WAKE FOREST SCHOOL OF MEDICINE
Curriculum Vitae

NAME Heather Marie Shappell, Ph.D.

ADDRESS Department of Biostatistics and Data Science
Wake Forest School of Medicine
525 Vine Street
Winston-Salem, NC 27101
(570) 621-8128
hshappel@wakehealth.edu

EDUCATION

2011 Arcadia University
Glenside, PA
Bachelor of Science/Mathematics and Computer Science

2013 Boston University
Boston, MA
Master of Arts/Biostatistics

2017 Department of Biostatistics
Boston University
Boston, MA
PhD

Research Advisor(s): Eric D. Kolaczyk, Ph.D.
Thesis: Methods for Longitudinal Complex Network Analysis in Neuroscience

POSTDOCTORAL TRAINING

2017 - 2020 Postdoctoral Fellow, Johns Hopkins University, Bloomberg School of Public Health, Department of Biostatistics, Baltimore, MD.
Research Advisor: Martin Lindquist, Ph.D., Brian Caffo, Ph.D.
Research Project: Methods for Analyzing Dynamic Functional Brain Networks

EMPLOYMENT

Academic Appointments

Wake Forest University School of Medicine, Winston Salem, NC

2020 - Present Assistant Professor (tenure-track), Division of Public Health Sciences, Department of Biostatistics and Data Science

2020 - Present	Faculty Member, Laboratory for Complex Brain Networks (LCBN)
2020 - Present	Affiliate Faculty, School of Biomedical Engineering and Sciences (Joint partnership between Virginia Tech and Wake Forest University).
2024 - Present	Affiliate Faculty, Neuroscience Graduate Program, Wake Forest University Graduate School of Arts & Sciences

Professional Experience

2010 Researcher, NSF Research for Undergraduate Program, Johnson City, TN.

Research Projects: Conducted original research on two projects involving Poisson approximations and graph theory.

2010- 2011 Undergraduate Research Assistant, Arcadia University, Mathematics and Computer Science Department, Glenside, PA.

Research Project: Analyzed data pertaining to the impact of NSF Math Science Partnership grants on higher education faculty. Also designed and prototyped SunSPOT-based wireless sensor networks for environmental monitoring.

2011- 2013 Graduate Research Assistant, Boston University, Biostatistics Department, Boston, MA.

Research Project: Performed four semester long rotations as part of the training for the NIH Training Grant in Biostatistics. Rotations included Bioinformatics, Genetics, Clinical Trials, and Ethics.

2013- 2014 Teaching Assistant - Introduction to Statistical Computing, Applied Statistics in Clinical Trials I, and Analysis of Correlated Data. Department of Biostatistics, Boston University.

2013- 2017 Graduate Research Assistant, Boston University, Biostatistics Department, Boston, MA.

Research Project: Statistical consultant for the Boston University Center for Psychiatric Rehabilitation, as well as for numerous clinical trials, including the first ever clinical trials in Progeria.

2015- 2017 Graduate Research Assistant, Boston University, Department of Mathematics and Statistics, Boston, MA.

Research Project: Developed statistical models for the analysis of network data.

2017- 2020 Post-doctoral fellow, Johns Hopkins University, Department of Biostatistics, Baltimore, MD.

Research Project: Developed methods for analyzing dynamic functional brain networks in neuroscience.

ADMINISTRATIVE SERVICE

Departmental Service

2020	Planning Committee for annual retreat, Division of Public Health Sciences
2021	Faculty Recruitment Committee, Biostatistics and Data Science
2021-2022	Twitter and Social Networking Committee, Biostatistics and Data Science
2021-2023	Assistant Professor Representative, Executive Committee, Biostatistics and Data Science
2022- 2023	Data Science Interest Group Committee, Biostatistics and Data Science
2022- Present	Seminar Series Committee, Biostatistics and Data Science
2024- Present	Faculty Recruitment Committee, Biostatistics and Data Science

Institutional Service

2023	Poster Presentation Judge, Medical Student Research Day, Wake Forest University Medical School
2024- Present	Intramural Research Support Committee

EXTRAMURAL APPOINTMENTS AND SERVICE

NIH Study Sections

Nov 2024	Neuroimaging Special Emphasis Panel

Data Monitoring Committee

2024- Present:	VA Cooperative Study, CSP # 2026: “Beta Blocker Dialyzability on Cardiovascular Outcomes (BRAVO).”

Teaching

2018- Present:	Boston University Metropolitan College, Computer Science Department. Online Course Instructor for Foundation of Analytics (CS 544) and Data Analysis and Visualization (CS 555).

