



Christopher T. Smith

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Education:

Ph.D. Neurobiology, University of North Carolina, Chapel Hill (UNC-CH) March 2014

Dissertation: Neurocognitive Investigation of Immediate Reward Selection Bias, A Putative Intermediate Phenotype for Alcohol Use Disorders

Advisor: Charlotte A. Boettiger, PhD

B.S. Neuroscience (magna cum laude), Furman University May 2008

Publications (also see [NCBI Bibliography](#)):

18. Smith CT, San Juan DT, Katz DT, Dang LC, Perkins SF, Burgess LL, Cowan RL, Manning HC, Nickels ML, Claassen DO, Samanez-Larkin GR, Zald DH (2018). Ventral striatal dopamine transporter availability is associated with lower trait motor impulsivity in healthy adults. *Translational Psychiatry*, 8 (1), 269. DOI: 10.1038/s41398-018-0328-y. PMCID: PMC6286354

17. Castrellon JJ, Seaman KL, Crawford JL, Young JS, Smith CT, Dang LC, Hsu M, Cowan RL, Zald DH, Samanez-Larkin GR (2018). Individual differences in dopamine are associated with reward discounting in clinical groups but not in healthy adults. *Journal of Neuroscience*, 39 (2): 231-332.

16. Smith CT, Dang LC, San Juan DT, Perkins SF, Burgess LL, Smith D, Cowan RL, Le NT, Kessler RM, Samanez-Larkin GR, Zald DH (2018). Lack of consistent sex differences in d-amphetamine-induced dopamine release measured with [¹⁸F]fallypride PET. *Psychopharmacology*. In Press.

15. Stark AJ, Smith CT, Lin YA, Peterson KJ, Trujillo P, van Wouwe NC, Kang H, Donahue MJ, Kessler RM, Zald DH, Claassen DO (2018). Nigrostriatal and mesolimbic D2/3 receptor expression in Parkinson's disease patients with compulsive reward-driven behaviors. *Journal of Neuroscience*. DOI: 10.1523/JNEUROSCI.3082-17.2018 PMCID: PMC5884458.

14. Stark AJ, Smith CT, Peterson KJ, Trujillo P, van Wouwe NC, Donahue MJ, Kessler RM, Deutch AY, Zald DH, Claassen DO (2018). [¹⁸F]fallypride characterization of striatal and extrastriatal D2/3 receptors in Parkinson's disease. *Neuroimage: Clinical*, 18, 433-442. PMCID: PMC5849871

13. Dang LC, Samanez-Larkin GR, Smith CT, Castrellon JJ, Perkins SF, Cowan RL, Claassen DO, Zald DH (2017). FTO affects food cravings and interacts with age to influence age-related decline in food cravings. *Physiology & Behavior*. DOI: 10.1016/j.physbeh.2017.12.013 PMCID: PMC5994171

