WAKE FOREST UNIVERSITY SCHOOL OF MEDICINE
Curriculum Vitae

NAME   Mohsen Bahrami, M.S., Ph.D.

ACADEMIC TITLE: Assistant Professor of Radiology

ADDRESS   Department of Radiology
                            Wake Forest School of Medicine
                            Medical Center Boulevard
                            Winston-Salem, NC 27157
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EDUCATION

        2010   Razi University
                    Kermanshah, Iran
                    Bachelor of Science / Electrical Engineering

        2014   University of Tehran
                    Tehran, Iran
                    Master of Science / Biomedical Engineering
                    Research Advisor: Gholam-Ali Hossein-Zadeh, PhD.
                    Thesis: Analysis and Comparison of fMRI Resting-State Functional Connectivity
                            in Patients with Alzheimer's Disease and Healthy Controls

        2019   The Virginia Tech-Wake Forest University School of Biomedical Engineering and
                    Sciences (SBES)
                    College/University
                    Winston-Salem, NC
                    Ph.D. Biomedical Engineering
                    Research Advisors: Paul J. Laurienti, MD, PhD. & Sean L. Simpson, PhD
                    Thesis: Brain Networks: Multivariate Tools to Analyze Structure, Function, and
                            Dynamics

POSTDOCTORAL TRAINING

        2020 - 2021   Research Associate, Wake Forest University School of Medicine, Department of
                            Radiology
                    Research Advisor: Sean L. Simpson, Ph.D. & Paul J. Laurienti, M.D., Ph.D.
                    Research Project: Analytical Tools for Complex Brain Networks: Fusing Novel
                            Statistical Methods and Network Science to Understand Brain
                            function

EMPLOYMENT

        Academic Appointments

        Wake Forest University School of Medicine

        2022 – Present   Assistant Professor, Department of Radiology
        2021 – 2022   Faculty Instructor, Department of Radiology

Professional Experience

2011 - 2014   Graduate Research Assistant – University of Tehran, Tehran, Iran

2013 - 2014   Teaching Assistant – University of Tehran, Tehran, Iran

2015 – 2016   Professional Development – Virginia Tech – Wake Forest University School of Biomedical Engineering and Science, Winston-Salem, NC

2015 - 2019   Graduate Research Assistant – Virginia Tech – Wake Forest University School of Biomedical Engineering and Science, Winston-Salem, NC

2017   Clinical Rotation – Virginia Tech – Wake Forest University School of Biomedical Engineering and Science, Carilion Clinic, Roanoke, VA, and Wake Forest Baptist Medical Center, Winston-Salem, NC

2019 - 2021   Research Associate - Laboratory for Complex Brain Networks (LCBN), Wake Forest University School of Medicine, Winston-Salem, NC

EXTRAMURAL APPOINTMENTS AND SERVICE

Peer Reviewer

NeuroImage
Human Brain Mapping
Journal of Alzheimer's Disease
Frontiers in Human Neuroscience
Biostatistics
Statistical Analysis and Data Mining
Frontiers in Physics
Brain Connectivity
TNSRE

COMPUTER SKILLS

Software Development

Software Name: WFU_MMNET (https://www.nitrc.org/projects/wfu_mmnet)
this software provides a multivariate framework to study how desired phenotypes affect complex topological properties of the brain. The friendly graphical user interface implemented in this software allows the larger neuroscience community who don't have deep knowledge or expertise in statistics and programming to use the strong implemented models. The main body of this software has been developed in MATLAB, but it automatically uses the strong statistical tools implemented in other languages, such as: SAS, R, and Python, to fit the models. The new version provides visualization tools to map the results into the brain space.

