BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
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NAME: Shappell, Heather M.

eRA COMMONS USER NAME (credential, e.g., agency login): HSHAPPE

POSITION TITLE: Assistant Professor, Wake Forest School of Medicine, Department of Biostatistics and Data Science

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Arcadia University, Glenside, PA	BS	05/2011	Mathematics and Computer Science
Boston University, Boston, MA	MA	05/2013	Biostatistics
Boston University, Boston, MA	PhD	05/2017	Biostatistics
Johns Hopkins University, Baltimore, MD	Postdoctoral Training	07/2020	Biostatistics

NOTE: The Biographical Sketch may not exceed five pages. Follow the formats and instructions below.

A. Personal Statement

My background is in statistics, mathematics, and computer programming. My research emphasis has been on the statistical analysis of network data with a concentration in complex brain networks. This research has centered on data in the context of EEG and epilepsy, as well as on resting-state fMRI in healthy individuals and individuals with Alzheimer's disease, attention-deficit/ hyperactivity disorder, and autism. Technical aspects include modeling and inference for noisy complex brain networks evolving over time, comparisons of what is driving network changes over time across groups, and estimating a percolation model from a series of observed networks.

My statistical research has also involved work in several clinical trials, with my heaviest involvement being in clinical trials for Hutchinson-Gilford progeria syndrome, an ultra-rare fatal segmental premature aging disease resulting in early death from premature atherosclerosis leading to heart failure.

B. Positions and Honors

Positions

2011-2017 Graduate Student, Boston University; Dept. of Biostatistics

2017-2020 Postdoctoral Fellow, Johns Hopkins University; Dept. of Biostatistics

2020-Present Assistant Professor, Wake Forest University; Dept. of Biostatistics and Data Science

Teaching

Biostatistics Department, Boston University College of Arts and Sciences
Computer Science Department, Boston University Metropolitan College

Honors and Awards

2007	Arcadia University Honors Program Member
2007	Arcadia University Distinguished Scholarship Recipient
2010	Phi Kappa Phi Inductee
2010	The Ellington Beavers Award for Intellectual Inquiry Recipient
2011	Charles E. Moulton Award in Mathematics Recipient
2011	NIGMS Biostatistics Training Grant Recipient
2013	Mu Sigma Rho Membership
2018	Johns Hopkins University Provost Fellowship Winner

C. Contribution to Science

1. *Statistical Analysis of Network Data.* I have worked on a mix of methodological and inter-disciplinary projects in the area of network analysis. Several projects are ongoing and involve brain networks constructed from either EEG or resting-state fMRI data. I have worked to adapt Stochastic-Actor Oriented Models, a type of modeling framework developed for social networks, to the neuroscience setting, and I have demonstrated this on data from the Alzheimer's Disease Neuroimaging Initiative. I have also developed an extension to these models to account for type I and type II error on the network edges. A third ongoing project involves estimating a percolation regime from a series of observed networks, which I have applied to epilepsy data. Additionally, I have proposed and adapted Hidden semi-Markov Models for dynamic brain network analysis and have applied these models to a range of data sets, including ADHD data, pain data, and Autism data.

a. **Shappell, H.,** Tripodis, Y., Killiany, R. J., & Kolaczyk, E. D. (2019). A paradigm for longitudinal complex network analysis over patient cohorts in neuroscience. *Network Science*, 7(2), 196-214. DOI: https://doi.org/10.1017/nws.2019.9
b. **Shappell, H.,** Caffo, B. S., Pekar, J. J., Lindquist, M. A. (2019). Improved state change estimation in dynamic functional connectivity using hidden semi-Markov models. *NeuroImage*, 191, 243-257. PMC6504179.
c. **Shappell, H.,** Duffy, K., Rosch, K., Pekar, J., Mostofsky, S., Lindquist, M., Cohen, J., (2021). Children with attention-deficit/hyperactivity disorder spend more time in hyperconnected network states and less time in segregated network states as revealed by dynamic connectivity analysis. *NeuroImage, 1053-8119, 117753.*
d. **Shappell, H.**, Kolaczyk, E.D., Accounting for Uncertainty in Stochastic Actor Oriented Models for Dynamic Network Analysis. Revisions in Preparation at *The Journal of Computational and Graphical Statistics.*