12. Elton A, **Smith CT**, Parrish MH, Boettiger CA (2017). COMT Val¹⁵⁸Met polymorphism exerts sex-dependent effects on fMRI measures of brain function. *Frontiers in Human Neuroscience*. DOI: 10.3389/fnhum.2017.00578 PMID: PMC5723646
11. **Smith CT**, Crawford JL, Dang LC, Seaman KL, San Juan D, Katz DT, Matuskey D, Cowan RL, Morris ED, Zald DH, Samanez-Larkin GR (2017). Partial-volume correction increases estimated dopamine D2-like receptor binding potential and reduces adult age differences. *Journal of Cerebral Blood Flow and Metabolism*. DOI: 10.1177/0271678X17737693
10. **Smith CT**, Dang LC, Buckholtz JW, Tetreault AM, Cowan RL, Kessler RM, Zald DH (2017). The impact of common dopamine D2 receptor gene polymorphisms on D2/3 receptor availability: C957T as a key determinant in putamen and ventral striatum. *Translational Psychiatry*, 7 (4), e1091, DOI: [10.1038/tp.2017.45](https://doi.org/10.1038/tp.2017.45). PMID: PMC5416688
9. Elton A, **Smith CT**, Parrish MH, Boettiger CA (2017). Neural systems underlying individual differences in intertemporal decision making. *Journal of Cognitive Neuroscience*, 29 (3), 467-479. PMID: PMC5285502
8. **Smith CT**, Dang LC, Cowan RL, Kessler RM, Zald DH (2016). Variability in paralimbic dopamine signaling correlates with subjective responses to d-amphetamine*. *Neuropharmacology*, 108, 394-402. PMID: PMC4912942
*Faculty of 1000 Recommended Article by Kent Berridge
7. **Smith CT**, Weafer J, Cowan RL, Kessler RM, Palmer AA, de Wit H, Zald DH (2016). Individual differences in timing of peak positive subjective responses to d-amphetamine: Relationship to pharmacokinetics and physiology. *Journal of Psychopharmacology*, 30 (4), 330-343. PMID: PMC5049703
6. **Smith CT**, Wallace DL, Dang LC, Aarts E, Jagust WJ, D'Esposito M, Boettiger CA (2016). Modulation of impulsivity and reward sensitivity in intertemporal choice by striatal and midbrain dopamine in healthy adults. *Journal of Neurophysiology*, 115 (3), 1146-1156. PMID: PMC4808128
5. **Smith CT**, Steel EA, Parrish MH, Kelm MK, Boettiger CA (2015). Intertemporal Choice Behavior in Late Adolescents and Adults: Effects of Age Interact with Alcohol Use and Family History Status. *Frontiers in Human Neuroscience*, Nov 23; 9:627. PMID: PMC4655234
4. **Smith CT**, Sierra Y, Oppler SH, Boettiger CA (2014). Ovarian Cycle Effects on Immediate Reward Bias in humans: a role for estradiol*. *Journal of Neuroscience*, 34 (16): 5468-5476. PMID: PMC3988406
*Featured in Journal of Neuroscience Journal Club Article: Dimitroff SJ (2014). Phasic estradiol levels and bias for immediate rewards. *Journal of Neuroscience*, 34 (37): 12239-12240.
3. Swift-Scanlan T, **Smith CT**, Bardowell SA, Boettiger CA (2014). Comprehensive interrogation of CpG islands in the gene encoding COMT, a key estrogen and catecholamine regulator. *BMC Medical Genomics*, 7:5, PMID: PMC3910242
2. **Smith CT**, Swift-Scanlan T, Boettiger CA (2014). Genetic polymorphisms regulating dopamine signaling in the frontal cortex interact to affect target detection under high working memory load. *Journal of Cognitive Neuroscience*, 26 (2), 395-407. PMID: PMC3877727
1. **Smith CT**, Boettiger CA (2012). Age modulates the effect of COMT genotype on delay discounting behavior. *Psychopharmacology*, 222 (4), 609-617. PMID: PMC340127

In revision:

Smith CT, Oppler SH, Steel, EA, Parrish MH, Swift-Scanlan T, Kelm MK, Robinson DL, Boettiger CA (2018). Modulation of reward sensitivity by genetic markers of striatal dopamine in emerging adults. *Cognitive, Affective, & Behavioral Neuroscience*

Parrish MH, **Smith CT**, Robinson DL, Boettiger CA (2018). Differential connectivity between salience and central executive networks associated with familial alcoholism in healthy adults. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*

Submitted:

Seaman KL, **Smith CT**, Juarez EJ, Dang LC, Castellon JJ, Burgess LL, San Juan MD, Kundzicz PM, Cowan RL, Zald DH, Samanez-Larkin GR (2018). Differential regional decline in dopamine receptor availability across adulthood: Linear and nonlinear effects of age. *Human Brain Mapping*. [bioRxiv Print](#)

Juarez EJ, Castellon JJ, Green MA, Crawford JL, Seaman KL, **Smith CT**, Dang LC, Matuskey D, Morris ED, Cowan RL, Zald DH, Samanez-Larkin GR (2018). Reliability of the correlative triad among aging, dopamine, and cognition. Targeted Journal: *eNeuro*

Acknowledgements:

Grisel JE, et al. (2008). Influence of β -endorphin on anxious behavior in mice: interaction with EtOH. *Psychopharmacology*, 200, 105-115.

Research Experience:**Postdoctoral Research Fellow****August 2014-present**

Department of Psychology, Vanderbilt University

Advisor: David H. Zald, PhD

Broadly, I am using fMRI and PET to better understand the neurobiology of motivation, reward, and decision making in human participants and the role of the neuromodulator, dopamine (DA), in these processes. Specifically, I have investigated individual differences in d-amphetamine (dAMPH)-induced dopamine release and subjective positive responses to dAMPH along with personality and genetic factors that may predict these individual differences measures.

Findings and conclusions:

- Individual variability exists in degree of subjective responses (Feel, Like, High, Want More) participants report after oral dAMPH. In addition to some individuals not reporting subjective responses to drug, there are distinct temporal patterns in High+Like+Feel responses with these ratings peaking by 60 minutes post dAMPH (Early Peak Responders) or later (Late Peak Responders). The Early Responders display faster dAMPH absorption (high early plasma levels) and heightened heart rate to the drug, suggesting they may a group particularly vulnerable to psychostimulant abuse (Smith et al., *Journal of Psychopharmacology* 2016).
- Fallypride PET measures of D2/3 receptor availability (binding potential, BPnd) and dAMPH-induced DA release have been used to identify brain areas associated with subjective responses to dAMPH:
 - vmPFC area's baseline/placebo D2 BPnd predicts subsequent dAMPH High.
 - A change in Fallypride BPnd post dAMPH (index of DA release) was correlated with dAMPH Want More ratings in vmPFC, right ventral striatum, and left insula, potentially implicating DA signaling in these areas with incentive salience processes in humans (Smith et al., *Neuropharmacology* 2016).

