Jeff J. MacInnes, PhD
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My work focuses on developing innovative tools that challenge the constraints of traditional experimental methodology, and using those tools to investigate novel questions about brain and behavior. I care about projects that promote collaborative and reproducible science, open source methodologies, and engagement with data through visualization.

2017-present **Postdoctoral Research Associate**
Institute for Learning & Brain Sciences - University of Washington
PIs: Andrea Stocco, PhD; Chantel Pratt, PhD; Rajesh Rao, PhD
projects: direct brain-to-brain interfaces in humans

2015-2017 **Postdoctoral Research Associate**
Duke Institute for Brain Sciences - Duke University
Johnson Laboratory - PI: Elizabeth Johnson, PhD
projects: dynamic automated gaze-mapping using mobile eye-tracking

Center for Cognitive Neuroscience - Duke University
Motivated Memory Laboratory - PI: R. Alison Adcock, MD PhD
projects: activation of neural systems for learning and memory using real-time fMRI

Education

2012-2015 **PhD - Psychology & Neuroscience**
Certificate in Cognitive Neuroscience
Duke University, Durham, NC
Dissertation: *Cognitive Neurostimulation: Learning to Volitionally Invigorate Mesolimbic Reward Network Activation*

Committee: R. Alison Adcock, MD PhD *(advisor)*
Timothy Strauman, PhD
Scott Huettel, PhD
Nan-Kuei Chen, PhD

2009-2012 **MA - Psychology & Neuroscience**
Duke University, Durham, NC

2007 **BS - Brain, Behavior, & Cognitive Science**
University of Michigan, Ann Arbor, MI
University Honors; Minor - Philosophy of Mind
Research Advisor: Oliver Schultheiss, PhD

Software/Tools

GitHub github.com/jeffmacinnes

Pyneal: Open source software package to support real-time functional magnetic resonance imaging (fMRI) across a variety of scanning environments. Python-based, and built in a modular fashion to accommodate a wide range of experimental applications
software: github.com/jeffmacinnes/pyneal
more info: jeffmacinnes.com/research/pyneal/pyneal.php

Dynamic Gaze Mapping: Open source analysis package supporting automated dynamic gaze mapping with mobile eye-tracking devices. This tool will automatically map gaze coordinates from a dynamic target object to static reference coordinate space, greatly facilitating the analysis of gaze behavior over time.
software: github.com/jeffmacinnes/glassesCalibration
more info: jeffmacinnes.com/research/gazeMapping/gazeMapping.php

Visualization: I develop visualizations to communicate complex data and facilitate viewer interaction. This work spans the domains of data visualization and science communication. These projects have taken the form of static figures, 3D animations, and web-based interactive applications, and have been used for scientific manuscripts, grant applications, interactive exhibits, and organization websites.
more info: jeffmacinnes.com/visualization/visualization.php

software specialties: Python, Pandas, OpenCV, Git/GitHub, Jupyter, Matlab, HTML, CSS, Javascript, D3js, P5js, Threejs, Nodejs, Blender, Adobe CS

Publications

Google Scholar

MacInnes JJ, Iqbal, S, Pearson, J, Johnson EN. Wearable Eye-tracking for Research: Automated dynamic gaze mapping and accuracy/precision comparisons across devices. (*in review)*

Haugg A, Sladky R, Skouras S, McDonald A, Craddock C, Kirshner M, Herdener M, Koush Y, Keynan J, Hendler T, Cohen K, Zich C, **MacInnes JJ**, Adcock A, Dickerson K, Chen N,

Young K, Bodurka J, Shuxia Y, Becker B, Auer T, Schweizer R, Emmert K, Haller S, Van De Ville D, Blefari M, Kim D, Lee J, Marins T, Fukuda M, Sorger B, Kamp T, Papoutsi M, Liew S, Veit R, Spetter M, Weiskopf N, Scharnowski F. Can we predict real-time fMRI neurofeedback success from pre-training brain activity? (*in review)*

Masha N, **MacInnes JJ**, Johnson EN. Varying the Amount of Social Information in an Image Affects Facial Processing Strategies of Participants with an Autism-Related Phenotype (*in review)*

MacInnes JJ*, Dickerson KC*. (2018) Real-time Functional Magnetic Resonance Imaging. *Encyclopedia of Life Sciences (eLS).* John Wiley & Sons, Ltd: Chichester

MacDuffie KM, **MacInnes JJ**, Dickerson KC, Scult MA, Beaty RE, Eddington KM, Strauman TJ, Adcock RA. (2018) Motivating Engagement in Cognitive Therapy Strategies Using Real-Time FMRI Neurofeedback. *NeuroImage: Clinical,* 19: 868-875

MacInnes JJ*, Dickerson KC*, Chen N, Adcock RA. (2016) Cognitive Neurostimulation: Learning to Volitionally Sustain Ventral Tegmental Area Activation. *Neuron*, 89(6)

