

**Neil David Woodward, PhD**

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**PERSONAL STATEMENT**

As an Associate Professor and Bixler-Johnson-Mayes Chair in the Department of Psychiatry and Behavioral Sciences at Vanderbilt University Medical Center (VUMC), I am actively engaged in research, clinical service, teaching, and administration. My lab uses multimodal neuroimaging (MRI, fMRI, diffusion imaging) and cognitive neuroscience methods to investigate the neural basis of psychotic disorders, brain development, and developmental disorders. I am also a licensed clinical psychologist and routinely conduct neuropsychological assessments on adolescents and adults with psychiatric illnesses, neurological disorders, and traumatic brain injury. My research program and clinical service serve as a platform for training researchers and clinician-scientists, from undergraduates to junior faculty. I am Director of VUMC's Postdoctoral Fellowship Training Program in Professional Psychology (APPIC membership) and Training Director for the psychosis emphasis track within the VUMC Internship in Professional Psychology, an APA-accredited clinical psychology pre-doctoral internship.

**EDUCATION**

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| 1995-1999 | Bachelor of Science with Specialization in Psychology, University of Alberta<br>Edmonton, Alberta, Canada  |
| 2001-2004 | Master of Arts in Psychology, Vanderbilt University<br>Nashville, Tennessee, United States   |
| 2006-2007 | Clinical Neuropsychology Intern, Edmonton Consortium Clinical Psychology Residency<br>Edmonton, Alberta, Canada  |
| 2001-2007 | Doctor of Philosophy in Clinical Psychology, Vanderbilt University<br>Nashville, Tennessee, United States  |
| 2007-2009 | Postdoctoral Research Fellow, Psychiatric Neuroimaging Program<br>Dept. of Psychiatry, Vanderbilt University Medical Center<br>Nashville, Tennessee, United States |

**LICENSURE**

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| 2012-present | Psychologist HSP, Tennessee (License #3033) |
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**ACADEMIC APPOINTMENTS**

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| 2017-present | Bixler-Johnson-Mayes Chair, Vanderbilt University School of Medicine  |
| 2016-present | Associate Professor<br>Dept. of Psychiatry and Behavioral Sciences, Vanderbilt University School of Medicine<br>Dept. of Psychology, College of Arts and Science, Vanderbilt University |
| 2009-present | Vanderbilt Brain Institute Neuroscience Training Faculty, Neuroscience Graduate Program   |
| 2013-2017    | Jack Martin, MD, Research Professor in Psychopharmacology<br>Dept. of Psychiatry and Behavioral Sciences, Vanderbilt University School of Medicine                                      |
| 2011-2015    | Assistant Professor   |

Dept. of Psychology, College of Arts and Science, Vanderbilt University

2009-2015 Assistant Professor  
Dept. of Psychiatry and Behavioral Sciences, Vanderbilt University School of Medicine

#### **ADMINISTRATIVE APPOINTMENTS**

2017-present Director, Postdoctoral Fellowship Training Program in Professional Psychology  
Vanderbilt Dept. of Psychiatry and Behavioral Science

2014-2016 Co-Director, Vanderbilt - Veterans Affairs Internship in Professional Psychology

#### **HOSPITAL APPOINTMENTS**

2012-present Clinical Neuropsychologist, Vanderbilt University Medical Center

#### **MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS**

2018-present Flux: The Society for Developmental Cognitive Neuroscience

2017-present Society for Research in Psychopathology

2009-present Society of Biological Psychiatry

#### **PROFESSIONAL ACTIVITIES**

##### INTRAMURAL:

##### *1. Grant Reviewer:*

2012 Kennedy Center Hobbs Discovery Grant Program, Team William Discovery Grant on Down Syndrome

##### EXTRAMURAL:

##### *1. Grant Reviewer (ad hoc/temporary member):*

2020 National Institute of Health (NIH), Neural Basis of Psychopathology and Sleep Disorders (NPAS)

2019 National Institute of Health (NIH), Member Conflict Study Section (2019/07 ZRG1 BDCN-T (02))

2018 Department of Defense Autism Research Program, Idea Development Review Panel

2018 National Institute of Health (NIH), Special Emphasis Study Section (2019/01 ZMH1 ERB-D(01))

2018 National Institutes of Health (NIH), Behavioral Genetics and Epidemiology (BGES) Study Section

2015 Swiss National Science Foundation, Sinergia Grant Reviewer

2012 National Institutes of Health (NIH), Behavioral Genetics and Epidemiology (BGES) Study Section

2012 Canadian Institute of Health Research (CIHR), Drug Safety and Effectiveness Network Targeted Research Review Committee