Journal Reviewer

Journal of American Heart Association

Human Brain Mapping

Biometrics

Network Neuroscience

Neuroimage

Psychometrika

Journal of Mathematical Sociology

Nature Communications

PROFESSIONAL MEMBERSHIPS AND SERVICE

2015-2016	Boston University Student Chapter of the American Statistical Association (ASA) President Led the development of the first ever student chapter of the ASA.
2015-2017	Boston Chapter of the American Statistical Association Committee Member for new college teaching award
2015-Present	Member, American Statistical Association
2015-Present	Member, Organization for Human Brain Mapping

PROFESSIONAL DEVELOPMENT

2021	K&R Writers Series, Clinical and Translational Sciences Institute, Wake Forest School of Medicine
2022	2022 Early Career Development Program for Women, Women in Medicine and Science, Wake Forest School of Medicine
2023-Present	Clinical and Translational Science Institute Translational Research Academy, Wake Forest School of Medicine

HONORS AND AWARDS

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

PROFESSIONAL INTERESTS

Network- and Complexity-Based Neuroimaging, Obesity and Exercise Science, and Alcohol and Substance Abuse.

Dr. Shappell is an Assistant Professor of Biostatistics and Data Science with experience performing successful inter-disciplinary research with collaborators from a variety of fields, including neuroscience, aging, mental health, and pediatrics. While her work initially focused on the statistical analysis for clinical trials and observational studies, her research emphasis over the past 7 years has been on the statistical analysis of network data, with a concentration in dynamic brain networks. She has developed models, as well as methods for statistical inference, for a variety of applications including the analysis of electroencephalogram data in patients with epilepsy and the analysis of functional magnetic resonance imaging data in healthy individuals and individuals with Alzheimer's disease, attention-deficit/ hyperactivity disorder, alcohol use disorder, autism, and obesity. Technical aspects include hidden Markov modeling and inference for noisy complex dynamic brain networks, comparisons of functional dynamic brain networks across healthy and diseased groups and estimating a percolation model from a series of observed brain networks. This work has provided modeling frameworks that have led to significant insights into the organization of functional communication in the brain in both healthy and diseased states.

GRANT FUNDING

Currently Active Grants

K25 EB032903 (**Shappell**) 03/01/2023 – 02/28/2027 75% effort
NIH NIBIB $72,490
Statistical Methods for Whole-Brain Dynamic Connectivity Analysis
My objective for the K25 award is to establish myself as an independent neuroimaging statistician, with expertise in whole-brain network analyses and an integral member of multidisciplinary research teams devoted to addressing diseases of the brain. Attaining these goals will require didactic training and research guidance. We will develop new methodology to improve whole-brain dynamic connectivity analyses of normal and abnormal brain function, which is vital for understanding various brain disorders, such as Alzheimer's Disease, and may help identify biomarkers and inform early prevention and treatment.
Role: Principal Investigator

R56 AG081860 (Sai) 09/30/2023 – 09/29/2028 5% effort
NIH NIA $926,389
PET Imaging of Microtubules in Cognitively Normal and Impaired Older Adults
As amyloid beta and tau pathology accumulate in the brains of people with Alzheimer's disease (AD), microtubule (MT) stability is heavily compromised. We propose a clinical imaging study of a novel MT-based PET radioligand, [11C]MPC-6827 in cognitively normal and mildly impaired/early AD older adults to determine its utility in imaging early stages of AD.
Role: Co-Investigator

P50 AA026117 (Laurienti) 12/01/2022 – 11/30/2027 10% effort
NIH NIAAA $292,130
Dynamic functional brain network phenotypes associated with vulnerability to hazardous alcohol consumption
This project is a continuation of the human neuroimaging studies examining brain networks associated with drinking behaviors in the Wake Forest Translational Alcohol Research Center

(WF-TARC). The overarching hypothesis of this proposal that the vulnerability to develop hazardous drinking is manifest in dynamic network connectivity within and between the default mode network (DMN) salience network (SN) and the sensorimotor network (SMN).
Role: Co-Investigator

R01 AG076669 (Hugenschmidt) 04/15/2022 – 03/31/2027 5% effort
NIH NIA $763,265
yr5
Establishing the optimal frequency of dance movement for neurocognitive and physical outcomes in people at risk of Alzheimer's disease.
The goal is to assess outcomes of 1x/weekly, 2x/weekly, and 3x/weekly dance movement classes and 1x/week music appreciation class control at 4 time-points over 6 months to determine the time course of changes in cardiorespiratory fitness and cognition.
Role: Co-Investigator

Pending Grant Proposals

NOSI R01 04/01/2025 – 03/30/2029 10% effort
NIH NIAA $1,532,400 total
Understanding the role of Alzheimer's disease biomarkers and sex differences on brain network associations with physical and cognitive function: A secondary analysis in the B-NET study.
This study is designed to determine if altered brain network organization is a neural mechanism linking cognitive and physical function. Brain network associations with
Alzheimer's disease biomarkers and sex differences will also be examined.
Principal Investigator: Paul Laurienti
Role: Co-Investigator