Programming

MATLAB, Advanced
R, Advanced
Python, Advanced
SAS, Intermediate
C, Intermediate
Unix and Shell, Intermediate
SLURM, Basic

<u>Neuroimaging Software</u>

FSL, Advanced
SPM, Advanced
FreeSurfer, Intermediate
MRICRON, Intermediate
CAMINO, Basic

PROFESSIONAL MEMBERSHIPS AND SERVICE

2015 - Present	Member, Biomedical Engineering Society (BMES) Organization
2016 - 2017	Member, American Statistical Association
2022 - 2023	Member, Obesity

HONORS AND AWARDS

2006	Ranked among top 0.5% of more than 434000 participants of BS national entrance exam
2013	1st rank, achieving the highest GPA among Biomedical Engineering graduates students
2016	Clinical Neuroscience project award for the best grant proposal
2019	Top download paper, 2018 – 2019, in Human Brain Mapping
2021	Award for pilot study from the Translation Science Center of Wake Forest
2022	PHS Top 10 Research Paper Award
2023	Best Poster Award, ICFRM 2023
2023	KL2 award for 2023 - 2025

GRANT FUNDING

<u>Currently Active Grants</u>

KL2 TR001421   07/01/2023 - 06/30/2025   75.00% effort
NIH $155,000 annual
Cerebral Small Vessel Disease and Brain Networks: Defining Resilience and Global Disruption
The vascular contributions to cognitive dysfunction and decline are seen as key modifiable risk factors; however, the mechanisms by which they produce brain lesions that affect brain networks are still unclear. This K25 Award can address this gap while preparing the applicant to lead translational studies in this field.
Principal Investigator: **Mohsen Bahrami**

R01 AG058969   08/15/2018 - 05/31/2024   5.00% effort
NIH / NIAAA $3,776,527 annual
Dynamic functional brain network phenotypes associated with vulnerability to hazardous alcohol consumption
Arterial stiffness increases with age and is emerging as a leading vascular risk factor for Alzheimer's disease (AD) as it has been associated with AD pathology in some studies. Yet, it is unclear if changes in arterial stiffness over time actually explain the increased risk for AD, especially among African-Americans and Hispanics. We propose to review more than 15 years of measurements from the Multi-Ethnic Study of Atherosclerosis (MESA) to determine if arterial stiffness is related to evidence of AD and AD pathology.
Co-Principal Investigators: Timothy Hughes, Kathleen Hayden, Jose Luchsinger

Role: Co-Investigator

P50 AA026117   12/01/2017 - 11/30/2027   2.50% effort
NIH / NIAAA $292,130 annual (Project 1)
Dynamic functional brain network phenotypes associated with vulnerability to hazardous alcohol consumption
This project has the potential to guide the development of future clinical trials to better target clinical outcomes by understanding corresponding mechanisms supporting meditation-related reductions in alcohol craving.
Principal Investigator: Jeffrey Weiner
Project PI: Paul Laurienti
Role: Co-Investigator

R01 AA029926   09/15/2021 - 08/31/2025   2.50% effort
NIH / NIAAA $333,774 annual
CRCNS: Multiplexed Impervious Functional Network Complements Brain Function for Tensioned Stability of Neural Information Processing
We will put forward a new description of brain function that can explain the agile functionality whereby we can dwell on a task, and also divert to other tasks, nimbly and seemingly abruptly depending on input. The complementary tools of correlation analysis and causation entropy (CSE) based information flow analysis gives a computationally valid paradigm whereby we will analyze these elements in the multilayer brain network using fMRI data from human subjects
Co-Principal Investigator: Paul Laurienti and Erik Bollt
Role: Co-Investigator

R01 DA047149   08/01/2023 - 04/30/2024   8.30% effort
NIH/NIDA $400,611 annual
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 applies 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

Pending Grants

None

Past Grant History

K25 EB012236   07/01/2012 - 06/30/2017
NIH / NIDDK
Statistical Methods for Whole-Brain Connectivity Networks
The research activities focused on developing new methodology and modifying existing methods in order to improve whole-brain connectivity analyses of normal and abnormal brain function.
Principal Investigator: Sean Simpson
Role: Graduate Student
Total Grant Amount: $796,146

