

Curriculum Vitae: Edvard I. Moser

Affiliation:

Kavli Institute for Systems Neuroscience and Centre for Neural Computation, Norwegian University of Science and Technology (NTNU), Trondheim, Norway

Contact:

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Place and Date of Birth, Nationality: Ålesund, Norway, 27. April 1962, Norwegian

Family: Married with May-Britt Moser, 2 daughters: Isabel and Ailin (born 1991 and 1995)

Present positions:

Founding Director of Kavli Institute for Systems Neuroscience (2007 –)
Founding Co-Director of Centre for Neural Computation (2013 – 2022)
Professor of Neuroscience (1998 –)

Past positions:

Founding Director of Centre for the Biology of Memory (2002 – 2012)
Associate Professor of Biological Psychology (1996-98)
Postdoc , Univ Edinburgh and Univ College London (1994-96)
Ph D student, Univ Oslo (1991-95)

Education (all Univ. of Oslo):

Mathematics, statistics, programming (1984-85)
Psychology (1985-90)
Neurobiology (1990)

Research

Neural network computations in the cortex, with particular emphasis on dynamic representation of space and memory in the hippocampal-entorhinal system.

I have studied how spatial location and spatial memory are computed in the brain. My most noteworthy contribution is probably the discovery of grid cells in the entorhinal cortex, which points to the entorhinal cortex as a hub for the brain network that makes us find our way. Together with many colleagues, and in particular my wife and long-term collaborator May-Britt Moser, I have shown how a variety of functional cell types in the entorhinal microcircuit contribute to representation of self-location, how the outputs of the circuit are used by memory networks in the hippocampus, and how episodic memories are separated from each other in the early stages of the hippocampal memory storage. The discovery of grid cells and their control of population dynamics in the hippocampus have led to a revision of established views of how the brain calculates self-position and spatial mapping and is becoming one of the first non-sensory cognitive functions to be characterized at a mechanistic level in neuronal networks.

Grid cells have attracted wide attention because the crystal-like structure underlying their firing fields does not arise out of sensory inputs but instead is created entirely within the brain itself. With the discovery of place cells and grid cells, as well as other co-localized spatial cell types, it has become possible to study neural computation at the high end of the cortical hierarchy, quite independently of sensory inputs and motor outputs. The presence of an experimentally controllable firing correlate, combined with the access to activity patterns of multiple discrete cell types, provides researchers with a model system to determine not only how specific activity patterns are generated but also how activity gets transformed from one cell type to another.

Honours

- 1999: Prize for young scientists awarded by the Royal Norwegian Academy for Sciences and Letters
 2003–: Elected member of The Royal Norwegian Society of Sciences and Letters
 2004–: Elected member of The Norwegian Academy of Science
 2005: 28th annual W. Alden Spencer Award (College of Physicians and Surgeons of Columbia University)
 2006: 10th Prix "Liliane Bettencourt pour les Sciences du Vivant" (Fondation Bettencourt, Paris)
 2006: 14th Betty and David Koetser Award for Brain Research (University of Zürich)
 2008: 30th Eric K. Fernström's Great Nordic Prize (Fernström Foundation, University of Lund)
 2010–: Elected member of The Norwegian Academy of Technological Sciences (NTVA)
 2011: 26th Louis-Jeantet Prize for Medicine (Louis-Jeantet Foundation)
 2011–: Fellow of the American Association for the Advancement of Science (AAAS)
 2011: Anders Jahre's Great Nordic Prize for Medical Research (Univ. Oslo)
 2011–: Elected member of the European Molecular Biology Organization (EMBO)
 2011–: Elected member of Academia Europaea
 2012–: Elected Society for Neuroscience Councilor
 2013: 13th Perl/UNC Neuroscience Prize (Univ. of North Carolina)
 2013: 102nd annual Fridtjof Nansen Award of Outstanding Research in Science and Medicine, Norwegian Academy of Science
 2013: 47th Louisa Gross Horwitz Prize for Biology or Biochemistry (Columbia University)
 2014: 59th Karl Spencer Lashley Award (American Philosophical Society)