##### *2. Journal Reviewer (ad hoc):*

American Journal of Psychiatry, Assessment, Biological Psychiatry, Biological Psychiatry: Cognitive Neuroscience and Neuroimaging, Brain, Brain Imaging and Behavior, Brain Structure and Function, Cerebral Cortex, Comprehensive Psychiatry, European Archives of Psychiatry and Clinical Neuroscience, European Psychiatry, Expert Review of Neurotherapeutics, Experimental Brain Research, General Hospital Psychiatry, Harvard Review of Psychiatry, Human Brain Mapping, International Journal of Neuropsychopharmacology, International Journal of Psychophysiology, JAMA Psychiatry, Journal of the American Academy of Child and Adolescent Psychiatry, Journal of Child Psychology and Psychiatry, Journal of the International Neuropsychological Society, Molecular Psychiatry, Neuroimage, Neuroimage: Clinical, Neuropsychopharmacology, Neuroscience Letters, npj Schizophrenia, PLoS One, Progress in Neuropsychopharmacology and Biological Psychiatry, Psychiatry Research, Psychological Medicine, Psychopharmacology, Schizophrenia Bulletin, Schizophrenia Research, Scientific Reports, Translational Psychiatry

#### **AWARDS**

2013 Travel Fellowship, 46<sup>th</sup> Winter Conference on Brain Research

2011 Young Investigator Travel Award, 13<sup>th</sup> International Congress on Schizophrenia Research

2009 NARSAD Young Investigator Award, Brain and Behavior Research Fund

1999 Young Scientist Award, 10<sup>th</sup> Biennial Winter Workshop on Schizophrenia

## TEACHING ACTIVITIES

### 1. Graduate School Course Teaching:

2010 Co-Instructor, NURO 325 (Neuroscience Discussions), Vanderbilt University

### 2. Guest Lectures:

2016-present VMS Brain, Behavior, and Movement Course: Cognitive Disorders  
 2015-present Geriatric Psychiatry Fellowship Seminar: Normal Cognitive Aging  
 2014-present Psychiatry Residency (PGY 1-4): Case Based Learning- Neuroscience of Schizophrenia  
 2013-present Psychiatry Residency (PGY-1): Testing Cognitive Functioning  
 2011-present Psychiatry Residency (PGY-2): Neuroimaging in Schizophrenia  
 2013-present VMS Brain, Behavior, and Movement Course: Cognition Neurocircuitry  
 2013 Psychiatry Residency (PGY-1): Cognitive Neuroscience I  
 2010-2014 Vanderbilt University, PSY246 (Schizophrenia): Neuropsychology of Schizophrenia, Brain Connectivity in Schizophrenia

### 3. Graduate Students and Postdoctoral Fellows Supervision:

#### Supervisor, Vanderbilt University Medical Center Internship in Professional Psychology

Alexandra Moussa-Tooks	2020-2021	Graduate Student, Indiana University Bloomington
Beshaun Davis	2019-2020	Graduate Student, Indiana University-Purdue University
Derek Dean	2018-2019	Graduate Student, University of Colorado Boulder
Nickolas Armstrong	2017-2018	Graduate Student, Chicago School of Prof. Psychology
Julia Sheffield	2017-2018	Graduate Student, Washington University St. Louis
Nicole Karcher	2016-2017	Graduate Student, University of Missouri
Nathan Dankner	2015-2016	Graduate Student, Vanderbilt University

#### Postdoctoral Fellows

Sarah Sperry, PhD	2020-present	VUMC Psychotic Disorders Fellowship
Anna Huang, PhD	2018-present	Woodward Lab
Suzanne Avery, PhD	2019-2020	Woodward/Heckers Labs
Julia M. Sheffield, PhD	2018-2020	VUMC Psychotic Disorders Fellowship, Woodward Lab
Derek Dean, PhD	2019-2020	Heckers/Woodward Labs
Yasmeen Iqbal, PhD	2016-2018	Woodward Lab
Khalima Bolden, PhD	2016-2017	VUMC Psychotic Disorders Fellowship
Monica Giraldo-Chica, PhD	2015-2017	Woodward Lab

#### Clinical Mentor, Vanderbilt Clinical Neuroscience Scholars Program

Olga Dadalko, PhD	2012-2013	Graduate Student, Vanderbilt Neuroscience
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#### Graduate Student Qualifying Exam and Doctoral Committee Membership

Prasanna Parvathaneni	2018-2019	Vanderbilt School of Engineering
BettyAnn Chodkowski	2013-2016	Vanderbilt Interdisciplinary Graduate Program
Jennifer Vega	2013-2014	Vanderbilt Neuroscience Program
Chris Muller	2012	Vanderbilt Neuroscience Program
Joyce Zhu	2014	Vanderbilt Psychology: Clinical Sciences
Kendra Hinton	2013	Vanderbilt Psychology: Clinical Sciences
Juliane Krueger	2011	Vanderbilt Neuroscience Program

## RESEARCH PROGRAM AND FUNDING

### Current Grant Support:

**1 R01 MH118273 (MPI: Heckers, Woodward, Zald)** 08/01/2019 – 05/31/2024

Title: The General Factor of Psychopathology in Psychosis and Severe Mental Illness