R01 04/01/2025 – 03/30/2029 25% effort
NIH $3,175,267 total
Analytical Tools for Human Connectome Project (HCP) Data
This project will (a) demonstrate the utility of new tools for relating phenotypic traits to brain network organization in Human Connectome Project (HCP) data—engendering deeper insights into the complex neurobiological interactions and changes that occur in brain health and disease, and (b) disseminate these tools with corresponding tutorials via the NIMH Data Archive (NDA) cloud environment to enhance rigor and reproducibility.
Principal Investigator: Sean Simpson
Role: Co-Investigator

F31 NIAAA 04/01/2025 - 03/30/2028 0% effort
NIH NRSA $317,412 total
The bidirectional relationship between brain network dynamics and adolescent alcohol use.
The proposed project will be the first to investigate the bidirectional relationship between dynamic brain networks and adolescent drinking, including (1) using dynamic brain networks to predict future drinking and (2) studying the impact of drinking history on brain network dynamics.
Trainee: Clayton McIntyre
Role: Mentor

Past Grant History

T32 GM74905 09/01/2011 – 07/01/2013

NIH NIGMS
Interdisciplinary Training Grant for Biostatisticians
Principal Investigator: Paola Sebastiani
Role: Graduate Student

R01 NS095369 09/01/2015 – 05/12/2017
NIH NINDS
CRCNS: Dynamic network analysis of human seizures for therapeutic intervention
A multi-disciplinary study focused on developing and using tools from dynamic network analysis to characterize epileptic seizures and examine the extent to which seizure characteristics may be used to inform and predict therapeutic interventions.
Principal Investigator: Eric D. Kolaczyk
Role: Co-Investigator
Total Grant Amount: $950,217

R01 EB016061-05A1 07/01/2017 – 07/31/2020
NIH NIBIB
Causal Inference for Neuroimaging
The goal of this project was 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.
Principal Investigator: Martin Lindquist
Role: Co-Investigator
Total Grant Amount: $306,282

P41 EB015909-18S1 07/01/2017 – 07/31/2020
NIH NIBIB
Resource for Quantitative Functional FMRI
The goal of this Biomedical Technology Resource Center was 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 markers.
Principal Investigator: Peter CM Van Zijl
Role: Co-Investigator
Total Grant Amount: $1,829,417

R01 AG058571 08/01/2020 - 05/31/2022
NIH 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 examined the legacy of a successful 10-year behavioral intervention designed to induce and maintain weight loss on the cognitive health of older individuals. We proposed to collect additional cognitive assessments; adjudicate cognitive status in large, well-characterized cohort; and conduct laboratory analyses of existing blood specimens to examine mechanisms that may explain the potential benefits and harm of intentional weight loss on late-life cognitive health in overweight and obese individuals.
Principal Investigator: Mark A. Espeland
Role: Co-Investigator
Total Grant Amount: $8,070,906

RF1 AG054068 08/01/2020 – 06/30/2021
NIH NIA
Alzheimer's Disease & Related Dementias: Geography, Environments, and Mechanisms
The long-term goal of this project was to better understand the neuropsychological processes, environmental determinants, and mechanistic pathways leading to geographic disparities in the risk of late-onset Alzheimer's disease (AD) of vulnerable populations.
Principal Investigator: Jiu-Chiuan Chen
Role: Co-Investigator
Total Grant Amount: $4,101,336

P30 AG072947 09/01/2021 – 09/30/2022
NIH NIA
Wake Forest Alzheimer's Disease Center: Core C: Data Management and Statistical Core
This application sought to establish a new Alzheimer's Disease Core Center (ADCC) at Wake Forest School of Medicine that will provide a comprehensive infrastructure for translational, interdisciplinary research on the pathophysiology, prevention, and treatment of AD and related disorders.
Principal Investigator: Suzanne Craft
Core C Principal Investigator: Mark A. Espeland
Role: Co-Investigator
Total Grant Amount: $1,062,240

P30 AG049638-04S1 07/01/2021 – 05/31/2022
NIH NIA
Multi-modal Imaging in a Diverse Cohort: The Wake Forest ADCC Neuroimaging Core
This established a new Alzheimer's Disease Core Center (ADCC) at Wake Forest School of Medicine that provided a comprehensive infrastructure for translational, interdisciplinary research on the pathophysiology, prevention, and treatment of AD and related disorders. Our ADCC focused on the transition from normal aging to mild cognitive impairment and then to AD and other dementias and understanding the contribution of metabolic and vascular factors to these transitions.
Principal Investigator: Suzanne Craft
Role: Co-Investigator
Total Grant Amount: $1,023,651