R01 ES008739   03/01/2013 - 06/30/2018
NIH / NIEHS

The Effect of Pesticide Exposure on Cognitive and Brain Development in Latino Children: PACE5
This proposal was an extension of the work that was performed over the past 20 years
(R01ES008739-19) and evaluated the effects of pesticide exposure on neurobehavioral and brain
development in children in Latino farmworker families.
Co-Principal Investigator: Paul Laurienti / Thomas Arcury
Role: Graduate Student
Total Grant Amount: $939,391

R01 EB024559   06/15/2018 - 02/28/2022
NIH / NIBIB
Analytical Tools for Complex Brain Networks: Fusing Novel Statistical Methods and Network
Science to Understand Brain Function
The project will fuse novel statistical methods with network-based functional neuroimage analysis
to engender powerful analytical tools to advance understanding of normal brain function and
alterations due to various brain disorders.
Principal Investigator: Sean Simpson
Role: Co-Investigator
Total Grant Amount: $1,534,484

R01 AG051624   05/15/2016 - 04/30/2022
NIH / NIA
The administrative supplement to EMPOWER acquired baseline brain magnetic resonance
imaging (MRI) scans on a random subset of n = 90 participants (EMPOWER has a total n = 160).
This study will evaluate those images to help determine whether an intervention focused on
increasing awareness of sedentary behavior and strategies to reduce sitting will help prevent
weight regain following weight loss in obese older adults.
Co-Principal Investigators: Barb Nicklas and W. Jack Rejeski
Supplement PI: Jonathan Burdette, MD
Role: Co-Investigator
Total Grant Amount: $1,534,484

U04449   07/01/2021 - 12/31/2022
WFU Translational Science Institute
Predicting variability in maintaining sedentary behavior intervention among older adults using
neuroimaging data and machine learning techniques
This project will obtain brain phenotypes and identify brain circuits from functional MRI brain data
associated with a weight-loss and sedentary behavior intervention.
Principal Investigator: **Mohsen Bahrami** / Jason Fanning
Total Grant Amount: $18,913

BIBLIOGRAPHY

<u>Peer-Reviewed Publications</u>

1. **Bahrami M,** Laurienti PJ, Quandt SA, Talton J, Pope CN, Summers P, Burdette JH, Chen HY, Liu J,
    Howard TD, Arcury TA, Simpson SL (2017)."The Impacts of Pesticide and Nicotine Exposures on
    Functional Brain Networks in Latino Immigrant Workers." <u>*Neurotoxicology*</u>.62:138-150.

2. **Bahrami M,** Lyday RG, Casanova R, Burdette JH, Simpson SL, Laurienti PJ (2019). "Using Low
    Dimensional Manifolds to Map Relationships Between Dynamic Brain Networks." <u>*Frontiers in Human
    Neuroscience*</u>, 13: p.430.

3. **Bahrami M,** Laurienti PJ, Simpson SL (2019). "Analysis of Brain Subnetworks within the Context of their Whole-Brain Networks." *Hum Brain Mapp*. 40(17): 5123-5141.doi:10.1002/hbm.24762.

4. **Bahrami M,** Laurienti PJ, Simpson SL (2019). "A MATLAB Toolbox for Multivariate Analyses of Brain Networks." *Hum Brain Mapp*. 40(1):175-186. doi: 10.1002/hbm.24363.

5. Simpson SL, **Bahrami M,** Laurienti PJ (2019). "A Mixed Modeling Framework for Analyzing Multitask Whole Brain Network Data." *Network Neuroscience*. 3(2):307-324. doi: 10.1162/netn_a_00065.

6. Burdette JH, Laurienti PJ, Miron LL, **Bahrami M,** Simpson SL, Nicklas BJ, Fanning J, Rejeski JW (2020). "Functional Brain Networks: Unique Patterns with Hedonic Appetite and Confidence to Resisting Eating in Older Adults with Obesity." *Obesity*, 28 (12): p.2379-2388.

7. Casanova R, Lyday RG, **Bahrami M,** Burdette JH, Simpson SL, Laurienti PJ (2021). "Embedding Functional Brain Networks in Low Dimensional spaces Using Manifolds Learning Techniques." *Frontiers Neuroinformatics*, 15: 740143.

