

DEMOGRAPHIC INFORMATION

Current Appointments

- 2011-present Professor, Department of Neuroscience, Johns Hopkins
- 2014-present Professor, Department of Psychological and Brain Sciences, Johns Hopkins

Personal Data

Neuroscience
338 Krieger Hall
3400 N. Charles Street
Baltimore, MD 218
410-516-6410 (phone)
410-516-8648 (fax)
kirkwood@jhu.edu

Education and Training (in chronological order)

Undergraduate

1984 ~M.S., Licenciatura Biología, Universidad de Chile, Santiago

Doctoral/graduate

1991 Ph.D., Biophysics, Brandeis University, Waltham, MA

Postdoctoral

1991-1993 Postdoctoral fellow, Brown University, RI

Professional Experience

- 1993-1997 Research Assistant Professor, Brown University, RI
- 1997-2004 Assistant Professor, Neuroscience, Johns Hopkins University School of Medicine, Baltimore, MD
- 2004- 2011 Associate Professor, Neuroscience, Johns Hopkins University School of Medicine, Baltimore, MD
- 2011- present Professor, Neuroscience, Johns Hopkins University School of Medicine, Baltimore, MD

RESEARCH ACTIVITIES

Peer Reviewed Original Science Publications

- 1 Golowash, J , **Kirkwood A.**, Miller C. Allosteric effect of Mg^{2+} on the gating of Ca^{2+} activated K^+ channels from mammal skeletal muscle. J. Expl. Biol. 1986; 124, 5-13.
- 2 **Kirkwood A.**, Weiner D, Lisman J. An estimate of the number of G regulatory proteins activated per excited rhodopsin in living Limulus ventral photoreceptors. Proc. Natl. Acad. Sci. (USA) 1988; 86, 3872-3876.
- 3 **Kirkwood A.**, Simmons M, Mather M, Lisman J. Muscarinic suppression of the M-current is mediated by a rise in internal Ca^{2+} concentration. Neuron 1991; 6, 1009-1014.
- 4 **Kirkwood A.**, Lisman J. Action potentials produce a long-term enhancement of M-current in

