

Towards a common framework to study the function of the insect central complex

**Sunday, April 15<sup>th</sup>**

- 3:00 pm      Check in
- 5:00 pm      Reception (*Lobby*)
- 5:30 pm      Introduction to conference format (Organizers)
- 5:45 pm**      **Introductory Talk: Uwe Homberg**, Philipps-Universität Marburg  
*The insect central complex: Early discoveries and recent hypotheses*
- 6:30 pm      Dinner
- 7:30 pm      **Perspective Talk: Gabe Sibley**, George Washington University  
*Looking for similarities between robot and insect-brain visual navigation algorithms*
- 8:30 pm      Science speed dating (*Lobby*)
- 9:30 pm      Refreshments available in Bob's Pub

## Monday, April 16<sup>th</sup>

- 7:00 am Breakfast (*Service ends at 8:00 am*)
- 8:15 am Session 1A: Anatomy across species**  
**Chairs: Stanley Heinze and Uwe Homberg**
- 8:15 am Session Introduction (Chairs)
- 8:20 am **Perspective Talk: Catherine Carr**, University of Maryland  
*Comparative approaches to auditory function*
- 9:00 am **Arnim Jenett**, Janelia Farm Research Campus/HHMI  
*Enumerating and producing GAL4 drivers for morphologically homogenous cell populations in the central complex*
- 9:20 am **Stanley Heinze**, University of Massachusetts Medical School  
*The central complex across insect species: Conservation of neuronal elements*
- 9:40 am **Rudolf Loesel**, Institut für Biologie II  
*Non-insect central bodies - A look beyond taxonomic boundaries*
- 10:00 am **Nicholas J. Strausfeld**, University of Arizona  
*What are we looking at, what are we looking for?*
- 10:25 am Break
- 11:00 am Session 1B: Development**
- 11:00 am **George S. Boyan**, Ludwig-Maximilians-Universität München  
*Proliferative cells and cellular interactions in developing central complex lineages of the grasshopper brain*
- 11:20 am **Frank Hirth**, King's College London  
*Ellipsoid body-specific microcircuits mediate coordinated behaviours in Drosophila*
- 11:40 am Panel Discussion: Circuits, comparative anatomy**  
**Chairs: Stanley Heinze and Uwe Homberg**  
**Participants: Catherine Carr, Nick Strausfeld, Arnim Jenett, George Boyan**
- 12:30 pm Lunch
- 1:30 pm Tour (*optional – meet at reception*)
- 2:30 pm Session 2: Spatial learning, visual learning and navigation**  
**Chairs: Eugenia Chiappe and Thomas Labhart**
- 2:30 pm Session Introduction (Chairs)
- 2:35 pm **Perspective Talk: James Knierim**, Johns Hopkins University  
*The integration of spatial and nonspatial information in the hippocampal system of the rat*
- 3:15 pm **Roland H. Strauss**, Johannes Gutenberg-Universitaet Mainz  
*Memotaxis is a novel orientation strategy found in Drosophila*

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- 3:35 pm **Michael Reiser**, Janelia Farm Research Campus/HHMI  
*Mapping out visual place learning in Drosophila*
- 3:55 pm **Barbara Webb**, University of Edinburgh  
*How do current models of insect navigation relate to the neural architecture of the central complex?*
- 4:15 pm Break and Group Photo
- 5:00 pm Panel Discussion: Spatial orientation, navigation**  
**Chairs:** Eugenia Chiappe and Thomas Labhart  
**Participants:** Jim Knierim, Roland Strauss, Michael Reiser, Barbara Webb, Gabe Sibley
- 6:00 pm Reception
- 6:30 pm Dinner
- 7:30 pm Poster Session
- 10:30 pm Refreshments available at Bob's Pub