Appointments and international evaluations

- 2002: Centre of Excellence appointment by Norw. Res. Council. Thirteen centers from all fields of science were selected from 129 proposals through an extensive international review process.
 2003: Evaluation by Norwegian Research Council Panel for Psychology /Psychiatry. Rated 'excellent'.
 2006: Centre for the Biology of Memory rated "exceptionally good" at midterm evaluation by international experts.
 2007: Founding Director of Kavli Institute for Systems Neuroscience (4th Kavli institute in the field of Neuroscience in the world).
 2011: National Research Council evaluation of biological disciplines: Rated 'Undoubtedly excellent'.
 2012: In its final report, the Scientific Advisory Board of the Centre for the Biology of Memory ranked the Moser group as among the top 0.1% of neuroscience groups worldwide (i.e. among the ~ top 10).
 2012: Centre of Excellence appointment by Norw. Res. Council. Director May-Britt Moser. I am Co-Director. Thirteen centers from all fields of science were selected.

Memberships

Society for Neuroscience (1992 -), Royal Norwegian Society of Sciences and Letters (2003 -), Norwegian Academy of Science (2004 -), European Dana Alliance for Brain Research (2006 -), Norwegian Academy of Technological Sciences (2010 -).

International professional activities

- 2005-06: Chairman of the Programme Committee of the Federation of European Neuroscience Societies (FENS) for Vienna 2006.
 2008: Evaluation panel for RIKEN-MIT Neuroscience Research Center (2008).
 2010 –: Scientific Advisory Board of Picower Ctr for Learn and Memory, MIT
 2012 –: Panel Member for European Research Council Starting Grants (panel LS5 Neurosciences and neural disorders).
 2012 –: Society for Neuroscience Councilor (elected; European representative)

2013 – : Scientific Advisory Board of Ernst Strungmann Forum, Frankfurt

Editorship

Current Opinion in Neurobiology (Chief Editor, with Cori Bargmann; 2010–)

Editorial Boards: Present

Hippocampus (2003–)

Faculty of 1000 (2003–)

Neuron (2007 –)

Learning and Memory (2011 –)

F1000 Research (2012 –)

BrainFacts.org (2011 – 2015)

Editorial Boards: Past

Science (Board of Reviewing Editors, 2004–2013)

Journal of Neuroscience (Reviewing Editor 2005–2010; Associate Editor 2003-2004)

Neuroscience (Section Editor for Behavioural Neuroscience, 2003–05; Editorial Board member 2000–05)

Neural Systems and Circuits (2010 -2012)

Guest editor: *Current Opinion in Neurobiology* (Dec 2007, Neurobiology of Behavior, with Barry Dickson)
Hippocampus (Dec 2008, Special Issue on Grid Cells, with M. Hasselmo and M-B Moser)

Referee service

Regular reviews for Nature, Science, Nature Neuroscience, Neuron, Journal of Neuroscience.

Less frequently: Current Biology, PLoS Biology, Nature Reviews Neuroscience, Proc Natl Acad Sci USA, Cell, Journal of Neurophysiology, European Journal of Neuroscience, Neuroscience, Behavioral Neuroscience, Hippocampus, in addition to ~15 other scientific journals.

Grant proposals

Human Frontiers Science Program, The Wellcome Trust, The Royal Society of London, National Science Foundation, The Irish Health Research Board, The Israel Science Foundation, Vienna Science and Technology Fund, Singapore Stem Cell Consortium, The Finnish Research Council, The Swedish Research Council, The Norwegian Research Council, French National Research Council.