- frog sympathetic ganglion. *Brain Res.* 1992; 580, 281-287.
- 5 Bear M. F, . **Kirkwood A.** Neocortical long-term potentiation. *Current Opinion in Neurobiology* 1993; **3**, 197-203.
- 6 **Kirkwood A,** Dudek, S, Gold, Aizenman, Bear M. Common forms of synaptic plasticity in hippocampus and neocortex in vitro. *Science* 1993; 240, 1518-1521.
- 7 **Kirkwood A,** Bear. M. Hebbian synapses in visual cortex. *J. Neurosci* 1994; 14, 1634-1645.
- 8 **Kirkwood A,** Bear M. Homosynaptic long-term depression in visual cortex. *J. Neurosci* 1994; 14, 3404-3412.
- 9 **Kirkwood A,** Lisman J.. Determinants of the single photon response variability: contribution of photoexcited rhodopsin lifetime. *J. Gen. Physiol.* 1994; 103, 679-690.
- 10 **Kirkwood A,** Bear M. Elementary forms of synaptic plasticity in the visual cortex. *Biol. Bull.* 1995; **28**, 73-81.
- 11 **Kirkwood A,** Lee H-K, Bear M. Long-term potentiation and experience-dependent plasticity in visual cortex are coregulated by age and experience. *Nature* 1995; 375, 328-331.
- 12 **Kirkwood A,** Rioult, M. Bear M. Experience-dependent modification of synaptic plasticity in rat visual cortex. *Nature* 1996; 381, 526-528.
- 13 Aizenman, CD, **Kirkwood A,** Bear M. A current source density analysis of evoked responses in slices of adult rat visual cortex: implications for the regulation of long-term potentiation. *Cerebral Cortex.* 1996; 6, 751-758.
- 14 **Kirkwood A.** Silva, A. Bear M. Age-dependent decrease of synaptic plasticity in the neocortex of α -CaM-KII mutant mice. *Proc. Natl. Acad. Sci. (USA)* 1997; 94, 3380-3383.
- 15 **Kirkwood A,** Rozas, C, Kirkwood J., Perez F. and Bear M. Modulation of Long-Term Synaptic Depression in visual cortex by acetylcholine and norepinephrine. *J. Neurosci.* 1999; 19: 1599-1609.
- 16 Huang JZ, **Kirkwood A,** Morales B, Pizzorusso, T. Porciatti, Bear, M F, Maffei L, & Tonegawa, S. BDNF is a key regulator of the maturation of inhibition and critical period of mouse visual cortex. *Cell* 1999; 98:739-755.
- 17 Frankland PW, O'Brien C O, Obne M, **Kirkwood A,** Silva, A. α -CAMKIII-dependent plasticity in the cortex is required for permanent memory traces. *Nature* 2001; 410, 309-313.
- 18 Rozas C, Frank H, Heynen A. Morales B, Bear, MF, **Kirkwood A.** Developmental inhibitory gate controls the relay of activity to the superficial layers of the visual cortex. *J. Neurosci.* 2001; 21, 6791-6801.
- 19 Yu H, Saura C, Choi SY, Sun L, Yang X, Handler M, Kawarabayashi T, Younkin L, Wilson M, Younkin S, Kandel E.R, **Kirkwood A,** Shen J. APP Processing, Notch Signalling and Synaptic Plasticity in the Adult Brain of *Presenilin-1* Conditional Knockout Mice. *Neuron* 2001; 31, 713-726.
- 20 Choi SY, Morales B, Lee HK, **Kirkwood A.** Absence of Long-Term Depression in the Visual Cortex of GAD 65 Knockout mice. *J. Neurosci.* 2002; 22: 5271-76.
- 21 Morales B, Choi SY, **Kirkwood A.** Dark rearing alters the development of GABAergic transmission in visual cortex. *J. Neurosci.* 2002; 22: 8084-90.
- 22 Gianfranceschi L, Siciliano R, Walls J, Morales B, **Kirkwood A,** Tonegawa S, Huang JZ, Maffei L. Visual cortex is rescued from the effects of dark rearing overexpression of BDNF. *PNAS.* 2003; 100: 12486-91.
- 23 Saura C, Choi SY, Beglopoulos C, Malkani S, Zhang D, Rao S, Chattarji, S, Kelleher R, Kandel E., Duff K., **Kirkwood A,** Shen. J. Loss of Presenilin Function Causes Impairments of Memory and Synaptic Plasticity Followed by Age-Dependent Neurodegeneration. *Neuron* 2004; 42: 23-36.
- 24 Hayashi ML, Choi SY, Rao BS, Jung HY, Lee HK, Zhang D, Chattarji S, **Kirkwood A,** Tonegawa S. Altered Cortical Synaptic Morphology and Impaired Memory Consolidation in Forebrain-Specific Dominant-Negative PAK Transgenic Mice. *Neuron.* 2004; 42:773-787.
- 25 Jiang B., Huang JZ, Morales B, **Kirkwood A.** Maturation of GABAergic transmission and the

timing of plasticity in visual cortex

Brain Res. Rev. 2005; 50: 126-33.