Granting Agency: National Institute of Mental Health  
Role on Project: Principal Investigator (Multiple PI: Stephan Heckers, Neil Woodward, David Zald)  
Effort: 2.14 calendar mos.  
Total Funding for Current FY: \$826,527

**1 R01 MH115000 (MPI: Woodward, Anticevic)** 06/04/2018 – 03/31/2022  
Title: Development of Thalamocortical Circuits and Cognitive Function in Healthy Individuals and Youth At-Risk for Psychosis  
Granting Agency: National Institute of Mental Health  
Role on Project: Principal Investigator (Multiple PI: Neil Woodward (contact PI), Alan Anticevic)  
Effort: 2.4 calendar mos.  
Total Funding for Current FY: \$369,864

**1 R01 MH123563 (PI: Vandekar)** 08/01/2020 – 05/31/2025  
Title: Semiparametric Inference for Psychiatric Neuroimaging  
Granting Agency: National Institute of Mental Health  
Role on Project: Co-Investigator  
Effort: 1.2 calendar mos.  
Total Funding for Current FY: \$446,105

**1 R01 MH102246 (PI: Taylor)** 01/15/2015 - 11/30/2020  
Title: Neural Connectivity Affecting the Antidepressant Response: Testing a Lesion Model  
Granting Agency: National Institute of Mental Health  
Role on Project: Co-Investigator  
Effort: 1.2 calendar mos.  
Total Funding for Current FY: \$588,408

Completed Grant Support:

**1 R01 MH102266 (PI: Woodward)** 09/01/2014 - 04/30/2020  
Title: Thalamocortical Networks in Psychosis  
Granting Agency: National Institute of Mental Health  
Role on Project: Principal Investigator  
Effort: 5.4 calendar mos.  
Total Funding: \$2,229,033

**Precision Medicine and Mental Health TIPS Initiative (PI: Rubinov)** 01/01/2019 - 12/31/2019  
Title: Mapping and Analysis of Functional Connectome Evolution to Enable Precision Medicine for Psychotic Disorders  
Granting Agency: Vanderbilt Brain Institute  
Role on Project: Co-Principal Investigator  
Effort: 0.0 calendar mos.  
Total Funding: \$50,000

**2 R01 MH070560 (PI: Heckers)** 09/27/2013 - 05/31/2017  
Title: Imaging Hippocampal Function in Psychosis  
Granting Agency: National Institute of Mental Health  
Role on Project: Co-Investigator  
Total Funding: \$2,049,581

**1 R01 MH098098 (PI: Zald)** 09/12/2012 - 05/31/2017  
Title: RDoC Constructs: Neural Substrates, Heritability, and Relation to Psychopathology  
Granting Agency: National Institute of Mental Health  
Role on Project: Co-Investigator

Total Funding: \$4,433,288

**5 R21 MH101321 (MPI: Cascio, Woodward)**

03/07/2014 - 02/28/2017

Title: Mapping Thalamocortical Networks Across Development in ASD

Granting Agency: NIMH

Role on Project: Principal Investigator (Multiple PI: Carissa Cascio (contact PI), Neil Woodward)

Total Funding: \$432,034

**5 R21 MH096177 (PI: Woodward)**

07/01/2012 - 06/30/2015

Title: Cognitive Neuroscience of Processing Speed Dysfunction in Schizophrenia

Granting Agency: National Institute of Mental Health

Role on Project: Principal Investigator

Total Project Funding: \$419,640

**Luton Rising Star Research Grant (PI: Woodward)**

08/01/2011 - 08/01/2012

Title: Functional Brain Network Changes Across Clinical States in Schizophrenia

Granting Agency: Luton Society

Role on Project: Principal Investigator

Total Funding: \$11,197

**NARSAD Young Investigator Award (PI: Woodward)**

2010-2012

Title: The Neural and Genetic Basis of Processing Speed Deficits in Schizophrenia

Granting Agency: Brain and Behavior Research Fund

Role on Project: Principal Investigator

Total Funding: \$60,000

**Luton Pilot Research Grant (PI: Woodward)**

2009-2011

Title: Comparing Conscious and Unconscious Skill Learning in Schizophrenia

Granting Agency: Luton Society

Role on Project: Principal Investigator

Total Funding: \$5000

**PUBLICATIONS AND PRESENTATIONS**

Original Papers:

1. Feola B, Armstrong K, Flook E, **Woodward ND**, Heckers S, Blackford JU. (in press) Evidence for inhibited temperament as a transdiagnostic factor across mood and psychotic disorders. *Journal of Affective Disorders*.
2. Huang AS, Rogers BP, Sheffield JM, Jalbrzikowski ME, Anticicovic AA, Blackford JU, Heckers S, **Woodward ND**. (in press) Thalamic nuclei volumes in psychotic disorders and youth with psychosis spectrum symptoms. *American Journal of Psychiatry*.
3. Quinde-Zlibut JM, Okitondo CD, Williams ZJ, Weitlauf A, Mash LE, Heflin BH, **Woodward ND**, Cascio CJ. (in press) Elevated thresholds for light touch in children with autism reflect more conservative perceptual decision-making rather than a sensory deficit. *Frontiers in Human Neuroscience*, 14:122. <https://doi.org/10.3389/fnhum.2020.00122>
4. Sheffield JM, Huang AS, Rogers BP, Giraldo-Chica M, Landman BA, Blackford JU, Heckers S, **Woodward ND**. (in press) Thalamocortical anatomical connectivity in schizophrenia and psychotic bipolar disorder. *Schizophrenia Bulletin*.
5. Flook EA, Feola B, Avery SN, Winder DG, **Woodward ND**, Heckers SH, Blackford JU. (in press) BNST-insula structural connectivity in humans. *NeuroImage*.
6. Sheffield JM, Rogers BP, Blackford JU, Heckers S, **Woodward ND**. (2020) Insula functional connectivity in psychotic disorders. *Schizophrenia Research*, 220:69-77.
7. McHugo M, Talati P, Armstrong K, Vandekar S, Blackford JU, **Woodward ND**, Heckers S. (2019) Hyperactivity and reduced activation of anterior hippocampus in early psychosis. *American Journal of Psychiatry*, 176(12):1030-1038.

8. Avery SN, Armstrong K, Blackford JU, **Woodward ND**, Cohen NJ, Heckers S. (2019) Impaired relational memory in the early stage of psychosis. *Schizophrenia Research*, 212:113-120.
9. Karcher NR, Rogers BP, **Woodward ND**. (2019) Functional connectivity of the striatum in schizophrenia and psychotic bipolar disorder. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, 4(11):956-965.
10. Avery SN, McHugo M, Armstrong K, Blackford JU, **Woodward ND**, Heckers S. (2019) Disrupted habituation in the early stage of psychosis. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, 4(11):1004-1012.
11. Huang AS, Rogers BP, Anticevic A, Blackford JU, Heckers S, **Woodward ND**. (2019) Brain function during stages of working memory in schizophrenia and psychotic bipolar disorder. *Neuropsychopharmacology*, 44(12):2136-2142.
12. Huang AM, Rogers BP, **Woodward ND**. (2019) Disrupted modulation of thalamus activation and thalamocortical connectivity during dual task performance in schizophrenia. *Schizophrenia Research*, 210:270-277.
13. Parvathaneni P, Nath V, McHugo M, Huo Y, Resnick S, **Woodward ND**, Landman B, Lyu I. (2019) Improving human cortical sulcal curve labelling in large scale cross-sectional MRI using deep neural networks. *Journal of Neuroscience Methods*, 324:108311.
14. Parvathaneni P, Lyu I, Huo Y, Rogers BP, Schilling KG, Nath V, Blaber JA, Hainline AE, Anderson AW, **Woodward ND**, Landman BA. (2019) Improved grey matter surface based spatial statistics in neuroimaging. *Magnetic Resonance Imaging*, 61:285-295.
15. Lyu I, Kang H, **Woodward ND**, Styner MA, Landman BA. (2019) Hierarchical spherical deformation for cortical surface registration. *Medical Image Analysis*, 57:72-88.
16. Sheffield JM, Rogers BP, Blackford JU, Heckers S, **Woodward ND**. (2019) Accelerated aging of functional brain networks supporting cognitive function in psychotic disorders. *Biological Psychiatry*, 86(3):240-248.
17. Menkes M, Armstrong K, Blackford JU, Heckers S, **Woodward ND**. (2019) Neuropsychological functioning in early and chronic stages of schizophrenia and psychotic bipolar disorder. *Schizophrenia Research*, 206:413-419.
18. Feola B, Armstrong K, **Woodward ND**, Heckers S, Blackford JU. (2019) Childhood temperament is associated with distress, anxiety, and reduced quality of life in schizophrenia spectrum disorders. *Psychiatry Research*, 275:196-203.
19. Armstrong K, Avery S, Blackford JU, **Woodward ND**, Heckers. (2019) Impaired associative inference in the early stage of psychosis. *Schizophrenia Research*, 202:86-90.
20. Gandelman JA, Albert K, Boyd BD, Park JW, Riddle M, **Woodward ND**, Kang H, Landman BA, Taylor WD. (2019) Intrinsic functional networks influence clinical symptoms and cognition in late life depression. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, 4(2):160-170.
21. McHugo M, Talati P, **Woodward ND**, Armstrong K, Blackford JU, Heckers S. (2018) Regionally specific volume deficits along the hippocampal long axis in early and chronic psychosis. *Neuroimage: Clinical*, 20:1106-1114.
22. Lyu I, Kim SH, **Woodward ND**, Styner MA, Landman BA. (2018) TRACE: A topological graph representation for automatic sulcal curve extraction. *IEEE Transactions on Medical Imaging*, 37(7):1653-1663.
23. Hinton KD, Lahey BB, Villalta-Gil V, Boyd BD, Yvernault BC, Werts KB, Plassard AJ, Applegate B, **Woodward ND**, Zald DH. (2018) Right fronto-subcortical white matter microstructure predicts cognitive control ability on the go/no-go task in a community sample. *Frontiers in Human Neuroscience*, 12:127.  
<https://doi.org/10.3389/fnhum.2018.00127>
24. Giraldo-Chica M, Rogers BP, Damon SM, Landman BA, **Woodward ND**. (2018) Prefrontal-thalamic anatomical connectivity and executive cognitive function in schizophrenia. *Biological Psychiatry*, 83(6):509-517.
25. Parvathaneni P, Rogers BP, Huo Y, Schilling KG, Hainline AE, Anderson AW, **Woodward ND**, Landman BA. (2017) Grey matter surface based spatial statistics (GS-BSS) in diffusion microstructure. *Medical Imaging Computing and Computer-Assisted Intervention*, 10433:638-646.
26. Riddle K, Cascio CJ, **Woodward ND**. (2017) Brain structure in autism: A voxel-based morphometry analysis of the autism brain imaging database exchange. *Brain Imaging and Behavior*, 11(2):541-551.
27. **Woodward ND**, Giraldo-Chica M, Rogers B, Cascio CJ. (2017) Thalamocortical dysconnectivity in autism spectrum disorder: An analysis of the Autism Brain Imaging Data Exchange. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, 2:76-84.

