STEPHEN COWEN, PH.D.

Assistant Professor
Department. of Psychology
The University of Arizona
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EDUCATION

2007-2008 *The Neurosciences Institute* *San Diego, CA*
Postdoctoral Fellow Advisor: Douglas A. Nitz
Research Focus: Investigation of the roles the hippocampus and prefrontal cortex play in spatial navigation and cost-benefit decision making.

1997-2007 *University of Arizona* *Tucson, AZ*
Ph.D. Psychology Advisor: Dr. Bruce McNaughton
Research Focus: Understanding the neural mechanisms underlying working memory, navigation, and memory consolidation using *in vivo* single-unit recordings in rats.

1988–1992 *University of Wisconsin* *Madison, WI*
B.A., Business Administration, Dean's List.

POSITIONS

2012-present *The University of Arizona* *Tucson, AZ*
Assistant Professor, Psychology

2010-2012 *The Neurosciences Institute* *San Diego, CA*
Associate Fellow, Neuroscience

2008-2010 *The Neurosciences Institute* *San Diego, CA*
Research Fellow, Neuroscience

GRANTS

Michael J Fox Foundation (administrative processing): Identification of network, oscillatory and behavioral signatures of the LRRK2 expression (Role: PI) ***06/01/17-05/31/19***
Objective: Identify neural biomarkers that distinguish the LRRK2 genetic form of Parkinson's disease from healthy controls and idiopathic Parkinson's disease. ($229,000)

LuMind Foundation: Brain development, sleep and learning in Down syndrome **(Role: Analysis, PI: Jaime Edgin)** ***1/01/17-present***
Objective: Identify neural signatures of sleep dysfunction in Down-syndrome subjects (EEG). ($250,000, 6.2% effort)

R24 NIMH: High-resolution electrical brain mapping by real-time and portable 4D Acoustoelectric Imaging (Role: Co-investigator, PI: Russel Witte) ***10/01/15-9/31/18***
Objective: Develop new technologies for acoustoelectric imaging of brain activity.

Michael J Fox Foundation (11014): Identification of network and oscillatory signatures of the LRRK2 mutation (Role: PI) ***08/01/15-07/31/16***
Objective: Identify neural biomarkers that distinguish the LRRK2 genetic form of Parkinson's disease from healthy controls and idiopathic Parkinson's disease. ($129,000)

NSF BRAIN-EAGER (DBI-1450767): Integrated Measurement of Dopamine Release and Large-Scale Ensemble Activity in Behaving Animals (Role: PI) ***09/01/14-08/31/17***

Objective: Develop novel technology for the simultaneous recording of the activities of individual neurons and dopamine release in freely behaving animals. ($300,000)

NIH R01 (NS084026-01A1): Restoring functional connectivity following TBI (Co-investigator, PI: Gene Gurkoff) ***06/01/14-09/01/18***

Objective: Assist investigation of functional connectivity changes associative traumatic brain injury and following deep-brain stimulation therapy. Support for travel to assist with inter-region LFP surgical procedures and recording. ($36,000)

Evelyn F. McKnight Brain Institute (Role: PI) ***08/01/12- present***

Objective: To investigate how high-order integration centers such as the frontal cortex and hippocampus change as a function of normal aging. One effect of age may be in the strength and fidelity interactions between neurons and brain regions. Large-scale ensemble recording allows the direct investigation of this issue in behaving animals. ($125,000)

G Harold and Leila Y. Mathers Charitable Foundation (Co-PI) 12/01/08 - 12/01/11

My Role: As a co-investigator, I performed ensemble-recording experiments that investigated how associations between reward, effort, and actions are stored in the frontal cortex and how these associations change when contingencies reverse. My work also informed the work of other investigators on this grant who study the rules of associative learning in cortical slices and in anesthetized animals. ($300,000 total)

The San Diego Foundation: Blasker-Rose-Miah Award (PI) 07/01/10 - 06/30/11

My Role: I was the principal investigator on this grant and performed multi-unit recordings in the anterior cingulate and orbitofrontal cortex of rats as they completed decision-making behaviors. ($50,000)

PUBLICATIONS

Parent KL, Hill DF, Crown LM, Wiegand J-P, Gies KF, Miller MA, Atcherley CW, Heien ML, Cowen SL (2017) Platform to Enable Combined Measurement of Dopamine and Neural Activity. Anal Chem:acs.analchem.6b03642.