- Genetic variation in the Dopamine D2 Receptor (DRD2) gene, specifically at the single nucleotide polymorphism (SNP) C957T, and not at the Taq1A SNP in the nearby ANKK1 gene, is associated with variation in D2 BPnd in human striatum (Smith et al., *Translational Psychiatry* 2017).
- Partial volume correction (PVC) methods are more impactful for PET scanners with lower resolution and controlling for regional gray matter volume can partially recapture the relationship between D2/3 BPnd (assessed with Fallypride and FLB 457) and age observed after PVC. Nevertheless, PVC methods do result in lower estimates of age-related decline in D2/3 BPnd than would be observed in raw, uncorrected PET data (Smith et al., *Journal of Cerebral Blood Flow and Metabolism* 2017).

Graduate Research Assistant

May 2009-June 2014

Curriculum in Neurobiology, UNC-CH

Advisor: Charlotte A. Boettiger, PhD

Investigated the neurobiology of immediate reward bias (Now vs Later Choice; delay discounting), an intermediate behavioral phenotype associated with substance use disorders in humans.

Findings and conclusions:

- Prefrontal cortex dopamine levels as indexed by a polymorphism in the COMT enzyme interacts with age group (18-21 vs. 22-40) to affect degree of discounting behavior observed in a delay discounting task (Smith & Boettiger, *Psychopharmacology* 2012).
- Discounting of delayed rewards decreases as function of age in low/moderate alcohol drinkers but not heavy, possible problem drinkers (Smith et al., *Frontiers in Human Neuroscience* 2015).
- Estradiol increases are associated with decreases in discounting of delayed rewards in individuals with putatively lower frontal DA (COMT Val carriers; Smith et al., *J Neurosci* 2014).

Investigated the neurobiology of working memory processes using behavioral genetics

Findings and conclusions:

- Target detection in an n-back working memory task is associated with genes implicated in frontal dopamine signaling according to an inverted-U function (Smith, Swift-Scanlan, and Boettiger, *Journal of Cognitive Neuroscience* 2014).

Investigated neural bases of delay discounting behavior.

Findings and conclusions:

- Low DA synthesis capacity (measured with FMT PET) in the putamen is associated with heightened Now vs Later choice behavior while low DA synthesis in the midbrain is related to greater sensitivity to the reward magnitude of Later rewards (Smith et al., *Journal of Neurophysiology* 2016).
- Neural networks engaged during Now vs Later choice performed in the context of fMRI relate Now choice behavior (temporal lobe network positively, frontoparietal-striatal network negatively) and their functional connectivity to each other during Now/Later choice correlates with participants' alcohol related harm behaviors (Elton, Smith, et al., *Journal of Cognitive Neuroscience* 2017).

Graduate Research Assistant, Rotating Student

June 2008 - May 2009

Biological and Biomedical Sciences Program, UNC-CH

Labs of Mark Wightman, Clyde Hodge, Charlotte Boettiger, and Patricia Maness

Undergraduate Research Assistant

2007-2008

Department of Psychology, Furman University

Advisor: Judith E. Grisel, PhD

Phenotypic and neurobiological differences in beta-endorphin transgenic mice responses to alcohol:

- Behavioral measures of rewarding, anxiolytic, and antidepressant effects of alcohol
- *in vivo* microdialysis measures of striatal dopamine and glutamate release to acute alcohol

Funding:

F32-DA041157 (Christopher Smith)

National Institute on Drug Abuse

6/2016 - 5/2019

\$173,734

Linking Temporal Differences in d-Amphetamine Subjective Effects to DRD2 and DAT

Differences in the speed of delivery of drugs of abuse as well as the subjective high they produce are believed to relate to their addiction potential. This research fellowship will investigate whether observed differences in the timing of subjective psychostimulant effects are related to measurable differences in the functioning of the neurotransmitter dopamine, personality traits, and genetics. By understanding how these factors affect individual differences in drug responsiveness we hope to identify potential biological and behavioral markers of psychostimulant addiction risk.

F31-AA020132 (Christopher Smith)

National Institute on Alcohol Abuse and Alcoholism

8/2011 - 7/2014

\$93,000

Now Versus Later Decision Making: Effects of Frontal Development and Alcohol Use

This fellowship explored the neurobiological bases for the decline in the tendency to choose smaller, sooner rewards (“*Now*”) over larger, later rewards (“*Later*”) from late adolescence to early adulthood, a tendency that also characterizes individuals with alcohol use disorders. Studying developmental changes in the structure and function of frontal and subcortical brain structures that regulate *Now/Later* decision-making using sMRI, fMRI, and DTI approaches may provide insight into why late adolescents are at increased risk for developing alcohol use disorders.