- 26 Saura CA, Chen G, Malkani S, Choi SY, Takahashi RH, Zhang D, Gouras GK, **Kirkwood A**, Morris RG, Shen J. Conditional inactivation of presenilin 1 prevents amyloid accumulation and temporarily rescues contextual and spatial working memory impairments in amyloid precursor protein transgenic mice. *J Neurosci*. 2005; 25:6755-64.
- 27 Lee HK, Min SS, Gallagher M, **Kirkwood A**. NMDA receptor-independent long-term depression correlates with successful aging in rats. *Nature Neurosci*. 2005; 8, 1657-9.
- 28 Choi SY, Chang J, Jiang B, Seol GH, Min SS, Han JS, Shin HS, Gallagher M, **Kirkwood A**. Multiple receptors coupled to phospholipase C gate long-term depression in visual cortex. *J Neurosci*. 2005; 25: 11433-43.
- 29 Goel A, Jiang B, Xu LW, Song L, **Kirkwood A**, Lee HK. Cross-modal regulation of synaptic AMPA receptors in primary sensory cortices by visual experience. *Nat Neurosci*. 2006; 9:1001-3.
- 30 Seol G, Ziburkus Z, Huang SY, Song L, Kim TI, Takamiya K, Hugarir RL, Lee, H.K. **Kirkwood, A**. Neuromodulators control the polarity of spike-timing dependent synaptic plasticity. *Neuron*. 2007; 55: 919-29.
- 31 Jiang B, Treviño M, **Kirkwood A**. Sequential Development of Long-Term Potentiation and Depression in Different Layers of the Mouse Visual Cortex. *J. Neurosci*. 2007; 27: 9648-52.
- 32 Boric K, Muñoz P, Gallagher M, **Kirkwood A**. Potential adaptive function for altered long-term potentiation mechanisms in aging hippocampus. *J. Neurosci*. 2008; 28: 8034-9.
- 33 Savonenko A, Muñoz P, Melnikova T, Wang Q, Liang X, Breyer R, Montine T, **Kirkwood A**, Andreasson. Impaired cognition, sensorimotor gating, and hippocampal long-term depression in mice lacking the prostaglandin E2 EP2 receptor. *J. Exp Neurol*. 2009; 217: 63-73.
- 34 Jiang B, Huang SY, de Pasquale R., Millman D, Song L., Lee HK, Tsumoto T, **Kirkwood A**. The maturation of GABAergic transmission in visual cortex requires endocannabinoid-dependent LTD of inhibitory inputs during a critical period. *Neuron* 2010; 66:248-59.
- 35 Millman D, Mihalas S, **Kirkwood A**, Niebur E. Self-organized criticality occurs in non-conservative neuronal networks during Up states. *Nat. Physics* 2010; 6: 801-805
- 36 Huang S, Gu Y, Quinlan E. **Kirkwood A** refractory period for rejuvenating GABAergic synaptic transmission and ocular dominance plasticity with dark exposure *J. Neurosci*. 2010; 30: 16636-16642.
- 37 Zhang D, Zhang C, Ho A, **Kirkwood A**, Sudhof TC, Shen J. Inactivation of presenilins causes pre-synaptic impairment prior to post-synaptic dysfunction. *J. Neurochem*, 2010; 115:1215-21.
- 38 Lorca R, Moreira-Ramos S, **Kirkwood A**, Huidobro-Toro JP, Morales P. Zinc enhances long-term potentiation through P2X receptor modulation in the hippocampal CA1 region. *Eur. J. Neurosci*. 2011; 33: 1175-85.
- 39 Muñoz P, Humeres A, Elgueta C, **Kirkwood A**, Hidalgo C, Núñez MT. Iron mediates N-methyl-D-aspartate receptor-dependent stimulation of calcium-induced pathways and hippocampal synaptic plasticity. *J Biol Chem*. 2011; 286:13382-92.
- 40 Kulkarni M, Zhang K, **Kirkwood A**. Single-cell persistent activity in anterodorsal thalamus. *Neurosci Lett*. 2011; 498:179-84.
- 41 Lee HK, **Kirkwood A**. AMPA receptor regulation during synaptic plasticity in hippocampus and neocortex. *Semin Cell Dev Biol*. 2011; 22:514-20.
- 42 Huang S, Treviño M, He K, Ardiles A, Pasquale Rd, Guo Y, Palacios A, Hugarir R, **Kirkwood A**. Pull-push neuromodulation of LTP and LTD enables bidirectional experience-induced synaptic scaling in visual cortex. *Neuron*. 2012;73:497-510.
- 43 Wang H, Megill A, He K, **Kirkwood A**, Lee HK. Consequences of inhibiting amyloid precursor protein processing enzymes on synaptic function and plasticity. *Neural Plasticity* (in Press)
- 44 Ardiles A, Mandal M, Tapia-Rojas C, Alexandre F, **Kirkwood A**, Inestrosa N, Palacios A. Post-synaptic dysfunction is associated with spatial and object recognition memory loss in a natural model of Alzheimer's disease. *PNAS*. 2012 (in Press).
- 45 LeGates T, Altimus C, Wang H, Yang S, Zhao H, Lee HK, **Kirkwood A**, Weber E, Hattar S. Aberrant light directly impairs mood and learning through melanopsin-expressing neurons. *Nature* 491, 594-5982 PMID: 3549331

