Curriculum Vitae

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Fabian Kloosterman, Ph.D.

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Research experiences & positions

2020 – present	Associate Professor, Faculty of Psychology and Educational Sciences, KU Leuven
2012 – 2020	Assistant Professor, Faculty of Psychology and Educational Sciences, KU Leuven
2013 – present	Member of Management Committee, Neuro-Electronics Research Flanders
2011 – present	Principal Investigator. NERF, VIB, imec and KU Leuven
2003 – 2011	Post-Doctoral Fellow & Associate with Matthew Wilson, Massachusetts Institute of Technology, Cambridge MA, USA

Education and Training

1998 – 2003	Ph.D. Neurobiology, University of Amsterdam, The Netherlands Promotors: Fernando Lopes da Silva and Menno Witter Thesis: "Interactions between the hippocampal formation and the entorhinal cortex: evidence for reentrant circuits"
1994 – 1998	M.Sc. (cum laude) Medical Biology, University of Amsterdam, The Netherlands
1997 – 1998	Master research training with Stan Leung, University of Western Ontario, Canada
1997	Master research training with Ger Ramakers, Netherlands Institute for Brain Research

Grants and Trainee fellowships

2021 – 2024 (running)	FWO research project (promotor) Linking past to future: contributions of awake hippocampal replay to learning Funding: € 408k
2017 – 2021 (running)	EU FET Open grant "STARDUST" (consortium member, led by prof. Farshad Moradi) In vivo optogeneticS, elecTrophysiology and phArmacology with an ultRasonically-powered DUST for Parkinson's Disease Funding: € 417k (total grant € 3787k)
2017 – 2021 (running)	KU Leuven C1 research grant (co-promotor, together with prof. Rudi D'Hooge) FLEXIBRAIN: The study of telencephalic interactions at the basis of behavioral flexibility Funding: € 264k (total grant € 528k)
2016 – 2020 (completed)	FWO research project (co-promotor, together with prof. Alexander Bertrand) Distributed signal processing algorithms for spike sorting in next-generation high-density neuroprobes Funding: € 200k (total grant € 400k)
2014 (completed)	VIB Tech Watch (promotor, together with Profs. Carmen Bartic and Matthew Holt) Dual-colour implantable mini fluorescent microscope for imaging brain function in behaving rodents Funding: € 25k

2011 – present	Annual NERF grant Funding: € 220k/year
2020 – 2024	KU Leuven – Taiwan PhD Fellowship for Yu-Ting Wei
2019 – 2023	KU Leuven – Taiwan PhD Fellowship for Ta-Shun Su
2019 – 2023	Baekeland PhD mandate for Rik van Daal (with Atlas Neuroengineering and prof. Michael Kraft)
2018 – 2022	FWO PhD fellowship for Lies Deceuninck

Invited Talks

2019	3rd International Neuromodulation Workshop, Ghent University, Belgium
2019	Spring Hippocampal Research Conference, Taormina, Italy
2017	Workshop "Functional network dynamics of the hippocampus", Bernstein Conference, Göttingen, Germany
2016	Workshop "Internally-generated sequences in the hippocampus", Ariccia, Italy
2016	Bernstein Sparks Workshop, Munich, Germany
2016	NERF Neurotechnology symposium, Leuven, Belgium
2016	SNI Lecture series, Innsbruck, Austria
2015	Belgian Society for Neuroscience, Mons, Belgium
2014	GDR Multielectrode Annual Meeting, Gif sur Yvette, France
2014	Neuronus conference, Krakow, Poland
2013	Neurotechnology symposium, Nijmegen, Netherlands
2011	Neuroelectronics seminar, imec, Leuven, Belgium

Mentoring

2011 – present	NERF and KU Leuven Currently lead group of 2 Postdoctoral Fellows, 7 Ph.D. students (promotor: 5, co-promotor: 1, visiting PhD student: 1) and a software engineer. Four former Ph.D. students successfully defended their thesis. I mentored over 20 Bachelor/Master students (research thesis or internship).
2003 – 2011	Massachusetts Institute of Technology Supervised and mentored undergraduate students through MIT's Undergraduate Research Opportunities Program. Mentored and advised graduate students and junior postdocs.
1998 – 2003	University of Amsterdam Teaching Assistant for biology laboratory courses (Zoology, Neuroanatomy, Methods in Neurobiology). Supervised research project of Master Student, provided daily instruction and mentorship.