28. Brosey E, **Woodward ND**. (2017) Neuroanatomical correlates of perceptual aberrations in psychosis. *Schizophrenia Research*, 179:125-131.
29. Vega JN, Zurkovsky L, Albert K, Melo A, Boyd BD, Dumas J, **Woodward ND**, McDonald BC, Saykin AJ, Park JH, Naylor M, Newhouse PA. (2016) Altered brain connectivity in early postmenopausal women with subjective cognitive impairment. *Frontiers in Neuroscience*, 10:433. <https://doi.org/10.3389/fnins.2016.00433>
30. **Woodward ND**, Heckers S. (2016) Mapping thalamocortical functional connectivity in chronic and early stages of psychotic disorders. *Biological Psychiatry*, 79(12):1016-25.
31. **Woodward ND**, Heckers S. (2015) Brain structure in neuropsychologically defined sub-groups of schizophrenia and psychotic bipolar disorder. *Schizophrenia Bulletin*, 41(6):1349-59.
32. McHugo M, Rogers BP, Talati P, **Woodward ND**, Heckers S. (2015) Increased amplitude of low frequency fluctuations but normal hippocampal-default mode network connectivity in schizophrenia. *Frontiers in Psychiatry*, 6:92. <http://dx.doi.org/10.3389/fpsy.2015.00092>
33. Brosey E, **Woodward ND**. (2015) Schizotypy and clinical symptoms, cognitive function, and quality of life in individuals with a psychotic disorder. *Schizophrenia Research*, 166(1-3):92-7.
34. Karbasforoushan H, Duffy B, Blackford JU, **Woodward ND**. (2015) Processing speed impairment in schizophrenia is mediated by white matter integrity. *Psychological Medicine*, 45(1):109-120.
35. Avery SN, Clauss JA, Winder DG, **Woodward N**, Heckers S, Blackford JU. (2014) BNST neurocircuitry in humans. *Neuroimage*, 91:311-323.
36. **Woodward ND**, Duffy-Alberto B, Karbasforoushan H. (2014) Response selection impairment in schizophrenia transcends sensory and motor modalities. *Schizophrenia Research*, 152(2-3):446-449.
37. **Woodward ND**, Duffy-Alberto B, Karbasforoushan H. (2013) Prefrontal cortex activity during response selection predicts processing speed impairment in schizophrenia. *Journal of the International Neuropsychological Society*, 19(7): 782-91.
38. Samanez-Larkin G, Buckholtz JW, Cowan RL, **Woodward ND**, Li R, Ansari MS, Arrington CM, Baldwin RM, Smith CE, Treadway MT, Kessler RM, Zald DH. (2013) A thalamo-cortico-striatal dopamine circuit for psychostimulant-enhanced human cognitive flexibility. *Biological Psychiatry*, 74(2): 99-105.
39. Sheffield J, Williams LE, **Woodward ND**, Heckers S. (2013) Reduced grey matter volume in psychotic disorder patients with a history of childhood sexual abuse. *Schizophrenia Research*, 143(1): 185-91.
40. **Woodward ND**, Karbasforoushan H, Heckers S. (2012) Thalamocortical dysconnectivity in schizophrenia. *American Journal of Psychiatry*, 169(10): 1092-9.
41. Treadway MT, Buckholtz JW, Cowan RL, **Woodward ND**, Li R, Ansari MS, Baldwin RM, Schwartzman AN, Smith CE, Bossaller NA, Shelton RC, Kessler RM, Zald DH. (2012) Dopaminergic mechanisms of individual differences in human effort-based decision making. *Journal of Neuroscience*, 32(18): 6170-6176.
42. Bobo WV, **Woodward ND**, Jayathilake K, Meltzer HY. (2011) The effect of armodafinil on cognitive performance and psychopathology in antipsychotic-treated patients with schizophrenia/schizoaffective disorder: A randomized, double-blind, placebo-controlled trial. *Schizophrenia Research*, 130(1-3): 106-113.
43. **Woodward ND**, Rogers B, Heckers S. (2011) Functional resting-state networks are differentially affected in schizophrenia. *Schizophrenia Research*, 130(1-3): 86-93.
44. Bauernfiend AL, Deitrich MS, Blackford JU, Charboneau EJ, Lillevig JG, Cannistraci CJ, **Woodward ND**, Cao A, Watkins C, Di Iorio CR, Cascio C, Salomon R, Cowan RL. (2011) Human ecstasy use is associated with increased visual cortical excitability: an fMRI study. *Neuropsychopharmacology*, 36(6): 1127-41.
45. **Woodward ND**, Cowan RL, Park S, Ansari MS, Baldwin RM, Li R, Doop ML, Kessler RM, Zald DH. (2011) Correlation of individual differences in schizotypal personality traits with amphetamine-induced dopamine release in striatal and extrastriatal brain regions. *American Journal of Psychiatry*, 168(4): 418-26.
46. Purdon SE, Waldie B, **Woodward ND**, Wilman A, Tibbo P. (2011) Procedural learning in first episode schizophrenia investigated with functional magnetic resonance imaging. *Neuropsychology*, 25(2): 147-58.
47. Williams LE, Must A, Avery S, Woolard A, **Woodward ND**, Cohen NJ, Heckers S. (2010) Eye movement behaviour reveals relational memory impairment in schizophrenia. *Biological Psychiatry*, 68(7): 617-24.
48. Buckholtz JW, Treadway MT, Cowan RL, **Woodward ND**, Li R, Ansari MS, Baldwin RM, Schwartzman AN, Shelby ES, Smith CE, Kessler RM, Zald DH. (2010) Dopaminergic network differences in human impulsivity. *Science*, 329(5991): 532.
49. Woolard A, Kose S, **Woodward ND**, Verbruggen F, Logan G, Heckers S. (2010) Intact associative learning in patients with schizophrenia: Evidence from a Go/NoGo paradigm. *Schizophrenia Research*, 122(1-3): 131-5.