- 46 Guo Y, Huang SY, de Pasquale, McGehrin K, Lee HK, **Kirkwood A**. (2012) Dark Exposure Extends the Integration Window for Spike Timing Dependent Plasticity. *J. Neurosci* 32 (43), 15027-15035.
- 47 Huang S, Hugarir RL, **Kirkwood A** (2013) Adrenergic Gating of Hebbian Spike-TimingDependent Plasticity in Cortical Interneurons. *J.Neurosci.* 33, 13171-13178.
- 48 Gu Y, Huang S, Chang MC, Worley P, **Kirkwood A**, Quinlan EM (2013) Obligatory Role for the Immediate Early Gene NARP in Critical Period Plasticity. *Neuron* 79, 335-346.
- 49 Wang H, Megill A, Wong PC, **Kirkwood A**, and Lee H-K†. (2014) Postsynaptic target specific synaptic dysfunctions in the CA3 area of BACE1 knockout mice. *PLoS One*.
- 50 Megill A*, Lee T*, DiBattista AM, Song JM, Spitzer MH, Rubenshtein M, Habib LK, Capule CC, Mayer M, Turner RS, **Kirkwood A**, Yang J, Pak DTS, Lee H-K, and Hoe H-St. (2013) A tetra(ethylene glycol) derivative of benzothiazole aniline enhances Ras mediated spinogenesis. *Journal of Neuroscience* 33 (22): 9306-9318.
- 51 S Mihalas, D Millman, R Iyer, **A Kirkwood**, E Niebur (2014) Nonconservative Neuronal Networks During Up-States Self-Organize Near Critical Points. *Criticality in Neural Systems*. 437-464
- 52 Huang S, Rozas C, Treviño M, Contreras J, Yang S, Song L, Yoshioka T, Lee HK, **Kirkwood A** (2014). Associative Hebbian synaptic plasticity in primate visual cortex. *J Neurosci*.34:7575
- 53 Yang S, Yang S, Park JS, **Kirkwood A**, Bao S. (2014). Failed stabilization for long-term potentiation in the auditory cortex of FMR1 knockout mice. *PLoS One*. 12;9(8):e104691.
- 54 Kirkwood A. (2015). Balancing excitation and inhibition. (2015) *Neuron*. 86(2):348-50

Extramural Sponsorship (current, pending, previous)

Current Grants:

4/1/98 - 11/30/17	Regulation of Synaptic Plasticity in Visual Cortex 5R01EY012124-12 NIH/NEI \$250,000 per year PI: Kirkwood
07/01/14-06/30/16	Daily modulation of the excitation/inhibition balance and its impact on learning Science of Learning. JHU \$150,000 total PI: Kirkwood
XX/09/15-06/30/19	Inhibitory function in aging entorhinal-dentate gyrus circuits \$200,000 per year PI: Kirkwood

* Equally contributing authors.

XX/09/15-06/30/18	Regulation of the timing of the critical period for ocular dominance plasticity R01EY022298 \$112,000 per year Multi PI: Quinlan, Kirkwood, Lee
Previous	
1998-1999	Sloane fellowship \$15,000 per year
2000-2005	Genetic Physiological and Behavioral Studies of Memory MH58880-01 NIH/NIA \$18,000 per year PI: Tonegawa 10% subcontract
2001-2005	PS1 in APP Processing and Synaptic R01NS04178 NIH \$40,000 per year PI: shen 15% subcontract
2001-2006	Cognition and Hippocampal/Cortical Systems in Aging P01AG009973 NIH/NIA \$50,000 per year PI: Gallagher 15% subcontract
11/01/07 - 10/31/09	Role of preselinins in synaptic function HHRG-05-14961 Alzheimer Association \$80,000 per year PI: Kirkwood
08/15/06 - 07/31/10	Senile degeneration in the Brain of Octodon Degus 1R03TW007171-01A1 NIH/Fogarty \$34,000 per year PI: Kirkwood 5%
08/15/09 - 07/31/15	Synaptic Function & Plasticity in CA3 Circuits in the Aging Hippocampus 5R01AG034606-02 NIH/NIA \$250,000 per year PI: Kirkwood

EDUCATIONAL ACTIVITIES

Teaching

Classroom instruction

1999-2002	Systems Neuroscience, Lecturer, Johns Hopkins University Medical School, Baltimore, MD
2000 - 2006	Developmental Neurobiology, Co-director, Johns Hopkins University, Baltimore, MD