Selected invited lectures

- 2000: EURESCO 2000 meeting on Retrieval of Memory, Granada, Spain (org. Y Dudai and T Robbins).
- 2001: Winter Conference on Neural Plasticity, Antigua (symposium organizer H Eichenbaum).
- 2001: Keystone Symposium on Hippocampus: The Integration of Cellular Mechanisms and Cognitive Function, Taos Civi Center, New Mexico, USA (organizers: E Schuman, M Wilson and M Mayford).
- 2001: Arctic Symposium on Memory and Memory Disorders, Saariselkä, Finland (org.: G Buzsaki et al.)
- 2001: CalTech seminar, Dept. of Biology, CalTech, Los Angeles, U.S.A. (E Schuman)
- 2001: EU Advanced Course in Computational Neuroscience, Trieste, Italy (organizers: A Treves et al.).
- 2002: FENS 2002 Satellite Symposium: Synaptic Plasticity: A Systems Viewpoint, Bristol (organizers C Warburton, M Brown, R Muller and Z Bortolotto).
- 2003: Spatial Representation in Animals, Toulouse 24-25 Jan 2003 (organizer Martin Giurfa).
- 2003: Molecular Basis of CNS Disorders, Bonn, 20-22 Feb 2003.
- 2003: Seminars at UCLA, L.A., and Salk Institute, San Diego, USA, May 2003 (organizers: Alcino Silva, Larry Squire and Terry Sejnowski).
- 2004: Lecture at Picower Centre for Learning and Memory, Massachusetts Institute of Technology 1 April (organizers M. Sheng and S. Tonegawa) and Boston University, 30 March (H Eichenbaum).

- 2004: EURESCO conference on the Representation of the Memory Trace, May 14-19, Obernai, France.
- 2005: Learning & Memory meeting, Cold Spring Harbor, New York, USA, April 20-24.
- 2005: Lecture at Rutgers University, Newark (with Gyuri Buzsaki), April 21st.
- 2005: Memory Concepts meeting (McDonnell Foundation), Newark, September.
- 2005: 28th annual W. Alden Spencer Award, given by the College of Physicians and Surgeons of Columbia University, New York, October 21.**
- 2005: Abschluss-Symposium des SFB, Berlin, October 24-25.
- 2005: Presidential Lecture, Society for Neuroscience Annual Meeting, Washington, USA, November**
- 2006: Distinguished Visitor, Kavli Institute for Brain and Mind, San Diego: Feb 14-27.
- 2006: Caltech Seminar, Los Angeles, Feb 21.
- 2006: Robert Greer Visiting Lectureship, University of Texas Medical School, Houston, March 2.**
- 2006: Fondation Ipsen meeting on 'Memories: Molecules and Circuits', April 24th
- 2006: Gatsby workshop on 'Principles of Neural Representation', London, May 10-12th.
- 2006: The Lausanne Neuroscience Seminars, Brain Mind Institute and Univ. of Lausanne, June 12th.
- 2006: Boehringer Ingelheim Seminar Series, Hungarian Academy of Sciences, Budapest, June 13th.
- 2006: Oxford Autumn School in Neuroscience, 25-26 Sept.
- 2006: Shanghai Symposium in Neuroscience, Shanghai Inst. of Brain Functional Genomics, Oct 30th.
- 2007: Weizmann Institute of Science, Israel: Inaugurate lecture at graduate school neuroscience program.
- 2007: Plenary Lecture at British Neuroscience Association's biannual meeting, April 21-24.
- 2007: Schwammerdamm lecture, Amsterdam, May 23rd.
- 2007: Plenary Lecture at Societe des Neurosciences (French Neuroscience Ass.), Montpellier, May 22-25.
- 2007: Plenary lecture at Gordon Research Conference on Neural Circuits and Plasticity, Newport RI, July 1-6.
- 2007: Plenary Lecture at IBRO biannual meeting, Melbourne, July 12-17.**
- 2007: Plenary Lecture at Scandinavian Physiology Society meeting, Oslo, August 10-12.
- 2007: Plenary Lecture at Ninth Nordic Meeting in Neuropsychology, Goteborg, August 19-22.
- 2007: Fred Kavli symposium, Santa Barbara, September 15.
- 2007: Speaker at Ascona Circuits meeting: The assembly and function of neuronal circuits, Monte Verita, Switzerland, Sept 23-28.
- 2007: Princeton Univ.: Neuroscience Institute seminar series, Nov. 9.
- 2007: Hebb lecture, McGill University, Montreal, Nov. 10.
- 2008: Salk-Nature-Ipsen Symposium: Genes, circuits and behaviour. Salk Institute, La Jolla, Jan 10-13.
- 2008: Lecture at Max Planck Institute for Brain Research, Heidelberg, Feb 15.
- 2008: Seminar at Janelia Farm Research Campus, VA, March 12.
- 2008: Seminar at State Univ New York, Brooklyn, March 13.
- 2008: Speaker at 'Neuronal Circuits: from Structure to Function', Cold Spring Harbor, 13-16 March
- 2008: Monthly Lecture at Rockefeller University (for broad neuroscience community), April 18.
- 2008: Speaker at Nobel symposium on 'Genes, Brain and Behavior', Karolinska Institutet, Stockholm, June 12-15.**
- 2008: Speaker at Molecular and Cellular Cognition Society FENS2008 satellite meeting, Geneva, July 10-11.
- 2009: Plenary speaker at Hungarian Neuroscience meeting, Budapest, 22-24 Jan 2009.
- 2009: Friday lecture at the Functional Imaging lab at UCL, London, 27 Feb
- 2009: Plenary lecture at Neuroscience Day, Edinburgh neuroscience community, 25-26 March
- 2009: Lecture at European Molecular Biology Lab, Rome, 30 April
- 2009: Duncan lecture, Northwestern Univ., Evanston, Illinois, 7 May**
- 2009: Lectures at UC Berkeley and UC San Fransisco, 13-14 May
- 2009: Keynote Lecture at McKnight Conference in Neuroscience, Aspen, Colorado, 4-8 June**
- 2009: Ernst Strüngmann Forum (former Dahlem Conference), Frankfurt, 16-21 Aug.
- 2009: Gordon Conference on Excitatory Synapses and Brain Function, Les Diablerets, Switzerland, 10 Sept.
- 2010: Heller lecture, Hebrew University, Jerusalem, 22 March**
- 2010: Lecture at Bir Zeit University, Ramallah, 23 March
- 2010: Center for Brain Science, Harvard, 4 March
- 2010: CSHL Asia Inaugural Neuroscience Symposium, Suzhou, China, 12-17 April
- 2010: New Concepts in Neuroscience conference, Bergen, Norway: 26-28 May
- 2010: Gatsby workshop on grid cells, London, 30 June – 2 July
- 2010: Attention & Performance conference on Space, Time and Number, Abbey of Vaux de Cernay, France, 6-10 July

