

EDUCATION

- **Vanderbilt University** Nashville, TN
Ph.D. in Neuroscience 2022
- **St. Mary's College of Maryland** St. Mary's City, MD
BA in Biochemistry major, Neuroscience minor 2015

PUBLICATIONS

• First-Authored Research Articles

- **Smith, N.K.**, Kondev, V., Hunt, T.R., Grueter, B.A., Neuropeptide Y modulates excitatory synaptic transmission and promotes social behavior in the mouse nucleus accumbens. *Neuropharmacology*, October 2022
- **Smith, N. K.**, Plotkin, J.M., Grueter, B.A. Hunger dampens a nucleus accumbens circuit to drive persistent food seeking. *Current Biology*, April 2022
- Turner, B. D.*, **Smith, N. K.***, Manz, K. M., Chang, B. T., Delpire, E., Grueter C. A., Grueter, B. A., Cannabinoid type-1 receptors in A2a neurons contribute to cocaine-environment association. *Psychopharmacology*, April 2021 (*denotes equal contribution)
- Reddy, I. A.*, **Smith, N. K.***, Erreger, K., Ghose, D., Saunders, C., Foster, D. J., Turner, B., Poe, A., Albaugh, V. L., McGuinness, O., Hackett, T. A., Grueter, B. A., Abumrad, N. N., Flynn, C. R., Galli, A. Bile Diversion, a Bariatric Surgery, and Bile Acid Signaling Reduce Central Cocaine Reward. *PLOS Biology*, July 2018 (*denotes equal contribution)

• First-Authored Reviews

- **Smith, N.K.**, Grueter, B.A. Hunger driven adaptive prioritization of behavior. *The FEBS Journal*, February 2021
- **Smith, N. K.**, Hackett, T. A., Galli, A. & Flynn, C. R. GLP-1: Molecular mechanisms and outcomes of a complex signaling system. *Neurochemistry International*, April 2019

• Co-Authored Publications

- Grueter, C. A., Murray, T. W., **Smith, N. K.**, Grueter, B. A. Neuropeptide Y receptor modulation of dopamine transmission in the nucleus accumbens core. *Neuropeptides*, May 2026
- Goldstein, N., Maes, A., Allen, H. N., Nelson, T. S., Kruger, K. A., Kindel, M., **Smith, N. K.**, Carty, J. R. E., Villari, R., Cho, E., Marble, E. L., Khanna, R., Taylor, B. K., Kennedy, A., Betley, J.N. A parabrachial hub for the prioritization of survival behavior. *Nature*, November 2025
- Zanella, D., **Smith, N. K.**, Hardaway, J.A., Buchanan, A.M., Mullins, C.H., Galli, A. Bile acids modulate reinstatement of cocaine conditioned place preference and accumbal dopamine dynamics without compromising appetitive learning. *Scientific Reports*, August 2023
- Flippo, K. H., Trammell, S. A.J., Gillum, M. P., Aklan, I., Perez, M. B., Yavuz, Y., **Smith, N. K.**, Jensen-Cody, S. O., Zhou, B., Claffin, K. E., Beierschmitt, A., Fink-Jensen, A., Knop, F. K., Palmour, R. M., Grueter, B. A., Atasoy, D., Potthoff, M. J. FGF21 suppresses alcohol consumption through an amygdalo-striatal circuit. *Cell Metabolism*, February 2022
- Warner, T., **Smith, N. K.**, Kang, J. Q. The therapeutic effect of stiripentol in Gabrg2+/Q390X mice associated with epileptic encephalopathy. *Epilepsy Research*. April 2019

ACADEMIC AND PROFESSIONAL HONORS

- **2026:** Society for Neuroscience Trainee Professional Development Award
- **2026:** Harry R. Kissileff Award for Best Oral Presentation Society for the Study of Ingestive Behavior
- **2026 - 2031:** NIDDK K99/R00 Pathway to Independence Award (K99DK147917) Impact Score: 20
- **2023 - 2025:** NIDDK National Research Service Award (F32DK135401) Impact Score: 12

- **2022 - 2023:** UPenn Diabetes, Endocrinology and Metabolism T32 training grant (T32DK007314)
- **2016 - 2018:** Vanderbilt Brain Institute Scholar Award
- **2015 - 2016:** Vanderbilt University Interdisciplinary Graduate Program Director's Award
- **2011 - 2015:** St. Mary's College of Maryland Presidential Award