Talks:

Conference Talks

Society for Neuroscience 2017 Annual Meeting. Washington, DC

November 2017

“Ventral Striatal Dopamine Transporter Availability Uniquely Predicts Lower Trait Impulsivity in Healthy Young Adults.”

Smith CT, San Juan DT, Katz DT, Dang LC, Perkins SF, Burgess LL, Cowan RL, Samanez-Larkin GR, Zald DH

Society of Biological Psychiatry 2016 Annual Meeting. Atlanta, GA

May 2016

“Subgenual Anterior Cingulate Dopamine D2/D3 Receptor Availability Differentiates Individuals With and Without Subjective Responses to Oral d-Amphetamine.” Substance Abuse Biology Oral Session.

Smith CT, Dang L, Cowan RL, Kessler RM, Zald DH

Cognitive Neuroscience Society 2012 Annual Meeting. Chicago, IL

March 2012

“Interacting effects of genetic polymorphisms regulating dopamine signaling in the frontal cortex on accurate target detection under high working memory load.” **Smith CT**, Boettiger CA.

Invited Talks

Invited Talk, Department of Biobehavioral Health

February 2018

The Pennsylvania State University, University Park, PA

“Individual Differences in Choice, Subjective Valuation, and Dopamine Signaling as Potential Markers for Drug Abuse Risk.” **Smith CT**

- Science Club Nashville. Nashville, TN **October 2017**
 “Dopamine, Decision Making, and Risk for Drug Addiction.” **Smith CT**
- Invited Lecture, Yale University. New Haven, CT **July 2016**
 “Individual differences in subjective responses to d-amphetamine: Insights from ¹⁸F-Fallypride PET imaging.” **Smith CT**
- Bucknell University Neuroscience Colloquium Invited Speaker. Lewisburg, PA **April 2015**
 “Investigating Factors Modulating Immediate Reward Selection Bias, A putative intermediate phenotype for alcohol use disorders.” **Smith CT**
- Brain Awareness Week Invited Speaker. Alamance Community College, Graham, NC **March 2014**
 “Biology of *Now* versus *Later* Choice: Implications for Substance Use Disorder Treatment.” **Smith CT**
- Invited Talk, Addiction Recovery Research Center, Dr. Warren Bickel, Director **July 2013**
 Virginia Tech Carilion Research Institute, Roanoke, VA
 “State and Trait Factors Underlying Now versus Later Decision Making Behavior.” **Smith CT**
- May Experience Guest Lecture. Furman University, Greenville, SC. **May 2012**
 “Investigating the role of age and alcohol use on *Now* versus *Later* Decision Making.” **Smith CT**
- Decision Making across the Disciplines D-CIDES Regional Conference. Duke University **April 2012**
 “Immediate Reward Bias: Fixed trait or Changeable State? A role for frontal dopamine.”
 Boettiger CA, **Smith CT**, Kelm MK
- First Annual Summer Research Conference Between Furman & Davidson Universities. **July 2007**
 Furman University, Greenville, SC.
 “Evaluating the neurocircuitry of β -endorphin mediated reinforcement in the nucleus accumbens using transgenic mice” **Smith CT**, Cloonan G, Grisel JE

Selected Abstracts (* undergraduate mentee presenter):

1. Castrellon JJ, Dang LC, **Smith CT**, Cowan RL, Gorgolewski KJ, Zald DH, Samanez-Larkin GR (2019). Latent circuit organization of dopamine D2 receptors. Organization for Human Brain Mapping Annual Meeting. Rome, Italy.
2. Castrellon JJ, Young JS, Dang LC, **Smith CT**, Cowan RL, Zald DH, Samanez-Larkin GR (2019). Individual differences in dopamine support self-control of everyday desires. Social & Affective Neuroscience Society Annual Meeting. Miami, FL.
3. Langoni EA, Castrellon JJ, Cooper JA, **Smith CT**, Zald DH, Samanez-Larkin GR (2018). Sex differences in effort discounting in late middle-age but not younger adulthood. Society for Neuroeconomics Conference. Philadelphia, PA.
4. Seaman KL, **Smith CT**, Zald DH, Daw ND, Samanez-Larkin GR (2018). Adult age differences in d-AMPH effects on model-based learning. Society for Neuroeconomics Conference. Philadelphia, PA.
5. **Smith CT**, Dang LC, San Juan DT, Perkins SF, Burgess LL, Smith DK, Cowan RL, Le NT, Kessler RM, Samanez-Larkin GR, Zald DH (2018). Lack of sex differences in d-amphetamine-induced dopamine release measured with Fallypride PET. Society for Neuroscience Annual Meeting. San Diego, CA.
6. Mchaourab Z#, McClure E, San Juan DT, **Smith CT**, Zald DH (2018). Neuroimaging of the midbrain region in humans. Middle Tennessee Science and Engineering Fair. Nashville, TN.