R01 DA047149 (Meade) 08/01/2023 - 04/30/2024
NIH NIDA
Role of cannabis on HIV-related cognitive impairment: a brain connectomics study
Marijuana, the mostly commonly abused drug among HIV-infected persons, may accelerate the development and progression of neurocognitive impairments. This study applied a connectomics approach to examine how HIV and marijuana interact to disrupt neural networks that underlie cognitive functioning, with implications for the development of improved diagnostics and treatments.
Principal Investigator: Christina S. Meade
Role: Co-Investigator
Total Grant Amount: $3,115,773

BIBLIOGRAPHY

Peer-Reviewed Publications

1) Sebastiani, P., Farrell, J.J., Alsultan, A., Wang, S., Edward, H.L., **Shappell, H.**, et al. BCL11A enhancer haplotypes and fetal hemoglobin in sickle cell anemia. *Blood Cells, Molecules, and Diseases*. 2015; 54(3):224-230. doi: 10.1016/j.bcmd.2015.01.001

2) Vathipadiekal, V., Farrell, J., Shuai, Z., Edward, H., **Shappell, H.**, et al. A Candidate Trans-Acting Modulator of Fetal Hemoglobin Gene Expression in the Arab-Indian Haplotype of Sickle Cell Anemia. *Blood*. 2015; 126(23):409-409. doi: 10.1002/ajh.24527

3) Gordon, L.B., Kleinman, M.E., Massaro, J.M., D'Agostino, R.B., **Shappell, H.**, et al. Clinical Trial of Protein Farnesylation Inhibitors Lonafarnib, Pravastatin and Zoledronic Acid in Children with Hutchinson-Gilford Progeria Syndrome. *Circulation*. 2016; 134(2):114-125. doi: 10.1161/CIRCULATIONAHA.116.022188

4) Burke, G. M., Genuardi, M., **Shappell, H.**, D'Agostino Sr, R. B., & Magnani, J. W. Temporal associations between smoking and cardiovascular disease, 1971 to 2006 (from the Framingham Heart Study). *The American Journal of Cardiology*. 2017; 120(10):1787-1791. doi: 10.1016/j.amjcard.2017.07.087

5) Maru, M., Rogers, E. S., Hutchinson, D., **Shappell, H.** 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*. 2018; 45(3):489-498. doi: 10.1007/s11414-018-9595-x

6) Russinova, Z., Bloch, P., Wewiorski, N., **Shappell, H.**, Rogers, E. S. Predictors of sustained employment among individuals with serious mental illness: findings from a 5-year naturalistic longitudinal study. *The Journal of Nervous and Mental Disease*. 2018; 206(9):669-679. doi: 10.1097/NMD.0000000000000876

7) Gordon, L. B., **Shappell, H.**, Massaro, J., D'Agostino, R. B., Brazier, J., Campbell, S. E., et al. Association of lonafarnib treatment vs no treatment with mortality rate in patients with Hutchinson-Gilford progeria syndrome. *JAMA*. 2018; 319(16):1687-1695. doi: 10.1001/jama.2018.3264

8) **Shappell, H.**, Caffo, B. S., Pekar, J. J., Lindquist, M. A. Improved state change estimation in dynamic functional connectivity using hidden semi-Markov models. *NeuroImage*. 2019; 191:243-257. doi: 10.1016/j.neuroimage.2019.02.013

9) **Shappell, H.**, Tripodis, Y., Killiany, R., Kolaczyk, E.D., A Paradigm for Longitudinal Complex Network Analysis over Patient Cohorts in Neuroscience. *Network Science.* 2019; 7(2):196. doi: 10.1017/nws.2019.9

10) **Shappell, H.**, Duffy, K., Rosch, K., Pekar, J., Mostofsky S., Lindquist M., Cohen J. 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*. 2021; 229:117753. doi: 10.1016/j.neuroimage.2021.117753

11) Sarhane KA, Slavin BR, Hricz N, Malapati H, Guo YN, Grzelak M, Chang IA, **Shappell H**, von Guionneau N, Wong AL, Mi R, Höke A, Tuffaha SH. Defining the relative impact of

muscle versus Schwann cell denervation on functional recovery after delayed nerve repair. *Experimental Neurology.* 2021; 339:113650. doi: 10.1016/j.expneurol.2021.113650

12) **Shappell, H.,** Simpson, S., Discussion on "Distributional independent component analysis for diverse neuroimaging modalities" by Ben Wu, Subhadip Pal, Jian Kang, and Ying Guo. 2021. Biometrics. 2022 Sep;78(3):1106-1108. doi: 10.1111/biom.13589

13) Bahrami, M, Laurienti, PJ, **Shappell, H.**, Dagenbach, D., Simpson, SL. A Mixed-Modeling Framework for Whole-Brain Dynamic Network Analysis. Network Neuroscience. 2022. 6(2):591-613. doi: 10.1162/netn_a_00238

14) Bahrami, M, Laurienti PJ, **Shappell HM**, Simpson SL. Brain Network Analysis: A Review on Multivariate Analytical Methods. Brain Connectivity. 2022; (2):64-79. doi: 10.1089/brain.2022.0007

15) Zhu, X.*, **Shappell, H.***, Kramer, M., Chu, C.J., Kolaczyk, E.D., Inferring the Type of Phase Transitions Undergone in Epileptic Seizures Using Random Graph Hidden Markov Models for Percolation in Noisy Dynamic Networks. PLOS Computational Biology. 2023; 19(6):e1011188. doi: 10.1371/journal.pcbi.1011188 ***These authors contributed equally**.

