Melissa R. Warden, Ph.D.

Assistant Professor and Miriam M. Salpeter Fellow
Department of Neurobiology and Behavior, Cornell University

Contact Information

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Education

1999-2006 Ph.D. in Systems Neuroscience, Massachusetts Institute of Technology
1992-1996 A.B. in Molecular Biology, Princeton University

Academic Appointments

Dec 2013- *Assistant Professor and Miriam M. Salpeter Fellow*, Neurobiology and Behavior, Cornell University.
2007-2013 *Postdoctoral Scholar*, Bioengineering/Psychiatry lab of Prof. Karl Deisseroth, Stanford University.
1999-2006 *Graduate Student*, Picower Institute for Learning and Memory lab of Prof. Earl K. Miller, Massachusetts Institute of Technology.
1997-1999 *Research Technician*, Neurobiology lab of Prof. William T. Newsome, Stanford University.
1995-1996 *Undergraduate*, Applied Physics/Molecular Biology lab of Prof. Steven M. Block, Princeton University.

Advanced Coursework

2003 Methods in Computational Neuroscience (MBL). Marine Biological Laboratory, Woods Hole, MA.

Awards and Honors

2015-2020 NIH Director's New Innovator Award (DP2 2MH109982)
2015-2017 Alfred P. Sloan Research Fellowship
2015-2016 Whitehall Foundation Research Grant
2014-2018 Robertson Neuroscience Investigator – New York Stem Cell Foundation
2013 American College of Neuropsychopharmacology Travel Award
2013 Miriam M. Salpeter Fellow, Cornell University
2013-2015 NARSAD Young Investigator Award, Brain & Behavior Research Foundation
2012 Best Postdoctoral Research Award, Stanford University
2012 Finalist, Sammy Kuo Prize in Neuroscience, Stanford University
2011 Society for Neuroscience Abstract selected for Neuroscience 2011 News Conference
2011 AAAS/Science Program for Excellence in Science Award
2003 Scholarship Award for Methods in Computational Neuroscience, Woods Hole
1999-2002 National Institutes of Health Predoctoral Training Fellowship (T32 GM007484)
1999 Sigma Xi Research Honor Society nomination

Publications (peer-reviewed)

1. Seo C, Guru A, Jin M, Ito B, Sleezer BJ, Ho YY, Wang E, Boada C, Krupa NA, Kullakanda DS, Shen CX, **Warden MR**. Intense threat switches dorsal raphe serotonin neurons to a paradoxical operational mode. Science. 2019 Feb 1;363(6426):aau8722.

2. Post RJ, **Warden MR**. Melancholy, anhedonia, apathy: the search for separable behaviors and neural circuits in depression. Curr Opin Neurobiol. 2018 Apr;49:192-200.

3. Lundqvist M, Herman P, **Warden MR**, Brincat SL, Miller EK. Gamma and beta bursts during working memory readout suggest roles in its volitional control. Nat. Commun. 2018 Jan 26;9(1):394.

4. Lindsay GW, Rigotti M, **Warden MR**, Miller EK, Fusi S. Hebbian Learning in a Random Network Captures Selectivity Properties of the Prefrontal Cortex. J Neurosci. 2017 Nov 8;37(45):11021-11036.

5. Ferenczi EA, Zalocusky KA, Liston C, Grosenick L, **Warden MR**, Amatya D, Katovich K, Mehta H, Patenaude B, Ramakrishnan C, Kalanithi P, Etkin A, Knutson B, Glover GH, Deisseroth K. Prefrontal cortical regulation of brainwide circuit dynamics and reward-related behavior. Science. 2016 Jan 1;351(6268):aac9698.

6. Sidor MM, Spencer SM, Dzirasa K, Parekh PK, Tye KM, **Warden MR**, Arey RN, Enwright JF 3rd, Jacobsen JP, Kumar S, Remillard EM, Caron MG, Deisseroth K, McClung, CA. Daytime spikes in dopaminergic activity drive rapid mood-cycling in mice. Mol Psychiatry. 2015 Nov;20(11):1406-19.

