

Prof. Martin Fuhrmann

Institute



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German Center for Neurodegenerative Diseases (DZNE), Bonn

Research Expertise

My research focuses on neurologic and neurodegenerative diseases, like Alzheimer's disease. I am interested in how the immune system interacts with the central nervous system. How do microglia – innate immune cells in the brain – interact with synapses and neurons, and how do they influence each other? Are microglia relevant for learning and memory and if so, how do they exert this function? To address these and other questions, we apply cutting edge multiphoton-based in vivo imaging methods in my lab. For example, it enables us to study neuronal activity in conjunction with microglia motility. In combination with optogenetic, chemogenetic, immunohistochemical, electrophysiological and behavior tests, we are able to causally link behavior to neuronal activity in brain regions relevant for learning and memory.

Education / Training

2017	Habilitation, University of Bonn
2002 – 2006	Dr. rer. nat., Technical University of Munich “summa cum laude”
1997 – 2002	Diplom Biologe t.o., Technical University Stuttgart

Positions Held

2020	W2-Professor, University of Bonn
2018 – present	Research Group Leader, DZNE
2010 – 2018	Junior Research Group Leader, DZNE
2006 – 2010	Postdoc Center for Neuropathology and Prion Research, LMU Munich
2002 – 2006	PhD Center for Neuropathology and Prion Research, LMU Munich

Honors / Awards

2019	ERC-Consolidator Grant
2016	DZNE Prize

10 Most Relevant Publications for Prof. Dr. Martin Fuhrmann

1. Nebeling FC, Poll S, Justus LC, Steffen J, Keppler K, Mittag M, **Fuhrmann M**. Microglial motility is modulated by neuronal activity and correlates with dendritic spine plasticity in the hippocampus of awake mice. **Elife**. **2023** Feb 7;12:e83176.
2. **Fuhrmann M**, Gockel N, Arizono M, Dembitskaya Y, Nägerl UV, Pennacchietti F, Damenti M, Testa I, Willig KI. Super-Resolution Microscopy Opens New Doors to Life at the Nanoscale. **J Neurosci**. **2022** Nov 9;42(45):8488-8497.
3. Poll S, **Fuhrmann M**. O-LM interneurons: Gatekeepers of pyramidal neuron activity in the hippocampus. **Neuron**. **2022** May 18;110(10):1606-1608.
4. Poll S, Mittag M, Musacchio F, Justus LC, Giovannetti EA, Steffen J, Wagner J, Zohren L, Schoch S, Schmidt B, Jackson WS, Ehninger D, **Fuhrmann M**. Memory trace interference impairs recall in a mouse model of Alzheimer's disease. **Nat Neurosci**. **2020** Aug;23(8):952-958.
5. Pfeiffer T, Poll S, Bancelin S, Angibaud J, Inavalli VK, Keppler K, Mittag M, **Fuhrmann M**, Nägerl UV. Chronic 2P-STED imaging reveals high turnover of dendritic spines in the hippocampus in vivo. **Elife**. **2018** Jun 22;7:e34700.
6. Schmid LC, Mittag M, Poll S, Steffen J, Wagner J, Geis HR, Schwarz I, Schmidt B, Schwarz MK, Remy S, **Fuhrmann M**. Dysfunction of Somatostatin-Positive Interneurons Associated with Memory Deficits in an Alzheimer's Disease Model. **Neuron**. **2016** Oct 5;92(1):114-125.
7. Wagner J, Krauss S, Shi S, Ryazanov S, Steffen J, Miklitz C, Leonov A, Kleinknecht A, Göricke B, Weishaupt JH, Weckbecker D, Reiner AM, Zinth W, Levin J, Ehninger D, Remy S, Kretzschmar HA, Griesinger C, Giese A, **Fuhrmann M**. Reducing tau aggregates with anle138b delays disease progression in a mouse model of tauopathies. **Acta Neuropathol**. **2015** Nov;130(5):619-31.
8. Gu L, Kleiber S, Schmid L, Nebeling F, Chamoun M, Steffen J, Wagner J, **Fuhrmann M**. Long-term in vivo imaging of dendritic spines in the hippocampus reveals structural plasticity. **J Neurosci**. **2014** Oct 15;34(42):13948-53.
9. **Fuhrmann M**, Bittner T, Jung CK, Burgold S, Page RM, Mitteregger G, Haass C, LaFerla FM, Kretzschmar H, Herms J. Microglial Cx3cr1 knockout prevents neuron loss in a mouse model of Alzheimer's disease. **Nat Neurosci**. **2010** Apr;13(4):411-3.
10. Kienast Y, von Baumgarten L, **Fuhrmann M**, Klinkert WE, Goldbrunner R, Herms J, Winkler F. Real-time imaging reveals the single steps of brain metastasis formation. **Nat Med**. **2010** Jan;16(1):116-22.