

## Nicholas L. Balderston

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### EDUCATION

- 2013      PhD in Experimental Psychology – Neuroscience  
University of Wisconsin-Milwaukee  
Department of Psychology  
Advisor: Fred Helmstetter  
Major: Neuroscience  
Minor: Neurobiology, Behavior Analysis  
Dissertation: Neural responses during trace conditioning with face and non-face stimuli recorded with magnetoencephalography.
- 2010      M.S. in Experimental Psychology  
University of Wisconsin-Milwaukee,  
Department of Psychology  
Advisor: Fred Helmstetter
- 2004      B.A. in Psychology  
University of West Florida  
Department of Psychology

### PROFESSIONAL APPOINTMENTS

- 2014      Postdoctoral Fellow  
National Institute of Mental Health  
Advisor: Christian Grillon
- 2012      Predoctoral Chateaubriand Fellow  
École Normale Supérieure  
Advisor: Catherine Tallon-Baudry

### PUBLICATIONS

2018

Torrise, S, Gorka, AX, Gonzalez-Castillo, J, **Balderston, NL**, Grillon, C, & Ernst, M (2018). Extended amygdala connectivity changes during sustained shock anticipation. *Translational Psychiatry*. 8(33)

## 2017

**Balderston, NL**, Liu, J, Roberson-Nay, R, Ernst, M, & Grillon, C (2017). The relationship between dlPFC activity during unpredictable threat and CO2-induced panic symptoms. *Translational Psychiatry*, 7(12), 1266.

**Balderston NL**, Hsiung A, Ernst M, Grillon C (2017) The effect of threat on right dlPFC activity during behavioral pattern separation. *J Neurosci* 37:0717–17.

**Balderston NL**, Hsiung A, Liu J, Ernst M, Grillon C (2017) Reducing State Anxiety Using Working Memory Maintenance. *J Vis Exp*:1–11.

**Balderston NL**, Hale E, Hsiung A, Torrissi S, Holroyd T, Carver FW, Coppola R, Ernst M, Grillon C (2017) Threat of shock increases excitability and connectivity of the intraparietal sulcus. *Elife* 6:1–27.

## 2016

Pedersen WS, **Balderston NL**, Miskovich TA, Belleau EL, Helmstetter FJ, Larson CL (2016) The Effects of Stimulus Novelty and Negativity on BOLD Activity in the Amygdala, Hippocampus, and Bed Nucleus of the Stria Terminalis. *Soc Cogn Affect Neurosci* :1–10.

Torrissi S, Nord CL, **Balderston NL**, Roiser JP, Grillon C, Ernst M (2016) Resting State Connectivity of the Human Habenula at Ultra-High Field. *Neuroimage*:0–1.

**Balderston NL**, Quispe-Escudero D, Hale E, Davis A, O'Connell K, Ernst M, Grillon C (2016) Working memory maintenance is sufficient to reduce state anxiety. *Psychophysiology* 0.

Torrissi S, Robinson O, O'Connell K, Davis A, **Balderston NL**, Ernst M, Grillon C (2016) The neural basis of improved cognitive performance by threat of shock. *Soc Cogn Affect Neurosci* 11:1677–1686.

Schultz DH, **Balderston NL**, Baskin-Sommers AR, Larson CL, Helmstetter FJ (2016) Psychopaths Show Enhanced Amygdala Activation during Fear Conditioning. *Front Psychol* 7:1–12.

**Balderston NL**, Vytal KE, O'Connell K, Torrissi S, Letkiewicz A, Ernst M, Grillon C (2016) Anxiety Patients Show Reduced Working Memory Related Dlpfc Activation During Safety and Threat. *Depress Anxiety* 12:1–12.

**2015**

Torrissi S, O'Connell K, Davis A, Reynolds R, **Balderston NL**, Fudge JL, Grillon C, Ernst M (2015) Resting state connectivity of the bed nucleus of the stria terminalis at ultra-high field. *Hum Brain Mapp* 36:4076–4088.

**Balderston NL**, Mathur A, Adu-Brimpong J, Hale EA, Ernst M, Grillon C (2015) Effect of anxiety on behavioural pattern separation in humans. *Cogn Emot* 9931:1–11.

**Balderston NL**, Schultz DH, Hopkins L, Helmstetter FJ (2015) Functionally distinct amygdala subregions identified using DTI and high-resolution fMRI. *Soc Cogn Affect Neurosci*:1–8.

**2014**

**Balderston NL**, Schultz DH, Baillet S, Helmstetter FJ (2014) Rapid amygdala responses during trace fear conditioning without awareness. *PLoS One* 9:e96803.