8. Peterson H, Mayhugh R, **Bahrami M**, Rejeski JW, Simpson SL, Heilman K, Porges SW, Laurienti PJ (2021). "Influence of Heart Rate Variability on Abstinence-Related Changes in Brain State in Everyday Drinkers." *Brain Sci*. 11(6):817.

9. Burdette JH, **Bahrami M,** Laurienti PJ, Simpson SL, Nicklas BJ, Fanning J, Rejeski JW (2022). "Longitudinal Relationship of Baseline Functional Brain Networks with Intentional Weight Loss in Older Adults." *Obesity.* **30**(4): p. 902-910.

10. **Bahrami M,** Laurienti PJ, Shappell HM, Dagenbach D, Simpson SL (2022). "A Mixed-Modeling Framework for Whole-Brain Dynamic Network Analysis." *Network Neuroscience*. 1-52.

11. **Bahrami M,** Simpson SL, Burdette JH, Lyday RL, Quandt SA, Chen HY, Arcury TA, Laurienti PJ (2022). "Altered Default Mode Network Associated with Pesticide Exposure in Latinx Children from Rural Farmworker Families." *NeuroImage*, **256**: 119179.

12. **Bahrami M,** Laurienti PJ, Shappell HM, Simpson SL (2022). "Brain Network Analysis: A Review on Multivariate Analytical Tools." *Brian connectivity*, 1-16.

13. Rejeski JW, Laurienti PJ, **Bahrami M,** Fanning J, Simpson SL, Burdette JH (2022). "Aging and Neural Vulnerabilities in Overeating: A Conceptual Overview and Model to Guide Treatment." *Psychiatry and Clinical Neurosciences Report, 1(3):* 1-12.

14. Kirse HA, **Bahrami M**, Lyday RG, Simpson SL, Peterson-Sockwell H, Burdette JH, Laurienti PJ (2023). "Differences in Brain Network Topology Based on Alcohol Use History in Adolescents." *Brain Sci*. 5;13(12):1676.

Peer-Reviewed Extended Abstracts in Conference Proceedings (Published)

1. **Bahrami M**, Hossein-Zadeh GA (2014). "Functional Parcellation Affect Network Measures in Graph Analysis of Resting-State fMRI." 21st Iranian Conference on Biomedical Engineering (ICBME). Tehran, Iran. Publisher: IEEE. Pages:263-268. doi: 10.1109/ICBME.2014.7043933.

2. Yousefi H, **Bahrami M**, Fatehi M, Zoroofi RA (2014). "3D Statistical Shape Models of Radius Bone for Segmentation in Multi Resolution MRI Data Sets." 21st Iranian Conference on Biomedical Engineering (ICBME). Tehran, Iran. Publisher: IEEE. Pages:246-251. doi: 10.1109/ICBME.2014.7043930.

3. **Bahrami M**, Hossein-Zadeh GA (2015). "Assortativity Changes in Alzheimer's Disease: A RestingState fMRI Study." IEEE 23rd Iranian Conference on Electrical Engineering (ICEE). Tehran, Iran. Publisher: IEEE. Pages:141-144. doi: 10.1109/IranianCEE.2015.7146198.

PRESENTATIONS AT PROFESSIONAL MEETINGS

1. **Bahrami M,** Hossein-Zadeh GA. "On the Robustness of Copula-Based Measures of Connectivity Analysis for Resting-State fMRI Data Analysis." *5th Iranian Conference on Bioinformatics (ICB 2014)*. Tehran, Iran. Spring 2014.

2. **Bahrami M,** Borjkhani M, Hossein-Zadeh GA, Bahrami F. "Lyapunove Exponent as a Feature to Distinguish Patients with Alzheimer's Disease and Healthy Controls Using Resting-State fMRI BOLD Signals." *1st Iranian Conference on Human Brain Mapping.* Tehran, Iran. Fall 2014.

