 Teaching Assistant for Statistical Methods in Public Health III & IV, 500 students, (Prof: Dr. Marie Diener-West)
- 2011 Teaching Assistant for Statistical Reasoning in Public Health I & II, 100 students, (Prof: Dr. John McGready)

Invited Presentations

- 2019 “Aging Multiple Sclerosis Lesions on Structural MRI”, Computational and Methodological Statistics, London, UK.
- 2019 “Statistical Analysis of Magnetic Resonance Imaging Data in Multiple Sclerosis”, Colorado School of Public Health Biostatistics and Bioinformatics Seminar, Denver, CO.
- 2019 “Visualizing the Environmental Impact of Beef Consumption Using Plotly and Shiny”, DCR Conference, Washington DC.
- 2019 “Statistical Analysis of Magnetic Resonance Imaging Data in Multiple Sclerosis”, UMass Amherst Statistics Seminar, Amherst, MA.
- 2019 “Statistical Analysis of Magnetic Resonance Imaging Data in Multiple Sclerosis”, Boston University Probability and Statistics Seminar, Boston, MA.

- 2019 “Characterizing the longitudinal behavior of multiple sclerosis lesions on structural magnetic resonance images”, University of Pennsylvania PennSIVE Seminar Series 2016, Philadelphia, PA.
- 2019 “Characterizing the longitudinal behavior of multiple sclerosis lesions on structural magnetic resonance images”, Joint Statistical Meeting 2019, Denver, CO.
- 2019 “Characterizing the longitudinal behavior of multiple sclerosis lesions on structural magnetic resonance images”, New England Statistical Symposium, Hartford, CT.
- 2019 “Neuroimaging Analysis in R”, New York R Conference, New York, NY.
- 2019 “Characterizing the longitudinal behavior of multiple sclerosis lesions on structural magnetic resonance images”, Memorial Sloan Kettering, Departments of Biostatistics, New York, NY.
- 2019 “Characterizing the longitudinal behavior of multiple sclerosis lesions on structural magnetic resonance images”, Memorial Sloan Kettering, Departments of Biostatistics, New York, NY.
- 2018 “Characterizing the longitudinal behavior of multiple sclerosis lesions on structural magnetic resonance images”, New York University, Departments of Biostatistics, New York, NY.
- 2018 “Characterizing the longitudinal behavior of multiple sclerosis lesions on structural magnetic resonance images”, Columbia University, Departments of Psychiatry and Biostatistics at Columbia University Irving Medical Center, New York, NY.
- 2018 “Characterizing the longitudinal behavior of multiple sclerosis lesions on structural magnetic resonance images”, Rutgers University, Department of Biostatistics, Piscataway, NJ.
- 2018 “Parallelization of Simulations with the foreach Package”, R Ladies New York Meetup Group, New York, NY.
- 2017 “Historical Functional Cox Regression, with an Application to Prediction of Multiple Sclerosis Lesions, Eastern North America Region of the International Biometric Society 2017, Washington DC
- 2016 “Neuroimaging Analysis Tools in R”, Houston R Users Group, Houston, TX.
- 2016 “Development of a Neuroimaging Biomarker for Lesion Recovery in Multiple Sclerosis” [Invited Session], Joint Statistical Meeting 2016, Chicago, IL.
- 2016 “Analysis of Longitudinal Multi-Sequence MRI in Multiple Sclerosis” [Invited Poster Session], , Joint Statistical Meeting 2016, Chicago, IL.
- 2016 “Development of a neuroimaging biomarker for lesion recovery in multiple sclerosis” University of Haifa, Department of Statistics, Haifa, Israel.
- 2016 “Using a cannon to kill a mosquito: my experiences with supervised machine learning algorithms” NIH Machine Learning Interest Group, NIH, Bethesda, MD.
- 2015 “Relating multi-sequence longitudinal data from MS lesions on structural MRI to clinical covariates and treatment” T3 seminar, Neuroimmunology Branch, NINDS, Bethesda, MD.
- 2015 “Relating Multi-Sequence Longitudinal Data from MS Lesions on Structural MRI to Clinical Covariates” Duke University, Biostatistics Core, Durham, NC.
- 2014 “Multiple Sclerosis Lesion Segmentation from Structural MRI” Ludwig Maximilian University of Munich, Department of Statistics, Munich, Germany.
- 2014 “Analysis of Longitudinal Structural MRI in Multiple Sclerosis” Indiana University School of Medicine, Department of Biostatistics, Indianapolis, IN.