- 2010: Berlin Brain Days: keynote lecture, 1-3 Nov.
- 2010: Lecture at Max Planck Inst. for Brain Res., Frankfurt
- 2011: Neural Plasticity conference, Morea, Tahiti, 14-18 Feb
- 2011: NIH campuswide seminar, Bethesda, 14 March
- 2011: Ely Lilly speaker at Université de Montreal 15-17 March
- 2011: Synapses – from molecules to circuits and behaviour, Cold Spring Harbor, April 12-16
- 2011: Lecture at Instituto De Neurociencias, Alicante, May 13
- 2011: Speaker at Nobel symposium ‘Machines, Molecules and Mind’, Sångå-Säby, Stockholm, May 25-28**
- 2011: Lecture at Institute for Neuroscience and Pharmacology, Copenhagen University, 31 Aug.
- 2011: Plenary lecture at EMBO meeting, Vienna, 11-14 Sep**
- 2011: Søren Falch Lecture, Univ. Bergen, 30 Sep
- 2011: Kavli Distinguished Lecture, Yale, 17 Nov**
- 2012: Max Birnstiel Lecture at IMP, Vienna, 18 Jan
- 2012: Adrian seminar, Cambridge University, 13 Feb
- 2012: Lecture at opening symposium of Neuroscience Centre at UCLA (A. Silva), 5-6 March
- 2012: Bauer Lectures, Brandeis University, Boston, 2-4 April
- 2012: Plenary Lecture at Soelden neuroscience meeting, Austria, 10-12 April
- 2012: Plenary talk at INS Nordic Meeting in Neuropsychology, Oslo 27 June
- 2012: Public scientific lecture at Karolinska Institute, Stockholm, 18 September
- 2012: Symposium speaker, Society for Neuroscience, New Orleans, 15 Oct
- 2012: EMBO meeting short talk for new members 24 Oct, Heidelberg
- 2012: Univ Basel and FMI: All-campus seminar in neuroscience, 25 Oct
- 2012: Lecture at Institut de Biologie de l’Ecole Normale Supérieure, Paris, 16 Nov
- 2012: Lecture at Univ. Bristol, 19 Nov
- 2013: Lecture at Max Planck Inst for Immunol and Epigenetics, Freiburg, 7 Feb
- 2013: Lecture at Neural Plasticity meeting, Curacao, February 15th
- 2013: First annual Jupiter Brain Sunposium, February 18-20th
- 2013: 8th Annual Eric M. Shooter Lecture, Stanford Univ Sch Med, 10 April**
- 2013: Keynote Lecture, UT Austin Learning and Memory Conference, 12-14 April**
- 2013: Lecture at Duke University, 15-16 April
- 2013: Perl/UNC Neuroscience Prize Lecture 17 April**
- 2013: Royal Society scientific meeting, "Space in the Brain: Cells, Circuits, Codes and Cognition" May 1-3, London.
- 2013: Plenary Lecture Belgian Neuroscience Meeting 31 May
- 2013: Lecture at Univ. of Würzburg 8 May
- 2013: Lecture at Univ. Helsinki, 9 Sep.
- 2013: ESF Neuroscience meeting, Stresa, Italy, 20-23 Oct.
- 2013: Kenneth O. Johnson Memorial Lecture, Johns Hopkins Univ., 15. Nov.**
- 2013: Nov2k symposium plenary lecture, Stockholm, 21-22 Nov.
- 2013: Hungarian Academy of Science: Neuroscience Seminar Series, 5-6 Dec.
- 2014: Lecture, Palestinian Neuroscience Initiative symposium, Al-Quds University, 14 Jan.
- 2014: **Louisa Gross Horwitz Prize Lecture, 16 Jan**
- 2014: Friday Lecture Series seminar at Rockefeller University, 17 Jan.
- 2014: Kavli Institute for Theoretical Physics neurophysics workshop, Santa Barbara, 3-7 Feb.
- 2014: Lecture at Centre for Neural Circuits and Behavior, Univ. of Oxford, 24 March
- 2014: Lecture at Institute Pasteur, Paris, 26 March
- 2014: ‘How to read a map’ conference, Janelia Farm Res. Campus, 6-9 April
- 2014: Lecture at NYU Med Ctr annual retreat, 10-12 April
- 2014: Lundbeck/FENS Brain Conference, Rungstedgaard, Denmark, 20-23 April
- 2014: Neural Networks in the Arctic, Spitsbergen 5-10 June
- 2014: Keynote lecture, Gordon conference on “Synaptic Transmission”, Waterville, New Hampshire, 3-8 August**
- 2014: Opening symposium for Max Planck Institute for Brain Research, 24-25 Sept.
- 2014: RIKEN Brain Science Institute Lecture, 4-5 Dec.
- 2014: “Vision, memory and thought: how cognition emerges from neural networks” conference, Univ. of Tokyo, 5-7 Dec.