Teaching

2018 – present	Neural Systems and Circuits, Biophysics master course, KU Leuven coordinator together with prof. Vincent Bonin
2014 – present	Hot Topics in System and Cognitive Neurosciences Biomedical Sciences master course, KU Leuven
2016	State of the Art Lecture in Biomedicine, Antwerp University
2014	Nanotechnology in Health, PhD course lecture, imec
2014	Capita Selecta of Nanoscience and Nanotechnology, KU Leuven
2013	Nanobiotechnology symposium, VIB
2012	Brain Circuits, PhD course lecture, Karolinska Institutet

Doctoral dissertations

Completed

2016 – 2020	Jasper Wouters, KU Leuven (co-promotor) Design and validation of low-complexity methods for resolving spike overlap in neuronal spike sorting
2012 – 2019	Frédéric Michon, KU Leuven (promotor) Hippocampal replay of neuronal activity patterns promotes the retention of salient experiences
2012 – 2018	Davide Ciliberti, KU Leuven (promotor) Real-time detection of hippocampal replay patterns for closed-loop experiments
2013 – 2018	Bogdan Raducanu, KU Leuven (co-promotor) Massive Parallel Readout Circuits for In-Vivo Signal Acquisition

Ongoing

2017 – present	Hanna den Bakker, KU Leuven (promotor) Hippocampal-prefrontal circuitry underlying cognitive flexibility
2018 – present	Rik van Daal, KU Leuven (co-promotor) Active ultra-flexible, high-density electrode arrays for chronic deep brain neural interfacing
2018 – present	Katarzyna Bzymek, KU Leuven (promotor) Application of distributed algorithms to neural signals from high-density neuroprobes for detailed study of the brain's memory system
2018 – present	Lies Deceuninck, KU Leuven (promotor) The neurophysiological basis of recent event working memory
2019 – present	Ta-Shun Su, KU Leuven (promotor) Decoding the neural circuits for spatial memory
2020 – present	Yu-Ting Wei, KU Leuven (promotor) Role of the retrosplenial cortex in visually-guided navigation

Honors, Awards and Fellowships

2003	NWO Talent Fellowship for Postdoctoral Research
1998	M.Sc. conferred with honors (“cum laude”)
1997	Individual fellowships for Master research training: Stichting Dr. Hendrik Muller’s Vaderlandsch Fonds, Amsterdam University Society, Dutch National Epilepsy Fund, Dutch Brain Foundation, Stichting Bekker-La Bastide-Fonds

Technology transfer

2017	Patent application: Yassin YH, Catthoor F, Kjeldsberg PG, Kloosterman F, Sun JJ, Couto J. A method for processing sensor data in a neuroprobe. Patent Application Number: EP3415085. Filed on 14 June 2017.

Peer review

Nature Communications, eLife, Frontiers, Journal of Comparative Neurology, Journal of Computational Neuroscience, Journal of Neural Engineering, Journal of Neuroscience, Journal of Neuroscience Methods, Advances in Cognitive Psychology, Cell Reports, Neuron

Publications

Journal articles (preprints or in revision)

1. Michon F, Krul E, Sun JJ, **Kloosterman F** (2020) Single-trial dynamics of hippocampal spatial representations are modulated by reward value. **bioRxiv** 2020.10.21.349043. doi: 10.1101/2020.10.21.349043.

