Erica S. Townsend, Ph.D.

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Education

Degree	*Institution*	*Field of Study*	*Year*
Ph.D.	Dartmouth College	Psychological & Brain Sciences (Behavioral Neuroscience)	2025
M.S.	Dartmouth College	Psychological & Brain Sciences (Behavioral Neuroscience)	2024
B.S.	Virginia Tech	Cognitive & Behavioral Neuroscience	2020
B.S.	Virginia Tech	Psychology	2020

Research Positions

Postdoctoral Research Associate — 2025 – current
Mentor: Dr. Jacqueline Giovanniello
Lewis Katz School of Medicine at Temple University
Center for Substance Abuse Research

Doctoral Researcher — 2020 – 2025
Mentor: Dr. Kyle Smith
Dartmouth College
Department of Psychological and Brain Sciences

Undergraduate Research Assistant — 2019 – 2020
Mentor: Dr. Daniel English
Virginia Tech
School of Neuroscience

Undergraduate Research Assistant — 2018 – 2020
Mentor: Dr. J. Michael Bowers
Virginia Tech
School of Neuroscience

Undergraduate Research Assistant — 2018 – 2019
Mentor: Dr. Angela Scarpa
Virginia Tech
Center for Autism Research

Awards & Honors

William M. Smith Promise Award in the Brain Sciences, Dartmouth College — 2025
Marie A. Center 1982 Award for Excellence in Research, Dartmouth College — 2024
Travel Award, Neukom Institute for Computational Science at Dartmouth — 2024
Marie A. Center 1982 Award for Excellence in Teaching, Dartmouth College — 2023
Outstanding Graduate Woman in Learning Award, Women in Learning — 2022
Omicron Delta Kappa, Virginia Tech — 2019
Nu Rho Psi, Virginia Tech — 2019

Publications

In Preparation

Townsend, E.S., Garrod, D.*, Smith, K.S. Dissociable dopamine dynamics underlying motivation and learning mechanisms simultaneously during sign-tracking.

Townsend, E.S., Garrod, D.*, Smith, K.S. Acetylcholine transmission underlying flexible cue-motivation under omission conditions.

Peer-Reviewed and Preprint Articles

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 (*under review at The Journal of Neuroscience*)

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

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.

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* undergraduate mentee

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.

Invited Talks

Temple University, Center for Substance Abuse Research — May 2025
University of Vermont, Vermont Summer Summit — July 2024
Albert Einstein College of Medicine, Dialogues in Graduate Education Symposium — May 2024

Teaching Experience & Pedagogy

Lab Instructor:
Systems Neuroscience Laboratory (PSYC 36), Dartmouth College — Fall 2021 - Winter 2023

Graduate Teaching Assistant:
Exotic Sensory Systems (PSYC 50.07), Dartmouth College — Fall 2023
Introduction to Neuroscience (PSYC 6), Dartmouth College — Winter 2022
Systems Neuroscience (PSYC 36), Dartmouth College — Fall 2021 - Winter 2023

Undergraduate Teaching Assistant:
Cognitive Neuroscience (NEUR 3084), Virginia Tech — Spring 2019

Guest Lecturer:
Introduction to Neuroscience (PSYC 6), Dartmouth College (x3)
Motivation, Drugs, and Addiction (PSYC 50.09), Dartmouth College (x2)
Exotic Sensory Systems (PSYC 50.07), Dartmouth College
Neurobiology of Learning and Memory (PSYC 50.08), Dartmouth College
Systems Neuroscience (PSYC 36), Dartmouth College (x4)

Completed Pedagogy Courses:
Center for the Improvement of Mentored Experience in Research (CIMER) — Winter 2022
Mentorship Series, Dartmouth College Center for the Advancement of Learning

Future Faculty Teaching Series, Dartmouth College Center for the Advancement of Learning — Spring 2022

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

Mentorship

Dartmouth College Undergraduate Students:

Angela Shang — 2024 - 2025
Dartmouth Women in Science Project (WISP) fellow; Undergraduate Research Assistantship at Dartmouth (URAD) grant recipient

Catherine Nemeskal — 2023 – 2025
Stamps Scholar

Isabel Coxe — 2023 – 2024
Undergraduate Research Assistantship at Dartmouth (URAD) grant recipient (2x)

Briana Maldonado — 2022 – 2024
Undergraduate Research Assistantship at Dartmouth (URAD) grant recipient (2x)

Audrey Herrald (now MD candidate at Dartmouth College) — 2022 – 2023
Honors Thesis student; Benjamin Benner 1969 Award for Excellence in Psychology Research recipient; Jack Baird Prize for Research Projects recipient

Daniela Garrod (now PhD candidate in Brown-NIH partnership program) — 2021 – 2024
Presidential Scholar; E.E. Just Fellow; Honors Thesis student; Lt. William Brewster Nickerson 1964 Prize for Outstanding Undergraduate Neuroscience Research recipient; Benjamin Benner 1969 Award for Excellence in Psychology Research third prize recipient

Joshua Zweifach (‘23) — 2021 – 2023

Isabelle Wilson (‘23) — 2021 – 2023
Dartmouth Women in Science Project (WISP) fellow; E.E. Just Fellow

Society Membership, Service, and Outreach

Society Memberships:

Philadelphia Chapter of the Society for Neuroscience
Women in Learning
International Behavioral Neuroscience Society
The Society for Neuroscience
Pavlovian Society

Service:

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

Behavioral Neuroscience Graduate Student Representative — 2022 – 2024
Dartmouth College Department of Psychological and Brain Sciences

Psychological and Brain Sciences Representative — 2021 – 2023
Dartmouth College Graduate Student Council

Academic Committee Member — 2021 – 2022
Dartmouth College Graduate Student Council

Undergraduate Student Councilor 2019 – 2020
Central Virginia Chapter of the Society of Neuroscience
Membership Coordinator 2019 – 2020
Nu Rho Psi Virginia Tech Chapter

Outreach:
Upper Valley Brain Bee Coordinator 2021 – 2024