



Curriculum Vitae

Professor Dr Denise Manahan-Vaughan



Foto: Markus Scholz | Leopoldina

Name: Denise Manahan-Vaughan

Date of birth: 17 May 1965

Research Priorities: Neuroscience, neurophysiology, brain disorders, synaptic plasticity, learning and memory, sensory information processing

Denise Manahan-Vaughan is a neuroscientist. The focus of her work is understanding the mechanisms that underlie the acquisition and retention of associative long-term memories. She is particularly interested in the hippocampus, a part of the brain which is of paramount importance for the creation of autobiographical and spatial memories. Her work provides insight into how learning influences synaptic plasticity in healthy people as well as after accidents and in the case of disease.

Academic and Professional Career

- since 2021 Vice Rector, Structure, Strategy and Planning, Ruhr University Bochum, Bochum, Germany
- since 2018 Spokesperson, Research Department of Neuroscience (RDN), Ruhr University Bochum, Bochum, Germany
- since 2017 Director, Institute of Physiology, Faculty of Medicine, Ruhr University Bochum, Bochum, Germany
- since 2010 Chairperson, Department of Neurophysiology, Faculty of Medicine, Ruhr University Bochum, Bochum, Germany
- 2008 - 2012 Spokesperson, RDN, Ruhr University Bochum, Bochum, Germany
- 2008 - 2010 Chairperson, Experimental Neurophysiology, Department of Neurophysiology, Faculty of Medicine, Ruhr University Bochum, Bochum, Germany
- 2003 - 2007 Professor of Neuroscience, Department of Neurophysiology, Faculty of Medicine, Ruhr University Bochum, Bochum, Germany

- 2003 - 2007 Principal Investigator, Learning and Memory Research (LMR), Department of Neurophysiology, Faculty of Medicine, Ruhr University Bochum, Bochum, Germany
- since 2003 Director, International Graduate School of Neuroscience (IGSN), Ruhr University Bochum, Bochum, Germany
- 1999 - 2003 Head of Working Group, Johannes Müller Institute for Physiology, Charité – Universitätsmedizin Berlin, Berlin, Germany
- 1996 - 1999 Team Leader, Leibniz Institute for Neurobiology (LIN), Magdeburg, Germany
- 1998 Habilitation in Physiology, Otto von Guericke University of Magdeburg, Magdeburg, Germany
- 1994 - 1995 Postdoctoral Fellow, LIN, Magdeburg, Germany
- 1992 - 1994 Lecturer in Physiology, Trinity College Dublin, University of Dublin, Dublin, Ireland
- 1992 - 1994 Research Assistant, Trinity College Dublin, University of Dublin, Dublin, Ireland
- 1992 PhD in Neuropharmacology and Neurophysiology, Trinity College Dublin, University of Dublin, Dublin, Ireland
- 1988 Bachelor of Natural Sciences BA (mod) Nat Sci (hons), Faculty of Life Sciences, Trinity College Dublin, University of Dublin, Dublin, Ireland

Functions in Scientific Societies and Committees

- since 2017 Member, Scientific Advisory Board, Hertie Institute for Clinical Brain Research, University Hospital Tübingen, Tübingen, Germany
- since 2014 Member, Scientific Advisory Board, LIN, Magdeburg, Germany
- 2013 - 2016 Member, Executive Board, RUB Research School, Ruhr University of Bochum, Bochum, Germany
- since 2012 Member, Scientific Advisory Board, PhD Programme “Neural Dynamics”, University of Bristol, Bristol, UK
- since 2012 Member, Scientific Advisory Board, Austrian Graduate School of Neuroscience, Austria
- 2012 - 2017 Member, Senate, Committee on Graduate Schools, German Research Foundation (DFG), Germany
- 2009 - 2010 Member, Professional Development Committee, Society for Neuroscience, USA
- 2005 - 2010 Chairperson, Network of European Neuroscience Schools (NENS), Federation of European Neuroscience Societies (FENS)
- 2005 - 2010 Member, Executive Committee, FENS

2005 - 2010 Member, Governing Council, FENS

Project Coordination, Membership in Collaborative Research Projects

- 2022 - 2027 Principal Investigator, Project “NeuroMind: Memories of the future”, Mercator Research Center Ruhr, Essen, Germany
- since 2017 Principal Investigator, Subproject “The neural mechanisms of extinction learning”, Collaborative Research Centres (SFB) 1280, DFG, Germany
- 2010 - 2022 Principal Investigator, Subproject “How do sensory systems interact with the hippocampus in the formation of synaptic plasticity and spatial memory?”, SFB 874, DFG, Germany
- 2010 - 2016 Spokesperson, Project “Structure of Memory”, Mercator Research Center Ruhr, Essen, Germany
- 2010 - 2016 Principal Investigator, Research Group (RU) 1581 “Extinction Learning: Behavioural, Neural and Clinical Mechanisms”, DFG, Germany
- 2009 - 2014 Spokesperson, Bochum Research School for Medical Neuroscience (BoNeuroMed), International Graduate School of Neuroscience (IGSN), Ruhr University Bochum, Bochum, Germany
- 2008 - 2013 Principal Investigator, Neurobiological Mechanisms of Memory Loss in Alzheimer's Disease (MEMOLOAD), 7th Framework Programme, European Union (EU)
- 2006 - 2010 Coordinator, Project “NovoBrain”, Marie Curie Host Fellowships – Early stage research training (EST), EU
- 2005 - 2010 Coordinator, Project “Cortex”, Marie Curie Host Fellowships – Early stage research training (EST), EU

Honours and Awarded Memberships

- 2022 Member, German National Academy of Sciences Leopoldina, Germany
- 2018 Member, Dana Alliance for Brain Initiatives, Dana Foundation, New York City, USA
- 2005 - 2010 Spokesperson, Competence Network Neuroscience (NeuroNRW), State of North Rhine Westphalia, Germany

Research Priorities

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particularly interested in the hippocampus, a part of the brain which is of paramount importance for the creation of autobiographical and spatial memories. Her work provides insight into how learning influences synaptic plasticity in healthy people as well as after accidents and in the case of disease.

Synapses are anatomical features of nerve cells, neurons, that allow intracellular communication on the basis of electrochemical transmission. Neurons are able to alter their communication efficiency based on the experience of their synapses. This process is called synaptic plasticity and forms the cellular mechanism of learning and memory in the brain.

Denise Manahan-Vaughan explores the molecular, cellular, genetic and systemic mechanisms of synaptic plasticity. The goal is to understand how complex long-term memories are created and retained in the mammalian brain. For example, Denise Manahan-Vaughan's research team is investigating the role of specific neuronal proteins and neurotransmitter receptors, i.e. messenger substances at synapses in the brain. She is also focused on investigating synaptic plasticity in the hippocampus as a result of learning and identifying brain structures that contribute to these processes.

For this, Manahan-Vaughan's team combines, for example, electrophysiological analyses of synaptic plasticity with cellular or magnetic resonance imaging. This multidisciplinary research approach also includes behavioural analyses of learning, immunohistochemical, biochemical and molecular biological analyses as well as confocal microscopy. The goal is not only to understand how memories are created by the brain, but also how brain disorders affect these processes. Mechanisms underlying the early development of psychoses and Alzheimer's disease are a particular focus of her research. Discoveries of these mechanisms may pave the way to new therapeutic possibilities.