7. Guru A, Post RJ, Ho YY, **Warden MR**. Making sense of optogenetics. Int J Neuropsychoph. 2015 Jul 25:1-8.

8. Sidor MM, Davidson TJ, Tye KM, **Warden MR**, Deisseroth K, McClung CA. In vivo optogenetic stimulation of the rodent central nervous system. J Vis Exp. 2015 Jan 15;95:e51483.

9. **Warden MR**, Cardin JA, Deisseroth K. Optical Neural Interfaces. Annu Rev Biomed Eng. 2014 Jul 11;16:103-129.

10. Lammel S, Tye KM, **Warden MR**. Progress in understanding mood disorders: optogenetic dissection of neural circuits. Genes Brain Behav. 2014 Jan;13(1):38-51.

11. Rigotti M, Barak O, **Warden MR**, Wang XJ, Daw N, Miller EK, Fusi S. The importance of mixed selectivity in complex cognitive tasks. Nature. 2013 May 30;497(7451):585-590.

12. Kim SY*, Adhikari A*, Lee SY, Marshel JH, Kim CK, Mallory CS, Lo M, Pak S, Mattis J, Lim BK, Malenka RC, **Warden MR**, Neve R, Tye KM, Deisseroth K. Diverging neural pathways assemble a behavioral state from separable features in anxiety. Nature. 2013 Apr 11;496(7444):219-223.

13. Tye KM*, Mirzabekov JJ*, **Warden MR***, Ferenczi EA, Tsai HC, Finkelstein J, Kim SY, Adhikari A, Thompson KR, Andalman AS, Gunaydin LA, Witten IB, Deisseroth K. Dopamine neurons modulate neural encoding and expression of depression-related behaviour. Nature. 2013 Jan 24;493(7433):537-541.
*** equal contribution**

14. **Warden MR**, Selimbeyoglu A, Mirzabekov JJ, Lo M, Thompson KR, Kim SY, Adhikari A, Tye KM, Frank LM, Deisseroth K. A prefrontal cortex-brainstem neuronal projection that controls response to behavioural challenge. Nature. 2012 Dec 20;492(7429):428-432.

15. Anikeeva P*, Andalman AS*, Witten I, **Warden M**, Goshen I, Grosenick L, Gunaydin LA, Frank LM, Deisseroth K. Optetrode: a multichannel readout for optogenetic control in freely moving mice. Nat Neurosci. 2012 Jan;15(1):163-70.

16. **Warden MR**, Miller EK. Task-dependent changes in short-term memory in the prefrontal cortex. J Neurosci. 2010 Nov 24;30(47):15801-10.

17. Siegel M, **Warden MR**, Miller EK. Phase-dependent neuronal coding of objects in short-term memory. Proc Natl Acad Sci U S A. 2009 Dec 15;106(50):21341-6.

18. **Warden MR**, Miller EK. The representation of multiple objects in prefrontal neuronal delay activity. Cereb Cortex. 2007 Sep;17 Suppl 1:i41-50.

Publications (refereed conference papers)

1. Wang M, Wang T, Wu C, Li B, Ouzounov DG, Sinefeld D, Guru A, Nam HS, Capecchi MR, **Warden MR**, Xu C. In vivo three-photon imaging of deep cerebellum. In Multiphoton Microscopy in the Biomedical Sciences XVIII 2018 Feb

23 (Vol. 10498). International Society for Optics and Photonics.

Book Chapters

1. Sidor MM, **Warden MR**. Optogenetics. In: Encyclopedia of Psychopharmacology, 2nd edition, Price LH and Stolerman IP (ed). New York, NY: Springer, 2015.

Intellectual Property

1. Deisseroth K, Tye KM, Warden MR (2015) "Non-human animal models of depression and methods of use thereof". **U.S. Patent** 2015/0040249.

Invited Talks

2020 FENS Symposium, 'Conserved Functions of Serotonergic Circuits in Diverse Animals'. Glasgow, UK.
Neuroscience Program Seminar Series, University of Ottawa. Ottawa, ON.
Department of Cellular and Molecular Physiology, Yale University. New Haven, CT.
Department of Physiology, Northwestern University. Chicago, IL.
Department of Neuroscience, University of Pennsylvania. Philadelphia, PA.