2014: Champalimaud Neuroscience Programme lecture, Lisbon, 10 Dec.

Symposia and conference organizer (recent)

2002: Memory functions of the hippocampus. Spring Hippocampal Research Conference, Grand Cayman.
 2002: Hippocampal memory networks: Between molecules and behaviour. FENS 2002, Paris.
 2004: Population codes in the hippocampus. Spring Hippocampal Research Conference, Grand Cayman.
 2005: Learning & Memory meeting, Cold Spring Harbor, New York, USA, April 20-24.
 2008: Fridtjof Nansen conference on Neural Networks and Memory, June 4-8, conference organizer.
 2008: Kavli Prize symposium, Univ. of Oslo and NTNU, Sept 8-11, co-organizer.
 2009: Ascona Circuit meeting: co-organizer, 4-8 Oct.
 2010: Kavli Prize symposium, Univ. of Oslo and NTNU, Sept 6-9, co-organizer.
 2011: Ascona Circuit meeting: co-organizer, 25-29 Sept.
 2013: Kavli Community Symposium, organizer, 22-23 Aug.
 2013: Ascona Circuit meeting: co-organizer 29 Sept – 4 Oct
 2014: Neural Networks in the Arctic, conference organizer, Spitsbergen 5-10 June

Current research supervision (shared with M.-B. Moser)

Postdoc: Kei Igarachi (2008 –), J Ye (2008 –), H Ito (2009 –), H Yamahachi (2011–), D Ledergerber (2011 –), D Rowland (2011 –), F Donato (2013 –), M Hägglund (2013 –).