3. **Bahrami M,** Hossein-Zadeh GA. "A Comparison Between Statistical characteristics of a Copula Based Measure and Cross-Correlation in Resting-State fMRI Connectivity Analysis." *1st Iranian Conference on Human Brain Mapping.* Tehran, Iran. Fall 2014.

4. **Bahrami M,** Laurienti PJ, Sandberg JC, Daniel SS, Arcury TA, Simpson SL. "The Impact of Pesticide on Latino Farmworkers' Functional Brain Networks." *NIEHS Environmental Health Science FEST.* Research Triangle Park NC, USA. December 2016.

5. **Bahrami M,** Laurienti PJ, Arcury TA, Simpson SL. "The Impacts of Pesticide and Nicotine on Functional Brain Networks in Latino Farmworkers." *North Carolina Cognition Group Conference.* Greensboro, NC, USA. March 2017.

6. **Bahrami M,** Laurienti PJ, Arcury TA, Simpson SL. "Brain Networks in Latino Farmworkers with Chronic Exposures to Pesticides." *BMES Annual Meeting.* Phoenix, AZ, USA. October 2017.

7. **Bahrami M,** Laurienti PJ, Simpson SL. "A Matlab Toolbox for Multivariate Analysis of Brain Networks." *Statistical Methods in Imaging.* Philadelphia, PA, USA. May 2018.

8. Mayhugh R, Rejeski WJ, **Bahrami M**, Simpson SL, Heilman K, Porges S, Gauvin L, Laurienti PJ. ""A MATLAB Toolbox for Multivariate Analysis of Brain Networks." *41st Annual Scientific Meeting of the Research Society on Alcoholism*. San Diego, CA, USA. June 2018.

9. **Bahrami M,** Laurienti PJ, Simpson SL. "A Matlab Toolbox for Multivariate Analysis of Brain Networks." *BMES Annual Meeting.* Atlanta, GA, USA. October 2018.

10. **Bahrami M,** Laurienti PJ, Simpson SL. "Analyzing Local Subnetworks: Context is Everything." *NetSci*. Burlington, VT, USA. May 2019.

11. Peterson H, Mayhugh R, Rejeski JW, **Bahrami M,** Simpson SL, Heilman K, Porges SW, Laurienti PJ. "Relationship between Cardiac Vagal Tone and Functional Brain Connectivity in Moderate to Heavy Alcohol Consumers." *NetSci.* Burlington, VT, USA. May 2019.

12. Peterson H, **Bahrami M**, Simpson SL, Rejeski WJ, Laurienti PJ. "Differential Functional Brain Network Topology During Periods Of Normal Drinking and Abstinence in Moderate to Heavy Alcohol Consumers." *43rd Annual Scientific Meeting of the Research Society on Alcoholism*. Virtual Meeting. June 2020.

INVITED EXTRAMURAL PRESENTATIONS AND SEMINARS

1. **Bahrami M**, Simpson SL, Arcury TA, Laurienti PJ. "A Mixed-Effects Modeling Approach to Study the Impacts of Pesticides on Farmworkers' Brain Networks Using RSFMRI Data." Joint Statistical Meetings. Chicago, IL. August 2016. (Invited Presentation)

2. **Bahrami M**, Burdette JH, Laurienti PJ, Nicklas B, Hughes T, Rejeski WJ, Fanning J. "Neural Signatures of Sedentary Behavior in Older Adults - A Machine Learning Study." 2023 Fall CTSA Program Annual Meeting. Washington DC, USA. November 2023. ((Invited Presentation)

DIDACTIC/SYSTEMATIC INSTRUCTION

University of Tehran, Department of Electrical and computer Engineering
Teaching Assistant, Pattern Recognition
Graduate Course, Fall 2013

University of Tehran, Department of Electrical and computer Engineering
Teaching Assistant, Functional Medical Imaging Systems
Graduate Course, Fall 2014

University of Tehran, Department of Electrical and computer Engineering
Teaching Assistant, Pattern Recognition
Graduate Course, Fall 2014

Wake Forest University Graduate School of Arts & Sciences
Assistant Professor of Radiology
CSC 674, Machine Learning, Fall 2023