2019 Brain and Mind Research Institute, Weill Cornell Medicine. New York, NY
Department of Biological Sciences, SUNY Albany. Albany, NY.
Plenary Talk, Junior Scientist Workshop on Mechanistic Cognitive Neuroscience, Janelia Research Campus. Ashburn, VA.
Department of Neuroscience, Johns Hopkins. Baltimore, MD.
Poitras Center & Stanley Center Translational Neuroscience Joint Seminar Series, McGovern Institute and Broad Institute of Harvard and MIT. Cambridge, MA.
Department of Physiology, New York Medical College. Valhalla, NY.
'Predictive Processing in the Brain', Sainsbury Wellcome Center for Neural Circuits and Behaviour. London, UK.

2018 Society for Neuroscience Minisymposium, 'Neuromodulation of Brain States'. San Diego, CA.
Genetic Manipulation of Neuronal Activity, Janelia Research Campus. Ashburn, VA.
Center for Neural Science, New York University. New York, NY.
Neuronex Technology Conference, Cornell University. Ithaca, NY.
New York Stem Cell Foundation Innovators Retreat. Montauk, NY.
The Brain Conferences, 'The Computational Neuroscience of Prediction'. Rungsted, Denmark.

2017 Seminars in Neuroscience, Universidade Federal do Rio Grande do Sul. Porto Alegre, Brazil.
Department of Neuroscience, University of Pittsburgh. Pittsburgh, PA.
New York Stem Cell Foundation Innovators Retreat. Montauk, NY.
Department of Neuroscience, University of Rochester. Rochester, NY.

2016 Mong Family Foundation Symposium, Cornell Neurotech. Ithaca, NY.
Laboratory of Atomic and Solid State Physics, Cornell University. Ithaca, NY.
Cornell Neurotech Advisory Board. Ithaca, NY.
Gordon Conference on Optogenetics, Neural Circuits, and Behavior. Newry, ME.
Department of Brain and Cognitive Sciences, Seoul National University. Seoul, Korea.
Y-IBS Workshop on Physical Tools to Control Biological Systems. Seoul, Korea.
Workshop on Unsolved Problems in Systems Neuroscience, Janelia Research Campus. Ashburn, VA.
New York Stem Cell Foundation Innovators Retreat. Montauk, NY.

2015 International Workshop on Technologies for Optogenetics. Lecce, Italy.
Panel talk, 3rd Annual Molecular Psychiatry Meeting. San Francisco, CA.
New York Stem Cell Foundation Innovators Retreat. Montauk, NY.
Fifth International Symposium on "Biology of Decision Making". Paris, France.

2014 International Workshop on Technologies for Optogenetics. Lecce, Italy.
Department of Biomedical Engineering, Cornell University. Ithaca, NY.
Symposium, 167th Annual Meeting, American Psychiatric Association. New York, NY.
New York Stem Cell Foundation Innovators Retreat. Montauk, NY.
Baker Institute for Animal Health, Cornell University. Ithaca, NY.
Mood disorders symposium, University of Alabama. Birmingham, AL.
Department of Psychological and Brain Sciences, UCSB. Santa Barbara, CA.

Department of Psychology, Cornell University. Ithaca, NY.

2013 Panel talk, 52nd Annual Meeting, American College of Neuropsychopharmacology. Hollywood, FL.
Symposium, 68th Annual Scientific Convention, Society of Biological Psychiatry. San Francisco, CA.
Optogenetics 2013: Neuronal Function to Mapping & Disease Therapeutics. Waltham, MA.
Langley-Porter Neuroscience Seminar, UCSF. San Francisco, CA.

2012 2nd Annual Research Symposium, Stanford University Postdoctoral Association
Neuroscience Institute, New York University Langone Medical Center. New York, NY.
Department of Biomedical Engineering, Johns Hopkins University. Baltimore, MD.
Center for Neural Science, New York University. New York, NY.
Department of Neurobiology and Behavior, Cornell University. Ithaca, NY.
Department of Psychology, University of Arizona. Tucson, AZ.
Panel talk, Winter Conference on Brain Research. Snowbird, UT.
Department of Psychiatry, University of Pittsburgh. Pittsburgh, PA.

