# Hailee Walker

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## PUBLICATIONS

**Walker, H.**, Kwak, D., Devaraju, P., Curd, B. C., Chikuni, A., Frost, N. A. (*pre-print*), Impaired spatiotemporal encoding of social behavior and anxiety in the prefrontal cortex of mice lacking ASD-risk gene Shank3. BioRxiv

Gatlin, R. E., Gagon, J., Park, S., Kwak, D., **Walker, H.**, Kronheim, L., Everett, T., Covington, A., Fluck, M. M., Zickmund, T., Frost, N. A., Zelikowsky, M., (*pre-print*), Co-release of opposing signaling molecules from cortical neurons controls the escalation and release of aggression, BioRxiv, doi: 10.1101/2025.03.13.643119.

**Walker, H.**, Frost, N. A., (2024), Protocol for the generation of single-nuclei RNA-seq libraries and quantification of heterogeneous cell types activated during social interaction, STAR Protocols, doi: 10.1016/j.xpro.2024.103395.

**Walker, H.**, Frost, N. A., (2024), Distinct transcriptional programs define a heterogeneous neuronal ensemble for social interaction, ISCIENCE, doi: 10.1016/ j.isci.2024.110355.

## RESEARCH EXPERIENCE

August 2023 – Present

***Graduate Research Assistant***
(Neuroscience of sickness behaviors in aging and Alzheimer's disease)
University of Utah, Salt Lake City
Faculty Mentor: *Jessica Osterhout, Ph.D. & Nick Frost, M.D., Ph.D.*
**Duties:**

- Design behavioral and imaging experiments to examine the neurobiology that underlies worsening of sickness symptoms and cognitive decline in aging and Alzheimer's disease following sickness.
- Manage breeding of double and triple transgenic lines.
- Perform behavioral assays and fluorescent antibody staining of neural tissue.
- Perform stereotactic surgeries for viral injections for chemogenetics.

January 2022 – July 2023

***Research Technician***
(Behavior, neuronal circuits, and neuronal activity changes in disease)
University of Utah, Salt Lake City
Faculty Mentor: *Nick Frost, M.D., Ph.D.*
**Duties:**

- Management and data collection for behavioral, molecular, and imaging experiments of a large cohort of progranulin deficient mice (a model for frontotemporal dementia) and sequencing and behavioral experiments in Shank3 deficient mice (a model of ASD).
- Managed the laboratory breeding colony generating multiple transgenic lines.
- Analyzed high-dimensional datasets using MATLAB and R including behavioral, neural recording and sequencing data.
- Mentored and trained one high school student, and four undergraduate students on technical aspects of laboratory experiments.
- Scored animal behavior using DeepLabCut.
- Performed stereotactic surgeries, dissection, nuclei isolation and sample preparation for single-nuclei and bulk RNA sequencing.
- Presented work at weekly lab meetings as well as in local and national conferences.

## PRESENTATIONS

**Walker, H.**, Devaraju, P., Curd, B., Frost, N.A. (2025). Disruption of a distributed ensemble for social interaction in mice lacking Shank3. Poster presentation at Winter Brain conference, Lake Tahoe, CA.

**Walker, H.**, Devaraju, P., Curd, B., Frost, N.A. (2023). Shank3-deficiency drives abnormal recruitment of a heterogeneous social ensemble. Poster presentation at Society for Neuroscience conference, Washington D.C.

**Walker, H.**, & Frost, N.A. (2023). Shank3-deficiency alters ensemble representations of social information. Poster presentation at the University of Utah's annual Mental Health, Brain, and Behavioral Science Research Day, Salt Lake City, UT.

**Walker, H.**, & Frost, N.A. (2023). Loss of Shank3 alters ensemble representations of social information. Poster presentation at University of Utah Department of Neurology Research Day, Salt Lake City, UT.

**Walker, H.**, & Frost, N.A. (2022). Behavioral phenotyping of mice with progranulin deficiency due to $Grn^{R493X}$ mutation. Poster presentation at the University of Utah's annual Mental Health, Brain, and Behavioral Science Research Day, Salt Lake City, UT.