**2013**

Schultz DH, **Balderston NL**, Geiger JA, Helmstetter FJ (2013) Dissociation between implicit and explicit responses in postconditioning UCS reevaluation after fear conditioning in humans. *Behav Neurosci* 127:357–368.

**Balderston NL**, Schultz DH, Helmstetter FJ (2013) The effect of threat on novelty evoked amygdala responses. *PLoS One* 8:e63220.

Larson CL, Baskin-Sommers AR, Stout DM, **Balderston NL**, Curtin JJ, Schultz DH, Kiehl KA, Newman JP (2013) The interplay of attention and emotion: top-down attention modulates amygdala activation in psychopathy. *Cogn Affect Behav Neurosci*:1–14.

**Balderston NL**, Schultz DH, Baillet S, Helmstetter FJ (2013) How to Detect Amygdala Activity with Magnetoencephalography using Source Imaging. *J Vis Exp*:1–10.

**2012 and Earlier**

Schultz DH, **Balderston NL**, Helmstetter FJ (2012) Resting-state connectivity of the amygdala is altered following Pavlovian fear conditioning. *Front Hum Neurosci* 6:1–10.

**Balderston NL**, Schultz DH, Helmstetter FJ (2011) The human amygdala plays a stimulus specific role in the detection of novelty. *Neuroimage* 55:1889–1898.

**Balderston NL**, Helmstetter FJ (2010) Conditioning with masked stimuli affects the timecourse of skin conductance responses. *Behav Neurosci* 124:478–489.

## REVIEWS AND CHAPTERS

Gilmartin, MR, **Balderston, NL**, & Helmstetter, FJ (2014). Prefrontal cortical regulation of fear learning. *Trends in Neurosciences*, 37(8), 455–464.

Ernst, M, Torrisi, S, **Balderston, NL**, Grillon, C, & Hale, EA (2014). fMRI Functional Connectivity Applied to Adolescent. *Annual Review of Clinical Psychology*, (December), 1–17.

Ernst, M, Hale EA, Torrisi, S, & **Balderston, NL** (2014). Introduction to functional brain connectivity and potential contributions to understanding adolescent vulnerability to substance abuse. Chapter in *Neuroimaging and Psychosocial Addiction Treatment*

## IN PREPARATION

**Balderston, NL**, Helmstetter, F, & Tallon-Baudry, C (In preparation). Coordinated medial temporal lobe and prefrontal cortex activity mediates trace fear conditioning.

Schultz, DH, **Balderston, NL**, Cheng, D, Geiger, JA, & Helmstetter, F. (In preparation). Conditional stimulus BOLD activation overlaps with shock evoked activity in somatosensory cortex.

Schultz, D, **Balderston, NL**, & Helmstetter, F. (In preparation). A direct comparison of auditory and visual fear conditioning in humans using FMRI.

## CURRENT FUNDING

2014-2018 NIH Intramural Research Training Award

## PREVIOUS FUNDING

2014	Madison Symposium on Emotion Travel Award
2012	Chateaubriand Fellowship
2009, 2010	John and Lynn Schiek Award in Behavior Analysis
2007	University of Wisconsin-Milwaukee Graduate School Travel Award
2006-2008	Chancellor's Graduate Student Award – University of Wisconsin-Milwaukee

## INVITED TALKS

- 2017 The role of the FPN in the expression and regulation of anxiety. UCLA. Department of Psychiatry and Biobehavioral Sciences
- 2016 Threat of shock and the prefrontal cognitive control system. MGH. Psychiatry Department
- 2010 Novel stimuli Evoke BOLD Responses in the Human Amygdala. Medical College of Wisconsin. Center for Imaging Research seminar series

## CONFERENCE TALKS

- 2017 The relationship between panic sensitivity and default mode network activity during the NPU threat task. Anxiety and Depression Association of America meeting.
- 2015 The effect of threat on within-network functional connectivity across the entire human brain. Society for Neuroscience.
- 2012 Rapid amygdala responses during trace fear conditioning without awareness. Brainstorm User Symposium at BioMag.
- 2010 BOLD response to novelty in the human amygdala. Milwaukee Area Neuroscience Meeting.
- 2008 In a direct comparison of novelty and emotional valence, novelty evokes larger magnitude BOLD responses in the amygdala. Society for Neuroscience.

## ON-CAMPUS TALKS

### National Institutes of Health

- 2018 The role of the FPN in the expression and regulation of anxiety. ANGST symposium.
- 2016 Threat of shock and the prefrontal cognitive control system. ANGST symposium.
- 2015 Anxiety is characterized by global changes in neural oscillations and functional connectivity. FANS symposium.
- 2015 Anxiety is characterized by global changes in neural oscillations and functional connectivity. fMRI seminar series.

