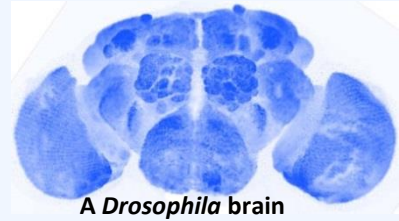




We are a small international english-speaking lab with a friendly atmosphere. Motivated and skilled Bachelor, Master or Erasmus students with strong interest in neuroscience and animal behaviour are welcome to apply.

**How do genes, neurons and neuronal circuits control and coordinate behavior?  
 How do interconnected neurons process information and compute behavioral decisions?**

Fruit flies are a great model system to study these fascinating questions. They show complex behavior, but have a small brain, which can be elegantly manipulated with genetic tools.



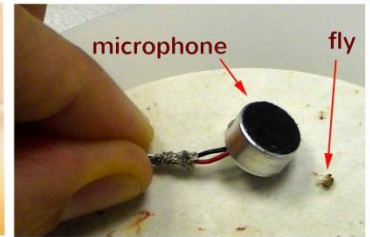
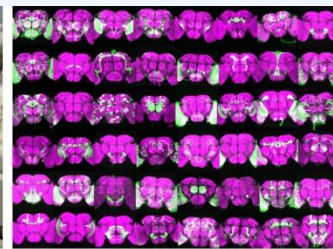
### Our model system/Techniques:

**Model organism:** We keep over 1000 transgenic fly lines for various behavioral studies. With these, we can visualize individual neurons in the nervous system, silence or activate them and manipulate gene expression.

***Drosophila* courtship song:** When a male fly meets a female, he shows courtship behavior and sings a song to her by vibrating his wing. Courtship song requires complex sensory processing and exquisite motor control. In the lab, we can record song with a custom made system and analyse it, in order to understand how this behaviour is generated in the nervous system and which genes and neurons are involved.

### **Techniques:**

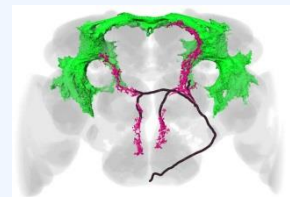
- *Drosophila* culture and genetics
- Nervous system dissection, confocal microscopy, 3 D reconstruction of neurons
- Genetic silencing and activation of neurons (Optogenetics), RNAi
- Behavioral experiments, song recordings
- Molecular biology, genotyping



***Drosophila* stocks, brains with Gfp expressing neurons, a singing male, microphone for recording song and courtship song.**

### Possible projects address:

- What are circuit mechanisms of multifunctional motor control and pattern generation? Anatomical and functional analysis of wing muscle motor neuron circuits.
- Parkinson disease model in *Drosophila*.
- Optogenetics: Red-shifted Channelrhodopsin to activate neurons and control behavior.
- How do different behaviours interact and influence each other on a circuit level?
- What is the genetic and neuronal basis of specific forms of memory/learning?



Reconstructed neurons

### **Publications:**

- M.N. Verzijden, J. K. Abbott, A.C. von Philipsborn, V. Loeschcke; **Male *Drosophila melanogaster* learn to prefer an arbitrary trait associated with female mating status.** *Current Zoology* 2015, 61 (6): 1036-1042.
- A.C. von Philipsborn, S. Jörchel, L. Tirian, E. Demir, T. Morita, D. L. Stern, B. J. Dickson; **Cellular and Behavioral Functions of fruitless Isoforms in *Drosophila* Courtship.** *Current Biology* 2014, 24 (3): 242-251.
- A.C. von Philipsborn, T. Liu, J.Y. Yu, C. Masser, S.S. Bidaye, B.J. Dickson; **Neuronal control of *Drosophila* courtship song.** *Neuron* 2011, 69(3): 509-522.