16) Mongraw-Chaffin, M., Evans, J.K., Bancks, M.P., Schaich, C.L., **Shappell, H.M**., Espeland, M.A. and Hayden, K.M. (2023), Association of HbA1c trajectory and variability with cognitive function. Alzheimer's Dement., 19: e063158. https://doi.org/10.1002/alz.063158

17) Hayden KM, Mielke MM, Evans JK, Neiberg R, Molina-Henry D, Culkin M, Marcovina S, Johnson KC, Carmichael OT, Rapp SR, Sachs BC, Ding J, **Shappell H**, Wagenknecht L, Luchsinger JA, Espeland M. The association between Alzheimer's disease blood-based biomarkers and cognitive impairment and probable dementia in Look AHEAD Cohort. JAR Life. 2024; 13:1-21. doi: 10.14283/jarlife.2024.1. Erratum in: JAR Life. 2024; 13:29. doi: 10.14283/jarlife.2024.3

18) Simpson, SL., **Shappell, HM.**, Bahrami, M. Statistical Brain Network Analysis. Annual Review of Statistics and Its Application. 2024; 11:505-531. doi: 10.1146/annurev-statistics-040522-02072

19) McIntyre CC, Bahrami M, **Shappell HM.**, Lyday RG, Fish J, Bollt EM, Laurienti PJ. Contrasting topologies of synchronous and asynchronous functional brain networks. Netw Neurosci. 2024 Nov; 1–16. doi.org/10.1162/netn_a_00413

20) Sachs, B.C., Latham, L.A., Bateman, J.R., Cleveland, M.J., Espeland, M.A., Fischer, E., Gaussoin, S.A., Leng, I., Rapp, S.R., Rogers, S. and **Shappell, H.M.,** et al. Feasibility of remote administration of the Uniform Data Set-Version 3 for assessment of older adults with mild cognitive impairment and Alzheimer's disease. Archives of Clinical Neuropsychology, 2024; 39(5):635-643. doi: 10.1093/arclin/acae001

21) Mielke MM, Evans JK, Neiberg R, Molina-Henry D, Marcovina S, Johnson KC, McCaffery J, Carmichael O, Rapp SR, Sachs BC, Ding J, **Shappell H**, Luchsinger JA, Espeland MA, Hayden KM. Alzheimer disease blood biomarkers and cognition among individuals with diabetes and overweight or obesity. JAMA Network Open 2024.

22) **Shappell, HM**., Rejeski, WJ., Khodaei, M., Lyday, R., Bahrami, M., Nicklas, BJ., Fanning, J., Burdette, JH., Laurienti, PJ. Brain network dynamics associated with intentional weight loss in older adults. *Aperture Neuro*. 2025; 10(5). doi:10.52294/001c.128461

23) McIntyre CC, Khodaei M, Lyday RG, Weiner JL, Laurienti PJ, **Shappell HM**. Triple network dynamics and future alcohol consumption in adolescents. Alcohol, Clinical and Experimental Research. 2025.In Press. Preprint available at bioRxiv; doi: 10.1101/2024.11.22.624880

24) **Shappell H**, Kramer M, Chu C, Kolaczyk ED. Accounting for Edge Uncertainty in Stochastic Actor-Oriented Models for Dynamic Network Analysis. Network Science, 2025. In Press. Preprint available at bioRxiv, doi: 10.1101/2025.02.17.638664

25) Hercules K, Liu Z, Wei J, Venegas G, Ciocca O, Dyer A, Lee G, Santini-Bishop S, **Shappell HM**, Gee DG, Sukhodolsky DG, Ibrahim K. Transdiagnostic Symptom Domains are Associated with Head Motion During Multimodal Imaging in Children. *Biological Psychiatry: Global Open Science.* April 2025. In Press. Preprint available at bioRxiv, doi: 10.1101/2024.09.13.612668

Non-Peer Reviewed Preprints

1) Laurienti PJ, Kritchevsky SB, Lyday RG, Miller ME, Lockhart SN, Rundle MM, Hugenschmidt CE, Burdette JH, **Shappell HM**, Chen H, Baker LD, Neyland BR, Holtzer R. Resting-state connectivity modifies the effects of amyloid on cognitive and physical function: evidence for network-based cognitive reserve. bioRxiv 2024.11.07.622257; doi:10.1101/2024.11.07.622257.

