# Hailey L Johnson

hljohnson22@wisc.edu | Madison, WI | https://haileyljohnson.github.io

## Education

**University of Wisconsin-Madison** **Sept. 2021-Current**
*Doctor of Philosophy in Computer Science (NSF Fellow)* *Madison, WI*

**University of Idaho** **May 2019**
*Bachelor of Science in Computer Engineering* *Moscow, ID*

## Research Experience

**People and Robots Laboratory** **May 2022 - Current**
*Research Assistant | Advisor: Dr. Bilge Mutlu* *Madison, WI*

- Integrating interdependence into assistive technology design to increase usability and learnability for adults with Down syndrome.
- Collaborating on a speech recognition tool for communication sciences and disorders researchers, optimizing models for individuals with Down syndrome and integrating qualitative analysis features.
- Assessed privacy and security notification usability with adults with Down syndrome.
- Co-designed and developed assistive technology probes, including gamified and AR tablet applications and a tangible interface using Raspberry Pi systems.
- Completed a systematic scoping literature review on accessible technologies for adults with Down syndrome.
- Conducted semi-structured interviews with adults with Down syndrome, parents/guardians, and experts to investigate technology usage in context to their lived experiences.
- Conducted interviews and analyzed qualitative and quantitative data to explore user experiences with conversational agents and social media for individuals with traumatic brain injury.

**Wisconsin Wireless and NetworkinG Systems (WiNGS) Laboratory** **Nov. 2021 - May 2022**
*Graduate Student | Lab Professor: Dr. Suman Banerjee* *Madison, WI*

- Constructed nonlinear chirp waveform models for low-power LoRa (Long Range) communication systems to increase the possible number of connected devices in a network.
- Simulated nonlinear chirp waveform implementations in MATLAB and Python for future real-world testing and data collection.

**Speech Pathology Application** (Sponsored by Micron) **Aug. 2018 – May 2019**
*Project Manager | Project PI: Dr. Feng Li* *Moscow, ID*

- Developed a portable MySQL database with Java API to store child speech audio data for speech therapists and future artificial intelligence research.
- Scheduled milestones, monitored reporting, communicated with clients, and performed technical design review presentations.

**NASA Undergraduate Student Instrument Project** **Nov. 2015 – May 2018**
*Project Manager and Technical Lead | Project PI: Dr. Joseph Law* *Moscow, ID*

- Managed a team of multi-disciplinary undergraduate students to design, build, test, and fly three payload systems on high-altitude and low-altitude balloon platforms.
- Developed and tested atmospheric data collection, sensor communication, and data storage software for post-flight analysis.
- Created and maintained research schedules that met NASA design review standards while overseeing a $200K budget.

## Work Experience

**University of Wisconsin - Madison** **Sept 2021 - May 2023**
*Teaching Assistant* *Madison, WI*

- Created, edited, and graded labs, assignments, quizzes, and tests for CS640: Introduction to Computer Networking in Fall 2021 and Spring 2022. Provided Java debugging support for assignments and labs.
- Created, edited, and graded labs, assignments, quizzes, and tests for CS220: Data Science Programming 1, in fall 2022. Provided Python debugging support for assignments and labs.
- Held weekly office hours for students to ask questions on class materials and assignments.

**DCS Corporation** **Aug. 2019 - Aug. 2021**
*Computer Engineer II and Lab Manager* *Aberdeen, MD*
- Designed and developed a multiplayer game in QT/C++ for human-agent teaming research to study how reaction time differences occur under situations of risk and ambiguity.
- Developed and tested a quantified uncertainty study in Qualtrics and Javascript to understand how information framing can enhance performance in computer-based training.
- Developed a human teaming virtual environment task in Unreal Engine/C++ to gain insight into remote human teaming communication through stressful situations.
- Managed the Innovation Commons lab space operations for Army Research Laboratories (ARL).

**Hewlett-Packard Incorporated** **June 2018 - May 2019**
*Firmware Engineering Intern* *Boise, ID*
- Developed and tested memory configuration file generation command line tool for future print devices, increasing engineer productivity.
- Performed unit, system, and engine testing on various developed printer firmware drivers.