2011 Panel talk, American College of Neuropsychopharmacology. Waikoloa Beach, HI.
Panel talk, Association for Research in Nervous and Mental Disease. New York, NY.
Press Conference at Neuroscience 2011. Washington, DC.
Anxiety and Depression: 21st Neuropharmacology Conference. Falls Church, VA.

Professional Activity

2018 NSF CAREER Panel, Neural Systems Cluster. Alexandria, VA.
2018 *Ad hoc* Study Section Member, NIH section on Biobehavioral Regulation, Learning and Ethology.
2017-2018 Program Committee, Computational and Systems Neuroscience Meeting. Salt Lake City, UT.
2016-2017 Program Committee, Computational and Systems Neuroscience Meeting. Salt Lake City, UT.
2016 Study Section Mail Reviewer, NIH section on Neuroscience and Ophthalmic Imaging Technologies
2015-2016 Editor, Research Topic, Frontiers in Systems Neuroscience
2015-present Scientific Board, International Workshop on Technologies for Optogenetics. Lecce, IT.
2015 Grant Reviewer, Israel Science Foundation
2015-present Member, Molecular Psychiatry Association
2014-2015 Abstract Reviewer, Computational and Systems Neuroscience Meeting. Salt Lake City, UT.
2011-present Member, American Association for the Advancement of Science
1999-present Member, Society for Neuroscience

University and Departmental Service

2016 Faculty talk with first year Presidential Life Sciences Fellows, Cornell University
2015-2016 Faculty Search Committee, Neurobiology and Behavior, Cornell University
2015-present Neurotech Advisory Board, Cornell University
2014-2015 Faculty Search Committee, Neurobiology and Behavior, Cornell University
2014-present Controlled Substances Officer, 2nd alternate, Neurobiology and Behavior, Cornell University
2014 Neurodinner talk, Program in Neuroscience, Cornell University
2014-present Undergraduate academic advisor, Cornell University
2013-present Graduate executive committee, Neurobiology and Behavior, Cornell University

Reviewer Cell; Neuron; Nature Neuroscience; Nature Medicine; Nature Communications; eLife; Journal of Neuroscience; Journal of Neural Engineering; Biological Psychiatry; Neuropsychopharmacology; Journal of Neurophysiology; Frontiers; Behavioural Brain Research, Scientific Reports

Teaching

2019 Neural Circuits of Motivated Behavior (BioNB 4370), Cornell University
2019 Introduction to Neuroscience (BioNB 2220) (6 lectures), Cornell University
2018 Introduction to Neuroscience (BioNB 2220) (7 lectures), Cornell University
2017 Neural Circuits of Motivated Behavior (BioNB 4370), Cornell University
2017 Introduction to Neuroscience (BioNB 2220) (6 lectures), Cornell University
2016 Neurotechnologies and Neural Circuits (BioNB 4200), Cornell University
2016 Introduction to Neuroscience (BioNB 2220) (5 lectures), Cornell University

2015 Introduction to Neuroscience (BioNB 2220) (2 lectures), Cornell University
2015 Neural Circuits of Motivated Behavior (BioNB 4370), Cornell University
2011 *Instructor*, Optogenetics Innovation Laboratory, Stanford University
2010 *Instructor*, Optogenetics Innovation Laboratory, Stanford University
2006 *Teaching assistant*. Statistics for Neuroscience Research (9.073J, HST.460J), MIT
2003 *Teaching assistant*. Discrete Stochastic Processes (6.262), MIT
2002 *Teaching assistant*. Neuroscience and Behavior (9.01), MIT
2002 *Teaching assistant*. Systems Neuroscience Laboratory (9.02), MIT
2000 *Teaching assistant*. Introduction to Psychology (9.00), MIT

Mentoring (graduate students and postdoctoral fellows)