2) Khodaei M, Laurienti PJ, Simpson SL, **Shappell H**. MIND Map; A Comprehensive Toolbox for Estimating Brain Dynamic States. https://www.bioRxiv.org/content/biorxiv/early/2024/12/17/2024.12.13.628351.full.pdf 2024

Miscellaneous Publications

1) Kaplan, W., Sharma, Abhishek., **Shappell, H.**, Kolaczyk, E.D. Insulin Trade Profile Technical Report. *Health Action International.* 2016.

2) Godbole, H., Grzesik, K., **Shappell, H.**, Poisson Approximations for the Number of kl-Scans. *Handbook of Scan Statistics*. 2017;1-8.

3) Chang L, Manning J, Baldassano C, de la Vega A, Fleetwood G, Geerligs L, Haxby J, Lahnakoski J, Parkinson C, **Shappell H**, Shim W, Wager T, Yarkoni T, Yeshurun Y, Finn E. naturalistic-data-analysis/naturalistic_data_analysis: Version 1.0. [Internet]. Zenodo; 2020 July. Available from: https://zenodo.org/records/3937849.

PRESENTATIONS AT PROFESSIONAL MEETINGS

1) **Shappell HM**, Grzesik K, Donders M. Planarized Pascal's triangle mod a general prime p graphs and their Properties. Joint Mathematics Meeting, New Orleans, LA, USA. Jan 2011

2) Grzesik K, **Shappell HM**, Donders M, Ross C. A Poisson Approximation for the Number of kl-Matches I. Joint Mathematics Meeting, New Orleans, LA, USA. Jan 2011

3) Donders M, Grzesik K, Ross C, **Shappell HM**,. A Poisson Approximation for the Number of kl-Matches II. Joint Mathematics Meeting, New Orleans, LA, USA. Jan 2011

4) **Shappell H**, Tripodis Y, Killiany RJ, Kolaczyk E. Dynamic Network Analysis in Resting-State fMRI for Alzheimer's Disease. Joint Statistics Meeting, Seattle, WA, USA. Aug 2015

5) **Shappell H**, Tripodis Y, Killiany RJ, Kolaczyk E. A Paradigm for Longitudinal Network Analysis over Patient Cohorts in Neuroscience. Workshop hosted by Columbia University Department of Statistics, New York, NY, USA. May 2016

6) Gordon LB, **Shappell H**, Massaro J, D'Agostino Sr RB, Brazier J, Campbell SE, Kleinman ME, Kieran MW. Update on Impact of Farnesylation Inhibitors on Survival in Hutchinson-Gilford Progeria Syndrome. Progeria Research Foundation 8th International Scientific Workshop, Boston, MA, USA. May 2016

7) **Shappell H**, Tripodis Y, Killiany RJ, Kolaczyk E. A Paradigm for Longitudinal Network Analysis over Patient Cohorts in Neuroscience. New England Statistics Symposium, Yale University. New Haven, CT, USA. April 2016

8) Kolaczyk ED, **Shappell H**, Tripodis Y, Killiany R. Dynamic Network Analysis in Resting-State fMRI for Alzheimer's Disease. Joint Statistics Meeting, Chicago, IL, USA. July 2016

9) **Shappell H**, Kolaczyk ED. Accounting for Uncertainty in Stochastic Actor Oriented Models. International Conference on Computational and Methodological Statistics, London, England. Dec 2017

10) **Shappell H**, Kramer MA, Chu CJ, Kolaczyk ED. Accounting for Uncertainty in Stochastic Actor Oriented Models. New England Statistics Symposium, University of Connecticut, Storrs, CT, USA. April 2017

11) **Shappell H**, Tripodis Y, Killiany R, Kolaczyk ED. Methods for Longitudinal Complex Network Analysis in Neuroscience. Eastern North American Region Spring Meeting, Atlanta, GA, USA. Mar 2018

12) Likelihood Based Dynamic Connectivity Analysis using Hidden Semi-Markov Models. Statistical Methods in Imaging Conference. Philadelphia, PA, USA. June 2018

13) **Shappell H**, Caffo B, Pekar P, Lindquist M. Likelihood Based Dynamic Connectivity Analysis using Hidden Semi-Markov Models. Organization for Human Brain Mapping Conference, Singapore. June 2018

14) **Shappell H**, Caffo B, Pekar P, Lindquist M. University Likelihood Based Dynamic Connectivity Analysis using Hidden Semi-Markov Models. Joint Statistical Meeting, Vancouver, British Columbia, Canada. July 2018

