



Curriculum Vitae Professor Dr May-Britt Moser

Name: May-Britt Moser

Date of birth: 4 January 1964

Research Priorities: Neuroscience, mechanism for spatial orientation, natural navigation system, grid cells, speed cells, Alzheimer's research

May-Britt Moser is a neuroscientist. She is known for her work on spatial orientation and spatial memory. Together with Edvard Moser she discovered a type of brain cell (grid cells), which enables precise orientation in space. This made it possible to demonstrate thinking capacity at a neuronal level for the first time. For the discovery of grid cells May-Britt Moser and Edvard Moser received the Nobel Prize in Physiology or Medicine in 2014, together with John O'Keefe.

Academic and Professional Career

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| 2015 | Co-Director, Egil and Pauline Braathen and Fred Kavli Centre for Cortical Microcircuits (BKC), Norwegian University of Science and Technology (NTNU), Trondheim, Norway |
| 2013 - 2022 | Founding Director and Director, Centre for Neural Computation and Director, Kavli Institute for Systems Neuroscience (KISN), NTNU, Trondheim, Norway |
| 2007 - 2012 | Founding Member and Vice Director, KISN, NTNU, Trondheim, Norway |
| 2002 - 2012 | Founding Member and Co-Director, Centre for the Biology of Memory, NTNU, Trondheim, Norway |
| 2001 - 2002 | Head, Department "Biological and Cognitive Psychology", NTNU, Trondheim, Norway |
| 2000 | Professor of Neuroscience, NTNU, Trondheim, Norway |
| 1996 - 2000 | Associate Professor of Biological Psychology, NTNU, Trondheim, Norway |
| 1996 | Visiting Scholar, University College London (UCL), London, UK |

- 1995 - 1996 Research Associate, University of Oslo (UiO), Oslo, Norway, and University of Edinburgh, Edinburgh, UK
- 1995 PhD in Neurophysiology, UiO, Oslo, Norway
- 1990 Degree in Psychology, UiO, Oslo, Norway
- 1982 - 1990 Degree in Mathematics, Chemistry, Statistics, Neurobiology and Psychology, UiO, Oslo, Norway

Functions in Scientific Societies and Committees

- 2013 - 2022 Member, Board of Directors, Centre of Excellence, Ministry of Education and Research, Oslo, Norway
- since 2007 Member, Editorial Board, Hippocampus
- 2002 - 2012 Member, Board of Directors, Centre of Excellence, Ministry of Education and Research, Oslo, Norway
- Expert: Nature, Science, Nature Neuroscience, Neuron, Journal of Neuroscience, European Journal of Neuroscience, Behavioral Neuroscience, Hippocampus

Project Coordination, Membership in Collaborative Research Projects

- 2011 - 2015 Advanced Grant, European Research Council (ERC)
- 2008 - 2010 Project "Space coding in hippocampo-entorhinal neuronal assemblies", Topic "HEALTH-2007-2.2.1-2: Coding in neuronal assemblies", 7th Research Framework Programme (FRP), ERC
- 2007 - 2010 Project "Functional Genomics Programme II", Research Council of Norway, Norway
- 2007 - 2009 Project "NevroNor", Research Council of Norway, Norway
- 2001 - 2005 Project "Medicine and Health Group", Research Council of Norway, Norway
- 2000 - 2003 Project "Strategic University Programme", Research Council of Norway, Norway
- 2000 - 2003 Project "Quality of Life and Management of Living Resources Work Program/ Research and technological development activities of a generic nature", 5th FRP, ERC

Honours and Awarded Memberships

- since 2023 Foreign Member, Royal Society, UK
- 2018 Royal Norwegian Order of Saint Olav, Norway
- since 2016 Member, Royal Swedish Academy of Sciences, Sweden