2018-2019 Brendan Ito, *rotation student*, Neurobiology and Behavior, Cornell University
2018- Eileen Troconis, *graduate student*, DVM/PhD Program, Cornell University
2017- Caitlin Miller, *graduate student*, co-mentored with Mike Sheehan, Neurobiology and Behavior, Cornell University
2017- Caleb Vogt, *graduate student*, co-mentored with Mike Sheehan, Neurobiology and Behavior, Cornell University
2017- Brianna Sleezer, *postdoctoral fellow*, Neurobiology and Behavior, Cornell University
2017-2017 Andrea Roeser, *rotation student*, Neurobiology and Behavior, Cornell University
2016-2016 Chunyan Wu, *rotation student*, Biological and Biomedical Sciences, Cornell University
2016- Wenchao Gu, *postdoctoral fellow*, Neurobiology and Behavior, Cornell University
2016- Yuval Baumel, *postdoctoral fellow*, Neurobiology and Behavior, Cornell University
2015-2015 Ruidong Chen, *rotation student*, Neurobiology and Behavior, Cornell University
2015-2019 David Bulkin, *postdoctoral fellow*, Neurobiology and Behavior, Cornell University
2014- Ryan Post, *graduate student*, Neurobiology and Behavior, Cornell University
2014- Akash Guru, *graduate student*, Neurobiology and Behavior, Cornell University
2014- Yi-Yun Ho, *graduate student*, Neurobiology and Behavior, Cornell University
2014- Changwoo Seo, *graduate student*, Neurobiology and Behavior, Cornell University

Thesis Committees

2018- Yuta Mabuchi, *graduate student*, Neurobiology and Behavior, Cornell University
2018- Aaron Mok, *graduate student*, Biomedical Engineering, Cornell University
2017- Saumya Sahai, *graduate student*, Neurobiology and Behavior, Cornell University
2017- Andrea Roeser, *graduate student*, Neurobiology and Behavior, Cornell University
2017- Meiqi Wu, *graduate student*, Biomedical Engineering, Cornell University
2017- Chunyan Wu, *graduate student*, Biological and Biomedical Sciences, Cornell University
2015- Fei Xia, *graduate student*, Applied and Engineering Physics, Cornell University
2015- Yu-Ting Cheng, *graduate student*, Neurobiology and Behavior, Cornell University
2015- Vaida Rimeikyte, *graduate student*, Human Development, Cornell University
2015- Ruidong Chen, *graduate student*, Neurobiology and Behavior, Cornell University
2015- Tejapratap Bollu, *graduate student*, Neurobiology and Behavior, Cornell University

Thesis Committees, external

2017-2017 Sweyta Lohani, *graduate student*, Center for Neuroscience, University of Pittsburgh

Mentoring (undergraduates)

2017- Brittney Moncrieffe, *undergraduate student*, Neurobiology and Behavior, Cornell University
2017-2018 Cynthia Shen, *undergraduate student*, Neurobiology and Behavior, Cornell University
2016-2019 Durga Kullakanda, *undergraduate student*, Neurobiology and Behavior, Cornell University
2016-2018 Julia Schaffer, *undergraduate student*, Chemistry, Cornell University
2016-2017 Nicholas Krupa, *undergraduate student*, Neurobiology and Behavior, Cornell University
2016-2018 *Mackenzie Lemieux, *undergraduate student*, Neurobiology and Behavior, Cornell University
***Mika Salpeter Award for undergraduate research in Neurobiology**
2016-2018 Kyle Pellegrino, *undergraduate student*, Neurobiology and Behavior, Cornell University

2016-2018 Qiuwei Yang, *undergraduate student*, Neurobiology and Behavior, Cornell University
2016-2018 Vladlena Lee, *undergraduate student*, Neurobiology and Behavior, Cornell University
2015-2018 *Kasey Han, *undergraduate student*, Neurobiology and Behavior, Cornell University
***Robert Capranica Award for undergraduate research in Neuroethology**
2015-2017 *Michelle Jin, *undergraduate student*, Neurobiology and Behavior, Cornell University
***Mika Salpeter Award for undergraduate research in Neurobiology**
2015-2017 Priyanka Boddu, *undergraduate student*, Computer Science, Cornell University
2015-2016 Emika Lisberger, *undergraduate student*, Physics, Cornell University
2015-2016 Nicholas Ringelberg, *undergraduate student*, Neurobiology and Behavior, Cornell University
2014-2016 Eli Wang, *undergraduate student*, Electrical & Computer Engineering, Cornell University
2014-2016 Jungsoo Kim, *undergraduate student*, Biological Engineering, Cornell University
2014-2015 Christina Boada, *undergraduate student*, Neurobiology and Behavior, Cornell University