Journal articles, peer reviewed, published or in press

2. Van Daal R[#], Çağatay A[#], Michon F[#], Aarts A, Kraft M, **Kloosterman F***, Haesler S* (2020) Chronic Neuropixels recordings in mice and rats. **Nature Protocols** (in press). (# equal contribution, * co-senior authors). [IF: 10.4]
3. Steinmetz NA, Aydin C, Lebedeva A, Okun M, Pachitariu M, Bauza M, Beau M, Bhagat J, Böhm C, Broux M, Chen S, Colonell J, Gardner RJ, Karsh B, **Kloosterman F**, Kostadinov D, Mora-Lopez C, O'Callaghan J, Park J, Putzeys J, Sauerbrei B, van Daal RRJ, Vollan AZ, Wang S, Welkenhuysen M, Ye Z, Dudman JT, Dutta B, Hantman AW, Harris KD, Lee AK, Moser EI, O'Keefe J, Renart A, Svoboda K, Häusser M, Haesler S, Carandini M, Harris TD (2021) Neuropixels 2.0: A miniaturized high-density probe for stable, long-term brain recordings. **Science** 372(6539):eabf4588. doi: 10.1126/science.abf4588. [IF: 41.8]
4. Wouters J, Patrinos P, Kloosterman F and Bertrand A (2020) Multi-Pattern Recognition Through Maximization of Signal-to-Peak-Interference Ratio with Application to Neural Spike Sorting. **IEEE Transactions on Signal Processing** 68:6240-6254. doi: 10.1109/TSP.2020.3033973. [IF 5.0]
5. Wouters J, **Kloosterman F**, Bertrand A (2020) SHYBRID: A graphical tool for generating hybrid ground-truth spiking data for evaluating spike sorting performance. **Neuroinformatics**. doi: 10.1007/s12021-020-09474-8. [IF 3.3]
6. Michon F, Sun JJ, Kim CY, **Kloosterman F** (2020) A Dual Reward-Place Association Task to Study the Preferential Retention of Relevant Memories in Rats. **Frontiers in Behavioral Neuroscience** 14:69. [IF 2.5]
7. Van Daal R, Sun JJ, Ceyssens F, Michon F, Kraft M, Puers R, **Kloosterman F** (2020) System for recording from multiple flexible polyimide neural probes in freely behaving animals. **Journal of Neural Engineering** 17(1), 016046. doi: 10.1088/1741-2552/ab5e19. [IF: 4.8]
8. Michon F, Sun JJ, Kim CY, Ciliberti D, **Kloosterman F** (2019) Post-learning hippocampal replay selectively reinforces spatial memory for highly rewarded locations. **Current Biology** 29(9):1436-1444.e5. [IF: 9.2]
9. Hu S, Ciliberti D, Grosmark AD, Michon F, Ji D, Penagos H, Buzsáki G, Wilson MA, **Kloosterman F***, Chen Z* (2018) Real-Time Readout of Large-Scale Unsorted Neural Ensemble Place Codes. **Cell Reports** 25 (10), 2635-2642.e5 *(* equal contribution, co-senior author)* [IF: 8.1]
10. Ciliberti D, Michon F, **Kloosterman F** (2018) Real-time classification of experience-related ensemble spiking patterns for closed-loop applications. **Elife** 7, e36275. doi: 10.7554/eLife.36275 [IF: 7.1]
11. Wouters J, **Kloosterman F**, Bertrand A (2018) Towards online spike sorting for high-density neural probes using discriminative template matching with suppression of interfering spikes. **Journal of Neural Engineering** 15 (5), 056005. [IF: 4.8]
12. Yassin YH, Catthoor F, **Kloosterman F**, Couto J, Sun JJ, Kjeldsberg PG, Van Helleputte N (2018). Algorithm/Architecture Co-optimisation Technique for Automatic Data Reduction of Wireless Read-Out in High-Density Electrode Arrays. **ACM Transactions on Embedded Computing Systems** 17(3), 1-19. [IF: 2.6]

13. Tanila H, Ku S, **Kloosterman F**, Wilson MA (2018). Characteristics of CA1 place fields in a complex maze with multiple choice points. **Hippocampus** 28 (2), 81-96. [IF: 3.5]

14. Raducanu BC, Yazicioglu RF, Lopez CM, Ballini M, Putzeys J, Wang S, Andrei A, Rochus V, Welkenhuysen M, Van Helleputte N, Musa S, Puers R, **Kloosterman F**, Van Hoof C, Fiáth R, Ulbert I, Mitra S (2017). Time Multiplexed Active Neural Probe with 1356 Parallel Recording Sites. **Sensors** 17 (10), 2388. [IF: 3.3]