PhD.: E Henrikssen (2006 –), H Stensola (2008 –), C Alme (2009 –), A Tsao (2009 –), L Lu (2009 –), M Chenglin (2009 –), T Wernle (2010–), N Dagslott (2011 –), Ø Høydal (2013 –).

Completed postdocs: F. Sargolini (2004-06; now Associate Professor at Univ. Marseille), P Ganter (2002–06), S Leutgeb (2002–07; now Assistant Professor at UCSD), V Brun (2005-07; now Assoc. Professor at Univ. Tromsø), A Sale (2006 – 07), J Leutgeb (2003-08; now Assistant Professor at UCSD), M Fyhn (2005-08 ; now Assoc. Professor at Univ. Oslo), T Hafting (2005-08 ; now Assoc. Professor Univ. Oslo), J Angie (2007 –08; now Lecturer at Univ. St. Andrews), R Langston (2007 –10 ; now Lecturer at Univ. Dundee), K Jezek (2005-10 ; now Assoc. Professor at Czech Academy of Sciences), L Colgin (2005-10 ; now Assistant Professor at UT Austin)**, D Derdikman (2005-; now Assistant Professor at Technion in Haifa), A Tashiro (2006 –12 ; now Assistant Professor at Nanyang Technol. Univ., Singapore)*, E Kropff (2008-2011; now Assistant Professor at Neuronal Plasticity Laboratory, Leloir Institute, Buenos Aires, Argentina), L Giacomo (2009-2011; now Assistant Professor at Stanford Univ.)***, J Whitlock (2007 – 2013) ****, T van Cauter (2008 – 2013), S-J Zhang (2008 –2011 ; now a group leader at the Kavli Institute).

Completed PhDs: S Molden (2005), H-A Steffenach (2005), F Tuvnes (2005), M Fyhn (2005)****, V Brun (2005), H-A Steffenach (2005), M K Otnæss (2006), T Solstad (2009) and Kirsten Gj Kjelstrup (2010), T Bonnevie (2014), Charlotte Boccara (2014), T Stensola (2014).

*Ayumu Tashiro received ERC Starting Grant in 2008 (at the Kavli Institute), also recipient of Gruber International Prize 2008 (awarded at Society for Neuroscience annual meeting); **Laura Colgin received the Gruber International Prize 2010; ***Lisa Giacomo received the Gruber International Prize 2012; she was offered an ERC Starting Grant in 2012: ****Jonathan Whitlock received an ERC Starting Grant in 2013 (Kavli Institute, 1.1.2014 –); *****Marianne Fyhn received the Donald B Lindsley Award for best PhD in behavioural neuroscience in 2005 and was a runner-up for the Science Eppendorff Prize in 2007.

Selected national administrative experience

Head of Interdisciplinary Programme in Neuroscience at NTNU (1998 – 2002); Head of Strategic University Programme in neuroscience at NTNU (2000–03); Head of international research consortium funded by European Commission (FW5; 2000–03); Member of Mental Health Board of Norwegian Research Council (2001–05); Director of Centre for the Biol. of Memory (Centre of Excellence, 2002–). Head of Program

Committee for Neuroscience Research and Education at NTNU (2003 - 2005). Responsible for master programme in neuroscience at NTNU (2003 - 2005).