50. Zald DH, **Woodward ND**, Riccardi P, Ansari MS, Baldwin R, Cowan RL, Smith CE, Hakyemez H, Li R, Kessler RM. (2010) The interrelationship of dopamine D2-like receptor binding in striatal and extrastriatal brain regions in healthy humans. *Neuroimage*, 51(1): 53-62.
51. Buckholtz JW, Treadway MT, Cowan RL, **Woodward ND**, Benning SD, Li R, Ansari MS, Baldwin RM, Schwartzman AN, Shelby ES, Smith CE, Cole D, Kessler RM, Zald DH. (2010) Mesolimbic dopamine reward system hypersensitivity in individuals with psychopathic traits. *Nature Neuroscience*, 13(4): 419-421.
52. Karageorgiou I, Dietrich MS, Charboneau EJ, **Woodward ND**, Blackford JU, Salomon, R, Cowan RL. (2009) Prior MDMA (Ecstasy) use is associated with increased basal ganglia-thalamocortical circuit activation during motor task performance in humans: An fMRI study. *Neuroimage*, 46(3): 817-826.
53. **Woodward ND**, Zald DH, Li R, Ding Z, Riccardi P, Ansari MS, Dawant B, Anderson S, Baldwin R, Kessler RM. (2009) Cerebral morphology and dopamine D2/D3 receptor distribution in humans: A combined [18F]fallypride and voxel-based morphometry study. *Neuroimage*, 46(1): 31-38.
54. Kessler RM, **Woodward ND**, Riccardi P, Li R, Ansari MS, Anderson S, Dawant B, Zald DH, Meltzer HY. (2009) Dopamine D2 receptor levels in striatum, thalamus, substantia nigra, limbic regions, and cortex in schizophrenia subjects. *Biological Psychiatry*, 65(12): 1024-1031.
55. **Woodward ND**, Waldie B, Rogers B, Seres P, Tibbo P, Purdon SE. (2009) Abnormal prefrontal cortical activity and connectivity during response selection in first episode psychosis, chronic schizophrenia, and unaffected siblings of individuals with schizophrenia. *Schizophrenia Research*, 109(1-3): 182-190.
56. Raj V, Liang H-C, **Woodward ND**, Bauernfeind AL, Lee J, Dietrich M, Park S, Cowan RL. (2010) MDMA (Ecstasy) use is associated with reduced BOLD signal change during semantic recognition in abstinent human polydrug users: A preliminary fMRI study. *Journal of Psychopharmacology*, 24(2): 187-201.
57. Meltzer HY, Brennan MD, **Woodward ND**, Jayathilake K. (2008) Association of *SULT4A1* SNPs with psychopathology and cognition in patients with schizophrenia or schizoaffective disorder. *Schizophrenia Research*, 106(2-3): 258-264.
58. **Woodward ND**, Tibbo P, Purdon SE. (2007) An fMRI investigation of procedural learning in unaffected siblings of patients with schizophrenia. *Schizophrenia Research*, 94(1-3): 306-316.
59. **Woodward ND**, Jayathilake K, Meltzer HY. (2007) *COMT* val108/158met genotype, cognitive function, and cognitive improvement with clozapine in schizophrenia. *Schizophrenia Research*, 90(1-3): 86-96.
60. **Woodward ND**, Purdon SE, Meltzer HY, Zald DH. (2007) A meta-analysis of cognitive change with haloperidol in clinical trials of second generation antipsychotics: dose effects and comparison to practice effects. *Schizophrenia Research*, 89(1-3): 211-224.
61. Zedkova L, **Woodward ND**, Shih EM, Seres P, Purdon SE, Tibbo, PG. (2006) Procedural learning in schizophrenia investigated with functional MRI. *Schizophrenia Research*, 88(1-3): 198-207.
62. Riccardi P, Zald DH, Li R, Park S, Ansari MS, Dawant B, Anderson S, **Woodward ND**, Schmidt D, Baldwin R, Kessler R. (2006) Sex differences in amphetamine induced displacement of [18F] Fallypride in striatal and extrastriatal regions: a PET study. *American Journal of Psychiatry*, 163(9): 1639-1641.
63. Riccardi P, Li R, Ansari MS, Zald DH, Park S, Dawant B, Anderson S, **Woodward ND**, Schmidt D, Baldwin R, Kessler RM. (2006) Amphetamine induced displacement of [18F] Fallypride in striatum and extrastriatal brain regions. *Neuropsychopharmacology*, 31(5): 1016-1026.
64. **Woodward ND**, Purdon SE, Meltzer HY, Zald DH. (2005) A meta-analysis of neuropsychological change to clozapine, olanzapine, quetiapine, and risperidone in schizophrenia. *International Journal of Neuropsychopharmacology*, 8(3): 457-472.
65. Purdon SE, **Woodward ND**, David SR, Stip E. (2003) Procedural learning in schizophrenia after 6 months of double-blind treatment with olanzapine, risperidone, and haloperidol. *Psychopharmacology*, 169(3-4): 390-397.
66. Purdon SE, **Woodward ND**, LaBelle A, Mintz AR. (2002) Procedural learning improvements after 6 weeks of treatment with clozapine. *Schizophrenia Research*, 53(1-2): 165-666.
67. Purdon SE, **Woodward ND**, Flor-Henry P. (2001) Asymmetrical hand force persistence and neuroleptic treatment in schizophrenia. *Journal of the International Neuropsychological Society*, 7(5): 606-614.