## **Tuesday, April 17<sup>th</sup>**

- 7:00 am Breakfast (*service ends at 8:00 am*)
- 8:15 am Session 3: Visual functions and sensory maps**  
**Chairs: Keram Pfeiffer and Roy Ritzmann**
- 8:15 am Session Introduction (Chairs)
- 8:20 am **Perspective Talk: Rüdiger Krahe**, McGill University  
*Topographic maps in the brain: The electrosensory system as a case study*
- 9:00 am Session 3A: Polarization vision**
- 9:00 am **Introductory Presentation: Thomas Labhart**, University of Zurich  
*Polarization vision: A short introduction*
- 9:25 am **Uwe Homberg**, Philipps-Universität Marburg  
*Establishing the topographic organization of E-vector orientation columns in the central complex of the locust brain*
- 9:45 am **Peter T. Weir**, California Institute of Technology  
*Flying Drosophila orient to sky polarization*
- 10:05 am **Mathias F. Wernet**, Stanford University  
*Genetic analysis of polarization vision in Drosophila*
- 10:25 am **Thomas Labhart**, University of Zurich  
*Can polarization-sensitive animals see e-vector orientations?*
- 10:45 am Break
- 11:15 am Session 3B: Other visual responses and sensory maps**
- 11:15 am **Ronny Rosner**, Philipps-Universität Marburg  
*Responses of central complex neurons of the locust to expanding shapes*
- 11:35 am **Johannes D. Seelig**, Janelia Farm Research Campus/HHMI  
*Calcium imaging in the Drosophila central complex during walking and flight behavior*
- 11:55 am **Panel Discussion: Visual functions and sensory maps**  
**Chairs:** Roy Ritzmann and Keram Pfeiffer  
**Participants:** Rüdiger Krahe, Uwe Homberg, Thomas Labhart, Peter Weir, Vivek Jayaraman
- 12:40 pm Lunch
- 2:00 pm Session 4A: Sensorimotor integration and motor control**  
**Chairs: Michael Reiser and Barbara Webb**
- 2:00 pm Session Introduction (Chairs)
- 2:05 pm **Perspective Talk: Stephen Lisberger**, HHMI/Duke University  
*From one model organism to another: Neural integration in monkeys and zebrafish*

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- 2:45 pm **Roland H. Strauss**, Johannes Gutenberg-Universitaet Mainz  
*Memory functions of the central complex improve climbing behavior in Drosophila*
- 3:05 pm **Roy E. Ritzmann**, Case Western Reserve University  
*Examining a role for the central complex in negotiating barriers*
- 3:25 pm **Berthold Hedwig**, University of Cambridge  
*Brain neurons and neuropils for auditory behaviour*
- 3:45 pm Break
- 4:10 pm **Ralf Heinrich**, Institute for Zoology  
*Structure and function of the central complex in the control of acoustic communication*
- 4:30 pm **Åsa M.E. Winther**, Karolinska Institutet  
*From chemical neuroanatomy to behavioral analysis: Peptide contribution to locomotor behavior in Drosophila*
- 4:50 pm **Benjamin L. de Bivort**, Rowland Institute at Harvard  
*A neural circuit controlling locomotor handedness*
- 5:10 pm Panel Discussion: Sensorimotor integration and motor control**  
**Chairs:** Michael Reiser and Barbara Webb  
**Participants:** Steve Lisberger, Roland Strauss, Roy Ritzmann, Berthold Hedwig
- 6:00 pm Reception
- 6:30 pm Dinner
- 7:30 pm Perspective Talk: Barry Stein**, Wake Forest School of Medicine  
*A cortical-midbrain dialogue during early life defines how the brain will integrate information from different senses*
- 8:30 pm Poster Reception
- 10:30 pm Refreshments available in Bob's Pub

## Wednesday, April 18<sup>th</sup>

- 7:00 am Breakfast (*service ends at 8:15 am*)
- 8:30 am Session 5: The future of central complex research? Going from phenomenon to mechanism.**  
**Chairs: Vivek Jayaraman, Eugenia Chiappe**
- 8:30 am Poster awards / mini-talks (15 minutes each)
- 9:00 am Session Introduction (Chairs)
- 9:05 am **Perspective Talk: Fred Rieke**, HHMI/University of Washington  
*The biophysical mechanisms of single photon detection*
- 9:45 am **Perspective Talk: Michael Mauk**, University of Texas at Austin  
*Computer simulations and neural system function*
- 10:25 am Break
- 11:00 am **Panel Discussion: Going from phenomenon to mechanism: The role of theory and synaptic physiology**  
**Chairs:** Vivek Jayaraman, Eugenia Chiappe  
**Participants:** Fred Rieke, Mike Mauk, Roland Strauss, Uwe Homberg, Barbara Webb
- 12:00 pm Open Discussion / Closing Remarks
- 12:30 pm Lunch and Departure (*To-go boxes available in servery for those on first shuttle*)
- 12:45 pm First shuttle to Dulles
- 1:30 pm Second shuttle to Dulles
- 2:15 pm Last shuttle to Dulles