

Hannah J. M. Haberkern

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HHMI Janelia Research Campus, 19700 Helix Dr, Ashburn, VA 20147

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
Supervisors: Steven Fry, Ruedi Stoop
- Julius Maximilians Universität Würzburg, Germany** 2006-2009
Bachelor of Science in Biomedicine
Bachelor thesis title: Operant learning in *Drosophila* larvae?
Supervisor: Bertram Gerber

RESEARCH EXPERIENCE

- Postdoctoral associate** | HHMI Janelia Research Campus Jun 2018 - present
Supervisor: Vivek Jayaraman
Navigational algorithms and circuit dynamics in two-dimensional environments; Connectomic analysis of a multimodal recurrent circuit that pins the fly's head direction representation to its surroundings
- Research Technician** | HHMI Janelia Research Campus Feb - Jul 2012
Supervisor: Vivek Jayaraman
Assembly of 2D virtual reality rig for tethered walking fruit flies.
- 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.*
- 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

A complete synaptic-resolution connectome of the *Drosophila melanogaster* central complex: implications for function (in prep). *To be submitted to bioRxiv and eLife in October. I will be a joint first author.*

Haber Kern 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.

Haber Kern 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.

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

Milde F, Tauriello G, **Haber Kern 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, **Haber Kern 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, **Haber Kern 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

- (upcoming) **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
- Invited 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.* Haber Kern 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
Haber Kern 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
Haber Kern 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

- Reviewer:** Current Biology, Journal of Experimental Biology, Journal of Neurogenetics, Cosyne 2019-2020
- 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:** 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
- Course 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” at Murray Edwards College Cambridge Sep 2007 - Jul 2009, Oct 2017 - Aug 2012

TEACHING AND SUPERVISION

- Women’s mentoring group** 2018 - 2020
- 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 (2nd 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 colleagues 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

<p>Vivek Jayaraman, PhD Senior Group Leader HHMI Janelia Research Campus, 19700 Helix Dr, Ashburn, VA 20147, United States vivek@janelia.hhmi.org + 1 571 209 4171</p>	<p>Berthold Hedwig, PhD University Reader in Neurobiology Department of Zoology, University of Cambridge, Downing St, CB2 3EJ Cambridge, United Kingdom bh202@cam.ac.uk +44 1223 36603</p>	<p>Ann M Hermundstad, PhD Group Leader HHMI Janelia Research Campus, 19700 Helix Dr, Ashburn, VA 20147, United States hermundstada@janelia.hhmi.org +1 571 209 4166</p>
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