Erica Townsend, Ph.D.

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EDUCATION

2025 **Dartmouth College**
Ph.D., Psychological & Brain Sciences (Systems & Behavioral Neuroscience)
Dissertation Advisor: Kyle Smith, Ph.D.

2024 **Dartmouth College**
M.S., Psychological & Brain Sciences (Systems & Behavioral Neuroscience)
Thesis Advisor: Kyle Smith, Ph.D.

2020 **Virginia Polytechnic Institute and State University (Virginia Tech)**
B.S., Cognitive & Behavioral Neuroscience – *Magna Cum Laude*
B.S., Psychology – *Magna Cum Laude*

RESEARCH EXPERIENCE

2025 – Present **Postdoctoral Research Associate**
Dartmouth College Department of Psychological & Brain Sciences
Laboratory of Kyle Smith, Ph.D.
Examining the dopaminergic and cholinergic transmission in the nucleus accumbens underlying compulsivity and motivated behavior in rat models using fiber photometry and detailed behavioral analyses; consultant on multiple projects investigating diverging circuits underlying social and food motivation in the striatum

2020 - 2025 **Doctoral Researcher**
Dartmouth College Department of Psychological & Brain Sciences
Laboratory of Kyle Smith, Ph.D.
Investigating the microcircuitry of the nucleus accumbens underlying motivation and behavioral flexibility in rat models using pharmacology, fiber photometry, electrophysiology, and optogenetics in combination with novel, detailed behavioral analyses

2019 - 2020 **Undergraduate Research Assistant**
Virginia Tech School of Neuroscience
Laboratory of Daniel English, Ph.D.
Exploring the role of interneurons on hippocampal place cell tuning and spatial navigation and memory in mouse models using in vivo *electrophysiology and optogenetics*

2018 - 2020 **Undergraduate Research Assistant**
Virginia Tech School of Neuroscience
Laboratory of J. Michael Bowers, Ph.D.
Studying the genetic basis of language production disorders and autism spectrum disorder in rat models

2018 - 2019 **Undergraduate Research Assistant**
Virginia Tech Center for Autism Research
Laboratory of Angela Scarpa, Ph.D.
Designing new clinical interventions and diagnostic tools for non-verbal children with autism spectrum disorder

AWARDS & HONORS

2024 **Marie A. Center 1982 Award for Excellence in Research**
Dartmouth College

2024 **Neukom Travel Award**
The Neukom Institute for Computational Science at Dartmouth College

2023 **Marie A. Center 1982 Award for Excellence in Teaching**
Dartmouth College

2022 **Outstanding Graduate Woman in Learning Award**
Women in Learning; International Behavioral Neuroscience Society

2020 **B.S. awarded with honors (2x)**
Virginia Tech School of Neuroscience; Virginia Tech Department of Psychology

2019 **Omicron Delta Kappa Leadership Honor**
Virginia Tech

2019 **Nu Rho Psi Honor in Neuroscience Scholarship**
Virginia Tech

PUBLICATIONS & PREPRINTS

Townsend, E.S. & Smith, K.S. (2025). Behavioral microanalyses refine sign-tracking characterization and uncover different response dynamics during omission and extinction learning. *Learning and Memory, 32*(3). DOI: 10.1101/lm.054065.124 (featured on the cover)

Amaya, K.A., Carmichael, J.E., **Townsend, E.S.**, Palmer, J.A., Stott, J.J., Smith, K.S. (2024). Habit learning shapes activity dynamics in the central nucleus of the amygdala. *bioRxiv*. DOI: doi.org/10.1101/2024.02.20.580730

Townsend, E.S., Amaya, K.A., Smedley, E.B., Smith, K.S. (2023). Nucleus accumbens acetylcholine receptors modulate the balance of flexible and inflexible cue-directed motivation. *Sci Rep.* 13, 13375. DOI: 10.1038/s41598-023-40439-4

INVITED TALKS

July 2024 Dissociable dopamine dynamics of learning & motivation in flexible sign-tracking responses
University of Vermont Summer Summit, Burlington, VT

May 2024 Dopamine dynamics in the nucleus accumbens track flexible motivation in rats
Albert Einstein College of Medicine Dialogues in Graduate Education Symposium, Bronx, NY

CONFERENCE ABSTRACTS & POSTERS

Garrod, D., **Townsend, E.S.**, Smith, K.S. (2024). Characterizing dopamine signaling in the nucleus accumbens across individual differences within sign-tracking responses. Wetterhahn Science Symposium, Hanover, NH.

Shang, A., **Townsend, E.S.**, Smith, K.S. (2024). Investigating the neural circuitry of motivation in food and social rewards. Wetterhahn Science Symposium, Hanover, NH.