EXPERIENCE

- **University of Pennsylvania** Philadelphia, PA
Postdoctoral Researcher 2022 - Present
 - **Laboratory of Dr. J. Nicholas Betley:** The pedunculopontine nucleus acts as an essential gateway for dopamine-driven associative learning.
- **Vanderbilt University** Nashville, TN
Graduate Student 2015 - 2022
 - **Laboratory of Dr. Brad Grueter (2017 - 2022):** Hunger drives persistent food seeking by dampening a nucleus accumbens to lateral hypothalamus circuit. Neuropeptide Y regulates excitatory transmission and promotes social behavior in the mouse nucleus accumbens.
 - **Laboratory of Dr. Aurelio Galli (2015 - 2017):** Bile diversion, a bariatric surgery, reduces central cocaine reward through bile acid signaling. Molecular mechanisms of GLP-1 in the lateral septal nucleus.
- **University of Maryland Baltimore** Baltimore, MD
Undergraduate Researcher 2014 - 2015
 - **Laboratory of Dr. Paul Shepard:** Molecular mechanisms of isoflurane underlying burst suppression in cortical EEG.
- **St. Mary's College of Maryland** St. Mary's City, MD
Undergraduate Researcher 2012 - 2015
 - **Laboratory of Dr. Craig Streu (2013 - 2015):** Synthesis and purification of organic ligands to produce metal coordination complexes mimicking complex natural products.
 - **Laboratory of Dr. Anne Marie Brady (2012 - 2013):** Compulsive cocaine self-administration in a rodent model of cognitive symptoms of schizophrenia.

INVITED TALKS

- **UPenn Neuroscience Public Lecture Series (May 2024):** Food for thought: The relationship between food, eating, and our brains. Philadelphia, Pennsylvania, USA
- **University of Pennsylvania (Feb 2021):** Hunger drives perseveration by dampening an accumbens circuit. Philadelphia, Pennsylvania, USA
- **University of Oregon (Nov 2020):** Hunger drives perseveration by dampening an accumbens circuit. Eugene, Oregon, USA
- **Max Planck Institute for Metabolism Research (Feb 2020):** Integrating hunger into the control of motivated behavior. Cologne, Germany
- **University of Alabama Birmingham (Nov 2019):** Hunger, via the arcuate nucleus neuropeptide BigLEN, suppresses excitatory transmission in a nucleus accumbens circuit that opposes feeding behavior. Birmingham, Alabama, USA

MEETING ABSTRACTS

- **Talks**
 - A pedunculopontine nucleus to ventral tegmental area circuit is required for dopamine responses to food and associative food-cue learning. Society for the Study of Ingestive Behavior, 2026.
Awarded Harry R. Kissileff Award for Best Oral Presentation.
 - The pedunculopontine nucleus is required for phasic dopamine release and associative learning. 41st Annual Mahoney Institute for Neuroscience Symposium, 2026
 - Ensembles for learning in the pedunculopontine nucleus. Small Circuits and Behavior Meeting, 2025

- A subset of pedunculopontine nucleus neurons drive food reward. Society for the Study of Ingestive Behavior, 2025
- Isolating the role of food reward circuitry in feeding decisions. Small Circuits and Behavior Meeting, 2023