- 2014 “SuBLIME and OASIS for Multiple Sclerosis Lesion Segmentation in Structural MRI” [Invited Poster Session] 2014 Eastern North America Region of the International Biometric Society , Baltimore, MD.
- 2013 “Health effects of lesion localization in Multiple Sclerosis: Spatial registration and confounding adjustment”. SAMSI Neuroimaging Data Analysis Workshop, Registration Working Group, Research Triangle Park, NC.
- 2013 “OASIS is Automated Statistical Inference for Segmentation with applications to multiple sclerosis lesion segmentation in MRI”. University of California, Berkeley Biostatistics Department, Berkeley, CA.

Contributed Oral Presentations

- 2018 “Reticulate: An R Interface to Python”, Lighting Talk, R Ladies New York Meetup Group, New York, NY.
- 2018 “Treatment Effect on Progression Free Survival in Oncology Assessed Using Electronic Health Records: A Simulation Study. International Conference on Health Policy Statistics 2018, Charleston, SC.
- 2015 “Relating Multi-Sequence Longitudinal Data from MS Lesions on Structural MRI to Clinical Covariates”. [Topics Contributed Session] Joint Statistical Meeting 2015, Seattle, WA.
- 2014 “Analysis of Multi-Sequence Time Series Data from MS Lesions on Structural MRI”. International Conference on Advances in Interdisciplinary Statistics and Combinatorics 2014, Greensboro, NC.
- 2014 “Analysis of Multi-Sequence Time Series Data from MS Lesions on Structural MRI”. Joint Statistical Meeting 2014, Boston, MA.
- 2013 “OASIS is Automated Statistical Inference for Segmentation with applications to multiple sclerosis lesion segmentation in MRI”. Joint Statistical Meeting 2013, Montreal, Canada.
- 2013 “Do not use a cannon to kill a mosquito: a comparison of supervised classification algorithms in the context of MS lesion segmentation in structural MRI”. 28th International Workshop on Statistical Modeling, Palermo, Italy.
- 2012 “Automatic lesion incidence estimation and detection in multiple sclerosis using multisequence longitudinal magnetic resonance images”. Functional Data Analysis Workshop, Bristol, United Kingdom.

Computing Proficiency

STATISTICAL SOFTWARE: R, STATA, Python, Matlab [working knowledge]

PROGRAMMING: Shell scripting

NEUROIMAGING SOFTWARE: ITK-SNAP, MIPAV, FSL, SPM, FreeSurfer, ANTs

DOCUMENT PREPARATION: L^AT_EX, MS Office

OTHER: Extensive knowledge of Adobe Illustrator and Photoshop

Software

R PACKAGES

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| oasis | R package implementation of OASIS is Automated Statistical Inference for Segmentation (OASIS) segmentation of Multiple Sclerosis lesions in the brain on structural MRI, hosted on R CRAN. |
| sublime | R package implementation of Subtraction Based Lesion Incidence Modeling and Estimation (SuBLIME) segmentation of new and enlarging Multiple Sclerosis lesions in the brain on structural MRI, hosted on R CRAN. |

Patents and Patent Applications

PATENT APPLICATIONS

Crainiceanu, C. M., **Sweeney, E. M.**, Shinohara, R. T., Goldsmith, A. J., and Reich, D. (2012). U.S. Patent Application No. 14/362,354.

