

Jasper Phelps

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Hometown: Urbana, Illinois, USA – Nationality: American

Current address: Lausanne, Switzerland

EDUCATION

Harvard University

2016 – 2021

Ph.D. in Neuroscience with Distinction in Computational Neuroscience

- Thesis: “The Structure of Motor Control Circuits in Adult *Drosophila*”
- Thesis advisor: Wei-Chung Allen Lee
- Relevant coursework: Cellular Neurophysiology, Systems Neuroscience, Molecular & Developmental Neuroscience, Probabilistic Modeling for Neural Data

Washington University in St. Louis

2011 – 2015

B.A. in Neuroscience & Applied Mathematics

- Cumulative GPA: 3.97 / 4.00
- Relevant coursework: Neurophysiology Laboratory, Principles of the Nervous System, Principles in Human Physiology, Biochemistry I & II, Math for the Physical Sciences, Intermediate Statistics, Differential Equations, Engineering & Scientific Computing, Algorithms & Data Structures

SELECTED PUBLICATIONS

Full publications list on [Google Scholar](#)

* indicates co-first authors

A. S. Bates*, **J. S. Phelps***, M. Kim*, H. H. Yang*, ..., H. S. Seung, B. L. de Bivort, M. Murthy, J. Drugowitsch, R. I. Wilson, W.-C. A. Lee. “Distributed control circuits across a brain-and-cord connectome” *bioRxiv* (2025).

<https://www.biorxiv.org/content/10.1101/2025.07.31.667571>

A. Azevedo*, E. Lesser*, **J. S. Phelps***, B. Mark*, ..., M. Dickinson, A. Pacureanu, H. S. Seung, T. Macrina, W.-C. A. Lee, J. C. Tuthill. “Connectomic reconstruction of a female *Drosophila* ventral nerve cord” *Nature* (2024).

<https://www.nature.com/articles/s41586-024-07389-x>

J. S. Phelps*, D. G. C. Hildebrand*, B. J. Graham*, A. T. Kuan, L. A. Thomas, T. M. Nguyen, J. Buhmann, A. W. Azevedo, A. Sustar, S. Agrawal, M. Liu, B. L. Shanny, J. Funke, J. C. Tuthill, W.-C. A. Lee. “Reconstruction of motor control circuits in adult *Drosophila* using automated transmission electron microscopy” *Cell* (2021).

[https://www.cell.com/cell/fulltext/S0092-8674\(20\)31683-4](https://www.cell.com/cell/fulltext/S0092-8674(20)31683-4)

A. T. Kuan*, **J. S. Phelps***, L. A. Thomas, T. M. Nguyen, J. Han, C.-L. Chen, A. W. Azevedo, J. C. Tuthill, J. Funke, P. Cloetens, A. Pacureanu, W.-C. A. Lee. “Dense neuronal reconstruction through X-ray holographic nano-tomography” *Nature Neuroscience* (2020).

<https://www.nature.com/articles/s41593-020-0704-9>

RESEARCH EXPERIENCE

Neuroengineering Lab

2022 – present

PI: Prof. Pavan Ramdya. *EPFL, Lausanne, Switzerland*

- Studying neuronal dynamics underlying limb coordination in adult *Drosophila*.
- Supported by postdoctoral fellowships from [EMBO](#), [HFSP](#), & [HHWF](#).

High Throughput Electron Microscopy Lab

2016 – 2022

PI: Prof. Wei-Chung Allen Lee. *Harvard Medical School, Boston, MA*

- Developed X-ray & electron microscopy techniques for rapidly mapping the structure of neural circuits, & applied them to study motor control in adult *Drosophila melanogaster*.
- Generated the first connectomic dataset of an adult *Drosophila* ventral nerve cord, & facilitated access to this dataset for ~200 users across ~30 labs.
- Discovered *Drosophila*'s largest leg sensory neurons, & showed that synapse directly onto the largest leg motor neurons.
- Reconstructed the legs of adult *Drosophila* using X-ray imaging to study the biomechanics of proprioceptive sensory neurons, motor neurons, muscles, & tendons.

Cellular Quality Control Lab

Summer 2014

PI: Prof. Richard Morimoto. *Northwestern University, Evanston, IL*

- Generated transgenic *C. elegans* with improved survivability in intense heat, aiming to investigate how heat resistance influences lifespan & resistance to neurodegeneration.

Theoretical & Computational Biophysics Group

Summer 2012 & 2013

PI: Prof. Klaus Schulten. *University of Illinois at Urbana-Champaign, IL*

- Performed molecular dynamics simulations of the protein Synaptotagmin-1, aiming to investigate the structural features underlying its ability to bend membranes & oligomerize.

Network for Computational Nanotechnology

2010 – 2011

PI: Dr. Nahil Sobh. *University of Illinois at Urbana-Champaign, IL*

- Wrote software for data & image analysis in Java, MATLAB, C#, JavaScript, & Tcl.

Hormonal Modulation of Neuroplasticity Lab

Summer 2009

PI: Prof. Donna Korol. *University of Illinois at Urbana-Champaign, IL*

- Helped maintain rat colony, ran rats through maze-learning experiments, & performed ovary-removal surgeries to control hormone levels.

