

**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

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**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

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GitHub [github.com/jeffmacinnes](https://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](https://github.com/jeffmacinnes/pyneal)  
**more info:** [jeffmacinnes.com/research/pyneal/pyneal.php](http://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](https://github.com/jeffmacinnes/glassesCalibration)  
**more info:** [jeffmacinnes.com/research/gazeMapping/gazeMapping.php](http://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](http://jeffmacinnes.com/visualization/visualization.php)

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

## Publications

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### Google Scholar

MacDuffie KM, **MacInnes JJ**, Dickerson KC, Scult MA, Beaty RE, Eddington KM, Strauman TJ, Adcock RA. Motivating Engagement in Cognitive Therapy Strategies Using Real-Time fMRI Neurofeedback. (*in review*)

**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*)

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

**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

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

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

MacDuffie KM, Dickerson KC, **Maclnnes 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, **Maclnnes 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*

**Maclnnes 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, **Maclnnes 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*

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

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

**Maclnnes 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\*, **Maclnnes 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, **Maclnnes 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*

**Maclnnes 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*

**Maclnnes 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

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### 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**

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**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**