



Systems neuroscience of *Drosophila*:
From genes to circuits to behaviours

FLiACT Workshop on Electrophysiology



MAX-PLANCK-GESELLSCHAFT

Max Plank Institute
for Chemical Ecology
Jena, Germany



DECEMBER 10-13, 2012



FLiACT Workshop 2012 on Electrophysiology in Jena

	MONDAY Dec 10th	TUESDAY Dec 11th	WEDNESDAY Dec 12th	THURSDAY Dec 13th
9:00-11:00	Elinor Thompson	Bill S. Hansson Dieter Wicher	André Fiala	Gilles Laurent
11:00-11:30	COFFEE & TEA	COFFEE & TEA	COFFEE & TEA	COFFEE & TEA
11:30-12:30	Presentation Skills	Emre Yaksi	Martin Nawrot	Gilles Laurent
12:30-13:30	LUNCH	LUNCH	LUNCH	LUNCH
13:30-14:30	Presentation Skills	Emre Yaksi	Martin Nawrot	PRACTICALS
14:30-16:00		PRACTICALS	PRACTICALS	
16:00-16:30	COFFEE & TEA	COFFEE & TEA	COFFEE & TEA	COFFEE & TEA
16:30-18:00	Presentation Skills	PRACTICALS	PRACTICALS	PRACTICALS
18:00-19:00		Case study talk: Dieter Wicher	Case study talks: Matthieu Louis & Silke Sachse	Concluding discussion & evaluation
19:00-19:30	Discussion	Discussion	Discussion	
20:00	DINNER @ hotel	DINNER @ hotel	DINNER @ hotel	FLiACT DINNER @ Ratszeise

Soft Skills Workshop	Scientific Lecture	Scientific Practical	Institute Talk	Group Discussion
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SOFT SKILLS WORKSHOP

Elinor Thompson (Barcelona Biomedical Research Park)

Say It So It Stays

Conference Presentation Skills for Scientists

Online meeting – 1 hour 30 mins

- Principles of presenting science successfully
- Scientists as audience
- The importance of purpose
- Visual aids that really aid
- Preparing for Jena

Jena workshop

0900 - 0930	Welcome to FLiACT – Matthieu Louis
0930 - 1100	Conference Presentations Course Introduction Understanding the game Purpose and message review Making your talk memorable
1100 - 1115	BREAK
1115 - 1315	Structure and organisation of your talk
1315 - 1415	LUNCH
1415 - 1520	Visuals Voice
1520 - 1535	BREAK
1535 - 1805	Individual presentations with feedback
1805 - 1830	Reflective learning

SCIENTIFIC LECTURE TOPICS

Bill S. Hansson (Managing Director, Max Planck Institute for Chemical Ecology, Jena)

Welcome and introductory note

Dieter Wicher (Max Planck Institute for Chemical Ecology, Jena)

General introduction to ion channel physiology

- Electrical properties of cell membrane (membrane capacitance + electric model), generation of action potentials
- Recording modes and equivalent circuits: intracellular recordings, voltage-clamp and current-clamp recordings
- Overview of other recording techniques

Emre Yaksi (KU Leuven)

Application of electrophysiology to *Drosophila*

- Single-sensillum recordings from the adult fly and LFP; electro-retinogram (what is it? what do we get from it?)
- Patch-clamp recording from sensory neurons: projection neurons and neurons from the auditory system? Introduction to head fixed preparation.
- Future developments: possibility to couple this preparation with behavioral assays, e.g. treadmill system.
- Current research in Yaksi lab with general emphasis on the parallels between fly and fish work

André Fiala (University Göttingen)

Introduction to optophysiology

- Functional imaging: introduction to GCaMP, Cameleon and other sensors. Principles and applications to the fly. Comparison with traditional electrophysiology. Will ephys be replaced by calcium imaging in the fly?
- Optogenetics and thermogenetics, tools and applications
- Concepts for dissecting neuronal circuits controlling and behavior

Martin Nawrot (Free University Berlin)

Introduction to data analysis

- Basic analyses of extracellular e-phys data: raw data filtering, spike sorting and the problems thereof.
- Basic spike train analyses: firing rate estimation in trial averages and single trial, measures of spike train variability.
- Neural coding and basic steps of spike response analyses towards i) tuning curves, ii) sparseness, iii) euclidean distance, iv) signal-to-noise ratio

Gilles Laurent (Max Planck Institute for Brain Research, Frankfurt)

Open questions in invertebrate sensory neuroscience

- Big challenges for the coming decades. Why addressing these questions in insects?
- Current understanding of insect olfaction: illustration of systems-neuroscience approach

GENERAL INFORMATION ABOUT PRACTICALS

- Students will be split into 6 groups with 2-3 students per group
- Equipment: 2 SSR rigs, 2 imaging rigs, 1 EAG rig, 1 patch clamp rig for in vivo recordings, 1 patch clamp rig for cell culture

A) In vivo and cell culture patch clamp recordings

instructors: Dieter, Taufia, Vard, Emre, Luis

B) Single-sensillum recordings and electro-antennograms

instructors: Elisa, Sonja

C) Calcium imaging of the adult antennal lobe

instructors: André, Silke, Veit, Martin