Hannah J. M. Haberkern

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EDUCATION

University of Cambridge, UK / HHMI Janelia Research Campus, USA *2012-2018*
PhD at the Department of Zoology
Advisors: Berthold Hedwig (University of Cambridge), Vivek Jayaraman (Janelia)
PhD thesis title: Multisensory navigation in tethered walking insects

ETH Zürich, Switzerland *2009-2012*
Master of Science in Computational Biology and Bioinformatics
Master thesis title: Measurement of *Drosophila's* phase response curve with mechanosensory stimuli

Julius Maximilians Universität Würzburg, Germany *2006-2009*
Bachelor of Science in Biomedicine
Bachelor thesis title: Operant learning in *Drosophila* larvae?

RESEARCH EXPERIENCE

Postdoctoral associate | HHMI Janelia Research Campus *Sep 2017 - present*
Supervisor: Vivek Jayaraman
Investigation of heading dynamics in two-dimensional environments (in progress); Implementation of two-dimensional Virtual Reality for two-photon imaging.

PhD Project | HHMI Janelia Research Campus *Sep 2012 - Sep 2017*
Supervisor: Vivek Jayaraman
Development of a 2D virtual reality for head-fixed flies and conditioning paradigms to study landmark-guided navigation.

PhD Project | University of Cambridge, Department of Zoology *Sep 2011 - Aug 2012*
Supervisor: Berthold Hedwig
Integration of auditory and antennal stimulation in tethered walking field crickets.

Research Technician | HHMI Janelia Research Campus *Feb - Jul 2012*
Supervisor: Vivek Jayaraman
Assembly of 2D virtual reality rig for tethered walking fruit flies.

Master thesis project | Institute of Neuroinformatics, ETH Zürich *May 2011 - Jan 2012*
Supervisors: Jan Bartussek, Steven Fry, Ruedi Stoop
Measurement of Drosophila's wing-beat response in tethered flight to small mechanosensory disturbances.

Rotation | D-INFK, ETH Zürich *Apr - May 2011*
Supervisor: Petros Koumoutsakos
Simulation of Juxtacrine signalling using "Subcellular Elements" method.

Rotation | D-BSSE Basel, ETH Zürich *Mar - Apr 2011*
Supervisor: Dagmar Iber
Development of a parameterization technique for Turing models.

Rotation | Institute of Neuroinformatics, ETH Zürich *Mar 2011*
Supervisor: Jan Bartussek

Investigation of self-induced feedback during tethered flight in Drosophila using a vibrometer.

Bachelor thesis project | Biozentrum, Universität Würzburg *Mar - Jun 2009*
Supervisor: Bertram Gerber
Attempted conditioning of crawling and turn movements of Drosophila larva using vibration stimuli.

Internship | Rudolf Virchow Zentrum, Universität Würzburg *Jul - Aug 2008*
Supervisor: Stephan Sigrist
Complementation analysis with bruchpilot mutants and histological investigation of their neuromuscular junction in Drosophila.

PUBLICATIONS

Hulse BK*, **Haberkern H***, Franconville R*, Turner-Evans DB*, Takemura S, Wolff T, Noorman M, Dreher M, Dan C, Parekh R, Hermundstad AM, Rubin GM, Jayaraman V (2020). A connectome of the Drosophila central complex reveals network motifs suitable for flexible navigation and context-dependent action selection. *bioRxiv*. (under review at eLife) *shared first-author

Haberkern H, Basnak MA, Ahanonu B, Schauder D, Cohen JD, Boldstad M, Bruns C, Jayaraman V (2019). Visually guided behavior and optogenetically induced learning in head-fixed flies exploring a virtual landscape. *Curr Biol.* 29 (10):1647-1659.

Haberkern H, Hedwig B (2016). Behavioural integration of auditory and antennal stimulation during phonotaxis in the field cricket *Gryllus bimaculatus*. *J Exp Biol.* 219(Pt 22):3575-3586.

Haberkern H, Jayaraman V (2016). Studying small brains to understand the building blocks of cognition. *Curr Opin Neurobiol.* 37:59-65.

Milde F, Tauriello G, **Haberkern H**, Koumoutsakos P (2014). SEM++: a particle model of cellular growth, signaling and migration. *Computational Particle Mechanics* 1 (2), 211-227

Wang D, Freitag F, Gattin Z, **Haberkern H**, Jaun B, Siwko M, Vyas R, van Gunsteren W F, Dolenc J (2012). Validation of the GROMOS 54A7 Force Field Regarding Mixed α/β -Peptide Molecules. *Helvetica Chimica Acta* 95 (12), 2562- 577

Eschbach C, Cano C, **Haberkern H**, Schraut K, Guan C, Triphan T, Gerber B (2011). Associative learning between odorants and mechanosensory punishment in larval *Drosophila*. *J Exp Biol.* 214(Pt 23):3897-905.