• Posters

- **Smith, N.K.**, Wu, R., Bianchi, J., Awh, M., Williams, S., Wang, S., Betley, J.N., The pedunculopontine nucleus is an essential gateway for dopamine-dependent associative learning. Pavlovian Society, 2026
- **Smith, N.K.**, Bianchi, J., Wu, R., Awh, M., Williams, S., Wang, S., Betley, J.N., Ensembles for learning in the pedunculopontine nucleus. 40th Annual Mahoney Institute for Neurosciences Annual Symposium, 2025
- **Smith, N.K.**, Bianchi, J., Williams, S., Wang, S., Betley, J.N., The pedunculopontine nucleus reinforces the consumption of palatable foods via the dopamine system. University of Pennsylvania Institute of Diabetes, Obesity and Metabolism Spring Symposium, 2024
- **Smith, N.K.**, Bianchi, J., Betley, J.N. Investigation of the role of the pedunculopontine nucleus in food consumption. Society for the Study of Ingestive Behavior, 2023
- **Smith, N. K.**, Plotkin, J. M., Grueter, B. A. Hunger drives perseveration by dampening a nucleus accumbens circuit. Society for the Study of Ingestive Behavior, 2021
- **Smith, N. K.**, Plotkin, J. M., Grueter, B. A. Hunger, via the arcuate nucleus neuropeptide BigLEN, suppresses excitatory transmission in a nucleus accumbens circuit that opposes feeding behavior. Society for Neuroscience, 2019
- **Smith, N. K.**, Plotkin, J. M., Grueter, B. A. BigLEN, an arcuate nucleus neuropeptide, acts to alter nucleus accumbens physiology and impair extinction of food seeking behavior. Tennessee Physiological Society, 2018
- **Smith, N. K.**, Reddy, I. A., Erreger, K., Ghose, D., Saunders, C., Turner, B., Poe, A., Albaugh, V. L., Hackett, T. A., Grueter, B. A., Abumrad, N. N., Flynn, C. R., Galli, A. Bariatric surgery controls bile acid signaling and impairs cocaine reward. Society for Neuroscience, 2017
- Brady, A.M., Forrester-Fronstin, Z., Hirsh, S., Jarrin, S.E., Karimi, A., Roberts, B.M., **Smith, N.K.** BrainSTEM: A neuroscience outreach program for high school students. Society for Neuroscience 2015
- **Smith, N. K.**, Knecht, S., Olexa, J., Streu, C. Progress Toward Synthesizing Transition Metal Complexes to Mimic Complex Natural Products. American Chemical Society 2015
- Palacorolla, H. L., Gyawali, U., Jarrin, S. E., **Smith, N. K.**, Brady, A.M. Compulsive Cocaine-Seeking in the Neonatal Ventral Hippocampal Lesion Model of Schizophrenia. Society for Neuroscience 2013

MENTORSHIP AND TEACHING

• Mentoring

- **Matthew Guo**: Undergraduate Researcher 2026 - Present
- **Ruoxi Wu**: Undergraduate Researcher 2024 - Present. Awarded Faculty for Undergraduate Neuroscience Travel Award SFN 2026.
- **Michelle Awh**: Research Technician 2024 – 2025. Ph.D. program at University of Chicago
- **Seamus Wang**: Undergraduate Researcher 2023 – 2024. B.Sc. 2024, Memorial Sloan Kettering Neurosurgery Internship 2024. MD class of 2029 Albert Einstein College of Medicine
- **John Bianchi**: Undergraduate Researcher 2022 – 2024. B.Sc. 2024, awarded Eliot Stellar Prize for Best Neuroscience Thesis for 2024 UPenn Neuroscience. MD Class of 2028 Geisinger College School of Medicine
- **Sukya Williams**: Undergraduate Researcher 2022- 2023. Expected B.Sc. 2026
- **Thomas Hunt**: Undergraduate Researcher, 2021-2022. B.Sc. 2023 Vanderbilt University. Co-author on Neuropharmacology manuscript. MD Class of 2028 Columbia University
- **Jared Plotkin**: Undergraduate Researcher, 2018 – 2021. B.Sc. 2021 Vanderbilt University, awarded Highest Honors for undergraduate thesis. Co-author on Current Biology publication. NYU Medical Scientist Training Program

• Teaching

- **Co-Instructor**: BIOL 4116 Neural Circuits for Survival, University of Pennsylvania, 2025
- **Invited Lecturer**: Striatal neuroplasticity shapes behavior, Neural Circuits and Behavior, University of Pennsylvania, 2024

- **Invited Lecturer:** Behavioral methods to study reward, Methods and Experimental Design in Neuroscience, Vanderbilt University 2019
- **Teaching Assistant:** Methods and Experimental Design in Neuroscience, Vanderbilt University 2019
- **Invited Lecturer:** Genetic tools to study neural circuitry, Methods and Experimental Design in Neuroscience, Vanderbilt University 2018
- **Invited Lecturer:** Homeostatic and hedonic feeding, Neurobiology of Reward, Vanderbilt University 2017

SCIENTIFIC OUTREACH

- **2017:** Presenter at Vanderbilt University Brain BLAST
- **2014:** Lecturer for BrainSTEM: A neuroscience outreach program for high school students
- **2012 - 2015:** Volunteer and host at Brain Bee neuroscience trivia competition