Winner, 1st place in Behavioral/Social Sciences age category

#High School Student mentee presenter

7. Juarez EJ, Castellon JJ, Green MA, McAllister GA, Seaman KL, **Smith CT**, Dang LC, Zald DH, Samanez-Larkin GR (2018). Reliability of the correlative triad among aging, dopamine, and cognition. Cognitive Neuroscience Society Annual Meeting. Boston, MA.
8. Zald DH, Dang LC, **Smith CT**, Samanez-Larkin GR, Castellon JJ, Perkins SF, Cowan RL (2017). How confident are we that dopamine D2 receptors are related to weight and obesity? Society for the Study of Ingestive Behavior Annual Meeting. Montreal, Quebec, Canada.
9. **Smith CT**, Castellon JJ, Tetreault AM, Katz DT, Wilkinson MR, Hinton KE, Ichinose M, Zald DH (2017). Inhibitory intolerance to uncertainty relates to processing of implicit risk in a modified fMRI BART. Organization for Human Brain Mapping Annual Meeting. Vancouver, British Columbia, Canada.
10. McKim TH, Guo G, Lane S, Parrish MH, **Smith CT**, Oppler SH, Menciloglu M, Gat K, Robinson DL, Boettiger CA (2017). Neurocognitive endophenotypes for hazardous alcohol use. Alcohol and Stress Conference. Volterra, Italy.
11. Wilkinson MR*, **Smith CT**, Zald DH (2016). Investigation of age-related changes in volume and D2/3 receptor availability in the substantia nigra and ventral tegmental area. Diversity Fellows Poster Session. Society for Neuroscience Annual Meeting. San Diego, CA.
12. Tetreault AM*, **Smith CT**, Buckholtz JW, Dang LC, Perkins SF, Castellon JJ, Cowan RL, Kessler RM, Zald DH (2016). Effects of single nucleotide polymorphisms related to dopamine receptor D2 gene (DRD2) on dopamine function in the brain. Vanderbilt University Undergraduate Research Fair.
13. Castellon JJ, **Smith CT**, Perkins SF, Samanez-Larkin GR, Zald DH (2016). Monoamine oxidase A: a genetic marker of social reward preferences under uncertainty. Interdisciplinary Symposium on Decision Neuroscience. Fox School of Business, Temple University, Philadelphia, PA.
14. McKim TH, Guo G, Oppler SH, Menciloglu M, Parrish M, **Smith CT**, Gates K, Boettiger CA (2016). Predicting subgroup classification based on brain connectivity in a heterogeneous sample of alcohol drinkers using GIMME. Research Society on Alcoholism 2016 Annual Meeting. New Orleans, LA.
15. **Smith CT**, Dang L, Cowan RL, Kessler RM, Zald DH (2015). Subjective responses to d-amphetamine and variability in dopamine signaling in ventromedial prefrontal cortex, insula, and ventral striatum. Vanderbilt Kennedy Center Science Day 2015. Nashville, TN.
16. Long EA*, **Smith CT**, Dang L, Cowan RL, Kessler RM, Zald DH (2015). Estradiol modulates variability in dopamine signaling in the temporal lobe, striatum, and parahippocampal gyrus. Vanderbilt Kennedy Center Science Day 2015. Nashville, TN.
17. **Smith CT**, Dang L, Cowan RL, Kessler RM, Zald DH (2015). Risky Choices on the Balloon Analog Risk Task are Positively Associated with Individual Differences in Dopamine Reactivity in Left Ventrolateral Prefrontal Cortex (vlPFC) and Right Superior Frontal Gyrus (SFG). Scientific Research Network on Decision Neuroscience and Aging Conference. Miami, FL.
18. Parrish MH*, **Smith CT**, Menciloglu M, Oppler SH, Boettiger CA (2014). Family history of alcohol use disorder and large-scale intrinsic network connectivity in adulthood. Society for Neuroscience Annual Meeting. Washington, DC.
19. **Smith CT**, Chanon VW, Kelm MK, Cerciello ER, Parrish MH, Garbutt JC, Kampov-Polevoy AB, Boettiger CA (2014). Attentional bias to alcohol cues changes in tandem with drinking during treatment:

- Association with brain activity in a putative visual bias circuit. Research Society on Alcoholism 2014 Annual Meeting. Bellevue, WA.
20. Boettiger CA, **Smith CT**, Kelm MK, Garbutt JC, Chanon VW Kampov-Polevoy AB (2014). Human studies of impulsive choice: Alcohol use disorders and the frontal cortex. Research Society on Alcoholism 2014 Annual Meeting. Bellevue, WA.
 21. Parrish MH*, **Smith CT**, Menciloglu M, Oppler SH, Boettiger CA (2014). Decreased Frontoparietal-Insula Connectivity in Adults with a Family History of Alcohol Use Disorder. Celebration of Undergraduate Research, University of North Carolina at Chapel Hill. Chapel Hill, NC.
*Also presented in Data Blitz at the North Carolina Cognition Conference, Duke University, March 2014
 22. Oppler SH*, **Smith CT**, Parrish MH, Steel EA, Kelm MK, Boettiger CA (2014). In young adults, reward sensitivity quadratically relates to genetically predicted striatal dopamine. Celebration of Undergraduate Research, University of North Carolina at Chapel Hill. Chapel Hill, NC.
 23. **Smith CT**, Chanon VW, Kelm MK, Cerciello ER, Parrish MH, Garbutt JC, Kampov-Polevoy AB, Boettiger CA (2013). A cognitive predictor of alcohol treatment success is associated with reduced activity in circuits implicated in top-down biasing of object recognition. 2013 Biomedical Research Imaging Center (BRIC) Research Day. Chapel Hill, NC.
 24. **Smith CT**, Boettiger CA (2012). n-back performance moderates the positive relationship between trait impulsivity and immediate reward bias in adults: Potentiation by heavy alcohol use. Society for Neuroscience 2012 Annual Meeting. New Orleans, LA.
 25. **Smith CT**, Boettiger CA (2012). Interacting effects of genetic polymorphisms regulating dopamine signaling in the frontal cortex on accurate target detection under high working memory load. North Carolina Conference on Cognition 2012. Chapel Hill, NC.
 26. Le M*, **Smith CT**, Boettiger CA (2011). Cognitive Impulsivity, Working Memory, and Genotype Effects. Celebration of Undergraduate Research, University of North Carolina at Chapel Hill. Chapel Hill, NC.
 27. **Smith CT**, Freeman-Daniels E, Boettiger CA (2010). Effects of Gender, Age, and Alcohol Use Behavior on Impulsive Decision Making. *Alcoholism: Clinical & Experimental Research*, 34, 119A.
 28. Chanon VW, **Smith CT**, Kalka LS, Kampov-Polevo AB, Garbutt JC, Boettiger CA (2010). Effects Of Naltrexone On Alcohol Attentional Bias And Delay Discounting: A Pilot Study. *Alcoholism: Clinical & Experimental Research*, 34, 177A.
 29. **Smith CT**, Cloonan G, Lee A, Grisel JE (2008). Investigating the role of β -endorphin in mediating alcohol reward using *in vivo* microdialysis. Symposium for Young Neuroscientists and Professors of the SouthEast. Charleston, SC.
 30. **Smith CT**, Cloonan G, Lee A, Grisel JE (2008). Role of β -endorphin in behavioral despair, stress, and anxiety. South Carolina IDeA Networks of Biomedical Research Excellence 2008 Research Symposium. Charleston, SC.
 31. **Smith CT**, Cloonan G, Lee A, Grisel JE (2007). Role of β -endorphin in behavioral despair, stress, and anxiety. Faculty for Undergraduate Neuroscience Social and Poster Session. Society for Neuroscience 2007 Annual Meeting. San Diego, CA.

Teaching:

Guest Lecture, Vanderbilt University, Nashville, TN **Spring 2018**
Neurobiology of Addiction (NSC 3240)
Neuroimaging Addiction
Number Enrolled: 33

Guest Lecture, Vanderbilt University, Nashville, TN **Spring 2017**
Abnormal Psychology (PSY 3100)
What can Positron Emission Tomography tell us about psychiatric disorders?
Number Enrolled: 149

Guest Lecture, Vanderbilt University, Nashville, TN **Spring 2016**
Psychopharmacology (NSC 3260)
Psychopharmacology of Amphetamines
Number Enrolled: 18

Instructional Assistant, UNC Dept. of Psychology, Chapel Hill, NC **Spring 2011**
Intro to Psychology (Psych 101)
Number Enrolled: 288

- Assisted in creation and grading of course assignments including exams and 5 2-page writing assignments with 2 other IAs.
- Managed online course material and online grade book via Blackboard system.
- Maintained weekly office hours for students.