RESEARCH SKILLS

Experimental / data generation

- *Drosophila melanogaster* husbandry, crosses, & nervous system dissections
- Fluorescence microscope design, construction, & alignment
- *In vivo* calcium imaging of neural activity in adult *Drosophila*
- High-speed videography & kinematic analysis of animal behavior
- Tissue processing for electron microscopy (fixation, heavy metal staining, resin embedding)
- Cutting ultrathin sections of resin-embedded tissue for transmission electron microscopy
- Automated serial section collection & electron microscopy imaging using GridTape
- Sample preparation for X-ray microscopy & X-ray imaging at synchrotron beamlines
- Computer-aided design & 3D printing

Software / data analysis

- Python, Bash, & MATLAB – Git & GitHub – Linux & computing clusters
- 2D & 3D elastic image alignment
- Convolutional neural networks for automated image annotation
- Cloud-based storage & processing of multi-terabyte microscopy datasets

From pre-PhD experiences, familiarity with

- Microelectrode recordings from neurons & muscles
- *C. elegans* husbandry – plasmid microinjection for transgene delivery in *C. elegans*
- Rat handling & surgeries
- Molecular dynamics simulations
- Programming in Java, R, & Tcl

TEACHING & MENTORING

Teaching assistant for course “Introduction to Programming in the Biological Sciences” 2022
School of Life Sciences, EPFL, Lausanne, Switzerland. Instructor: Dr. Justin Bois.

- Helped teach master’s & PhD students basic Python skills in intensive 1-week bootcamp.

Teaching assistant for course “Probabilistic Models for Neural Data” 2020
Dept. of Neurobiology, Harvard Medical School, Boston, MA. Instructor: Prof. Jan Drugowitsch.

- Designed & implemented modeling exercises using Jupyter notebooks.
- Assisted students with preparing presentations on modeling theory.

Training & managing research assistants 2019
Dept. of Neurobiology, Harvard Medical School, Boston, MA

- Designed & implemented a group training program for 8 Northeastern University students working as full-time research assistants in my PhD thesis lab.
- Managed 4 research assistants working full-time with me on my projects.

Math fellow for SAGA Education 2015 – 2016
Kelvyn Park High School, Chicago, IL

- Trained in techniques for effective small group tutoring.
- Served as a math tutor & role model for 10 high school students at risk of dropping out.

Math tutor for the Department of Mathematics 2011 – 2015
Washington University in St. Louis, MO

- Organized & led review sessions for groups of 2 to 15 students in 6 different math subjects.
- Hired as a 1-on-1 math tutor by 4 different students.

CONFERENCE PRESENTATIONS

Poster: “Light sheet calcium imaging in adult *Drosophila* links premotor neurons to behavior” at *Motor Control: Spinal Circuits & Beyond*, University of St. Andrews, Scotland, June 2025.

Talk: “Synaptic resolution connectome reconstruction of motor neurons & premotor circuits in adult *Drosophila*” at *Motor Control: Spinal Circuits & Beyond*, University of St. Andrews, Scotland, June 2023.

Poster: “A seventeen lab collaboration to reconstruct the connectome of the adult *Drosophila* ventral nerve cord” at *Neurobiology of Drosophila* (virtual), Cold Spring Harbor Laboratory October 2021.

Poster: “Reconstruction of motor control circuits in adult *Drosophila* using automated transmission electron microscopy” at *Max Plank / HHMI Connectomics Conference*, Berlin, Germany, April 2019.

Poster: “Toward connectomic analysis of sensorimotor circuitry in the adult *Drosophila* ventral nerve cord” at *Neural Circuits of the Insect Ventral Nerve Cord*, Janelia Research Campus, Ashburn, VA, April 2018.

Talk: “Production of novel *C. elegans* strains to investigate *hsf-1* functions; Analysis of autism-linked proteins using aggregation propensity calculations” at *Conte Center for Computational Neuropsychiatric Genomics REU Symposium*, The University of Chicago, IL, August 2014.

Poster: “Novel ImageJ plugins for quantitative image analysis” at *Imaging Without Boundaries Conference*, University of Illinois at Urbana-Champaign, IL, October 2010.

GRANTS & AWARDS

Postdoctoral fellowship from Helen Hay Whitney Foundation (HHWF)	2024-2026
Postdoctoral fellowship from Human Frontier Science Program (HFSP)	2024-2026
Postdoctoral fellowship from EMBO	2023-2024
Proposal accepted for 4 days of imaging time at The European Synchrotron	2022
Contributor to NIH grant RF1MH117808 for funding during PhD	2019
Proposal accepted for 6 days of imaging time at The European Synchrotron	2018
Travel grant from the Harvard Brain Science Initiative	2018
Community resource award from the Harvard Brain Science Initiative	2018
Honorable mention from the NSF Graduate Research Fellowship Program	2018
Proposal accepted for 3 days of imaging time at The European Synchrotron	2017
Summer research grant from the Chicago Center for Systems Biology	2014
College-sponsored National Merit Scholarship	2011 – 2015

INVOLVEMENT

Harvard University Table Tennis Club – Coach	2016 – 2022
NCTTA-Certified Collegiate Table Tennis Coach	2018
Harvard Graduate Program in Neuroscience – Interview weekend lead organizer	2017
Washington University Representation Project (Feminism Club) – Member	2014 – 2015
Washington University Math Club – Member	2013 – 2015
Washington University Table Tennis Club – President	2012 – 2015

Last updated: August 2025