Okun A, McKinzie DL, Witkin JM, Remeniuk B, Husein O, Gleason SD, Oyarzo J, Navratilova E, McElroy B, Cowen SL, Kennedy JD, Porreca F (2016) Hedonic and motivational responses to food reward are unchanged in rats with neuropathic pain. Pain 157:2731–2738.

Wiegand J-PL, Gray DT, Schimanski LA, Lipa P, Barnes CA, Cowen SL (2016) Age Is Associated with Reduced Sharp-Wave Ripple Frequency and Altered Patterns of Neuronal Variability. J Neurosci 36:5650–5660.

Cowen S.L., Nitz D.A. (2014) Repeating Firing Fields of CA1 Neurons Shift Forward in Response to Increasing Angular Velocity, Journal of Neuroscience, 34(1):232-41.

Miller M.A., Thomé A, Cowen S.L. (2013) Intersection of Effort and Risk: Ethological and Neurobiological Perspectives, Frontiers in Neuroscience, 7:208.

Cowen S.L., Davis G.A., Nitz D.A. (2012) Anterior cingulate neurons in the rat map anticipated effort and reward to their associated action sequences. Journal of Neurophysiology 107(9):2393–2407.

Cowen, S.L. and McNaughton, B.L (2007) Selective delay activity in the medial prefrontal cortex of the rat: The contribution of sensory-motor information and contingency. Journal of Neurophysiology, 98(1):303-16.

Maurer, A.P., Cowen, S.L., Burke, S.N., Barnes, C.A. and McNaughton, B.L. (2006) Phase precession in hippocampal interneurons showing strong functional coupling to individual pyramidal cells. The Journal of Neuroscience, 26:13485-13492.

Maurer, A.P., Cowen, S.L., Burke, S.N., Barnes, C.A. and McNaughton, B.L. (2006) Organization of hippocampal cell assemblies based on theta phase precession. Hippocampus, 16:785-794.

Battaglia, F.P., Sutherland, G.R., Cowen, S.L., McNaughton, B.L. and Harris, K.D. (2005). Firing rate modulation: A simple statistical view of memory trace reactivation. Neural Networks, 18:1280-1291.

McNaughton, B.L., Barnes, C.A., Battaglia, F.P., Bower, M.R., Cowen, S.L., Ekstrom, A.D., Gerrard, J.L., Hoffman, K.L., Houston, P.F., Karten, Y., Lipa, P., Pennartz, C.M.A. and Sutherland, G.R. (2003) Off-line reprocessing of recent memory and its role in memory consolidation: A progress report. In: P. Maguet, C. Smith and B. Stickgold (Eds.) Sleep and Brain Plasticity. Oxford University Press: United Kingdom, pp. 225-246.

In the News:

Wiegand J-PL, Cowen, SL, "Memory-related brainwaves occur less often in old age" Arizona Daily Star Science Supplement, p. 18, 1/29/2017.
http://arizonadailystar.az.newsmemory.com/?special=College+of+Science

UA Researchers Develop Brain-Mapping Technology. UA Now article describing an NIH R24 grant in which I am a co-investigator with PI Russel Witte.
https://uanews.arizona.edu/story/ua-researchers-develop-brain-mapping-technology
Also covered in Cronkite news.
http://cronkitenews.azpbs.org/2016/09/16/ua-researchers-aim-to-look-deep-inside-the-brain/
And the Arizona Sentinel:
http://www.tucsonsentinel.com/local/report/091916_abi_brain/ua-researchers-developing-new-way-look-deep-inside-brain/

