Katelyn L. Arnemann

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Education

2012-2018 **University of California, Berkeley**
Ph.D. in Neuroscience
"Insights on Alzheimer's disease etiology from network approaches in healthy aging"
Advisor: William Jagust
Dissertation Committee: Mark D'Esposito, Jack Gallant, & Lexin Li

2007-2010 **Case Western Reserve University**
B.A. in Cognitive Science; Philosophy

Research Experience

2018- **Rutgers University, Newark**, NJ , USA
Center for Molecular and Behavioral Neuroscience
Postdoctoral Associate
Principal Investigator: Michael Cole

Latent functional connectivity project

- Implemented exploratory factor analysis to estimate latent functional connectivity across many cognitive states using fMRI data from the Human Connectome Project
- Explored dynamic functional connectivity to assess effect of using data-driven brain states on latent functional connectivity estimates

2013-2018 **University of California, Berkeley**, CA , USA
Helen Wills Neuroscience Institute
Graduate Student Researcher in Neuroscience
Principal Investigator: William Jagust

General

- Implemented and piloted multiband rs-fMRI sequences
- Used Python to wrangle longitudinal multimodality neuroimaging data (rs-fMRI, MRI, FDG-PET, PIB-PET, AV1451-PET) for hundreds of sessions
- Developed a flexible rs-fMRI preprocessing stream using nipype in Python https://github.com/klarnemann/jagust_rsfmri
- Mentored three undergraduate students and a visiting graduate student

Predictors of spatial pattern of amyloid and tau pathology project

- Used linear regression to dissociate properties of the connectivity (rs-fMRI) from metabolism (FDG-PET) in young adults
- Compared explanatory power of metabolism, connectivity, and a novel metric of metabolic inefficiency in predicting the spatial pattern of amyloid-β (PIB-PET) and tau (AV1451-PET)

Metabolic networks in preclinical Alzheimer's disease project

- Identified differences in group metabolic brain networks (FDG-PET) for young, healthy old, and Alzheimer's disease patients

- Found significant widespread elevated metabolic correlation strength and metabolic brain network desegregation in healthy older adults, with departure in subgroup with two Alzheimer's risk factors (ApoE ε4 genotype and amyloid-β)

Cross-sectional model of amyloid-β spread via directed progression networks

- Modeled accumulation of amyloid-β using cross-sectional PIB-PET
- Built directed progression networks to model the spread of amyloid-β across successive stages of amyloid-β accumulation in normal aging
- Detected multiple sources of amyloid-β accumulation in PIB- older adults

Community detection methods

- Extended cluster-stabilization approaches to address degeneracy of network community detection by partitioning a consistency matrix generated through iterative sub-sampling
- Contributed to BrainX in Python by overhauling weighted community detection to allow flexible functionality for networks with negative weights
  https://github.com/nipy/brainx

2010-2012 **U.S. Department of Veteran's Affairs**, Martinez, CA, USA
Neurology Division
Research Assistant in Rehabilitation Neuroscience
Principal Investigators: Mark D'Esposito & Anthony Chen

General

- Trained brain injured patients with executive dysfunction on a selective attention task and administered MRI scans and neuropsychological tests
- Helped edit manuscripts and book chapters

Network modularity predicts rehabilitation project

- Computed modularity using community detection in intrinsic brain networks from baseline rs-fMRI, used this metric to predict improvement in executive function after a rehabilitative intervention

Neural codes for task condition, stimulus, and relevance project

- Used a linear multilayer perceptron classifier to perform multivariate pattern analysis during selective attention to faces and/or scenes during a working memory task in young adults
- Classification of condition, stimulus category, and stimulus relevance were compared for the middle frontal gyrus and visual associate cortex

2008-2010 **Case Western Reserve University**, Cleveland, OH, USA
Department of Cognitive Science
Undergraduate Research Assistant in Cognitive Neuroscience
Principal Investigator: Anthony Jack

General

- Managed and trained other undergraduate research assistants
- Used E-Prime to create and administer a wide variety of neuropsychological and cognitive tests and questionnaires

Opposing domains hypothesis of brain function project

- Implemented and pilot tested a novel 2x2 factorial design crossing cognitive domain (social/mechanical) and stimulus modality (text/video)
- Conducted a pilot analysis using a general linear model to contrast brain activity during social and mechanical reasoning tasks, which respectively invoked activity characteristic of the so-called "default-mode" and "task-positive" networks
- Conducted a meta-analysis extracting coordinates associated with social/emotional and numerical/logical reasoning

Publications

Arnemann KL, , Maass A, Harrison T, Baker S, de Flores R, Chetelat G, Jagust WJ, Early life metabolic inefficiency predicts amyloid-β topology in preclinical Alzheimer's disease (in preparation).

Arnemann KL, +Stoeber F, *Narayan S, Rabinovici GD, Jagust WJ. Metabolic brain networks in aging and preclinical Alzheimer's disease. Neuroimage: Clinical (2018): 17 987-999.

Arnemann KL, Chen AJ, Novakovic-Agopian, Gratton C, Nomura EM, D'Esposito. Functional brain network modularity predicts response to cognitive training after brain injury. Neurology (2015): 84 1568-1574.