Books, Book Chapters, and Invited Review Articles:

1. Heckers S, **Woodward ND**, Ongur D. (2018) Neuroimaging of psychotic disorders. In *Neurobiology of Mental Illness, 5<sup>th</sup> Edition*. Eds. Charney D, Nestler E. Oxford.



2. Giraldo-Chica M, **Woodward ND**. (2017) Review of thalamocortical resting-state fMRI studies in schizophrenia. *Schizophrenia Research*, 180:58-63.
3. **Woodward ND**. (2016) The course of neuropsychological impairment and brain structure abnormalities in psychotic disorders. *Neuroscience Research*, 102:39-46.
4. Heckers S, **Woodward ND**, Ongur D. (2013) Neuroimaging of psychotic disorders. In *Neurobiology of Mental Illness, 4<sup>th</sup> Edition*. Eds. Charney D, Buxbaum J, Sklar P, Nestler E. Oxford.
5. Karbasforoushan H, **Woodward ND**. (2012) Resting-state networks in schizophrenia. *Current Topics in Medicinal Chemistry*, 12(21): 2404-14.
6. **Woodward ND**, Meltzer HY. (2010) Neuropsychology of treatment resistant schizophrenia. In *Advances in Biological Psychiatry (Vol. 26): Therapy-Resistant Schizophrenia*. Eds. Elkis, H and Meltzer, HY. Karger

Letters to Editor, Commentaries, Book reviews, and Editorials:

1. Burdick KE, Millett CE, del Mar Bonnín C, Bowie CR, Carvalho AF, Eyler LT, Gallagher P, Harvey PD, Kessing LV, Lafer B, Langenecker SA, Lewandowski KE, Lopez-Jaramillo C, Marshall DF, Martínez-Aran A, McInnis MG, McIntyre RS, Miskowiak KW, Porter RJ, Purdon SE, Ryan KA, Sumiyoshi T, Torres IJ, Van Rheenen TE, Vieta E, **Woodward ND**, Yatham LN, Young AH. (2019) The international consortium investigating neurocognition in bipolar disorder (ICONIC-BD). *Bipolar Disorders*, 21:6-10.
2. **Woodward ND**. (2017) Thalamocortical functional connectivity, cognitive impairment, and cognitive remediation in schizophrenia. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, 2:307-309.
3. **Woodward ND**, Cascio C. (2015) Resting-state functional connectivity in psychiatric disorders. *JAMA Psychiatry*, 72(8):743-4.