2. *Clinical Trials and Observation Studies.* I have worked on several clinical trials and observational studies. My largest contribution has been in clinical trials for Hutchinson-Gilford progeria syndrome - an ultra-rare fatal segmental premature aging disease resulting in early death from premature atherosclerosis leading to heart failure. My participation has mainly been with the second and third trials, where I have analyzed multiple outcomes, including weight gain, bone mineral density, pulse wave velocity, arterial plaques, and extraskeletal calcifications. Most recently, I have acted as the primary statistician on a project where we provide an assessment of Lonafarnib monotherapy treatment on patient survival as compared to a large untreated retrospective and concurrent patient cohort. I have also been a statistician on several observational studies,

including a study on smoking and cardiovascular disease association in the Framingham Heart Study and a study on fetal hemoglobin gene expression in the Arab-Indian haplotype of Sickle cell anemia.

a. Gordon, L.B., Kleinman, M.E., Massaro, J.M., D'Agostino, R.B., **Shappell, H.**, Gerhard-Herman, M., Smoot, L.B., Gordon, C.M., Cleveland, R.H., Nazarian, A. and Snyder, B.D., (2016). Clinical Trial of Protein Farnesylation Inhibitors Lonafarnib, Pravastatin and Zoledronic Acid in Children with Hutchinson-Gilford Progeria Syndrome. *Circulation*, pp. CIRCULATIONAHA-116. PMC4943677
b. Burke, G. M., Genuardi, M., **Shappell, H**., D'Agostino Sr, R. B., & Magnani, J. W. (2017). Temporal associations between smoking and cardiovascular disease, 1971 to 2006 (from the Framingham Heart Study). *The American journal of cardiology*, 120(10), 1787-1791. PMC6541867
c. Gordon, L. B., **Shappell, H.**, Massaro, J., D'Agostino, R. B., Brazier, J., Campbell, S. E., ... & Kieran, M. W. (2018). Association of lonafarnib treatment vs no treatment with mortality rate in patients with Hutchinson-Gilford progeria syndrome. *Jama*, 319(16), 1687-1695. PMC5933395
d. Maru, M., Rogers, E. S., Hutchinson, D., **Shappell, H.** (2018). An Integrated Supported Employment and Education Model: Exploratory Study of an Innovative Approach Designed to Better Meet the Needs of Young Adults with Psychiatric Conditions. *The journal of behavioral health services & research*, 45(3), 489-498. PMID: 29536344

The complete publication list can be found at:
https://www.ncbi.nlm.nih.gov/myncbi/heather.shappell.1/bibliography/public/

D. Research Support

Ongoing Research Support

P30AG049638 Craft, PI 9/1/2020 – 6/30/2026
NIA
Data Management and Statistical Core
The mission of Data Management and Statistical (DMS) Core is to promote excellence in the Wake Forest ADCC by providing outstanding data management, biomedical computing, and analytical support to ADCC investigators and affiliates.
Role: Investigator

R01AG058571 Espeland, PI 9/01/2020-3/31/2022
NIA
Long-Term Impact of Random Assignment to Intensive Lifestyle Intervention on Alzheimer's Disease and Related Dementias: The Action for Health in Diabetes ADRD Study (Look AHEAD-MIND)
Type 2 diabetes mellitus and obesity in combination nearly double one's risk for Alzheimer's disease and related dementias. Our study will examine the legacy of a successful 10-year behavioral intervention design mechanisms that may explain the potential benefits and harm of intentional weight loss on late-life cognitive health in overweight and obese individuals need to induce and maintain weight loss on the cognitive health of older individuals. We propose to collect additional cognitive assessments; adjudicate cognitive status in large, well-characterized cohort; and conduct laboratory analyses of existing blood specimens to examine.
Role: Investigator

Completed Research Support

R01EB016061-05A1 Lindquist, PI 7/1/17 – 7/31/20
NIH/NIBIB
Causal Inference for Neuroimaging - The goal of this project is to develop a general framework for causal inference in functional magnetic resonance imaging (fMRI) research using the potential outcomes approach widely utilized in the statistical literature.
Role: Investigator

110156-0818 Van Zijl, PI 7/1/17 – 7/31/20

NIH/NIBIB

Resource for Quantitative Functional FMRI - The goal of this Biomedical Technology Resource Center, now in its 15th year, is to develop technologies that allow quantitative measurement of MRI biomarkers for tracking changes in brain anatomy, function, metabolism and physiology and to provide reference brain atlases for such marker.

Role: Investigator