Curriculum vitae

W. Ryan Williamson

University of Colorado Anschutz Medical Campus
12800 East 19th Avenue
Aurora, CO 80045
phone: (936) 520-1666
email: wallace.williamson@cuanschutz.edu

EDUCATION

2011 Ph.D., Neuroscience, The University of Texas Southwestern Medical Center
2006 B.S., Biology, Sam Houston State University

PROFESSIONAL APPOINTMENTS

2025-present Member, Neuroscience Graduate Program (NSP)
2023-present CU Anschutz Med Campus, Physiology and Biophysics, Research Asst. Prof.
2020-present CU Anschutz Med Campus, The IDEA Core, Director
2019-2020 CU Anschutz Med Campus, BioElectrics Lab, Postdoctoral Fellow
2012-2018 HHMI Janelia Research Campus, Card Lab, Postdoctoral Fellow

GRANTS AND FUNDING

2024 **The Raynor Cerebellum Project Grant**
Automated Head-Fixed Training Device for Mice
Award Amount: $755,000

SELECTED COLLABORATIVE RESEARCH CONTRIBUTIONS

- Development of shared experimental platforms adopted across multiple laboratories
- Engineering of standardized data-acquisition systems enabling cross-site human research
- Design of durable, washable animal behavioral hardware to improve reproducibility
- Technical leadership and mentorship on multi-modal neuroscience projects

RESEARCH INFRASTRUCTURE DEVELOPMENT & COLLABORATIVE ENGINEERING

Laminar-Flow Zebrafish Swim Tunnel (Aquatic Treadmill) for Motor and Physiological Assays

2025 – PI: Charles Sagerstrom – Effort: 240 hrs

Designed and fabricated a custom zebrafish swim-tunnel system enabling precisely controlled water-flow speeds for sustained and graded swimming experiments. The system integrates mechanically optimized flow-straightening geometry, custom housings and transitions, and electronically controlled flow actuation to achieve stable, repeatable swim conditions. This platform enables high-throughput assessment of locomotor performance and physiological responses and has been adopted for ongoing zebrafish motor-control and disease-model studies.

Custom Hypoxia Chamber for Ambient Oxygen Control in Neurodevelopmental Experiments

2025 – PI: Danielle Barber – Effort: 180 hrs

Designed and implemented a custom hypoxia chamber enabling precise, stable control of ambient oxygen levels for laboratory experiments. The system integrates gas handling, electronic control, and monitoring to produce reliable hypoxic conditions while maintaining experimental accessibility and safety. The chamber is now in routine use by the lab and supports ongoing studies requiring reproducible oxygen manipulation without reliance on commercial turnkey systems.

Standardized Mobile Cart for Multi-Site Human Motor and Cognitive Assessment

2025 – PI: Daniel Kramer, Project Lead: Rex Tien – Effort: 180 hrs

Played a central role in the hardware and software development of a mobile clinical assessment platform designed to standardize behavioral and physiological data acquisition across multiple hospital sites. Contributed to system architecture and implementation coordinating up to four synchronized cameras, audio capture, photodiode-based display timing verification, and bidirectional alignment signaling for integration with intracranial neural-recording systems. Additionally, provided day-to-day technical leadership and coordination with the software developer to ensure hardware–software integration met experimental and clinical requirements.

Washable Volitional Treadmill for Head-Fixed Mouse Behavioral Experiments

2025 – PI: Stephanie Bonney – Effort: 120 hrs

Designed and iteratively prototyped a volitional treadmill for head-fixed mice that emphasizes durability, hygiene, and reproducibility. The final design minimizes manual fabrication steps and uses stainless-steel structural components and a thin fiberglass-reinforced silicone running surface in place of traditional cloth belts, enabling rapid cleaning and reuse. The treadmill is

now in active use across multiple laboratories and supports head-fixed locomotor and motor-learning assays requiring reliable, contamination-resistant hardware.

PUBLICATIONS

Peer-Reviewed Primary Research Articles

2024 Phadke, A., Wetzel, A., Fournier, L., Brack, A., Sha, M., Padró-Luna, N., Williamson, W., Demas, J., Cruz-Martín, A. REVEALS: an open-source multi-camera GUI for rodent behavior acquisition. *Cerebral Cortex*

2024 Simoes de Souza, F. M., Williamson, R., McCullough, C., Teel, A., Futia, G., Ma, M., True, A., Crimaldi, J. P., Gibson, E., Restrepo, D. Miniscope Recording Calcium Signals at Hippocampus of Mice Navigating an Odor Plume. *J. Vis. Exp.*

2022 Bowles, S., Hickman, J., Peng, X., Williamson, W., Huang, R., Washington, K., Donegan, D., Welle, C. Vagus nerve stimulation drives selective circuit modulation through cholinergic reinforcement. *Neuron*

2021 Bowles, S., Williamson, W., Nettles, D., Hickman, J., Welle, C. Closed-loop automated reaching apparatus (CLARA) for interrogating motor systems. *J. Neural Eng.*

2020 Lacin, H., Williamson, W., Card, G., Skeath, J., Truman, J. Unc-4 acts to promote neuronal identity and development of the take-off circuit in the Drosophila CNS. *eLife*

2018 Williamson, W., Peek, M., Breads, P., Coop, B., Card, G. Tools for rapid behavioral phenotyping of automatically isolated Drosophila at high resolution. *Cell Reports*

2017 von Reyn, C., Nern, A., Williamson, W., Breads, P., Wu, M., Namiki, S., Card, G. Feature Integration Drives Probabilistic Behavior in the Drosophila Escape Response. *Neuron*