- since 2016 Member, German National Academy of Sciences Leopoldina, Germany
- since 2015 International Member, American Philosophical Society, USA
- since 2015 International Member, National Academy of Medicine, USA
- since 2014 Foreign Member, National Academy of Sciences, USA
- 2014 Nobel Prize in Physiology or Medicine (together with Edvard Moser and John O’Keefe), Nobel Assembly at Karolinska Institutet, Stockholm, Sweden
- 2014 Karl Spencer Lashley Award, American Philosophical Society, USA
- 2013 Perl-UNC Neuroscience Prize, University of North Carolina, Chapel Hill, USA
- 2013 Fridtjof Nansen Award of Outstanding Research in Science and Medicine, Norwegian Academy of Science, Norway
- 2013 Madame Beyer Award, Trondheim Chamber of Commerce, Trondheim, Norway
- 2013 Louisa Gross Horwitz Prize for Biology or Biochemistry, Columbia University, New York City, USA
- since 2012 Member, European Molecular Biology Organization (EMBO)
- since 2011 Member, Academia Europaea
- 2011 Anders Jahre Senior Medical Prize, UiO, Oslo, Norway
- 2011 Louis-Jeantet Prize for Medicine, Louis-Jeantet Foundation, Geneva, Switzerland
- since 2010 Member, Norwegian Academy of Science and Letters (DNVA), Norway
- 2008 Eric K. Fernström Prize, Karolinska Institute, Solna, Sweden
- 2008 - 2012 Funded Grant (together with Fred Gage), James S. McDonnell Foundation, Saint Louis, USA
- 2006 Betty and David Koetser Award for Brain Research, Betty and David Koetser Foundation for Brain Research, Zurich, Switzerland
- 2006 Liliane Bettencourt Prize for Life Sciences, Bettencourt Schueller Foundation, Paris, France
- 2005 W. Alden Spencer Prize, Columbia University, New York City, USA
- since 2005 Member, DNVA, Norway
- since 2003 Member, Royal Norwegian Society of Sciences and Letters (DKNVS), Norway
- 1999 Scientific Annual Prize, DKNVS, Norway

Research Priorities

May-Britt Moser is a neuroscientist. She is known for her work on spatial orientation and spatial memory. Together with Edvard Moser she discovered a type of brain cell (grid cells), which enables precise orientation in space. This made it possible to demonstrate thinking capacity at a neuronal level for the first time. For the discovery of grid cells May-Britt Moser and Edvard Moser received the Nobel Prize in Physiology or Medicine in 2014, together with John O'Keefe.

May-Britt Moser researches computational and information-processing functions in the brain and cognitive behaviour derived therefrom. Her research is focused on orientation in space. Together with Edvard Moser she discovered previously unknown nerve cells in the brains of rats, so-called grid cells. Grid cells work like an internal navigation system. They place a virtual coordinate grid of hexagons over the perceived environment and the brain uses this grid to calculate the position in space. Both researchers were thus able to demonstrate thinking capacity at a neuronal level for the first time. In further studies they also identified "border cells". These become active when animals approach obstacles and walls.

May-Britt Moser and Edvard Moser thus revealed essential principles of the orientation system in rodents. The grid and border cells they discovered are involved in interaction with other cells. These include head direction cells, a kind of compass, and place cells, which fire signals when the animal passes known locations and landmarks. Together, the different cell types are assumed to create a kind of map of the spatial environment. In more recent work, both researchers have also discovered cells that indicate walking speed, known as speed cells. For this they investigated the brain activity of rats at different walking speeds. As speed increases the speed cells become more active.

For the discovery of grid cells, May-Britt Moser and Edvard Moser received the Nobel Prize in Physiology or Medicine in 2014. They share the award with the British-US neuroscientist John O'Keefe, who identified place cells of the brain. The results of research by May-Britt Moser and Edvard Moser could advance research into Alzheimer's disease, because brain areas relating to orientation are the first to be affected by Alzheimer's.

A remarkable finding of recent years is the discovery of a signal for "episodic time" in the lateral entorhinal cortex (LED), a sister region of the medial entorhinal cortex (MEC) for spatial coding. The LED marks the time between the signal and the actual experience of a message which is referred to as an episode. Until now it has been assumed that mainly spatial information is sent by grid cells in the MEC to place cells in the hippocampus. Now May-Britt Moser has been able to show that it is mainly the precise timing of neuronal activity in the hippocampus that depends on signals from the MEC.

These findings on the internal navigation system shed new light on neurological diseases, in which the precise timing of neural activities is disturbed, as in Alzheimer's dementia, schizophrenia or after a stroke and brain injuries.