Ballard IC, Murty VP, Carter RM, **MacInnes JJ**, Huettel SA, Adcock RA. (2011) Dorsolateral prefrontal cortex drives mesolimbic dopaminergic regions to initiate motivated behaviors. *Journal of Neuroscience*, 31(28):10340-46

Schultheiss OC, Patalakh M, Rawolle M, Liening S, **MacInnes JJ**. (2011) Referential competence is associated with congruence between implicit and explicit motivation. *Journal of Research in Personality,* 45, 59-70

Carter RM*, **MacInnes JJ***, Huettel SA, Adcock RA. (2009) Activation in the VTA and nucleus accumbens increases in anticipation of both gains and losses. *Frontiers in Behavioral Neuroscience*. (3) 21

-Commentary in: Seo, H (2010) Ambivalent Dopamine. *Frontiers in Neuroscience*, 4

* co-lead authors

Abstracts & Presentations

Thorp J, Hakimi S, **MacInnes JJ**, Dickerson KC, Adcock RA. Mesolimbic connectivity during neurofeedback training predicts learning to volitionally activate the ventral tegmental area. *Society for Neuroscience*, *2018*

Hakimi S, **MacInnes JJ**, Dickerson KC, Adcock RA. Modeling structure in learning to self-regulate motivation via veridical real-time fMRI neurofeedback from the ventral tegmental area. *Society for Neuroeconomics, 2018*

Hakimi S, **MacInnes JJ**, Dickerson KC, Adcock RA. Temporal structure of learning to regulate ventral segmental area through real-time fMRI neurofeedback. *Computational Cognitive Neuroscience, 2018*

Hakimi S, **MacInnes JJ**, Dickerson KC, Adcock RA. Modeling VTA Learning from Real-time fMRI Neurofeedback. *Real-time Functional Imaging and Neurofeedback, 2017*

Dickerson KC, MacDuffie KE, **MacInnes JJ**, Eddington KM, Strauman TJ, Adcock RA. Using Real-time Neurofeedback as a Tool for Demonstrating Therapeutic Efficacy. *Real-time Functional Imaging and Neurofeedback, 2017*

Haugg A, Sladky R, Kirschner M, Herdener M, Koush Y, **MacInnes JJ**, Dickerson KC, Chen NK, Adcock RA, Young K, Yao S, Becker B, Emmert K, Van De Ville D, Haller S, Scheerer H, Bruhl A, Fukuda M, Weiskopf N, Scharnowski F. Pre-training Localizer Activity Predicts Real-time fMRI Neurofeedback Learning Success. *Real-time Functional Imaging and Neurofeedback*, 2017

MacInnes J. Mapping the Geographic Spread of Collaborations Across Duke University. *Scholars@Duke Data Visualization Challenge*, Duke Research Computing, 2017 ***First Place Winner***

Dickerson KC, **MacInnes J**, Chen N, Adcock RA. Cognitive Neurostimulation of the Dopamine System. *American College of Neuropsychopharmacology, 2016*

Iqbal S, **MacInnes J.** Dynamic Object-Gaze Tracking with OpenCV. *PyData Carolinas, 2016*

MacDuffie KM, Dickerson KC, **MacInnes J**, Eddington KM, Strauman TJ, Adcock RA. Real-time fMRI Neurofeedback Motivates Engagement of Cognitive Strategies for Depression. *Society for Neuroscience, 2016* ***selected as SFN Hot Topic of 2016***

MacDuffie KM, **MacInnes J**, Dickerson KC, Scult MA, Beaty RE, Eddington KM, Strauman TJ, Adcock RA. Motivating Engagement in Cognitive Therapy Strategies Using Real-Time FMRI Neurofeedback. *Association for Psychological Science, 2016*

MacInnes J, Wardle ME, Johnson EN. Facial Fixations: How Visual Exploration Varies Across Artistic Depictions of Faces. *European Conference on Visual Perception: Visual Science of the Arts Conference, 2016*

Johnson EN, **MacInnes J**, Iqbal S, Wardle ME, Pearson JM. Gaze Meets Space: Mapping Natural Viewing Behavior in the Gallery. *European Conference on Visual Perception: Visual Science of the Arts Conference, 2016*

MacInnes J*, Dickerson KC*, Adcock RA. Cognitive Neurostimulation: Learning to volitionally sustain ventral tegmental area activation. *Real-time Functional Imaging & Neurofeedback, 2015*

MacInnes J*, Dickerson KC*, Adcock RA. Cognitive Neurostimulation: Learning to volitionally sustain ventral tegmental area activation. *Translational Neuroscience, 2014*

