
Erica Townsend, M.S.

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EDUCATION

- 2020 - Present **Dartmouth College**
Ph.D., Psychological & Brain Sciences (Systems & Behavioral Neuroscience)
Dissertation Advisor: Kyle Smith, Ph.D.
Expected Graduation: Spring 2025
- 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*
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RESEARCH EXPERIENCE

- 2020 - Present **Graduate 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
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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. (under review). Behavioral microanalyses refine sign-tracking characterization and differentiate response dynamics during omission and extinction learning.

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. <https://doi.org/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

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| Winter 2023 | Teaching Assistant & Lab Co-Instructor
Dartmouth College Department of Psychological & Brain Sciences
<i>Systems Neuroscience with Lab (PSYC 36)</i>
<i>Supervisor: Kyle Smith, Ph.D.</i> |
| Fall 2023 | Teaching Assistant
Dartmouth College Department of Psychological & Brain Sciences
<i>Topic Study: Exotic Sensory Systems (PSYC 50.07)</i>
<i>Supervisor: Kelly Finn, Ph.D.</i> |
| Winter 2022 | Teaching Assistant & Lab Co-Instructor
Dartmouth College Department of Psychological & Brain Sciences
<i>Introduction to Neuroscience (PSYC 06)</i>
<i>Supervisor: Emily Finn, Ph.D.</i> |
| Fall 2021 | Teaching Assistant & Lab Co-Instructor
Dartmouth College Department of Psychological & Brain Sciences
<i>Systems Neuroscience with Lab (PSYC 36)</i>
<i>Supervisor: Matthijs van der Meer, Ph.D.</i> |
| Spring 2019 | Undergraduate Teaching Assistant
Virginia Tech School of Neuroscience
<i>Cognitive Neuroscience (NEUR 3084)</i>
<i>Supervisor: Georgia Hodes, Ph.D.</i> |

PEDAGOGY

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| Winter 2022 | Center for the Improvement of Mentored Experience in Research (CIMER) Mentorship Series
<i>Dartmouth College Center for the Advancement of Learning (DCAL)</i> |
| Spring 2022 | Future Faculty Teaching Series
<i>Dartmouth College Center for the Advancement of Learning (DCAL)</i> |
| Fall 2021 | Communicating Science
<i>Dartmouth College Guarini School of Graduate and Advanced Studies</i> |

INVITED LECTURES

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| Oct 2023 | Learning and Motivation
<i>Introduction to Neuroscience (PSYC 6), Dartmouth College</i> |
| Nov 2022 | How to Write a Scientific Article
<i>Systems Neuroscience Laboratory (PSYC 36), Dartmouth College</i> |
| Mar 2023 | Addiction Vulnerability
<i>Motivation, Drugs, and Addiction (PSYC 50.09), Dartmouth College</i> |
| Dec 2022 | The Association Cortex
<i>Systems Neuroscience (PSYC 36), Dartmouth College</i> |

Nov 2022	The Morris Water Maze and Memory Formation <i>Systems Neuroscience Laboratory (PSYC 36), Dartmouth College</i>
Sep 2022	Associative Learning and Sign-Tracking <i>Exotic Sensory Systems (PSYC 50.07), Dartmouth College</i>
Jun 2022	Actions, Habits, and Rewards <i>Neurobiology of Learning and Memory (PSYC 50.08), Dartmouth College</i>
May 2022	Learning and Memory in Behavior <i>Systems Neuroscience (PSYC 36), Dartmouth College</i>
Mar 2022	Mechanisms of Learning and Memory <i>Introduction to Neuroscience (PSYC 06), Dartmouth College</i>
Feb 2022	Learning and Motivation <i>Introduction to Neuroscience (PSYC 06), Dartmouth College</i>

MENTORING

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

<u>Period</u>	<u>Name</u>	<u>Achievements & Outcomes</u>
2024 – Present	Angela Shang ('27)	<ul style="list-style-type: none"> Dartmouth Women in Science Project (WISP) fellow; Undergraduate Research Assistantships at Dartmouth (URAD) leave term grant recipient; poster presenter (1x)
2023 – Present	Catherine Nemeskal ('25) *	<ul style="list-style-type: none"> Stamps Scholar; Presidential Scholar
2023 – 2024	Isabel Coxé ('26)	<ul style="list-style-type: none"> Undergraduate Research Assistantships at Dartmouth (URAD) grant recipient (2x)
2022 – 2024	Briana Maldonado ('24)	<ul style="list-style-type: none"> Undergraduate Research Assistantships at Dartmouth (URAD) grant recipient (2x)
2022 – 2023	Audrey Herrald ('23) *	<ul style="list-style-type: none"> Benjamin Benner 1969 Award for Excellence in Research in Psychological and Brain Sciences; Jack Baird Prize for Research Projects; poster presenter (1x); <u>M.D. candidate at Geisel School of Medicine at Dartmouth College</u>
2021 – 2024	Daniela Garrod ('24) *	<ul style="list-style-type: none"> 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); <u>PhD student in the Brown-NIH Neuroscience Graduate Partnership Program</u>
2021 – 2023	Joshua Zweifach ('23)	<ul style="list-style-type: none"> Poster presenter (1x)
2021 – 2023	Isabelle Wilson ('23)	<ul style="list-style-type: none"> 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 <i>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.</i>
2022 – Present	Behavioral Neuroscience Graduate Student Representative , Dartmouth College Department of Psychological and Brain Sciences <i>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</i>

2021 – 2024	Coordinator, Upper Valley Brain Bee <i>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</i> [link for more info]
2021 – 2022	Psychological and Brain Sciences Representative, Dartmouth College Graduate Student Council <i>Act as a liaison for the graduate students in the Psychological and Brain Sciences Department and Dartmouth College deans and leadership</i>
2021 – 2022	Academic Committee Member, Dartmouth College Graduate Student Council <i>Advocate for the academic equity, accessibility, integrity, and rights of graduate students across all departments</i>
2020	Undergraduate Student Councilor, Central Virginia Chapter of the Society for Neuroscience <i>Served as a representative for undergraduate student researchers in the local Central Virginia region</i>
2019 – 2020	Membership Chair, Virginia Tech Nu Rho Psi <i>Managed the society’s campus outreach events such as Brain Awareness Week and engaged members in mentorship and volunteer opportunities</i>

PROFESSIONAL AFFILIATIONS

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