Cowen, S.L., Heien, M.A. Video report and interview for NSF Brain Initiative grant awardees: http://www.nsf.gov/discoveries/disc_videos.jsp?cntn_id=135837&media_id=79376&org=NSF

Cowen, S.L., Heien, M.A. Video interview for UA Now regarding collaborative research and technology development: http://uanews.org/videos/lab-two-heads-are-better-one

KUAZ Arizona Public Media NPR Science interview with Dr. Lesley Tolbert entitled "How the brain makes up its mind" December 2015.

Cowen, S.L. "Is memory in your brain, body or both?" Arizona Daily Star, Sunday Dec. 1, 2013.

Invited Review:

Nitz D, Cowen S. Crossing borders: sleep reactivation as a window on cell assembly formation. Nature Neuroscience. 2008;11(2):126–8.

Ph.D. Dissertation:

Selective Delay Activity in the Medial Prefrontal Cortex: The Contribution of Sensory-Motor Information and Expectation (2007). The University of Arizona. (http://cownescience.com/publications)

In Preparation:

Ye T, Bartlett MJ, Schmit MB, Falk T, Cowen SL (2017) Extended exposure to ketamine reduces cortico-striatal coupling in the beta-band and enhances gamma-band activity in the hippocampus. Front. Neuroscience *(In Progress)*

Hill DF, Parent KL, Atcherley CA, Cowen SL, Heien ML (2017) Nucleus accumbens dopamine release evoked by stimulation of the medial prefrontal cortex peaks at 20 Hz at long stimulation durations. J. Neural Stim. (*In Progress*)

Spanò G, Gómez RL, B. Demara M, Cowen SL, Edgin JE (2017) To Nap or Not to Nap?: Sleep-dependent Memory Consolidation in Typical and Atypically Developing Preschoolers. Science, (*In Progress*)

Lewis SA, Negelspach DC, Kaladchibachi S, Cowen SL, Fernandez F (2017) Spontaneous Alternation: A Gateway to Spatial Working Memory in Drosophila? Learning and Memory (*Under Review*)

McElroy B, Okun A, McKinzie DL, Witkin JM, Remeniuk B, Husein O, Gleason SD, Oyarzoa J, Navratilova E, Kennedy JD, Porreca F, Cowen SL (2017) Deficits in Instrumental Learning, Persistence, and Cognitive Flexibility in Rats with Neuropathic Pain. Pain (*In Progress*)

CURRENT RESEARCH

My research focuses on understanding how the activities of groups of neurons and the release of neuromodulators such as dopamine underlie our capacity to decide, remember, and navigate. Towards this end, I utilize high-density neural recording technologies and fast-scan cyclic voltammetry in behaving animals to study the neural mechanisms underlying cost-benefit decision making, spatial navigation, and memory consolidation.

RESEARCH AND PROFESSIONAL SKILLS

Extensive experience developing and applying software and hardware tools for the investigation of the neural basis for decision-making, memory consolidation, working memory, and spatial navigation. Techniques include software development, creating behavioral training systems, microdrive design/construction, single-unit recording methods, and advanced data analysis methods.

Conceived and built numerous automated maze-based systems for the training and testing of decision-making and memory-driven behaviors. The design and required software is freely available online (cowen.faculty.arizona.edu). My systems are currently in use in the laboratories of three collaborators.

Authored software toolboxes (Matlab) for the analysis of motor behavior, memory trace reactivation, local-field oscillations, spike sorting, and event-triggered analyses of neural data.

Designed and built an animal-mounted inertial measurement system for analysis of animal behavior. The system is currently under evaluation in three laboratories.

Developed, built, and wrote the software for a novel 120 channel neural recording system. This system is being used to explore correlated neuronal activity in the prefrontal cortex.

Produced a system for both the real-time and off-line identification of single unit spiking activity in the behaving rat from physiological recordings (Waveform Cutter).