15. Neumann AR, Raedt R, Steenland HW, Sprengers M, Bzymek K, Navratilova Z, Mesina L, Xie J, Lapointe V, **Kloosterman F**, Vonck K, Boon PAJM, Soltesz I, McNaughton BL, Luczak A (2017). Involvement of fast-spiking cells in ictal sequences during spontaneous seizures in rats with chronic temporal lobe epilepsy. **Brain** 140 (9), 2355-2369. [IF: 11.3]

16. Ciliberti D, **Kloosterman F** (2017). Falcon: a highly flexible open-source software for closed-loop neuroscience. **Journal of Neural Engineering** 14 (4), 045004. [IF: 4.8]

17. Michon F, Aarts A, Holzhammer T, Ruther P, Borghs G, McNaughton B, **Kloosterman F** (2016). Integration of silicon-based neural probes and micro-drive arrays for chronic recordings of large populations of neurons in behaving animals. **Journal of Neural Engineering** 13(4):046018. [IF: 4.8]

18. Agarwal R, Chen Z, **Kloosterman F**, Sarma SV (2016). A Novel Nonparametric Approach for Neural Encoding and Decoding Models of Multimodal Receptive Fields. **Neural Computation** 28(7):1356-87. [IF: 2.5]

19. Sodkomkham D, Ciliberti D, Wilson MA, Fukui K, Moriyama K, Numao M, **Kloosterman F** (2016). Kernel density compression for real-time Bayesian encoding/decoding of unsorted hippocampal spikes. **Knowledge-Based Systems** 94:1-12. [IF: 5.1]

20. Gomperts SN, **Kloosterman F**, Wilson MA (2015). VTA neurons coordinate with the hippocampal reactivation of spatial experience. **eLife** doi:10.7554/eLife.05360. [IF: 7.1]

21. Zhang J, Mitra S, Suo S, Cheng A, Xiong T, Michon F, Welkenhuysen M, **Kloosterman F**, Chin PS, Hsiao S, Tran TD, Yazicioglu F, Etienne-Cummings R (2015). A closed-loop compressive-sensing-based neural recording system. **Journal of Neural Engineering** 12(3):036005. [IF: 4.8]

22. **Kloosterman F**, Layton S, Chen Z, Wilson MA (2014). Bayesian Decoding using Unsorted Spikes in the Rat Hippocampus. **Journal of Neurophysiology** 111(1):217-27. [IF: 2.2]

23. Chen Z, **Kloosterman F**, Brown EN, Wilson MA (2012). Uncovering spatial topology represented by rat hippocampal population neuronal codes. **Journal of Computational Neuroscience** 33(2):227-55. [IF: 1.7]

24. Nguyen DP, **Kloosterman F**, Barbieri R, Brown EN, Wilson MA (2009). Characterizing the dynamic frequency structure of fast oscillations in the rodent hippocampus. **Frontiers in Integrative Neuroscience** 3:11. [IF: 3.1]

25. Davidson TJ*, **Kloosterman F***, Wilson MA (2009). Hippocampal replay of extended experience. **Neuron** 63(4): 497-507. (**equal contribution, F. Kloosterman is corresponding author)* [IF: 14.4]

26. **Kloosterman F**, Davidson TJ, Gomperts SN, Layton SP, Hale G, Nguyen DP, Wilson MA (2009). Micro-drive array for chronic in vivo recording: drive fabrication. **Journal of Visualized Experiments** (26). pii: 1094. [IF: 1.2]

27. Nguyen DP, Layton SP, Hale G, Gomperts SN, Davidson TJ, **Kloosterman F**, Wilson MA (2009). Micro-drive array for chronic in vivo recording: tetrode assembly. **Journal of Visualized Experiments** (26). pii: 1098. [IF: 1.2]

28. Poon N, **Kloosterman F**, Wu C, Leung LS (2006). Presynaptic GABA(B) receptors on glutamatergic terminals of CA1 pyramidal cells decrease in efficacy after partial hippocampal kindling. **Synapse** 59(3): 125-134. [IF: 2.9]