2016 Wu, M., Nern, A., Williamson, W., Morimoto, M., Reiser, M., Card, G., Rubin, G. Visual projection neurons in the Drosophila lobula link feature detection to distinct behavioral programs. *eLife*

Highlighted in: Keleş, M. and Frye, M. The eyes have it. *eLife*

2016 Mellert, D., Williamson, W., Shirangi, T., Card, G., Truman, J. Genetic and Environmental Control of Neurodevelopmental Robustness in Drosophila. *PLoS One*

2014 von Reyn, C., Breads, P., Peek, M., Zheng, G., Williamson, W., Yee, A., Leonardo, A., Card, G. A spike-timing mechanism for action selection. *Nature Neuroscience*

2014 Zschätzsch, M., Oliva, C., Langen, M., Geest, N., Özel, M., Williamson, W, Lemon, W., Soldano, A., Munck, S., Hiesinger, P., Sanchez-Soriano, N., Hassan, B. Regulation of branching dynamics by axon-intrinsic asymmetries in Tyrosine Kinase Receptor signaling. *eLife*

2014 Wang D., Epstein, D., Khalaf, O., Srinivasan, S., Williamson, W., Fayyazuddin, A., Quiocho, F., Hiesinger, P. Ca2+–Calmodulin regulates SNARE assembly and spontaneous neurotransmitter release via v-ATPase subunit V0a1. *The Journal of Cell Biology*

2012 Haberman, A., Williamson, W., Epstein, D., Wang, D., Rina, S., Meinertzhagen, I., and Hiesinger, P. The synaptic vesicle SNARE neuronal Synaptobrevin promotes endolysosomal degradation and prevents neurodegeneration. *The Journal of Cell Biology*

2010 Williamson, W., Yang, T., Terman, J., and Hiesinger, P. Guidance Receptor degradation is required for neuronal connectivity in the *Drosophila* nervous system. *PLoS Biology*

2010 Williamson, W., Wang, D., Haberman, A., and Hiesinger, P. A dual function of V0-ATPase a1 provides an endolysosomal degradation mechanism in *Drosophila melanogaster* photoreceptors. *The Journal of Cell Biology*

Highlighted in: Short, B. The acid test of v-ATPase function. *The Journal of Cell Biology*

2010 Williamson, W. and Hiesinger, P. Preparation of Developing and Adult Drosophila Brains and Retinae for Live Imaging. *Journal of Visualized Experiments*

Invited reviews, article addenda and book chapters

2022 Moran, A., Teel, A., Williamson, W., Person, A., and Ristrepo, D. Extracting positional information in an odor-guided droplet reach task. 47. *Chemical Senses*

2012 Williamson, W., Chan, C.-C., and Hiesinger, P. "Subcellular Resolution Imaging in Neural Circuits." The making and un-making of neuronal circuits in Drosophila. 61-89. *Humana Press*

2010 Williamson, W. and Hiesinger, P. On the Role of V0a1-dependent Degradation in Alzheimer Disease. *Communicative & Integrative Biology*

2008 Williamson, W. and Hiesinger, P. Synaptic Patterning by Morphogen Signaling. *Science Signaling*

HONORS AND AWARDS

2014 4th Place, Nikon's Small World Photomicrography Competition

2010 1st Place, Graduate Student Poster Award Competition. 51st Annual Drosophila Research Conference of the Genetics Society of America, Washington, D.C.

GRADUATE TEACHING & CURRICULUM CONTRIBUTIONS

Spring 2024 Fundamental Neurobiology (NRSC 7610) — Automated Image Analysis module

Fall 2024 NSP Bootcamp — Microcontrollers & Embedded Systems

Dec 2025 Neural Development (NRSC 7615) — Synapse Formation module

MENTORSHIP

2024-present Benjamin Reynolds – Research Technician

2024-present Michelle Near – Graduate Student (co-mentor)

2025-present Madison Helsel – IT Entry Professional

CONFERENCE ACTIVITY

Panels organized

2018 Co-chair, Techniques and technology. Drosophila Research Conference, Philadelphia, PA
2017 Co-chair, Neural circuits and behavior. Drosophila Research Conference, San Diego, CA
2013 Chair, Visually driven escape. Dynamics of Prey Capture and Escape, Ashburn, VA

Oral presentations

2018 Williamson, W., Peek, M., Breads, P., Coop, B., Card, G. An apparatus for automated, high-throughput, and detailed assessment of individual Drosophila free behavior. Drosophila Research Conference, Philadelphia, PA
2015 Williamson, W. FlyPEZ: an automated, high-throughput, and detailed assessment of individual Drosophila behavior. Neurobiology of Drosophila, Cold Spring Harbor, NY

Poster presentations

2017 Williamson, W., Peek, M., Breads, P., Coop, B., Card, G. High-throughput quantification of behavior in automatically isolated Drosophila. Society for Neuroscience, Washington, D.C.
2011 Williamson, W., Yang, T., Terman, J., and Hiesinger, P. Guidance Receptor Degradation Is Required for Neuronal Connectivity in the Drosophila Nervous System. Drosophila Research Conference, Washington, D.C.
2010 Williamson, W., Wang, D., and Hiesinger, P. A dual function of the v-ATPase reveals a neuron-specific degradation pathway in Drosophila. Drosophila Research Conference, Washington, D.C.
2009 Williamson, W., Wang, D., and Hiesinger, P. A cell-specific and acidification-independent function of the V0 ATPase during visual map formation. Neurobiology of Drosophila, Cold Spring Harbor, NY

EXTRACURRICULAR SERVICE

2018 President of JARS (Janelia Association for Research Scientists), the on-campus society for postdoctoral fellows, graduate students, and technicians

MEDIA COVERAGE

2014 PBS NewsHour, How studying fruit flies and zebrafish might unlock secrets of the human brain