Hannah J. M. Haberkern

haberkernh@janelia.hhmi.org | +1 571-699-7739
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

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 *Jun 2018 - present*
Supervisor: Vivek Jayaraman
Investigation of mechanisms by which visual landmarks can help to calibrate the fly's internal heading estimate using virtual reality and two-photon calcium imaging in behaving flies (in progress).

PhD Project | HHMI Janelia Research Campus *Sep 2012 - May 2018*
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

In revision at Current Biology: **Haberkern H**, Basnak MA, Ahanonu B, Schauder D, Cohen JD, Boldstad M, Bruns C, Jayaraman V. A virtual reality paradigm for studying visually guided 2D navigation in head-fixed flies. On the adaptive behavior of head-fixed flies navigating in two-dimensional, visual virtual reality.

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

Poster *(Poster Prize)* | *A virtual reality paradigm for studying visually-guided navigation in head-fixed flies.* *Dec 2017*
Haberkern H, Jayaraman V; 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

SCIENTIFIC SERVICE

Conference organization: Structure and Function of the Insect Central Complex. Janelia Research Campus, Ashburn, USA, October 28 - 31, 2018. Co-organizers: Marie Dacke, Yvette Fisher, Hannah Haberkern, Vivek Jayaraman *Feb - Oct 2018*

Workshop organization: Junior Scientist Workshop on Mechanistic Cognitive Neuroscience. Janelia Research Campus, Ashburn, USA, October 21 - 26, 2018. Co-organizers: Hannah Haberkern, Misha Ahrens, Gowan Tervo, Alla Karpova, Josh Dudman and Vivek Jayaraman. *Feb - Oct 2018*

Curse curriculum design: I helped with 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

Supervision of Students: Master thesis project of Laura Porta (University of Pisa; Oct 2017 - Jun 2018); Janelia Undergraduate Scholars summer projects of Dimitra Vardalaki (Jun - Jul 2015), Mélanie Basnak (Jun - Aug 2016), Laura Porta (Jun - Aug 2017). Assistance with science project for high school student Madison Ruschaupt (Dez 2018 – Mar 2019) *2015 - 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*

SKILLS

Experimental

- Behavioral setup design and paradigm development
- Hardware programming in Arduino, C/C++, Python
- *Drosophila* and cricket (*Gryllus bimaculatus*) handling
- Ex-vivo *Drosophila* dissection and confocal imaging
- In-vivo 2-photon calcium imaging in behaving *Drosophila*

Computational

- Data analysis and statistics on Python, Matlab, R
- Mathematical modelling

Languages: English (fluent), German (fluent), French (basic)

REFERENCES

Vivek Jayaraman, PhD
Group Leader at Janelia Research Campus, PhD advisor

HHMI Janelia Research Campus, 19700 Helix Dr, Ashburn, VA 20147, United States
vivek@janelia.hhmi.org
+ 1 571 209 4171

Berthold Hedwig, PhD
University Reader in Neurobiology at University of Cambridge, PhD advisor

Department of Zoology, University of Cambridge, Downing St, CB2 3EJ Cambridge, United Kingdom
bh202@cam.ac.uk
+44 1223 36603

Prof. Bertram Gerber, PhD
Leipniz Institute for Neurobiology, Magdeburg, Bachelor thesis advisor

Department Genetics, Leibniz Institute for Neurobiology, Brenneckestraße 6, 39118 Magdeburg, Germany
bertram.gerber@lin-magdeburg.de
+49 391 6263 92261