2003-2004 Neurosciences A, Lecturer, Johns Hopkins University Medical School, Baltimore, MD
2003 - present Neuroscience and Cognition I and II, Lecturer (co-director of neurocog II from 2003-8), Johns Hopkins University Medical School, Baltimore, MD .
2007-present Physiological Foundations for Biomedical Engineering, Lecturer, Johns Hopkins University, Baltimore, MD.
2008-2011 Communication between cells, Co-director, Johns Hopkins University, Baltimore, MD.
2007- present Learning and Memory. Lecturer Univ Maryland College Park
2012-present Synaptic function and plasticity
2012-present Topics in Cortical plasticity

Workshops/seminars

1999 Methods for Recording in Brain slices. Co-Organizer , Universidad deValparaiso, Chile
2001 Cellular mechanisms of memory. Co-Organizer , Universidad deValparaiso, Chile.
2003 IBRO School of Neuroscience, Lectures, Montevideo, Uruguay. Lectures
2003 Molecular Neuroscience, Co-Organizer, Univ. Cohimbra, Portugal.
2014 Neurobiology (Electrophysiology section). Marine Biologica Lab

Mentoring

Advisees

Post-docs

1999 - 2001 Morales, Bernardo, Ph.D., currently Full Professor, University of Santiago, Chile.
2001-2003 Choi, Se-Young, Ph.D., currently Assistant Professor, University of Seoul
2003 Lee, Hey-Kyoung, Ph.D., currently Assistant. Professor, University of Maryland.
2003-2005 Jiang, Bin, Ph.D., currently Assistant Professor, Sun Yat-sen University.
2001-2002 Jokubas Zirburkus, Ph.D., currently Assistant Professor, University of Houston
2004-2006 Seol, Geun, Ph.D., currently Assistant Professor, Korea University, Korea.
2004-2005 Min, SunSeek, Ph.D., currently, Assistant Professor, Eulji University, Korea.
2005-2006 Mizumo, Fenxia, Ph.D., currently Post-doctoral fellow.
2006-2007 Colon, Melissa, Ph.D., currently Assistant Professor University of Puerto Rico.
2007-2009 Mario, Treviño, Ph.D., currently Post-doctoral fellow, Max Plank Institute.
2007-2014 Huang, Shi-yon, Ph.D., Staff Scientist at Hussman Institute.
2008-2010 SungGu Min, Ph.D., currently Post-doctoral fellow at University of Maryland.
2009-2011 dePasquale, Roberto, Ph.D., currently Independent Scient at University of Chicago.
2010-2011 Mandal, Madhu, currently Post-doctoral at University of Maryland.
2011-present Kaiwen He, PhD. currently Post-doctoral fellow in this lab.
2011-present Trin Thran, PhD. currently Post-doctoral fellow in this lab

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Students

2002-2004 Chang, Jeff, B.S., currently attending Medical School in Michigan/ M.S.
2000-2002 Cranston, Bradford, B.S., currently Teacher/M.S.
2006-2007 Mautek Malkani, M.S., currently Consultant/M.S.
2009-2012 Alvaro Ardiles, M.S/currently post-doc at University of Valparaiso/PhD

Thesis committees

2003 Helm, Katherine, Ph.D., Psychology, dissertation committee member
2003 Sadogopan, S., Ph.D., thesis committee member
2006-Present Makino, Yu, Ph.D., thesis committee member
2006 –present Kim, Yushin, Ph.D., thesis committee member
2008-2011 Ardiles, Alvaro, Ph.D., thesis committee member (Universidad de Valparaiso)
2009 Kathleen Cho, Ph.D., dissertation committee member (MIT)
2010-present Natalie Trzcinski, Ph.D thesis committee member
2011 Lena Khibnik, Ph.D., dissertation committee member (MIT)

Training grant participation
1998-present Neuroscience, preceptor
1999-present Visual Neuroscience, preceptor

ORGANIZATIONAL ACTIVITIES

Institutional Administrative Appointments

2000 Member, Search committee for faculty recruitment
2008 Member, Search committee for faculty recruitment

Editorial Activities

Editorial Board appointments

2004- present *Experimental Neurology*
2006- present *Experimental Biology and Medicine*
2009- present *Journal of Experimental Neuroscience*
2012-present *Frontiers in synaptic Neuroscience*
2014-present *Science Reports*