### University of Wisconsin-Milwaukee

- 2012 Differential effects of novelty and fear on activity within anatomically defined subregions of the human amygdala. Graduate Student Research Symposium.
- 2010 BOLD response to novelty in the human amygdala. Graduate Student Research Symposium.
- 2010 BOLD response to novelty in the human amygdala. Neuroscience and Physiology seminar series.

- 2008 The effects of novelty and emotional valence on BOLD activity in the amygdala, hippocampus, and visual cortex. Neuroscience and Physiology seminar series.
- 2008 Masking blocks contingency awareness but not implicit learning in fear conditioning. Graduate Student Research Symposium.
- 2007 Fear learning does not depend on awareness. Neuroscience and Physiology seminar series.
- 2007 The role of awareness in fear acquisition. Graduate Student Research Symposium.
- 2007 The effects of visual masking on fear acquisition. Neuroscience and Physiology seminar series.

## POSTERS

- 2017 The effect of threat of shock on working memory maintenance vs. manipulation during the Sternberg paradigm. Society for Neuroscience.
- 2016 Threat of shock engages the dlPFC during a wide variety of cognitive paradigms. Society for Neuroscience.
- 2016 Anxiety patients show reduced working memory related dlPFC activation during safety and threat. Psychophysiological Research.
- 2015 Resting State Alpha Oscillations in the Expression of Anxiety-potentiated Startle. Society for Biological Psychiatry meeting.
- 2015 Anxiety interferes with brain activity at rest. Madison Symposium on Emotion.
- 2014 Anxiety impairs performance and reduces dlPFC activity during high load spatial working memory. Society for Neuroscience.
- 2013 Neural sources of delay and trace fear conditioning recorded with magnetoencephalography. Society for Neuroscience.
- 2012 Using DTI and high-resolution BOLD to identify distinct functional subunits of the human amygdala. Society for Neuroscience.
- 2012 Rapid amygdala responses during trace fear conditioning without awareness. Organization for Human Brain Mapping meeting.
- 2012 Behavioral and amygdala BOLD responses in psychopaths during fear conditioning. Organization for Human Brain Mapping meeting.
- 2011 Neuromagnetic amygdala responses during trace fear conditioning without awareness. Society for Neuroscience.
- 2010 The effect of threat on novelty evoked amygdala responses. Program. No. 602.13. Society for Neuroscience.
- 2009 Novel faces but not scenes drive BOLD responses in the amygdala. Society for Neuroscience.
- 2009 BOLD response to novelty in the human amygdala. Poster presented at the Organization for Human Brain Mapping.
- 2007 Masked presentation of simple visual stimuli and learning without awareness in human fear conditioning. Society for Neuroscience.

2007            Learning without awareness in human fear conditioning. Pavlovian Society meeting.

## **TEACHING EXPERIENCE**

### **Instructor**

Introduction to Psychology (Fall 2012)

### **Teaching Assistant**

Physiological Psychology (Fall 2006, Fall 2012)

Research Methods (Spring 2007, Fall 2007, Spring 2008, Fall 2009)

## **RESEARCH EXPERIENCE**

2014            Postdoctoral Fellow  
National Institute of Mental Health  
Advisor: Christian Grillon

2012            Predoctoral Chateaubriand Fellow  
École Normale Supérieure  
Advisor: Catherine Tallon-Baudry

2006-2013    Research Assistant  
University of Wisconsin-Milwaukee  
Psychology Department  
Advisor: Fred Helmstetter

2006            Project Coordinator  
University of West Florida  
Psychology Department  
Advisor: Susan Walch

## **MEMBERSHIPS**

Society for Neuroscience  
Society for Biological Psychiatry  
Society for Psychophysiological Research  
Anxiety and Depression Association of America  
Human Brain Mapping  
Pavlovian Society

## **REVIEWER**

Behavioral Brain Research  
Brain  
Brain Structure & Function  
Clinical Psychological Science  
Cognition and Emotion  
Frontiers in Human Neuroscience  
Frontiers in Neuroscience: section Brain Imaging Methods  
Human Brain Mapping  
Journal of Experimental Psychology: General  
Journal of Psychiatry and Neuroscience  
Neurobiology of Learning and Memory  
Neuroimage  
PLoS One  
Psychiatry Research: Neuroimaging  
Psychoneuroimmunology  
Royal Society Open Science

## **PRESS/MEDIA COVERAGE**

2017            eLIFE Podcast  
                  Episode 40  
                  The Anxious Brain  
                  <https://elifesciences.org/podcast/episode40>

## **REFERENCES**

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