Crainiceanu, C., Goldsmith, A. J., Pham, D., Reich, D. S., Shiee, N., Shinohara, R. T., and **Sweeney, E. M.** (2013). U.S. Patent Application No. 14/385,509.

Extended Department Research Visits

UNIVERSITY OF HAIFA

Department of Statistics
Haifa, Israel
working with Dr. Philip Reiss
April 2016

LUDWIG MAXIMILIAN UNIVERSITY OF MUNICH

Department of Statistics
Munich, Germany
working with Dr. Sonja Greven
June 2014

UNIVERSITY OF GÖETTINGEN

Department of Animal Sciences
Biometrics & Bioinformatics
Göttingen, Germany
working with Dr. Jan Gertheis
July 2014

UNIVERSITY OF PENNSYLVANIA

Department of Biostatistics and Epidemiology
Philadelphia, PA
working with Dr. Russell T. Shinohara
January 2013, 2014, and 2015,
July 2014, September - October 2015

Peer Review

Biomedical Signal Processing and Control, Biometrics, BMJ Open, Computer Methods and Programs in Biomedicine, International Journal for Quality in Health Care, Journal of Computational and Graphical Statistics, Journal of the Neurological Sciences, Multiple Sclerosis Journal, Nature: Scientific Reports, NeuroImage, NeuroImage: Clinical, Neuroradiology, PLOS ONE, Statistics in Medicine

Honors and Awards

2016	Jane and Steve Dykacz Award, Johns Hopkins Biostatistics Department <i>Best student paper in medical statistics for “Relating multi-sequence longitudinal intensity profiles and clinical covariates in new multiple sclerosis lesions”</i>
2015	American Statistical Association Gertrude M. Cox Scholarship <i>Award to encourage women to enter statistically oriented professions</i>
2014	Young Researcher Travel Award, International Conference on Advances in Interdisciplinary Statistics and Combinatorics
2014	Jane and Steve Dykacz Award, Johns Hopkins Biostatistics Department <i>Best student paper in medical statistics for “OASIS Is Automated Statistical Inference for Segmentation with Applications to Multiple Sclerosis Lesion Segmentation in MRI”</i>
2012	Johns Hopkins Imaging Conference Poster Session Peer Choice Award
2011	Exceptional Summer Student, NINDS
2008, 2009	Yuri Abramovich Memorial Mathematics Scholarship, IUPUI Mathematics Department
2007, 2008, 2009	Anna K Suter Mathematics Scholarship, IUPUI Mathematics Department

Service

2019	Secretary, American Statistical Association Statistics in Imaging Section
2019	Board Member, R-Ladies NYC
2017	Invited Session Organizer, Shaping the Future of the Field: Biostatisticians in a Data Driven World, 2017 Eastern North America Region of the International Biometric Society Meeting, Washington DC
2017	Invited Session Organizer, Shaping the Future of the Field: Biostatisticians in a Data Driven World, 2017 Eastern North America Region of the International Biometric Society Meeting, Washington DC
2016	Member of the Social Media Committee, Eastern North America Region of the International Biometric Society
2016 - 2017	Member of Council for Emerging and New Statisticians, Eastern North America Region of the International Biometric Society
2016	Invited Session Organizer, Statisticians and Multiple Sclerosis Research, Joint Statistical Meeting 2016, Chicago, IL
2015	Peer Facilitator, Johns Hopkins University Data Science Hackathon, Baltimore, MD
2015 - 2016	Gerontology Interest Group Co-Leader, Johns Hopkins School of Public Health, Baltimore, MD
2015	Session Chair, 2015 Eastern North America Region of the International Biometric Society Meeting, Miami, FL

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| 2014 - 2105 | Student Journal Club Co-Organizer with John Muschelli, Biostatistics Department, Johns Hopkins School of Public Health, Baltimore, MD. |
| 2014 | Volunteer, Eastern North America Region of the International Biometric Society Meeting 2014, Baltimore, MD |
| 2013 | Session Chair, Joint Statistical Meeting 2013, Montreal, Canada |

Last updated: April 24, 2020