

Erica S. Townsend, Ph.D.

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Education

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 Experience

Postdoctoral Fellow	2025 – current
Mentor: Dr. Jacqueline Giovanniello	
Temple University Lewis Katz School of Medicine	
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

First Place Poster Award, Temple University Department of Neural Sciences Research Day	2025
Travel Fellow, Winter Conference on Brain Research	2025
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 College	2024
Marie A. Center 1982 Award for Excellence in Teaching, Dartmouth College	2023
Outstanding Graduate Woman in Learning Award, Women in Learning (at IBNS)	2022
B.S. awarded with Honors, Virginia Tech Department of Psychology	2020
B.S. awarded with Honors, Virginia Tech School of Neuroscience	2020
Omicron Delta Kappa, Virginia Tech	2019
Nu Rho Psi, Virginia Tech	2019

Publications

Preprint Articles

Townsend, E.S., Garrod, D., Smith, K.S. (2025). Phasic dopamine encodes persistent attraction to reward cues. *bioRxiv*. DOI: <https://doi.org/10.64898/2025.12.09.693300>

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*)

Peer-Reviewed 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](#))

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

Townsend, E.S., Velasquez, A., Maechler, M.R., Giovanniello, J.G. (upcoming). Chronic stress alters DMS activity to promote habit. Winter Conference on Brain Research, Big Sky, MT.

Townsend, E.S., Velasquez, A., Maechler, M.R., Giovanniello, J.G. (2025). Chronic stress alters DMS activity to promote habit. 4th Annual Temple University Department of Neural Sciences Research Day, Philadelphia, PA.

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.

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, Scotland, 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
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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
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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	Fall 2021

Advanced Studies

Mentorship

<i>Temple University Center for Substance Abuse Research:</i>	
Andrew Velasquez	2025 – current
Laboratory Manager	
<i>Temple University Undergraduate Students:</i>	
Kristen Pineda	2025 – current
Building Research Independence by Developing Goals and Hands-On Experiences (BRIDGE) fellow	
Avery Weidner	2025 – current
College of Science and Technology Summer Research Scholar	
<i>Dartmouth College Undergraduate Students:</i>	
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 Herraldr (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:

International Behavioral Neuroscience Society

Philadelphia Chapter of the Society for Neuroscience

Women in Learning

Pavlovian Society

The Society for Neuroscience

Central Virginia Chapter of the Society for Neuroscience

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	
<i>Outreach:</i>	
Upper Valley Brain Bee Coordinator	2021 – 2024