Funding (selected)

- 2000 – 2003: **European Commission Framework V** 'Quality of Life and Management of Living Resources Work Program / Research and technological development activities of a generic nature': 15.4 million NOK (1.9 mill. Euro; 20% to M/E Moser). Coordinator.
- 2002 – 2012: **Centre of Excellence Appointment by Norw. Res. Council**: Total budget 100 million NOK (12.5 mill Euro) over 10 years. See above.
- 2008 – 2010: **European Commission Framework VII**: Collaborative Project: Small or medium-scale focused research project: HEALTH-2007-2.2.1-2: Coding in neuronal assemblies. 22 million NOK (3 mill. Euro; 20% to M/E Moser). Coordinator.
- 2008 – : **Endowment from Kavli Foundation to establish Kavli Institute for Systems Neuroscience**; total of 7 million NOK per year, including supplementary funding from NTNU. Unlimited in time.
- 2009 – 2013: **European Research Council Advanced Investigator Grant**; individual grant, total of 20 million NOK over 5 years (2.5 M Euro).
- 2013 – 2015: **European Commission Framework VII**: ICT Future Emerging Technologies (ICT-2011.9.11): 2.9 million Euro over 3 years. Coordinator.
- 2013 – 2022: **Centre of Excellence Appointment by Norw. Res. Council**: Total budget 175 million NOK (24 mill Euro) over 10 years. See above.
- 2014 – 2019: **European Research Council Advanced Investigator Grant**; individual grant, total of 20 million NOK over 5 years (2.5 M Euro).

Publications

Theses:

Moser, E.I. & Moser, M.-B. (1990). Spatial learning in a water maze following hippocampal lesions: Effects of the volume and the septo-temporal location of the lesion. Thesis ('hovedoppgave ') in Psychology, University of Oslo.

Moser, E.I. (1995). Field potential changes in the dentate gyrus during spatial learning in the rat. Dr. philos. thesis.

Articles: * = most significant publications

Skårdal, O., Lind, E., van der Welle Gjøen, J., Moser, E., Smørdal, T., Nyhus, S.T. & Moser, M.B. (1986). The interactional effects of personality and gender in small groups: A missing perspective in research. *International Journal of Small Group Research*, 2, 172-185.

Moser, M.B., Moser, E.I., Wultz, B. & Sagvolden, T. (1988). Component analyses differentiate between exploratory behavior of SHR and WKY rats in a two-compartment free-exploration open field. *Scandinavian Journal of Psychology*, 29, 200-206.

Wultz, B., Sagvolden, T., Moser, E.I. & Moser, M.B. (1990). The spontaneously hypertensive rat as an animal model of attention deficit hyperactivity disorder: Methylphenidate effects on the exploratory behavior of SHR and WKY rats in a two-compartment free-exploration open field. *Behavioral and Neural Biology*, 53, 88-102.

Moser, E.I. (1991). Finnes det en nosologisk distinkt ADD-populasjon? *Tidsskrift for Norsk Psykologforening*, 28, 477-487.

Moser, E.I., Mathiesen, I. & Andersen, P. (1993). Association between brain temperature and dentate field potentials in exploring and swimming rats. *Science*, 259, 1324-1326.

Moser, E.I., Moser, M.-B. & Andersen, P. (1993). Spatial learning impairment parallels the magnitude of dorsal hippocampal lesions, but is hardly present following ventral lesions. *Journal of Neuroscience* 13, 3916-3925.

Moser, E.I., Moser, M.-B. & Andersen, P. (1993). Synaptic potentiation in the rat dentate gyrus during exploratory learning. *Neuroreport*, 5, 317-320.

Moser, E.I. & Andersen, P. (1994). Conserved spatial learning in cooled rats in spite of slowing of dentate field potentials. *Journal of Neuroscience* 14, 4458-4466.

Moser, E.I., Moser, M.-B. & Andersen, P. (1994). Potentiation of dentate synapses initiated by exploratory learning: Dissociation from brain temperature, motor activity and arousal. *Learning & Memory*, 1, 55-73.

Moser, M.-B., Moser, E.I., Forrest, E., Andersen, P. & Morris, R.G.M. (1995). Spatial learning with a minislab in the dorsal hippocampus. *Proceedings of the National Academy of the Sciences USA*, 92, 9697-9701.

Moser, E.I. (1995). Learning-related changes in hippocampal field potentials. *Behavioural Brain Research*, 71, 11-18.