Mentoring:

Vanderbilt University

Neuroscience 292 (Independent Research) Research Project advisor for Elliot McClure (Spring 2018)
Project title: Asymmetry in Midbrain Dopamine D2 Receptor and Dopamine Transporter Availability

Neuroscience 292 Research Project advisor for Aaron Tetreault (Fall 2016)
Project title: Using a Modified BART/BAIT fMRI Task to Better Analyze Uncertainty Processing

Undergraduate Neuroscience Honors Thesis advisor for Emily Long (2015-16 academic year)
Thesis title: Estradiol Levels Modulate Dopamine Binding and Release: An [18-F]-Fallypride PET Study

Neuroscience 292 Research Project advisor for Jennifer Wu (Spring 2016)
Project title: Investigating Personality Factor Structure and Alternative Barratt Impulsivity Scale Substructure: Relationships to Fallypride DRD2 Receptor Availability

Neuroscience 292 Research Project advisor for Aaron Tetreault (Spring 2016)
Project title: C957T Single Nucleotide Polymorphism in the Dopamine D2 Receptor (DRD2) Gene Affects Striatal and Midbrain DRD2 Availability

Neuroscience 292 Research Project advisor for Emily Long (Spring 2015)
Project title: Estradiol Levels Modulate Dopaminergic Release in Response to d-Amphetamine: An [18F]-Fallypride PET Study

Neuroscience 292 Research Project advisor for Joseph Hayden Schelbe (Spring 2015)

Project title: Investigating Role of Variation in Dopamine Signaling Genes on D2/3 Receptor Availability and d-Amphetamine-Induced Dopamine Release Measured with Fallypride PET

UNC Chapel Hill

Undergraduate Psychology Honors Thesis advisor for Scott Oppler (2013-14 academic year)

Thesis title: The Role of Ventral Striatal Dopamine in Reward Valuation Sensitivity*

***2013-14 Dashiell-Thurstone Prize in Psychology, Best Senior Honors Thesis**

Undergraduate Psychology Honors Thesis advisor for Michael Parrish (2013-14 academic year)

Thesis title: Family History of Alcohol Use Disorders Affects Intrinsic Connectivity in Large-scale Brain Networks of Adults

Psychology 395 (Independent Research) Research Project advisor for Michael Parrish (Spring 2013)

Project title: A Comparison of Methods for Resting State Functional Connectivity MRI Analyses

Psychology 395 Research Project advisor for Scott Oppler (Spring 2013)

Project title: Investigating the Role of Striatal Dopamine on Impulsive Choice Behavior

Psychology 395 Research Project advisor for Yecenia Sierra (Fall 2012-Spring 2013)

Project title: Estradiol is related to Impulsive Choice Behavior and Trait Impulsivity (Spring 2013)

Project title: How menstrual cycle hormones affect frontal-dependent function (Fall 2012)

Undergraduate Psychology Honors Thesis advisor for Martina Le (2010-11 academic year)

Thesis title: Cognitive Impulsivity, Working Memory, and Genotype Effects

Biology 395 Research Project advisor for Ankita Desai (Summer 2011)

Project title: Effect of C957T DRD2 on ICR

Other directly supervised undergraduate research volunteers:

Yuchen Xu (Fall 2018-present)	Vanderbilt University
Robby Espano (Fall 2018-present)	Vanderbilt University
Aniruddha Shekara (Summer 2018-present)	Vanderbilt University
Paul Kundzicz (Summer 2017-present)	Vanderbilt University
Joe Ferber (Summer 2018)	Vanderbilt University
Zenab Mchaourab (Fall 2017-Spring 2018)	Harpeth Hall School (High School)
Daniel Katz (Summer 2016-Spring 2017)	Vanderbilt University
Miki Wilkinson (Summer 2016-Fall 2016)	Tennessee State University NERVE Student
Noe Zubieta (Spring 2015)	Vanderbilt University
Melisa Menciloglu (Fall 2013-Spring 2014)	UNC Chapel Hill
Rachel Kaplan (Spring 2012)	UNC Chapel Hill
Chelsea Lang (Fall 2011)	UNC Chapel Hill
Jose Lopez (Fall 2010 - Spring 2011)	UNC Chapel Hill

Professional Development:

CIRTL Evidence-Based Teaching Workshop

May 2017

Center for the Integration of Research, Teaching, and Learning (CIRTL) 2-day workshop on effective evidence-based teaching practices including topics on active learning, learning preferences, student motivation, course design, assessment, classroom management, and application the legacy cycle.

PET Pharmacokinetics Workshop**July 2016**

Yale University, in conjunction with the 2016 Neuroreceptor Mapping Meeting Workshop focused on various methods of Positron Emission Tomography pharmacokinetic data modeling and estimation of parameters of interest, including Binding Potential.

An Introduction to Evidence-Based Undergraduate STEM Teaching**Fall 2015 - Spring 2016**

Center for the Integration of Research, Teaching, and Learning (CIRTL)

- **Fall:** Coursera course in addition to weekly group meetings at Vanderbilt Center for Teaching.
- **Spring:** Teaching practicum, including guest lecture (*see Teaching*) with feedback
- **Certificate in College Teaching from Vanderbilt Center for Teaching**

Multi-Modality Short Course**May 2013**

Athinoula A. Martinos Center for Biomedical Imaging, Boston, MA

-Two-week program focused on a variety of techniques for studying brain structure and function including MRI, PET, MEG, EEG, DTI, MRS, NIRS, and TMS. Exposure to Freesurfer program for structural MRI analyses and FS/Fast for functional MRI analyses.