Journal Reviewer

ca 2000-present *Neuron*
ca 2000-present *J. Neuroscience*
ca 2000-present *J. Neurophysiology*
ca 2000-present *Cerebral Cortex*
ca 2000-present *Eur. J. Neurosci*
ca 2000-present *J Physiology*
ca 2000-present *Brain Res*
ca 2000-present *Learning and Memory*
ca 2003-present *Neurobiology of Aging*
ca 2003-present *Visual Neuroscience*
ca 2003-present *Nature Neurosci*
ca 2004-present *PNAS*
ca 2006-present *Science*
ca 2007-present *Exp. Neurol*
ca 2007-present *Plos1*
ca 2010-present *Frontiers in cellular Neuroscience.*

Advisory Visual Sciences B, NIH, ad hoc member

2001, 02, 04, 05 Special Emphasis Panel NIMH, member
2003 CSR / MDCN-3, ad hoc member
2007-2011 Central Visual processing, NIH, member
2005-present Alzheimer Association, grant reviewer
2005-present Chilean Science and Technology Council, grant reviewer
2008 Lister Institute, UK. fellowship reviewer
2008 MRC, UK, fellowship reviewer.
2015 German Research Foundation
2015 ANR, the French National Research Agency

Professional Societies

1988-present Society for Neuroscience, member
2003-present International Brain Research Organization (IBRO), member

Conference Organizer, Session Chair

1999 Society for Neuroscience: meeting, session chairperson.

- 2002 National Academy of Sciences: Japanese-American Frontiers in Sciences Symposium, session chair.
- 2003 National Academy of Sciences: Japanese-American Frontiers in Sciences Symposium, session organizer
- 2010 43rd Winter Conference on Brain Research, session organizer
- 2010 "Bristol Symposium on Neural Plasticity", session chairperson
- 2010 Cantoblanco Workshop on Memory Formation, Madrid. Session chair.
- 2013 44rd Winter Conference on Brain Research, session organizer
- 2014 45rd Winter Conference on Brain Research, session organizer
- 2014 "Synaptic basis of Cognitive Dysfunction" Valparaiso, Chile. Co-organizer
- 2014 Society for Neuroscience: meeting, minisymposium chairperson

RECOGNITION

Awards, Honors

- 1998 Alfred Sloan Fellowship

Invited Talks, Panels

- 1998 "Elementary mechanisms of synaptic plasticity in visual cortex", IIIrd Iberoamerican Congress of Biophysics, Buenos Aires, Argentina
- 1998 "Regulacion de plasticidad sinaptica en corteza visual", 20th meeting of the Chilean Society of Biology
- 1998 "Mechanism of cortical plasticity", Brandeis University, Waltham, MA
- 1999 "Elementary mechanisms of cortical plasticity", University of Alabama, Birmingham, AL
- 2000 "Mechanisms of visual cortical plasticity", MCP Hahnemann University, Philadelphia, PA
- 2000 "Regulation of experience-dependent plasticity by intracortical inhibition", Barrels XXIII, Miami, FL
- 2000 "Cellular mechanism for the critical period of visual cortex plasticity", Cold Spring Harbor Laboratory, Cold Spring Harbor, NY
- 1999 "A cellular model for the critical period of cortical plasticity", Royal Society of Physiology, Pucon
- 2000 "Regulation of synaptic plasticity", Pohang University of Science and Technology, Pohang, Korea
- 2001 "Inhibition of cortical plasticity", Harvard University
- 2001 "Regulation of synaptic plasticity in visual cortex", University of Washington
- 2002 "Regulation of synaptic plasticity", University of Virginia
- 2002 "Cellular basis of visual cortical plasticity", Brown University
- 2002 "Critical periods in brain development", In Spectrum of Developmental Disabilities, Johns Hopkins
- 2002 "Learning and Memory", Frontiers of Science Conference, National Academy of Sciences, Irvine, CA
- 2003 "Determinants of cortical plasticity", Rutgers University
- 2003 "Mechanisms of cortical plasticity", Department Pathology, Johns Hopkins
- 2003 "The cellular basis of the critical period in visual cortex", Uruguay
- 2003 "Regulation of cortical plasticity", Albert Einstein College of Medicine, New York, NY
- 2003 "Neuromodulation of cortical plasticity", University of Wales, Cardiff, UK
- 2004 Mouse Visual System Symposium at ARVO
- 2004 "Neuromodulation of visual cortical plasticity", 5th International Symposium Neuronal Mechanism of vision, Bochum, Germany
- 2004 "Control of cortical plasticity", Erasmus University, Rotterdam, Netherlands
- 2004 "Determinants of cortical plasticity", Department of Neurology, Johns Hopkins
- 2005 "Cellular basis for the behavioral control of synaptic plasticity", University of Maryland, College Park
- 2005 "Visual cortical plasticity", University of Santiago, Chile
- 2005 "Role of Presenilins in synaptic function and plasticity", Symposia on neurodegenerative diseases, Santiago, Chile
- 2006 "Neuromodulation of synaptic plasticity", Seoul National University, Korea
- 2006 "The gating of synaptic plasticity", 39th Annual Winter Conference on Brain Research, Colorado
- 2006 "Plasticity of GABAergic transmission in visual cortex", 18th Winter Conference on Neural Plasticity, Barbados
- 2007 "Synaptic mechanisms in successful aging", Dementia consortium Johns Hopkins
- 2007 "Neuromodulation of cortical plasticity", Rutgers University
- 2007 "Neuromodulation of synaptic plasticity in cortex," Department of Biology, Johns Hopkins
- 2008 "Regulation of cortical plasticity", Burke Center, Columbia University
- 2008 "Regulation of cortical plasticity", Virginia Commonwealth University