Peer-Reviewed Conference Symposia and Workshop Presentations:

*"Imaging thalamocortical networks across illness stages in psychosis"*

69<sup>th</sup> Annual Meeting of the Society of Biological Psychiatry, May 8-10, 2014, New York, NY, USA

*"Thalamocortical dysconnectivity in schizophrenia"*

46<sup>th</sup> Annual Winter Conference on Brain Research, January 26-31, 2013, Breckenridge, CO, USA

*"Thalamocortical dysconnectivity in schizophrenia: A biomarker of atypical brain maturation?"*

67<sup>th</sup> Annual Meeting of the Society of Biological Psychiatry, May 3-5, 2012, Philadelphia, PA, USA

*"Dopaminergic function and schizotypal personality traits in healthy individuals"*

65<sup>th</sup> Annual Meeting of the Society of Biological Psychiatry, May 20-22, 2010, New Orleans, LA, USA

*"Patients with schizophrenia and their unaffected relatives demonstrate abnormalities in fronto-subcortical circuitry during procedural learning: An fMRI investigation"*

36<sup>th</sup> Annual Meeting of the International Neuropsychological Society, February 6-9, 2008, Waikoloa, HI, USA

*"An introduction to the pharmacogenetics of cognitive improvement in schizophrenia"*

14<sup>th</sup> Edmonton Schizophrenia Conference, October 6<sup>th</sup>, 2006, Edmonton, AB, Canada

*"A meta-analysis of neuropsychological change to atypical antipsychotic drugs in schizophrenia"*

24<sup>th</sup> CINP Congress, June 9-13, 2006, Chicago, IL, USA

Peer-Reviewed Conference Talks:

*"Resting-state networks are differentially affected in schizophrenia"*

**Woodward ND**, Rogers B, Heckers SH

13<sup>th</sup> International Congress on Schizophrenia Research, April 2-6, 2011, Colorado Springs, CO, USA

*"The neural basis of response selection in schizophrenia: A potential endophenotype"*

**Woodward ND**, Waldie B, Rogers B, Seres P, Tibbo P, Purdon SE

12<sup>th</sup> International Congress on Schizophrenia Research, March 29-April 1, 2009, San Diego, CA, USA

*“An fMRI investigation of procedural learning in unaffected siblings of patients with schizophrenia”*

**Woodward ND**, Tibbo P, Purdon SE

11<sup>th</sup> International Congress on Schizophrenia Research, March 28-April 1, 2007, Colorado Springs, CO, USA

*“Procedural learning and neuroleptic treatment in schizophrenia”*

**Woodward ND**, Purdon SE, David SR, Stip E

29<sup>th</sup> Annual Meeting of the International Neuropsychological Society, Feb. 14-18, 2001, Chicago, IL, USA

A. Invited Lectures:

*“Brain Connectivity in Psychotic Disorders”*

Dalhousie University, Psychiatry Grand Rounds, Sept. 20, 2017, Halifax, NS, Canada

*“Neuroscience of Psychosis”*

American Association for the Advancement of Science (AAAS), Judicial Seminar on Emerging Issues in Neuroscience, May 17, 2016, Vanderbilt Law School, Nashville, TN, USA

*“Brain networks in Health and Disease”*

Psychology Research Day, April 1, 2014, Tennessee State University, Nashville, TN, USA

*“Brain Connectivity Approaches to Investigating Schizophrenia”*

Vanderbilt University, Psychiatry Grand Rounds, June 14, 2012, Nashville, TN, USA

Vanderbilt University, Neurocardiology Grand Rounds, Sept. 14, 2012, Nashville, TN, USA

*“Functional Brain Networks in Schizophrenia”*

McLean Neuroscience Seminar, May 22<sup>nd</sup>, 2012, McLean Hospital, Belmont, MA, USA

*“The Brain at Work in Schizophrenia”*

NARSAD “Meet the Scientist” webinar, March, 2011

*“The Role of Genetics in the Etiology and Treatment of Neuropsychological Impairment in Schizophrenia”*

Vanderbilt University, Psychiatry Grand Rounds, August 21, 2008, Nashville, TN, USA

*“Genes, Dopamine, and Cognitive Change with Atypical Antipsychotics in Schizophrenia”*

Psychiatry Grand Rounds, June 8, 2007, Alberta Hospital Edmonton, AB, Canada

*“An Introduction to fMRI Methods and Applications”*

Edmonton City-Wide Neuropsychology Rounds, Nov. 7, 2006, University of Alberta Hospital, AB, Canada