15) **Shappell H**, Caffo B, Pekar P, Lindquist M. A Simulation-Based Comparison of Dynamic Connectivity Methods in fMRI. Joint Statistics Meeting, Denver, CO, USA. July 2019

16) Zhu X, Kolaczyk E, **Shappell H**. Random Graph Hidden Markov Models for Percolation in Noisy Dynamic Networks. Joint Statistics Meeting, Denver, CO, USA. July 2019

17) **Shappell H**, Caffo B, Pekar J, Lindquist M. A Simulation-Based Comparison of Dynamic Connectivity Methods. 25th Annual Meeting of the Organization for Human Brain Mapping, Rome, Italy. June 2019

18) McIntyre CC, Lyday RG, Laurienti PJ, **Shappell HM**. Using dynamic functional brain networks to predict future alcohol use in adolescents. Wake Forest Biomedical Graduate Programs Research Day, Winston-Salem, NC, USA. March 2023

19) **Shappell H**, Laurienti PJ, Lyday RG, Fanning J, Rejeski WJ, Burdette JB. Using Dynamic Networks to Study the Brain: New Methods and an Application to a Weight-loss Study. Translational and Learning Health Scholar Showcase, Clinical and Translational Science Institute, Wake Forest University School of Medicine, Winston Salem, NC, USA May 2023

20) **Shappell H**, Laurienti PJ, Lyday RG, Fanning J, Rejeski WJ, Burdette JB. Using Dynamic Networks to Study the Brain: New Methods and an Application to a Weight-loss Study. Training Grantees Meeting, National Institute of Health, Bethesda, Maryland, USA. June 2023

21) McIntyre CC, Khodaei M, Lyday RG, Laurienti PJ, **Shappell HM**. Sex specific relationship between network dynamics and alcohol consumption in adolescents. Research Society on Alcohol - Sex & Gender & Alcohol Satellite, Minneapolis, MN, USA. June 2024

22) McIntyre CC, Khodaei M, Lyday RG, Laurienti PJ, **Shappell HM**. Patterns of dynamic functional brain connectivity related to hazardous drinking risk in adolescents. Research Society on Alcohol; Minneapolis, MN, USA. June 2024

23) Khodaei M, Simpson SL, **Shappell H**, Laurienti PJ. Redefining Brain Network Comparison with A Novel Multiscale Distance Measure. Society for Neuroscience Annual Meeting, Chicago, IL, USA. Oct 2024

24) Peterson-Sockwell H, Lyons MG, **Shappell H**, Cohen JR. Differences in dynamic functional connectivity in youth with ADHD on and off stimulant medication. Society for Neuroscience Annual Meeting, Chicago, IL, USA. Oct 2024

25) Khodaei M, Simpson SL, **Shappell H**, Laurienti PJ. Redefining Brain Network Comparison with A Novel Multiscale Distance Measure. Biomedical Engineering Society Conference (BMES), Baltimore, MD, USA. Oct 2024

INVITED EXTRAMURAL PRESENTATIONS AND SEMINARS

1) Sierpinski Gasket Graphs mod p, Southeastern Research Experience for Undergraduates (REU) Minisymposium, UNC-Asheville, NC. 2010

2) Poster: A Paradigm for Longitudinal Network Analysis over Patient Cohorts in Neuroscience, Boston University/ Keio University Probability and Statistics Workshop, Boston, MA. 2016

3) Methods for Longitudinal Complex Network Analysis in Neuroscience. Mathematics and Statistics Department at East Tennessee State University, Johnson City, TN. 2018

4) Methods for Longitudinal Complex Network Analysis in Neuroscience. Duke Network Analysis Center at Duke University, Durham, NC. 2019

5) Improved State Change Estimation in Dynamic Functional Connectivity using Hidden semi-Markov Models. Neural Systems Analysis Laboratory, Johns Hopkins University, Baltimore, MD. 2021

6) Improved State Change Estimation in Dynamic Functional Connectivity using Hidden semi-Markov Models. Metropolitan College, Boston University, Boston, MA. 2021

7) Improved State Change Estimation in Dynamic Functional Connectivity using Hidden semi-Markov Models. Department of Biostatistics and Epidemiology, University of Kentucky, Lexington, KY. 2021

8) Improved State Change Estimation in Dynamic Functional Connectivity using Hidden semi-Markov Models. IPAM Workshop "Reconstructing Network Dynamics from Data: Applications to Neuroscience and Beyond." Los Angeles, CA. 2022

9) Using Dynamic Networks to Study the Brain: New Methods and an Application to a Weight-loss Study. Yale University, New Haven, CT. 2023

10) Using Dynamic Networks to Study the Brain: New Methods and an Application to a Weight-loss Study. Biomedical Research Imaging Center, University of North Carolina at Chapel Hill, NC. 2024

11) Using Dynamic Networks to Study the Brain: New Methods and an Application to a Weight-loss Study. EPIC Course, University of North Carolina at Chapel Hill, NC. 2024