Andersen, P. & Moser, E.I. (1995). Brain temperature and hippocampal function. *Hippocampus*, 5, 491-498.

Moser, E.I. (1996). Altered inhibition of dentate granule cells during spatial learning in an exploration task. *Journal of Neuroscience*, 16, 1247-1259.

Moser, E.I. & Mathiesen, I. (1996). Relationship between neuronal activity and brain temperature in rats. *Neuroreport*, 7, 1876-1880.

Paulsen O. & Moser E.I. (1998). A model of hippocampal memory formation and retrieval: GABAergic control of synaptic plasticity. *Trends in Neurosciences*, 21, 273-278.

- Moser, M.-B. Moser, E.I. (1998). Distributed encoding and retrieval of spatial memory in the hippocampus. **Journal of Neuroscience**, 18, 7535-7542.
- Moser, E.I., Krobort, K.A., Moser, M.-B. & Morris, R.G.M. (1998). Saturation of long-term potentiation does impair spatial learning. **Science**, 281, 2038-2042.
- Moser, M.-B. & Moser, E.I. (1998). Functional differentiation in the hippocampus. **Hippocampus**, 8, 608-619.
- Moser, E.I. & Moser, M.-B. (1999). Is learning blocked by saturation of synaptic weights in the hippocampus? **Neuroscience and Biobehavioral Reviews**, 23, 661-672.
- Otnæss, M.K., Brun, V.H., Moser, M.-B. & Moser, E.I. (1999). Pretraining prevents spatial learning impairment following saturation of hippocampal long-term potentiation. **Journal of Neuroscience**, 19, RC49 (1-5).
- Moser, M.B. & Moser, E.I. (2000). Pretraining and the function of hippocampal long-term potentiation. **Neuron** 26, 559-561.
- Brun, V.H., Ytterbø, K., Morris, R.G.M., Moser, M.B. & Moser, E.I. (2001). Retrograde amnesia for spatial memory induced by NMDA receptor-mediated long-term potentiation. **Journal of Neuroscience**, 21, 356-362.
- Hollup, S.A., Molden, S., Donnett, J.G., Moser, M.B. & Moser, E.I. (2001). Accumulation of hippocampal place fields at the goal location in an annular watermaze task. **Journal of Neuroscience**, 21, 1635-1644.
- Hollup, S.A., Molden, S., Donnett, J.G., Moser, M.B. & Moser, E.I. (2001). Place fields of rat hippocampal pyramidal cells and spatial learning in the watermaze. **European Journal of Neuroscience**, 13, 1197-1208.
- Hollup, S.A., Kjelstrup, K.G., Hoff, J., Moser, M.-B. & Moser, E.I. (2001). Impaired recognition of the goal location during spatial navigation in rats with hippocampal lesions. **Journal of Neuroscience**, 21, 4505-4513.
- Moser, E.I. & Paulsen, O. (2001). New excitement in cognitive space: Between place cells and spatial memory. **Current Opinion in Neurobiology**, 11, 745-751.
- Steffenach, H.-A., Sloviter, R.S., Moser, E.I. & Moser, M.-B. (2002). Impaired retention of spatial memory after transection of longitudinally-oriented axons of hippocampal CA3 pyramidal cells. **Proceedings of the National Academy of the Sciences USA**, 99, 3194-3198.
- * Brun, V.H., Otnæss, M.K., Molden, S., Steffenach, H.-A., Witter, M.P., Moser, M.-B., Moser, E.I. (2002). Place cells and place representation maintained by direct entorhinal-hippocampal circuitry. **Science**, 296, 2089-2284.
- Fyhn, M., Molden, S., Hollup, S.A., Moser, M.-B. & Moser, E.I. (2002). Hippocampal neurons responding to first-time dislocation of a target object. **Neuron**, 35, 555-566.
- Kjelstrup, K.G., Tuvnes, F.A., Steffenach, H.-A., Murison, R., Moser, E.I., Moser, M.-B. (2002). Reduced fear expression after lesions of the ventral hippocampus. **Proceedings of the National Academy of the Sciences USA**, 99, 10825-10830.
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