Optimized the NEURON neuronal network simulator to work on a distributed computing network.

Designed, programmed, and implemented a database to streamline the administration of 200 small business loans and 30 construction and public works projects (APRODIB, Honduras C.A.).

TEACHING

Spring 2018 (scheduled): Drugs, Cognition, and the Brain (PSY 313)

Spring 2018 (scheduled): Statistics (PSY 230)

Fall 2017: Graduate Statistics using R (PSY 510) University of Arizona

Spring 2017: Guest lecture (4 lectures on learning and memory systems) Systems Neuroscience (NRSC 560a)

Spring 2017: Neural Coding and Memory (PSY 506a)

Fall 2016: Graduate Statistics using R (PSY 510) University of Arizona

Spring 2016: Guest lecture (4 lectures on learning and memory systems) Systems Neuroscience (NRSC 560a)

Spring 2016: Drugs, Cognition, and the Brain (PSY 313)

Fall 2015: Statistics (PSY 230)

Fall 2015: Brain and Cognition (PSY 402)

Spring 2015: Guest lecture (1 lecture: The anatomy of the basal ganglia) (Principles of Neuroanatomy)

Spring 2015: Guest lecture (3 lectures on learning and memory systems) Systems Neuroscience (NRSC 560a)

Spring 2015: Neural Mechanisms of Decision Making (PSY/NRSC 596)

Fall 2014: Statistics (PSY 230)

Fall 2014: Brain and Cognition (PSY 402)

Spring 2014: Neural Coding and Memory (PSY 506a)

Spring 2014: Guest lecture (3 lectures on learning and memory systems) Systems Neuroscience (NRSC 560a)

Spring 2014: Guest lecture (Hippocampus and space) Systems Neuroscience (NSCS 315)

Fall 2013: Statistics (PSY 230)

Fall 2013: Brain and Cognition (PSY 402)

Spring 2013: Neural Mechanisms of Decision Making (PSY/NRSC 596e)

Summer 2006: "Brains!" A summer camp on neuroscience for grade-school children

ADVISING AND MENTORING

Dissertation and Master's committee (2017): 8 graduate students, chair of committee for 2 students.

Dissertation committee (2016): 7 graduate students, chair of committee for 1 student.

Honors Thesis adviser (2016-present): 3 students.

Dissertation committee (2015): 2 graduate students.

Dissertation committee (2014): 2 graduate students.

Graduate adviser (2014 - present): 4 students.

Graduate adviser (2013): 3 students.

Honors Thesis adviser (2013-present): Undergraduate thesis.

Demonstrator and Instructor (2013): Tucson Book Festival neuroscience booth. Spikerbox electrophysiology demonstration.

Thesis adviser (2012-2017): Master's thesis advisor for 4 students (Physiology and Neuroscience Departments).

Mentor: (2012-present): 42 Undergraduate and 5 High School students.

Thesis adviser (2010): Undergraduate thesis advisor for student at Whitman College.

INVITED TALKS AND CONSULTATIONS

Invited speaker: Mayo Clinic Brain Initiative Symposium, Apr 1, 2017, "Integrated Measurement of Dopamine Release and Large-Scale Ensemble Activity in Behaving Animals", Rochester, MN.

Invited speaker: U of Arizona Neuroscience DataBlitz Jan 23, 2017. "Brains, oscillations, aging, and memory", Tucson AZ.

Invited poster presenter: NSF/NIH Brain Initiative Investigators Meeting. "A system for the combined measurement of dopamine and neural activity (DANA)", Dec 13, 2016, Bethesda, MD.

Invited speaker: UA Brain Initiative Collaboration DataBlitz "Synchronous neuronal activity, Parkinson's disease, and ketamine", Dec 7, 2016, Tucson AZ.

Invited speaker: U of Arizona Neural Systems and Cognitive Sciences Seminar "Brains, oscillations, aging, and Parkinson's disease", Dec 6, 2016, Tucson AZ.