12) Using Dynamic Networks to Study the Brain: New Methods and an Application to a Weight-loss Study. The Cohen Lab, Psychology and Neuroscience Departments, University of North Carolina at Chapel Hill, NC. 2024

13) Dynamic Brain Networks in Obesity and Weight loss in Older Adults. Psychiatry Department, University of North Carolina at Chapel Hill, NC. 2024

14) A Hidden Semi-Markov Model Approach to State-Based Dynamic Brain Network Analyses: Recent Developments and Future Directions. Challenges in Neuroimaging Data Analysis Workshop. Chicago, IL. 2024

15) Dynamic Brain Networks in Obesity and Weight Loss in Older Adults.. The American Statistical Association (ASA) Statistics and Data Science in Aging (SDSA) Interest Group Webinar, 2025

16) Dynamic Brain Networks in Obesity and Weight Loss in Older Adults. University of North Carolina at Chapel Hill, EPIC Course. 2025

INVITED INTRAMURAL / LOCAL TALKS

2021 Improved State Change Estimation in Dynamic Functional Connectivity using Hidden semi-Markov Models. Translational Science Center, Wake Forest University, Winston Salem, NC.

2021 Improved State Change Estimation in Dynamic Functional Connectivity using Hidden semi-Markov Models. Network Group Meeting, Wake Forest University School of Medicine, Department of Radiology, Winston Salem, NC.

2023 Using Dynamic Networks to Study the Brain: New Methods and an Application to a Weight-loss Study. Public Health Sciences Grand Rounds, Wake Forest University School of Medicine, Winston Salem, NC.

2024 Brain Dynamics and Successful Weight loss in Older Adults. Public Health Sciences Fall Virtual Showcase, Wake Forest University School of Medicine, Winston Salem, NC.

2024 Using Dynamic Networks to Study the Brain: New Methods and an Application to a Weight-loss Study. Translational and Learning Health Scholar Showcase, Clinical and Translational Science Institute, Wake Forest University School of Medicine, Winston Salem, NC.

2025 Dynamic Brain Networks in Obesity and Weight Loss in Older Adults. Wake Forest University Graduate School Neuroscience Tutorial, Winston Salem, NC.

DIDACTIC/SYSTEMATIC INSTRUCTION

Wake Forest University, Division of Public Health Sciences
Guest Lecturer, CPTS 742 Clinical Trials,
2021, 2023, 2024

Wake Forest University School of Medicine, BERD Lunch and Learn, “Analysis of a Continuous Outcome.” 2023, 2024

Boston University, Department of Biostatistics
Instructor, BS 805 Introduction to Statistical Computing
2014, 2017

MENTORING RELATIONSHIPS

Graduate Students:

Mohammadreza Khodaei PhD Student 2022-present
School of Biomedical Engineering and Sciences Graduate Student at Wake Forest University. Dr. Shappell serves as his PhD co-advisor along with Dr. Sean Simpson and Dr. Paul Laurienti, while he studies the use of multivariate models to examine relationships between brain networks and human intelligence.

Clayton McIntyre PhD Student 2023-present
Neuroscience Graduate Program at Wake Forest University Graduate School of Arts and Sciences. Dr. Shappell is a dissertation committee member for Clayton while he studies the relationship between functional brain network dynamics and alcohol consumption in adolescents.

Derek Madden PhD Student 2024-present
School of Biomedical Engineering and Sciences Graduate Student at Wake Forest University. Dr. Shappell serves as his PhD co-advisor along with Dr. Paul Laurienti,

while he studies structure and function coupling in brain networks as it relates to alcohol use disorder.

Postdoctoral Fellows

Hope Peterson Postdoctoral Fellow 2023-present
The University of North Carolina at Chapel Hill. Dr. Shappell serves as her fellowship co-advisor along with Dr. Jessica Simpson, while she studies the use of multivariate models to examine relationships between brain networks and autism.

Resident and Fellows

Qiuyu Zhu, MD, PhD Cardiology Fellow 2024-present
Wake Forest University Health Sciences, Wake Forest University School of Medicine. Dr. Shappell serves on the THSS Thesis Committee for Qiuyu while he seeks to identify new imaging markers of coronary artery disease in patients with extreme obesity (BMI > 40) using cardiac MRI.

PUBLIC OUTREACH

2021 Winston Salem Journal
Editorial Writer
Co-author on article about Covid-19 vaccine safety

COMMUNITY ACTIVITIES AND SERVICE

2015 Gorgeous Culture Chinese Summer Camp
Instructor for student leadership summer camp, Boston, MA.
Prepared lesson plans to build leadership skills and taught a weeklong leadership course.

2017 Pottsville Area High School
Presented “What I Do” to high school math courses to foster interest in mathematics and statistics careers.