Neuroimaging Training Program**July 2012**

University of California, Los Angeles

- Two-week program focused on advanced neuroimaging analysis methods including multivoxel pattern analysis, machine learning, and new data collection approaches. Afternoon workshops and a final group project focused on using MATLAB, Psychtoolbox, and FSL software to design imaging experiments and collect and analyze resting state, functional, and diffusion imaging MRI data.

Training Course in fMRI**August 2011**

University of Michigan, Ann Arbor, MI

- Two-week program focused on introduction to fMRI physics, study design, and introduction to data analysis; experience with MATLAB and SPM software to assist in fMRI data analysis.

Teaching Certificate**Summer 2011**

Summer Teaching and Pedagogy Series, UNC Chapel Hill, Chapel Hill, NC

UNC Center for Faculty Excellence and Training Initiative in Biomedical and Biological Sciences

- Series of lectures focused on strategies to actively engage undergraduate students in lecture classes, integrating technology in the classroom, and developing better teaching skills.

Professional Affiliations:

Society for Neuroscience (2007-present)

Cognitive Neuroscience Society (2009-present)

Research Society on Alcoholism (2009-present)

Organization for Human Brain Mapping (2015-present)

Society of Biological Psychiatry (2016-present)

Faculty for Undergraduate Neuroscience (2016-present)

Organization for the Study of Sex Differences (2017-present)

Society for Neuroeconomics (2018-present)

Service:

Ad-hoc Reviewer (see [Publons profile](#)) for: *PLoS One, Cerebral Cortex, Neuropsychologia, Hormones and Behavior, Neuroimage, Neuroscience Letters*

[Fisk-Vanderbilt Bridge Program](#) Mentor

January 2018 - Present

Contributing writer: [Health:Further Blog: Taking Health Further](#)

2018 - Present

Contributing writer: [The POSTDOCKET](#), The monthly newsletter of the

2017 - Present

National Postdoctoral Association (NPA)

Co-webmaster: Vanderbilt Postdoctoral Association [Website](#) **2017 - Present**

Vanderbilt Postdoctoral Association Junior Co-Chair (Vice President) **July 2017 - July 2018**
Vanderbilt Postdoctoral Association and Shared Resources Annual Symposium **Spring 2017, 2018**

Planning Committee Member
Vanderbilt 3-Minute Thesis (3MT) Competition Planning Committee **Spring 2018**

2018 Vanderbilt BRET Career Symposium Planning Committee **Spring 2018**
Assisted the Vanderbilt Biomedical Education and Training (BRET) Office in selecting and inviting speakers for the 2018 Career Symposium.

Vanderbilt Postdoctoral Association Treasurer **August 2016 - July 2017**

2017 Vanderbilt BRET Career Symposium & Reunion Planning Committee **Spring 2017**
Assisted the Vanderbilt BRET Office in selecting and inviting former alumni to return for the 2017 Career Symposium. Assisted in itinerary planning and management.

Member, Honors Thesis Committee for Tiffany Farina **April 2016**
Vanderbilt Psychology Department (Faculty Mentor: Geoffrey Woodman)
Thesis Title: The Effects of Priming on Reaction Times, Confidence Rating Measures, and Accuracy

Abstract Reviewer, Organization for Human Brain Mapping Annual Meeting **2016, 2017, 2018**

Academic Honors and Awards:

UNC Psychology Club Research Mentor Award **2014**
Graduate Mentor Award from UNC Office of Undergraduate Research **2010, 2012, 2013**
HHMI Future Scientists and Clinicians Summer Program Co-Mentor **2013**
Graduate Student Award, Cognitive Neuroscience Society 2012 Annual Meeting **2012**
Research Society on Alcoholism Student Merit Travel Award **2010, 2014**

Press:

Neuropharmacology article recommended by F1000 Faculty Member Kent Berridge **June 8, 2016**
<http://f1000.com/prime/726354524?bd=1>
"Confirmation, Good for Teaching, Interesting Hypothesis, New Finding"

Radio Interview: Trying to understand what causes addictions **October 31, 2014**
<http://carolinaconnection.org/2014/10/31/trying-to-understand-what-causes-addictions/>

Scientific American MIND Guest Blog Feature **May 7, 2014**
Estrogen's Role in Impulsive Behavior
<http://blogs.scientificamerican.com/mind-guest-blog/2014/05/07/estrogens-role-in-impulsive-behavior/>

Featured Research Article in *Carolina Scientific Magazine* **Fall 2012**
[Uncovering addiction](#) (2012), *Carolina Scientific*, 5 (1), 20-21.