29. Tolner EA, **Kloosterman F**, van Vliet EA, Witter MP, Lopes da Silva FH, Gorter JA (2005). Presubiculum stimulation in vivo evokes distinct oscillations in superficial and deep entorhinal cortex layers in chronic epileptic rats. **Journal of Neuroscience** 25 (38): 8755-8765. [IF: 5.6]

30. Tolner EA, **Kloosterman F**, Kalitzin SN, Lopes da Silva FH, Gorter JA (2005). Physiological changes in chronic epileptic rats are prominent in superficial layers of the medial entorhinal area. **Epilepsia** 46(suppl 5): 72-81. [IF: 6.5]

31. **Kloosterman F**, van Haeften T, Lopes da Silva FH (2004). Two reentrant pathways in the hippocampal-entorhinal system. **Hippocampus** 14(8): 1026-1039. [IF: 3.5]

32. **Kloosterman F**, van Haeften T, Witter MP, Lopes da Silva FH (2003). Electrophysiological characterization of interlaminar entorhinal connections: an essential link for reentrance in the hippocampal-entorhinal system. **European Journal of Neuroscience** 18(11): 3037-3052. [IF: 3.1]

33. **Kloosterman F**, Witter MP, van Haeften T (2003). Topographical and laminar organization of subicular projections to the parahippocampal region of the rat. **Journal of Comparative Neurology** 455(2): 156-171. [IF: 2.8]

34. Townsend G, Peloquin P, **Kloosterman F**, Hetke J, Leung LS (2002). Recording and marking with silicon multichannel electrodes. **Brain Research Protocols** 9(2): 122-129.

35. **Kloosterman F**, Peloquin P, Leung LS (2001). Apical and basal orthodromic population spikes in hippocampal CA1 in vivo show different origins and patterns of propagation. **Journal of Neurophysiology** 86(5): 2435-2444. [IF: 2.2]

Conference proceedings (peer reviewed)

36. Wouters J, **Kloosterman F**, Bertrand A (2019) A data-driven regularization approach for template matching in spike sorting with high-density neural probes. 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Berlin, Germany, 2019, pp. 4376-4379.

37. Wouter J, **Kloosterman F**, Bertrand A (2019) Signal-to-peak-interference ratio maximization with automatic interference weighting for threshold-based spike sorting of high-density neural probe data. 9th International IEEE/EMBS Conference on Neural Engineering (NER), San Francisco, CA, USA. pp. 247-250. doi: 10.1109/NER.2019.8716953

38. Wouters J, **Kloosterman F**, Bertrand A (2018). Data-driven multi-channel filter design with peak-interference suppression for threshold-based spike sorting in high-density neural probes. IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP). doi: 10.1109/ICASSP.2018.8462517

39. Raducanu BC, Yazicioglu RF, Lopez CM, Ballini M, Putzeys J, Wang S, Andrei A, Welkenhuysen M, Van Helleputte N, Musa S, Puers R, **Kloosterman F**, Van Hoof C, Mitra S (2016). Time multiplexed active neural probe with 678 parallel recording sites. Solid-State Device Research Conference (ESSDERC), 2016 46th European, 385-388.

40. Yazicioglu RF, Mora Lopez C, Mitra S, Raducanu B, Musa S, **Kloosterman F** (2014). Ultra-High Density In-Vivo Neural Probes. 36th Annual International IEEE EMBS Conference.

41. Chen Z, **Kloosterman F**, Wilson MA, Brown EN (2010). Variational Bayesian inference for point process generalized linear models in neural spike trains analysis. In 2010 IEEE International Conference on Acoustics, Speech and Signal Processing, pp 2086-2089.

Book chapters

42. Chen Z, **Kloosterman F**, Wilson MA (2015). Probabilistic approaches to uncover rat hippocampal population codes. In: Advanced State Space Methods for Neural and Clinical Data, Z. Chen (Ed.), Cambridge University Press.

43. **Kloosterman F** (2012). Analysis of hippocampal memory replay using neural population decoding. In: Neuromethods, Neuronal Network Analysis, T. Fellin and M. Halassa (Eds.), Springer.