

Koen Seignette



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About Me

I am a postdoctoral neuroscientist working on the cellular and circuit mechanisms underlying sleep- and learning-related plasticity of feedforward and contextual sensory information. I am also interested in understanding how experience and brain state change information processing across cellular compartments. I enjoy exploring new techniques and topics, teaching, supervising undergraduate and PhD students and collaborating with other scientists.

References

Christiaan N. Levelt (c.levelt@nin.knaw.nl)
Matthew E. Larkum (matthew.larkum@hu-berlin.de)

Publications

Seignette, K., de Kraker, L., Papale, P., Petro, L. S., Hobo, B., Montijn, J. S., Self, M. W., Larkum, M. E., Roelfsema, P. R., Muckli, L., & Levelt, C. N. (2024). Experience-dependent predictions of feedforward and contextual information in mouse visual cortex. *bioRxiv*. <https://doi.org/10.1101/2024.06.10.598181> (submitted)

Seignette, K., Jamann, N., Papale, P., Terra, H., Pornoso, R. O., de Kraker, L., van der Togt, C., van der Aa, M., Neering, P., Ruimschotel, E., Roelfsema, P. R., Montijn, J. S., Self, M. W., Kole, M. H. P., & Levelt, C. N. (2024). Experience shapes chandelier cell function and structure in the visual cortex. *eLife*, 12, RP91153. <https://doi.org/10.7554/eLife.91153>

de Kraker, L., **Seignette, K.**, Thamizharasu, P., van den Boom, B. J. G., Ferreira Pica, I., Willuhn, I., Levelt, C. N., & van der Togt, C. (2022). SpecSeg is a versatile toolbox that segments neurons and neurites in chronic calcium imaging datasets based on low-frequency cross-spectral power. *Cell Reports Methods*, 2(10), 100299. <https://doi.org/10.1016/j.crmeth.2022.100299>

Montijn, J. S., **Seignette, K.**, Howlett, M. H., Cazemier, J. L., Kamermans, M., Levelt, C. N., & Heimel, J. A. (2021). A parameter-free statistical test for neuronal responsiveness. *eLife*, 10, e71969. <https://doi.org/10.7554/eLife.71969>

Seignette, K., & Levelt, C. N. (2018). Amblyopia: The thalamus is a no-go area for visual acuity. *Current Biology*, 28(12), R709–R712. <https://doi.org/10.1016/j.cub.2018.04.081>

Sommeijer, J. P., Ahmadlou, M., Saiepour, M. H., **Seignette, K.**, Min, R., Heimel, J. A., & Levelt, C. N. (2017). Thalamic inhibition regulates critical-period plasticity in visual cortex and thalamus. *Nature Neuroscience*, 20(12), 1715–1721. <https://doi.org/10.1038/s41593-017-0002-3>

Work experience

Postdoc 09/2023 – present

Cellular and circuit mechanisms underlying sleep-dependent plasticity of sensory processing

Institute for Biology, Charité, Humboldt University of Berlin, Germany
Prof. Matthew Larkum

PhD 01/2016 – 08/2023
graduated 12/2024

Predictive signals in visual cortex:

How experience and expectations shape visual processing

Netherlands Institute for Neuroscience, Amsterdam, the Netherlands
Promoter: Prof. Christiaan Levelt, Co-promoter: Prof. Pieter Roelfsema

Master thesis 01/2014 – 12/2015

mGluR5-dependent reorganization of nuclear paraspeckles

University of Zurich, Zurich, Switzerland
Prof. Shiva K Tyagarajan, Prof. Steven A Brown, Prof. Jean-Marc Fritschy

Master research project 01/2013 – 07/2013

Glutamate receptor plasticity in fear memory reconsolidation

CNCR, Free University Amsterdam, Amsterdam, the Netherlands
Dr. Leanne JM Schmitz, Prof. Sabine Spijker

Bachelor research project 03/2012 – 07/2012

Figure-ground modulation in primary visual cortex of awake mice

Netherlands Institute for Neuroscience, Amsterdam, the Netherlands
Dr. Jeannette AM Lorteije, Prof. Pieter Roelfsema

Education

Master 09/2012 – 03/2015

Brain & Cognitive Sciences, track Neuroscience

University of Amsterdam, Amsterdam, the Netherlands
Graduated March 2015, *cum laude*

Bachelor 09/2009 – 07/2012

Psychobiology

University of Amsterdam, Amsterdam, the Netherlands
Graduated July 2012

Invited talks

- 2024** Predictive processing symposium, NIN Amsterdam, NL
- 2023** SILS, University of Amsterdam, Amsterdam, NL
- 2022** European Visual Cortex Meeting, Seeon, DE
Bordeaux Neurocampus Seminar, Bordeaux, FR
NIN mini-symposium, Amsterdam, NL
- 2021** Flagera meeting, NIN Amsterdam, NL
NIN seminar, Amsterdam, NL
Student association Durham seminar, Durham, UK
- 2019** ONWAR graduate school meeting, Woudschoten, NL
NIN seminar, Amsterdam, NL
- 2018** Neurocure Seminar, Berlin, DE
- 2017** Optogenetics meeting, Nijmegen, NL

Technical skills

Surgical procedures	Viral injections, headbars, craniotomies, chronic windows, EEG/EMG electrode implantations, prism implantations, grin lens implantations
Neuronal recording / analysis	Headfixed 2P&3P calcium imaging, widefield calcium imaging, miniaturized microscopy, neuropixels, EEG/EMG, confocal, Matlab
Molecular/ biochemical	PCR, qRT-PCR, plasmid cloning, lentivirus production, immunohistochemistry, RNA FISH, western blotting, RNA immunoprecipitation, synaptic membrane isolation
Other	Behavioral training, virtual reality, optogenetics, chemogenetics, brain clearing, rabies tracing, fear conditioning, perfusion

Awards & grants

- 2024** NIN PhD award for collaborative excellence, for our paper on chandelier cells in the visual cortex of mice
- 2014** Erasmus grant for the international research project I performed at the University of Zurich

Poster presentations

- 2023** HBP summit, Marseille, FR
- 2022** 2022 European Visual Cortex Meeting, Seeon, DE
FENS, Paris, FR
NIN-Donders meeting, Amsterdam, NL
- 2021** 2021 SFN, Washington, US (online)
- 2019** 2019 Dutch Neuroscience Meeting, Lunteren, NL
European Visual Cortex Meeting, London, UK
NIN poster day, Amsterdam, NL
- 2018** 2018 GABA meeting, Schaffhausen, CH
ONWAR graduate school meeting, Woudschoten, NL
- 2017** 2017 ONWAR graduate school meeting, Woudschoten, NL
HBP WP3 meeting, Amsterdam, NL

Teaching

During my PhD and Postdoc I have supervised 10 bachelor and master students

- 2025** Introduction to Neuroscience, lecture on Vision
Animal- and Neurophysiology Practicals
Popular science student practicals
- 2024** Animal- and Neurophysiology Practicals
Popular science student practicals

Extracurricular/organizational

- 2016–2021** PhD representative, NIN Amsterdam
- 2017–2019** ONWAR graduate school annual meeting committee
- 2015–2017** MBCS ABC journal editor
- 2014** MBCS Cognito newsletter committee

Languages

Dutch (native), English (fluent), German (B2)