SELECTED PRESENTATIONS

Invited talk | *Lessons from analyzing navigational circuits in the Drosophila hemibrain connectome.* *Mar 2021*
Workshop 5, The Brain Connectivity Workshop Series organized by the NIH and DOE

Invited talk | *Heading circuit dynamics during spatial navigation in cluttered two-dimensional environments.* *Nov 2020*
Entomology 2020, Symposium on Insect Navigation

Invited talk | *Probing central complex function during context-dependent navigation in two-dimensional environments.* Part of FENS symposium “Flexible navigation and the insect central complex: insights from a multifaceted brain region” at FENS *July 2020*

Invited talk | *Visually guided behavior of fruit flies in 2D virtual reality* *Nov 2018*
Hosted by Prof. Keram Pfeiffer, PhD, Biozentrum, University of Würzburg, Germany

Conference talk | *Two-dimensional virtual reality with optogenetic reinforcement to study landmark-guided navigation in head-fixed Drosophila* — *Oct 2018*
Structure and Function of the Insect Central Complex, HHMI Janelia Research Campus, Ashburn, USA

Poster *(Poster Prize)* | *A virtual reality paradigm for studying visually-guided navigation in head-fixed flies.* Haberkern H, Jayaraman V — *Dec 2017*
FENS Winter School on Navigation, Obergurgl, Austria

Invited talk | *Landmark-guided navigation in a 2D virtual reality environment*. — *Dec 2016*
Hosted by Andrew Leifer, PhD, Department of Physics & Princeton Neuroscience Institute, Princeton University

Poster | *Landmark-guided navigation in a 2D virtual reality environment.* — *Nov 2016*
Haberkern H, Bruns C, Basnak M, Biafra A, Bolstad M, Cohen J, Jayaraman V;
Annual meeting of the Society for Neuroscience, San Diego, USA

Invited talk | *Dissecting navigation in a visual and virtual thermal landscape.* — *Apr 2016*
University of Cambridge PDN Department Graduate Symposium, Cambridge, UK

Poster | *A virtual reality system for the study of visually guided navigation in head-fixed walking Drosophila.* — *Nov 2014*
Haberkern H, Jayaraman V; Flies, worms and robots: combining perspectives on minibrains and behavior, ESF conference, Barcelona, Spain

Poster | *Do crickets integrate polarotaxis and phonotaxis?* — *Mar 2013*
Haberkern H, Hedwig B; 10th Göttingen Neuroscience Meeting, Göttingen, Germany

Poster | *Self-induced feedback during tethered flies in Drosophila melanogaster*. — *Sep 2011*
Haberkern H, Bartussek J, Medici V, Fry SN; Champalimaud Neuroscience Symposium, Lisbon, Portugal

Poster | *Early lung development: Branching mode selection.* — *Jun 2011*
Haberkern H, Menshykau D, Kraemer K, Iber D; 9th $[BC]^2$ Basel Computational Biology Conference on Multiscale Modeling, Basel, Switzerland

SCHOOLS AND WORKSHOPS

FENS Winter School | *Neural control of behaviour - Series 1: Navigation.* — *Dec 10-16 2017*
Obergurgl, Austria.

Junior Scientist Workshop | *Neural Circuits and Behavior*. — *Oct 3-8 2016*
Janelia Research Campus, Ashburn, USA

OTHER PROFESSIONAL ACTIVITIES

Seminar series (virtual): Co-organizer of “The future of foraging” seminar series, which was broadcasted through crowdcast/World Wide Neuro and open to anyone. — *Mar – May 2021*

Peer review: Current Biology, eLife, Journal of Experimental Biology, Journal of Neurogenetics, Review of COSYNE abstracts — *2019-2021*

Workshop organization (virtual): Co-organizer for *Junior Scientist Workshop on Mechanistic Cognitive Neuroscience*. Janelia Research Campus, Ashburn, USA, November 15 - 21, 2020. — *Apr-Nov 2020*

FENS symposium (virtual): Organizer and chair of session *Flexible navigation and the insect central complex: insights from a multifaceted brain region* at FENS 2020 — *May 2019-Jul 2020*

Workshop organization: Co-organizer for *Junior Scientist Workshop on Mechanistic Cognitive Neuroscience*. Janelia Research Campus, Ashburn, USA, October 27 – November 1, 2019. — *Feb-Oct 2019*

Conference organization: Co-organizer for *Structure and Function of the Insect Central Complex*. Janelia Research Campus, Ashburn, USA, October 28 - 31, 2018. — *Feb - Oct 2018*

Workshop organization: Co-organizer for *Junior Scientist Workshop on Mechanistic Cognitive Neuroscience*. Janelia Research Campus, Ashburn, USA, October 21 - 26, 2018. — *Feb - Oct 2018*

Curse curriculum design: Reorganizing the bachelor in biomedicine course curriculum based on the Bologna guidelines. — *Apr 2008 - Jul 2009*

Active member in student associations: Association of biology students and Association of biomedical students at the Universität Würzburg, "Computer officer" of the MCR at Murray Edwards College Cambridge — *Sep 2007 - Jul 2009, Oct 2017 - Aug 2012*

TEACHING AND SUPERVISION

Women's mentoring group — *2018 - 2021*

Supervision of Janelia Undergraduate Scholars: Dimitra Vardalaki (Jun - Jul 2015), Mélanie Basnak (Jun - Aug 2016, coauthor on publication), Laura Porta (Jun - Aug 2017), Shivam Chitnis (Jun - Aug 2019 and Jun – Sep 2020 (virtually)). — *2015 - 2020*

Supervision of high school student: Vinay Bhaip (Second Place in Virginia Science Fair) — *Jun 2019 - Dec 2019*

Supervision of Master thesis project: Laura Porta (University of Pisa) — *Oct 2017 - Jul 2018*

Women's coding circle: Teaching python classes and helping collogues with program projects — *Aug 2017 - Sep 2018*

Teaching Assistant: Supervision of exercises for "Introduction to computer science for biologists and pharmacists" lecture course, ETH Zürich, Switzerland — *Sep 2009 - Jul 2010*

Teaching Assistant: Exam preparation for "General Biology" lecture course, Universität Würzburg, Germany — *May - Jul 2008*

REFERENCES

Vivek Jayaraman, PhD
PhD advisor
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Kristin Branson, PhD
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