MacInnes J*, Dickerson KC*, Adcock RA. Behavioral neurostimulation: Sustained activation of the human dopaminergic midbrain using real-time fMRI. *Society for Neuroscience Annual Meeting, 2013*

Dickerson KC*, **MacInnes J***, Adcock RA. Sustained activation of the human dopaminergic midbrain using real-time fMRI. *Mechanisms of Motivation, Cognition, and Aging Interactions Annual Meeting*, 2013

Carter RM, **MacInnes J**, Winecoff A, Adcock RA, Huettel SA. Distribution analysis of fMRI contrasts in social and affective tasks. *Social and Affective Neuroscience Society Annual Meeting, 2013*

MacInnes J, Adcock RA. Intentional activation of the human dopaminergic midbrain: Experimental foundations for therapeutic behavioral neurostimulation. *National Academy of Sciences: Kavli Frontiers of Science Symposia, 2011*

MacInnes J, MacDuffie K, Adcock RA. Instructed salience modulates reward-motivated enhancements in item and relational memory. *Cognitive Neuroscience Society Annual Meeting, 2011*

MacInnes J, MacDuffie K, Adcock RA. Differential impact of reward motivation on item versus source memory. *Society of Neuroscience Annual Meeting, 2010*

MacDuffie K, Murty V, **MacInnes J**, Johnson B, Adcock RA. Motivated word-list encoding: Valence or value? *Duke University Center for Neuroeconomic Studies Annual Retreat, 2010*

Ballard I, Murty V, **MacInnes J**, Carter RM, Huettel S, Adcock RA. Prefrontal origin of reward information in the mesolimbic dopamine system. *Cognitive Neuroscience Society Annual Meeting, 2010*

MacInnes J, Carter RM, Adcock RA, Huettel S. Rewards earned for others – An fMRI study of the neural correlates of altruism. *Cognitive Neuroscience Society Annual Meeting, 2009*

MacInnes J, Rouse E, Figueroa S, Ely S, Adcock RA. Pupillary indices of successful reward-motivated learning. *Soc. for Neuroscience Annual Meeting, 2008*

MacInnes J, Rouse E, Figueroa S, Ely S, Adcock RA. Pupil responses to reward cues as predictors of long-term memory for associated images. *Center for Neuroeconomics Annual Meeting, Duke University, 2008*

* co-lead authors

Teaching

courses

Functional Magnetic Resonance Imaging
Spring 2016 - Graduate Course, Duke University

Introduction to Cognitive Neuroscience
Summer 2014 - Duke University

guest lectures

New tools for real-time fMRI
Spring 2018 - Integrated Brain Imaging Center, University of Washington

New Methods for Studying Naturalistic Behaviors
Fall 2016 - Wharton Neuroscience Initiative, University of Pennsylvania

Dynamic Object-Gaze Tracking with OpenCV
Fall 2016 - PyData Carolinas (with Shariq Iqbal)

fMRI Methods in Cognitive Neuroscience
Summer 2016 - Undergraduate Intro to Cognitive Neuroscience, Duke University

Cognitive Neurostimulation of Effective Learning States
Fall 2014 - Duke University

Real-time fMRI and Applications
Spring 2013 - fMRI methods group, Duke University

Physiological De-noising of fMRI data
Spring 2013 - fMRI methods group, Duke University

Advanced Imaging Analyses
Spring 2012 - Undergraduate fMRI course, Duke University

Real-time fMRI and MVPA
Fall 2011 - Graduate fMRI course, Duke University

K-Space and MR Physics
Fall 2011 - Graduate fMRI course, Duke University

teaching asst.

Biological Basis of Behavior
Spring 2013 - Undergraduate course, Duke University

Functional Magnetic Resonance Imaging
Spring 2012 - Undergraduate course, Duke University

Functional Magnetic Resonance Imaging

Fall 2011 - Graduate course, Duke University

recognitions & memberships

2018 - Brain Awareness Week exhibit designer, volunteer
2017 - University of Washington Summer Institutes in Biostatistics - Scholarship Award
2017 - 1st Place, Scholars@Duke Data Visualization Competition
2016-2017 - Brain Awareness Week exhibit planner, volunteer
2015 - Real-Time Functional Imaging & Neurofeedback Student Travel Award
2015 - Duke Graduate School Travel Award
2009-2013 - James B. Duke Graduate Fellowship
2011-2012 - Board of Directors, Design - Brain Awareness week
2010 - NSF Fellow - East Asia & Pacific Summer Institutes
2008, 2010 - Society for Neuroscience member
2009 - NSF Graduate Research Fellowship - Honorable Mention
2008-2009 - Cognitive Neuroscience Society member
2005-2007 - University Honors – University of Michigan
2006-2007 - Undergraduate Psychological Society member – University of Michigan
2002-2007 - Michigan Competitive Scholarship
2002 - Ruth M. Butler Community Service Award