



## Program Experimental Neurophysiology: Theory and Practice

21–25 October 2024.

### 21 October – Monday

*Principles of neuronal excitability (Organizer: Maarten Kole)*

Location: Netherlands Institute for Neuroscience (NIN)

Morning: Colloquium room, 2<sup>nd</sup> floor, NIN, Amsterdam.

<http://herseninstituut.nl/over-ons/contact/>

Afternoon: NIN colloquium room

- 09:30 – 10:00 Welcome and general course introduction (M. Kole)
- 10:00 – 10:45 Biophysical basis of neuronal excitability (M. Kole)
- 10:45 – 11:00 Coffee break
- 11:00 – 12:00 Principles of patch-clamp recording (M. Kole)
- 12:00 – 13:00 Lunch (arranged by the NIN)
- 13:00 – 17:00 Deconstructing the action potential with *Neurons in Action* (M.Kole / R. Min) –  
**Bring your own laptop and install Neurons in Action** (link below)

### 22 October – Tuesday

*Synaptic transmission and plasticity (Organizer: Rogier Min)*

Location: Netherlands Institute for Neuroscience (NIN)

Morning: Large meeting room, 2<sup>nd</sup> floor, NIN, Amsterdam.

<http://herseninstituut.nl/over-ons/contact/>

Afternoon: NIN electrophysiology labs (gather in NIN colloquium room)

- 09:30 – 10:30 Physiology of the presynaptic terminal and short-term synaptic plasticity (Niels Cornelisse)
- 10:30 – 10:45 Coffee break
- 10:45 – 11:45 The postsynapse and long-term synaptic plasticity (R. Min)
- 11:45 – 13:00 Lunch (arranged by the NIN)
- 13:00 – 17:00 Patch-clamp recordings of neurons in acute brain slices/ Slice culture. (Tim Heistek, Mohit Dubey, Viktor Al-Naqib, Kieran Higgins)



## 23 October – Wednesday

*Cognitive and Systems Neurophysiology (Organizer: Cyriel Pennartz)*

Location: Swammerdam Institute for Life Science (SILS), UvA  
Morning: Room A1.28, Faculty of Science Building, first floor  
Afternoon: t.b.d.(Umberto)(Room A1.28 stays available until 17 hrs).

- 09:30 – 10:45 *In vivo* recordings of spike trains and population coding (Cyriel Pennartz)
- 11:00 – 12:00 Dendritic integration: What is it and how do we study it? (Mototaka Suzuki)
- 12:00 – 13.00 Lunch
- 13.00 – 17.00 Practical demonstration *in vivo* electrophysiology and/or *in vivo* 2-photon imaging, with data analysis (Umberto Olcese)

## 24 October – Thursday

*In vivo cellular physiology (Organizer: Gerard Borst)*

Location: Erasmus MC  
Morning: room OWR 15, education center (<https://www.erasmusmc.nl/-/media/erasmusmc/pdf/0-bereikbaarheid-nl-eng/plattegronden/240326-def-eng-building-fe.pdf>).  
Afternoon: room Ee1205, 12<sup>th</sup> floor Faculty (Ee) building. To enter the Ee-building you need a visitors' pass, which you can get from the reception at the 3<sup>rd</sup> floor (and if there is no pass in your name, call 010-7043309).

- 09:30 – 10:45 *In vivo* patch clamp and juxtacellular recordings (Gerard Borst)
- 11:00 – 12:00 Translational and clinical applications of multi-electrode recordings (Zhenyu Gao)
- 12:00 – 13.00 Lunch (arrange your own. There's an AH-to-go and a restaurant in the main hall (Passage) of Erasmus MC)
- 13.00 – 15.00 Practical demonstration *in vivo* electrophysiology in cerebellum/motor cortex (divided into groups)



## 25 October – Friday

*Masterclass / Human cellular neurophysiology (Organizers: Maarten Kole, Rogier Min)*

Location: Netherlands Institute for Neuroscience (NIN)

Morning: Large meeting room, 2<sup>nd</sup> floor, NIN, Amsterdam.

<http://herseninstituut.nl/over-ons/contact/>

Afternoon: NIN colloquium room

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|---------------|--|
| 9:30 – 11:00  | Reading of masterclass paper / design questions. Followed by a plenary discussion and design of questions for masterclass (M. Kole and R. Min) |
| 11:00 – 12:00 | Masterclass (Marlene Bartos)   |
| 12:00 – 13:00 | Lunch (arranged by ONWAR)  |
| 13:00 – 13:45 | Midnight madness; patch-seq in human neurons (Christiaan de Kock)  |
| 13:45 – 14:30 | Invasive electrophysiology in the human brain (Matt Self)  |
| 14:30 – 14:45 | Break  |
| 14:45 – 15:30 | Brain Machine Interfaces (Anouck Schippers)  |
| 15:30 – 16:00 | Coffee/Tea break / filling out evaluation  |
| 16.00 – 17.00 | Swammerdam Lecture Prof. Dr. Marlene Bartos<br>(University of Freiburg, Germany)   |
|               | <i>The role of inhibition in shaping hippocampal spatial codes</i>   |
| 17.00 –       | Discussion and drinks.   |