Jack AI, *Dawson AJ, **Begany KL**, Leckie RL, Barry KP, Ciccia AH, Snyder AZ. fMRI reveals reciprocal inhibition between social and physical cognitive domains. NeuroImage (2013): 66 385-401.

Presentations

2019 Cognitive Neuroscience Society Annual Meeting
San Francisco, CA, USA
Poster: *Estimating latent functional connectivity underlying multiple brain states*

2018 Society for Neuroscience Annual Meeting
San Diego, CA, USA
Poster: *Amyloid-beta spreads from multiple sources in healthy aging*

2017 Society for Neuroscience Annual Meeting
Washington, DC, USA
Nanosymposium: *Metabolic inefficiency in early life predicts the spatial pattern of amyloid-β in late life*

2016 Annual UC Berkeley Neuroscience Research Conference
Watsonville, CA, USA
Talk: *Metabolic efficiency predicts the spatial pattern of Alzheimer's pathology in late life*

Alzheimer's Association International Conference
Toronto, ON, Canada
Poster*: Beta-amyloid spreads from multiple epicenters in preclinical Alzheimer's disease*

Human Amyloid Imaging Conference
Miami, FL, USA
Talk: *Metabolic efficiency predicts the spatial pattern of Alzheimer's pathology in late life*

2015 Brain Lunch
University of California, Berkeley, CA, USA
Talk: *Metabolic efficiency predicts the spatial pattern of Alzheimer's pathology in late life*

2014 Annual UC Berkeley Neuroscience Research Conference
Watsonville, CA, USA
Talk: *Anterior and posterior memory networks in aging and disease*

2012 Henry H. Wheeler Jr. Brain Imaging Center Research Day
University of California, Berkeley, CA, USA
Talk: *Brain modularity predicts responsiveness of brain injury patients to cognitive rehabilitation*

Society for Neuroscience Annual Meeting
New Orleans, LA, USA
Poster: *Individual differences in response of brain injury patients to cognitive rehabilitation: evidence from analyses of functional brain networks*

Cognitive Neuroscience Society Annual Meeting
Chicago, IL, USA
Poster: *Predicting the response of patients with brain injury to cognitive rehabilitation: evidence from analyses of functional brain networks*

2011 Center for Integrated Brain Health and Wellness Grand Opening
U.S. Department of Veterans Affairs, Martinez, CA, USA
Poster: *Functional brain imaging for understanding the neuroscience of rehabilitation*

2010 Midwestern Undergraduate Cognitive Science Conference
University of Indiana, Bloomington, IN, USA
Talk: *Two domains of human higher cognition: distinct brain networks underlie social and mechanical reasoning*

SOURCE Intersections Competition
Case Western Reserve University, Cleveland, OH, USA
Poster: *Two domains of human higher cognition: distinct brain networks underlie social and mechanical reasoning*

2009 Society for Neuroscience Annual Meeting
Chicago, IL, USA
Poster: *Two domains of human higher cognition: distinct brain networks underlie social and mechanical reasoning*

Teaching Experience

2017 (Summer) **University of California, Berkeley**, CA, USA
Redwood Center for Theoretical Neuroscience
Teaching Assistant
Berkeley Summer Course in Mining and Modeling of Neuroscience Data

2015 (Spring) **University of California, Berkeley**, CA, USA
Helen Wills Neuroscience Institute
Graduate Student Instructor
Applied Statistics for Neuroscience (graduate level)

2013 **University of California, Berkeley**, CA, USA

(Fall) Department of Public Health
Graduate Student Instructor
The Aging Brain (undergraduate level)

2009 (Spring) **Case Western Reserve University**, Cleveland, OH, USA
Department of Cognitive Science
Undergraduate Student Supplemental Instructor
Introduction to Cognitive Science II (undergraduate level)

Leadership & Community Engagement

2017 **Data Science Workshop**
Graduate Data Science Organization
University of California, Berkeley, CA, USA
Participant

2017 **Human Brain Imaging Faculty Search Committee**
Joint Department of Psychology & Helen Wills Neuroscience Institute
University of California, Berkeley, CA, USA
Graduate Student Representative on Committee

2016 **Helen Wills Neuroscience Institute Climate Committee**
University of California, Berkeley, CA, USA
Member

2015-2016 **Graduate Student Assembly**
University of California, Berkeley, CA, USA
Neuroscience Graduate Program Representative

2014-2016 **Neuroscience Data Mining Group**
University of California, Berkeley, CA, USA
Founding Member and Leader
https://sites.google.com/site/neurodatamininggroup/

2014 **Women in Tech Workshop**
Facebook & NumFocus
Mentor

2013-2015 **Berkeley Science Review**
University of California, Berkeley, CA, USA
Contributing Author & Editor

2012-2015 (Summers) **Level Playing Field Institute**, Oakland, CA, USA
Summer Math and Science Honors Academy
Project Leader

Honors and Awards

2013 **Graduate Research Fellowship Program**
National Science Foundation

2010 **Cognitive Science Award**
Department of Cognitive Science
Case Western Reserve University, Cleveland, OH, USA

2010 **Truman P. Handy Philosophical Prize**
Department of Philosophy
Case Western Reserve University, Cleveland, OH, USA