**NASA Ames Summer Intern** **June 2017 - Aug. 2017**
*Engineering Intern on TechEdSat project* *Moffett Field, CA*
- Practiced Cube Satellite design, integration, and NASA's quality assurance procedures.
- Participated in two professional presentations and published a scientific poster on the TechEdSat passive Exo-Brake for cube satellite atmosphere reentrance.

## Publications and Presentations

Hailey L. Johnson and Bilge Mutlu. 2025. Accessible Technology for Adults with Down Syndrome: A Scoping Review. ACM Trans. Access. Comput. 18, 3, Article 12 (September 2025), 57 pages. https://doi.org/10.1145/3748333 — Sept. 2025

Hailey Lynn Johnson, Audra Sterling, and Bilge Mutlu. 2024. "It Is Easy Using My Apps:" Understanding Technology Use and Needs of Adults with Down Syndrome. In Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI '24). Association for Computing Machinery, New York, NY, USA, Article 913, 1–17. https://doi.org/10.1145/3613904.3642950 — Oct. 2024

Yaxin Hu, Hajin Lim, Lisa Kakonge, Jade T. Mitchell, Hailey L. Johnson, Lyn S. Turkstra, Melissa C. Duff, Catalina L. Toma, and Bilge Mutlu. 2024. *SMART-TBI: Design and Evaluation of the Social Media Accessibility and Rehabilitation Toolkit for Users with Traumatic Brain Injury*. In Proceedings of the 26th International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '24). Association for Computing Machinery, New York, NY, USA, Article 37, 1–19. https://doi.org/10.1145/3663548.3675641 — Oct. 2024

Yaxin Hu, Hajin Lim, Hailey L Johnson, Josephine M. O'Shaughnessy, Lisa Kakonge, Lyn Turkstra, Melissa Duff, Catalina Toma, and Bilge Mutlu. 2023. *Investigating Day-to-day Experiences with Conversational Agents by Users with Traumatic Brain Injury*. In Proceedings of the 25th International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '23). Association for Computing Machinery, New York, NY, USA, Article 54, 1–15. https://doi.org/10.1145/3597638.3608385 — Oct. 2023

Sarah Chu, Hailey Johnson, Marcus Murbach, Ali Guarneros Luna, *"Technical Education Satellite."* NASA Ames Research Center Internship Poster Symposium, Moffett Field, CA, USA. — Aug. 2017

Hailey Johnson, Bethany Kersten, Jonathan Preheim, Mareyna Karlin, William Miller, Avery Brock, Richard Baptista, *"Training in Advanced Technology and Exploration Research to Optimize Teamwork in Space (TATERTOTS)"* 2017 Exploration Science Forum, Moffett Field, CA, USA. Aug. 2017

## Grants and Awards

ACM ASSETS 2024 Doctoral Consortium Oct. 2024

**National Science Foundation Graduate Research Fellowship Program** **April 2023**

University of Wisconsin-Madison Fall Competition Grant Dec. 2023

Outstanding Senior, University of Idaho Department of Electrical and Computer Engineering May 2019

2018 PepsiCo/Society of Women Engineers Student Engineering Challenge, 2nd place award Oct. 2018

Computer Engineer of the Year, University of Idaho Department of Electrical and Computer Engineering May 2018

NASA Undergraduate Student Instrument Project (USIP) Grant, $200,000 May 2016

## Teaching and Volunteer Experience

**CS571: Building User Interfaces** **March 6, 2025**
*Accessibility Lecture* *Madison, WI*
Prepared and presented two 95-min lectures on accessibility in user interface design to ~300 students.

**CS220: Introduction to Python** **Sept. 2022 - May 2023**
*Weekly Lab* *Madison, WI*
Facilitated weekly python programming labs with ~30 university students.

**Gigi's Playhouse Madison** **June 2022-Sept.2023**
*Volunteer* *Madison, WI*
- Participate in the weekly social group, Fantastic Friends, for adults with Down syndrome.
- Plan weekly activities to teach social group members new topics.