### Contact details local organizers

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|-----------------|--|
| Rogier Min      | <a href="mailto:r.min@amsterdamumc.nl">r.min@amsterdamumc.nl</a> |
| Maarten Kole    | <a href="mailto:m.kole@nin.knaw.nl">m.kole@nin.knaw.nl</a>       |
| Cyriel Pennartz | <a href="mailto:c.m.a.pennartz@uva.nl">c.m.a.pennartz@uva.nl</a> |
| Gerard Borst    | <a href="mailto:g.borst@erasmusmc.nl">g.borst@erasmusmc.nl</a>   |



Background reading material on the different topics, the information for the masterclass and software installation can be found via this link:

[https://drive.google.com/drive/folders/1ukz2JFfn40k9yp4c3czx1L\\_t-0PeI2Qh?usp=sharing](https://drive.google.com/drive/folders/1ukz2JFfn40k9yp4c3czx1L_t-0PeI2Qh?usp=sharing)

We strongly advise you to look through this material in advance. People taking this course have very diverse neuroscience backgrounds, and this will help to equalize the background knowledge.

**Day 1. Neuronal excitability:**

Bruce P Bean (2007). The action potential in mammalian central neurons. *Nat. Rev. Neurosci.* 8(6):451-65. doi: 10.1038/nrn2148.

**Please install Neurons in Action (NIA) on your laptop (PC/Mac) via this [link](#)**

**Day 2. Synaptic transmission:**

Basic:

Synaptic transmission (*Neuroscience 6<sup>th</sup> edition* by: Purves *et al*, Chapter 5).

More on techniques:

Glasgow SD, McPhedrain R, Madranges JF, Kennedy TE, Ruthazer ES (2019). Approaches and Limitations in the Investigation of Synaptic Transmission and Plasticity. *Front Synaptic Neurosci* 11:20. doi: 10.3389/fnsyn.2019.00020.

**Days 3 and 4. In vivo recording techniques and population coding:**

Buzsáki G, Anastassiou CA, Koch C (2012). The origin of extracellular fields and currents--EEG, ECoG, LFP and spikes. *Nat. Rev. Neurosci.* 13(6):407-20. doi: 10.1038/nrn3241.

Georgopoulos AP, Carpenter AF (2015). Coding of movements in the motor cortex. *Curr. Opin. Neurobiol.* 33:34-9. doi: 10.1016/j.conb.2015.01.012.

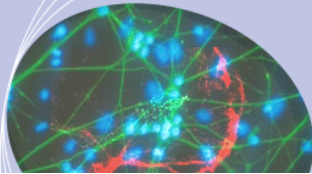
**Day 5. Human neuron activity:**

Quiroga RQ (2012). Concept cells: the building blocks of declarative memory functions. *Nat. Rev. Neurosci.* 13(8):587-97. doi: 10.1038/nrn3251.

**Workshop article by our invited speaker, Marlene Bartos**

*Make sure to read the article carefully before the Friday of the course. When reading, prepare questions for our masterclass guest (Marlene Bartos), so that we can have a dynamic and interesting masterclass!*

Cholvin T, Hainmueller T and Bartos M. The hippocampus converts dynamic entorhinal inputs into stable spatial maps (2021). *Neuron* 109(19): 3135-3148.e7



# ONWAR



Graduate School Neurosciences Amsterdam Rotterdam

Marlene  
Bartos



## ONWAR SWAMMERDAM LECTURE

### The role of inhibition in shaping hippocampal spatial codes

Hosted by Maarten Kole



October 25th, 16:00



NIN, colloquium room



It's recommended to attend the Swammerdam Lectures in person. If that is not possible please email [k.hubregtse@live.nl](mailto:k.hubregtse@live.nl)

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Prof. Dr. Marlene Bartos investigates how information is processed and encoded in neuronal networks to realize learning, memory and behavior. Utilizing electrophysiological, imaging, molecular and computational approaches they study fundamental questions from the level of the cellular and molecular events underlying synaptic communication to how different neuron types govern the emergence of neuronal network oscillations during behavior. Marlene Bartos is director of the Institute for Physiology in Freiburg and recipient of numerous prizes. She leads a Collaborative Research Center, a transregional alliance of multiple universities, bridging the gap between basic and applied neurosciences, focusing on interneurons and the development of new therapeutic strategies restoring healthy cognitive function in various psychiatric disorders.