

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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