Katelyn L. Arnemann

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Education

2012-2018 **University of California, Berkeley**
Ph.D. in Neuroscience
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, *Digma L, Jagust WJ, Amyloid-beta spreads from multiple sources in healthy aging (in preparation).

Arnemann KL, , Maass A, Harrison T, Baker S, de Flores R, Chetelat G, Jagust WJ, Early life metabolic inefficiency predicts the spatial patterns of Alzheimer's pathology in late life (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 (Fall) **University of California, Berkeley**, CA, USA
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**
Career Development in Physical Sciences
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/neurodataminninggroup/

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