Townsend, E.S., Smith, K.S. (2024). Nucleus accumbens dopamine dynamics underlying flexible sign-tracking during a contingency change. Neuroscience Day at Dartmouth, Hanover, NH.

Townsend, E.S., Smith, K.S. (2024). Nucleus accumbens dopamine dynamics underlying flexible sign-tracking during a contingency change. Winter Conference on Brain Research, Breckenridge, CO.

Townsend, E.S., Garrod, D., Smith, K.S. (2023). Deep exploration of sign-tracking behaviors in dynamic cue-reward relationships. Society for Neuroscience Annual Meeting, Washington, D.C.

Garrod, D., **Townsend, E.S.**, Smith, K.S. (2023). Exploring nucleus accumbens dopamine dynamics during the sign-tracking response. Wetterhahn Science Symposium, Hanover, NH.

Townsend, E.S., Garrod, D., Amaya, K.A., Smedley, E.B., Smith, K.S. (2022). Nucleus accumbens acetylcholine receptors differentially modulate the updating of sign tracking responses. Society for Neuroscience Annual Meeting, San Diego, CA.

Garrod, D.*, Wilson, I.C.*, Herrald, A.L., Zweifach, J.A., **Townsend, E.S.**, Smith, K.S. (2022). Effects of cholinergic transmission in the nucleus accumbens on the updating of sign-tracking responses. Wetterhahn Science Symposium, Hanover, NH. (* denotes equal contribution)

Townsend, E.S., Amaya, K.A., Smedley, E.B., Smith, K.S. (2022). Nicotinic receptor activity in the nucleus accumbens differentially alters sign-tracking during a contingency change and overtraining. International Behavioral Neuroscience Society Annual Meeting, Glasgow, United Kingdom.

Amaya, K.A., Carmichael, J. E., **Townsend, E.S.**, Palmer, J.A., Smith, K.S. (2022). Activity dynamics in the central nucleus of the amygdala during habit formation. Winter Conference on Brain Research, Snowmass, CO.

Townsend, E.S., Amaya, K.A., Smedley, E.B., Smith, K.S. (2022). Cholinergic transmission in the nucleus accumbens core alters the flexibility of sign-tracking responses. Winter Conference on Brain Research, Snowmass, CO.

Townsend, E.S., Amaya, K.A., Smedley, E.B., Smith, K.S. (2021). Cholinergic transmission in the nucleus accumbens core alters the flexibility of sign-tracking responses. Society for Neuroscience Annual Meeting, Chicago, IL (Virtual).

Townsend, E.S., Klaver, L.M.F., English, D.F. (2020). The role of inhibition in place tuning: a pilot. School of Neuroscience Research Symposium, Blacksburg, VA.

Townsend, E.S., Muskett, A., Scarpa, A. (2019). Adaptive Functioning and Depressive Symptoms in Children with Minimally Verbal ASD. Dennis Dean Undergraduate Research Conference, Blacksburg VA.

TEACHING EXPERIENCE

Winter 2023 — **Teaching Assistant & Lab Co-Instructor**
Dartmouth College Department of Psychological & Brain Sciences
Systems Neuroscience with Lab (PSYC 36)
Supervisor: Kyle Smith, Ph.D.

Fall 2023 — **Teaching Assistant**
Dartmouth College Department of Psychological & Brain Sciences
Topic Study: Exotic Sensory Systems (PSYC 50.07)
Supervisor: Kelly Finn, Ph.D.

Winter 2022 — **Teaching Assistant & Lab Co-Instructor**
Dartmouth College Department of Psychological & Brain Sciences
Introduction to Neuroscience (PSYC 06)
Supervisor: Emily Finn, Ph.D.

Fall 2021 — **Teaching Assistant & Lab Co-Instructor**
Dartmouth College Department of Psychological & Brain Sciences
Systems Neuroscience with Lab (PSYC 36)
Supervisor: Matthijs van der Meer, Ph.D.

Spring 2019 — **Undergraduate Teaching Assistant**
Virginia Tech School of Neuroscience
Cognitive Neuroscience (NEUR 3084)
Supervisor: Georgia Hodes, Ph.D.