- 2008 “Regulation of cortical plasticity”, Nerve Net symposium, Marine Biological Lab
- 2008 “What controls the polarity of synaptic plasticity”, Brown University
- 2008 “Neural basis of successful aging”, NIA
- 2009 “Control of cortical plasticity”, Universidad de Chile
- 2009 “Neuromodulation of synaptic plasticity”, Wayne State University
- 2009 “Synaptic mechanism of plasticity in visual cortex”, Scuola normale superiore, Pisa
- 2009 “Ontogeny of synaptic plasticity”, Society of Neuroscience, Chile
- 2009 “Neuromodulation of LTP and LTD”, University of Maryland, Baltimore
- 2010 “Controlling the polarity of synaptic plasticity in cortex”, Max Plank Inst/University, Valparaiso, Chile
- 2010 “Recent advances in the neuromodulation of neural plasticity”, 43rd Winter Conference on Brain Research, Colorado
- 2010 “The Polarity of Plasticity in Visual Cortex”, SUNY, Stony Brook, NY
- 2010 “Neuromodulation of synaptic plasticity in visual cortex”, University Rochester, NY
- 2010 “Synapses for successful aging” Cantoblanco Workshop, Madrid , Spain
- 2010 “Neuromodulatory control of the polarity of synaptic plasticity” , Picower center, MIT
- 2010 “Synapses for successful aging” in Mechanisms of neuroplasticity symposium" Valparaiso, Chile
- 2010 “Control of synaptic plasticity” Universidad de Santiago, Santiago, Chile
- 2010 “Metaplasticity in cortex” Medical School University of Chile, Santiago, Chile
- 2011 “Maturation and rejuvenation of GABAergic transmission”, Univ. Southern California
- 2011 “Maturation and rejuvenation of cortical inhibition”, 43rd Winter Conference on Brain Research, Colorado
- 2011 “Maturation and rejuvenation of cortical inhibition”, NYU
- 2012 “Control of synaptic plasticity” CINV, Valparaiso Chile
- 2012 “Pull-push control of synaptic plasticity” University of Texas, Dallas
- 2012 “Pull-push control of synaptic plasticity” McGill University, Montreal
- 2012 “Pull-push control of synaptic plasticity” Otto-von-Guericke University, Magdeburg, Germany
- 2012 “Pull-push control of synaptic plasticity” SUNY New York
- 2013 “Pull-push control of synaptic plasticity” 44rd Winter Conference on Brain Research, Colorado
- 2013 “Synaptic decisions” Valparaiso, Chile
- 2013 “Neuromodulation of cortical plasticity” Sun Yat Sen University, Guangdong, China
- 2014 “Neuromodulation of cortical plasticity” 45th Winter conference, Colorado
- 2014 “Neuromodulation of cortical plasticity” University of Pittsburgh, Pennsylvania
- 2015 “Neuromodulation of cortical plasticity” Marine Biological Lab



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