## EDUCATION

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| Aug 2023 - Present | ***Ph.D. Program in Neuroscience***<br>University of Utah, UT |
| Aug 2018 - Dec 2021 | ***Bachelor of Science in Biology***<br>University of Utah, UT<br>Emphasis in Cell and Molecular Biology Minor in Chemistry |
| Aug 2016 - June 2018 | ***Associates of Science in General Studies***<br>Salt Lake Community College, UT |

## TEACHING EXPERIENCE

Aug 2024 – Dec 2024 ***Teaching Assistant***
University of Utah, Salt Lake City
Supervisor: *Frans Vinberg, Ph.D.*
**Course:** Cellular and Molecular Neuroscience

**Lectures**

*Microglia in Health and Disease,* University of Utah, Cell and Molecular Neuroscience, November 2024.

*Human Brain Demonstration,* Westminster University, Brains are Cool & Neuroanatomy Lab, February 2025.

## FELLOWSHIPS/AWARDS

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| 2026 | *Graduate Research Fellowship*<br>University of Utah; 1-year fellowship for stipend + tuition benefits. |
| 2023 | *Graduate Student Travel Assistance Award*<br>University of Utah; Awarded assistance towards travel to the SFN conference to present my work and attend professional development workshops. |
| 2018 | *Regents Scholarship*<br>Achievement-based scholarship for students who completed advanced courses in core subject areas, including additional STEM courses. |

## MENTORSHIP

2025-present Zak Holt - Undergraduate Research Assistant, Osterhout Lab, University of Utah
- UROP Recipient

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| 2025-pesent | Eojin Lee – SURFiN Fellow, Frost Lab, University of Utah |
| 2024-2025 | Vy Nguyen – SURFiN Fellow, Frost Lab, University of Utah<br>- UROP Recipient |
| 2023 | Haley McLaughlin – Undergraduate Research Assistant, Frost Lab, University of Utah |
| 2022-2023 | Abia Fazili – Undergraduate Research Assistant, Frost Lab, University of Utah |
| 2022 | Devika Rajeev – High School Student, Frost Lab, University of Utah |

## HONORS

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| 2025 | NSF GRFP Honorable Mention with a perfect score |
| 2021 | Bachelor of Science Degree with Cum Laude |
| 2018 | Associate of Science Degree with High Honors |

## LEADERSHIP

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| Student Organization Leadership | 2025- 2026 | SLC Brain Bee co-chair. |
| SURFiN Mentor | 2024-present | Mentor of a Simon's Foundation SURFiN fellow. |
| Student Organization Leadership | 2024-present | Brain Awareness Week co-chair. |
| Project Management | 2022-present | Frost Lab – Social ensembles in the mPFC and frontotemporal dementia research projects.<br>Osterhout Lab – Impact of the aged brain on the response to infections. |
| Mentor to Lab Members | 2022-2023 | Frost Lab - Mentored and trained one high school student, four undergraduate students, and two rotating graduate students on techniques and experiments in the laboratory. |

## VOLUNTEER WORK

Aug 2023 – present

***Brain Awareness Week***

University of Utah Health, Salt Lake City

Neuroscience Program

**Duties:**

- Visit local elementary and high schools to teach them about neuroscience.
- As co-chair (starting July 2024): obtaining funding, recruiting volunteers, and scheduling visits with teachers.
    - Started a collaboration with PBS and hosted neuroanatomy demonstration for PBS event.

Sep 2024 – present

***Brain Bee Committee***

University of Utah Health, Salt Lake City

Neuroscience Program

**Duties:**

- Recruit students to participate in the annual Brain Bee competition and coordinate the event
- As co-chair (starting April 2025): Coordinate event preparation by assigning event

preparation tasks to volunteers, run the event website, and schedule all event details.

Sep 2018 - Dec 2019 ***Hospital Elder Life Program Volunteer***
University of Utah Health, Salt Lake City
Delirium Prevention Program
Supervisor: *Nancy Joyce, Elder Life Specialist*
**Duties:**

- Frequent orientation of elderly hospital patients and companionship.
- Assist with cognitive engagement, and mobility.