PEDAGOGY

Winter 2022 — Center for the Improvement of Mentored Experience in Research (CIMER) Mentorship Series
Dartmouth College Center for the Advancement of Learning (DCAL)

Spring 2022 — Future Faculty Teaching Series
Dartmouth College Center for the Advancement of Learning (DCAL)

Fall 2021 — Communicating Science
Dartmouth College Guarini School of Graduate and Advanced Studies

INVITED LECTURES

Oct 2023 — Learning and Motivation
Introduction to Neuroscience (PSYC 6), Dartmouth College

Nov 2022	How to Write a Scientific Article *Systems Neuroscience Laboratory (PSYC 36), Dartmouth College*
Mar 2023	Sign-Tracking and Addiction Vulnerability *Motivation, Drugs, and Addiction (PSYC 50.09), Dartmouth College*
Dec 2022	The Association Cortex *Systems Neuroscience (PSYC 36), Dartmouth College*
Nov 2022	The Morris Water Maze and Memory Formation *Systems Neuroscience Laboratory (PSYC 36), Dartmouth College*
Sep 2022	Associative Learning and Sign-Tracking *Exotic Sensory Systems (PSYC 50.07), Dartmouth College*
Jun 2022	Actions, Habits, and Rewards *Neurobiology of Learning and Memory (PSYC 50.08), Dartmouth College*
May 2022	Learning and Memory in Behavior *Systems Neuroscience (PSYC 36), Dartmouth College*
Mar 2022	Mechanisms of Learning and Memory *Introduction to Neuroscience (PSYC 06), Dartmouth College*
Feb 2022	Learning and Motivation *Introduction to Neuroscience (PSYC 06), Dartmouth College*

MENTORING

*Dartmouth College Undergraduate Research Assistants (**bold** indicates obtained funding /grants; asterisks (*****) indicate honors thesis students.*

Period	Name	Achievements & Outcomes
2024 – 2025	Angela Shang ('27)	o Dartmouth Women in Science Project (WISP) fellow; **Undergraduate Research Assistantships at Dartmouth (URAD) leave term grant recipient**; poster presenter (1x)
2023 – 2025	Catherine Nemeskal ('25)	o **Stamps Scholar**; **Presidential Scholar**
2023 – 2024	Isabel Coxe ('26)	o **Undergraduate Research Assistantships at Dartmouth (URAD) grant recipient (2x)**
2022 – 2024	Briana Maldonado ('24)	o **Undergraduate Research Assistantships at Dartmouth (URAD) grant recipient (2x)**
2022 – 2023	Audrey Herrald ('23) *****	o Benjamin Benner 1969 Award for Excellence in Research in Psychological and Brain Sciences; **Jack Baird Prize for Research Projects**; poster presenter (1x); M.D. candidate at Geisel School of Medicine at Dartmouth College
2021 – 2024	Daniela Garrod ('24) *****	o **E.E. Just Undergraduate Fellow**; **Presidential Scholar**; Tufts University Building Diversity in Biomedical Sciences summer research fellow; Lt. William Brewster Nickerson 1964 Prize for Outstanding Undergraduate Neuroscience Research; third prize Benjamin Benner G. 1969 Award for Excellence in Research in Psychology; poster presenter (5x); PhD student in the Brown-NIH Neuroscience Graduate Partnership Program
2021 – 2023	Joshua Zweifach ('23)	o Poster presenter (1x)
2021 – 2023	Isabelle Wilson ('23)	o **E.E. Just Undergraduate Fellow**; **Presidential Scholar**; Poster presenter (1x)

SERVICE, OUTREACH, & LEADERSHIP

2023 –2024 **Faculty Search Committee Member,** Dartmouth College Department of Psychological and Brain Sciences

Served as a graduate student chairperson to select qualified applicants for tenure-track faculty positions in the PBS department; communicated opinions and information between the

committee and fellow graduate students; organized applicant job talks and scheduling.

2022 – Present **Behavioral Neuroscience Graduate Student Representative,** Dartmouth College Department of Psychological and Brain Sciences
Support and represent graduate students in the PBS department graduate program committee, allowing for a student perspective on major departmental decisions and matters; paved the way for an "en route" master's degree for PBS students as of Fall 2023

2021 – 2024 **Coordinator,** Upper Valley Brain Bee
Organized 2 major brain trivia competitions and many community outreach events to engage local New Hampshire and Vermont middle and high schoolers in neuroscience and STEM research; leading "boot camp" style neuroscience lectures and activities at regional grade schools

2021 – 2022 **Psychological and Brain Sciences Representative,** Dartmouth College Graduate Student Council
Act as a liaison for the graduate students in the Psychological and Brain Sciences Department and Dartmouth College deans and leadership

2021 – 2022 **Academic Committee Member,** Dartmouth College Graduate Student Council
Advocate for the academic equity, accessibility, integrity, and rights of graduate students across all departments

2020 **Undergraduate Student Councilor,** Central Virginia Chapter of the Society for Neuroscience
Served as a representative for undergraduate student researchers in the local Central Virginia region

2019 – 2020 **Membership Chair,** Virginia Tech Nu Rho Psi
Managed the society's campus outreach events such as Brain Awareness Week and engaged members in mentorship and volunteer opportunities

PROFESSIONAL AFFILIATIONS

2022 – Present Women in Learning
2022 – Present International Behavioral Neuroscience Society
2020 – Present The Society for Neuroscience
2020 – Present Pavlovian Society