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

Experience

2021-present **Unlearn.AI**, San Francisco, CA, USA
Data Scientist

- Lead data processing team comprised of data scientists and engineers to spearhead new disease progression models
- Collaborated to develop software in **python** to generalize and streamline data processing and EDA

2019-2021 **Datacubed Health**, Brooklyn, NY, USA
Research Scientist

- Conducted **statistical validation** of Linkt mobile app features, including surveys, cognitive tasks, and geofencing
- Performed **data wrangling** and **QA** for data transfers to clients conducting **clinical trials**
- Conducted ML analyses (e.g., **survival analysis**, **classification**) to predict behavior of participants in clinical trials
- Contributed to scientific requirements and data specifications of Datacubed products

2019 **Insight Data Science**, New York City, NY, USA
Data Science Fellow

Points of Interest web application

- Built a web-app recommender system for little-known travel destinations using NLP (LDA topic analysis) and categorical features (MCA dimensionality reduction and k-means clustering)
- Scraped, cleaned, and feature-engineered text data from wikipedia.org and stateparks.com

2018-2019 **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
- Demonstrated that latent functional connectivity improves prediction of evoked brain activity and behavior

- Contributed to open-source software Brain Activity Flow Toolbox for predictive models of brain activation patterns

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, FDGPET, 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
https://github.com/nipy/brainx

- 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

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 rsfMRI, 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, McCormick EM, Ito T, Hanson SJ, Cole M, Estimating latent functional connectivity underlying multiple brain states (in review).

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

Talks

2017 Society for Neuroscience Annual Meeting
Washington, DC, USA

Metabolic inefficiency in early life predicts the spatial pattern of amyloid-β in late life

2016 Human Amyloid Imaging Conference
Miami, FL, USA
Metabolic efficiency predicts the spatial pattern of Alzheimer's pathology in late life

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

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

Posters

2019 Organization for Human Brain Mapping Annual Meeting
Rome, Italy
Estimating latent functional connectivity underlying multiple brain states

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

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

2016 Alzheimer's Association International Conference
Toronto, ON, Canada
Beta-amyloid spreads from multiple epicenters in preclinical Alzheimer's disease

2012 Society for Neuroscience Annual Meeting
New Orleans, LA, USA
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
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
Functional brain imaging for understanding the neuroscience of rehabilitation

2010 SOURCE Intersections Competition Case Western Reserve University
Cleveland, OH, USA
Two domains of human higher cognition: distinct brain networks underlie social and mechanical reasoning

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

Teaching Experience

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

2015 **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
Department of Public Health
Graduate Student Instructor
The Aging Brain (undergraduate level)

2012-2015 **Level Playing Field Institute**, Oakland, CA, USA
Summer Math and Science Honors Academy
Summer Project Leader
Topics in Current Science Research (high school level)

2009 **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 Work 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

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