Speaker: Michael J Fox Foundation Consortium Progress Update "Identification of network and oscillatory signatures of the LRRK2 mutation", Oct 23, 2017, Video presentation.

Grant Proposal Presentation: To **Northrop Grumman** (with Dr. Bob Wilson) "Biologically-inspired algorithms for solving the explore-exploit dilemma", Nov 1, 2016, Video presentation.

Invited speaker: Taormina Pain Mechanisms and Therapeutics Conference, "Ketamine and its impact on corticostriatal-limbic interactions", June 10, 2016, Taormina, Italy.

Invited speaker: U of Arizona, May 25, 2016."Brains, oscillations, aging, and Parkinson's disease", Undergraduate Program in Biology.

Invited speaker: Emory University. "Effort-reward decision making: Neural systems and neuromodulation", Atlanta, GA. March 8, 2016

Invited speaker: Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy national convention. "Simultaneous Detection of Dopamine Release and Multiple Single-Unit Activity in Awake and Behaving Rats", Atlanta, GA. March 7, 2016

Invited speaker: Arizona Integrated Wellness Cooperative (AIWC). "Memories are made of this: How our brains create the past.", Tucson, AZ, September 22, 2015.

Faculty host: For **Ralph Greenspan,** Ph.D. (UCSD), At University of Arizona, Neuroscience Seminar Series Talk: "The Fruit Fly and the B.R.A.I.N. Initiative.", September 2015.

Invited speaker: U of A Psychology Dept. Undergraduate Honors Seminar. September 15, 2015 Title: "Research and Research Opportunities in the Cowen Laboratory."

Invited speaker: U of A Medical School: Medical School Residents Journal Club. September 7, 2015 Title: "Ketamine and neural oscillations."

Invited consultant: Science and Entertainment Exchange (National Academy of Sciences). Oct. 2015. Consultation on hemineglect for a writer/producer developing a film script.

Invited speaker: UC Davis. Davis CA, May 8, 2015 Title: "The Influence of Aging on the Variability of Neuronal Activity"

Invited speaker: McKnight Brain Institute Meeting. Miami FL, May 1, 2015 Title: "The Influence of Aging on the Variability of Neuronal Activity"

Invited speaker: Undergraduate Neuroscience Association, March 23, 2015 Title: "The Circuitry of Choice: Roles of neural activity and neuromodulation in decision making"

Invited speaker: Quantitative Biology Colloquium, University of Arizona February 3, 2015, Title: "Ripples, Neurons, and Aging"

Invited speaker: Graduate Interdisciplinary DataBlitz, University of Arizona, January 26, 2015, Title: "Effort, Reward, and Dopamine"

Invited speaker: NAWBO Women's Business Wellness Workshop, Tucson, January 12, 2014 "Move it or lose it: How our bodies empower our brains"

Invited speaker: Workshop on the Computational Properties of the Prefrontal Cortex "Effort and the Anterior Cingulate", Whistler, BC (Canada), Sept 2014.

Invited speaker: Rising Stars in Neuroscience lecture,
Evelyn F. McKnight Brain Institute, "Neural System, Networks, and the Impact of Aging", Gainesville, Florida, April. 24, 2014.

Faculty host: For **Doug Nitz, Ph.D**., University of Arizona, February 2014. CNS Seminar Series Talk: "Cell Assemblies of the Basal Forebrain"

Invited speaker: University of Arizona Evelyn F. McKnight Brain Institute Scientific Program (Tucson, Arizona), Oct. 23, 2013. Title: "The Impact of Aging on Physiology and Function of the Prefrontal Cortex"

Invited speaker for the Neural Circuits of Adaptive Control workshop (Paris, France) Sept. 28 2013 Title: "The Measurement and Meaning of Effort Guided Behavior"

Invited speaker at the COSYNE computational neuroscience conference. "Beyond the cost of work: Relationships between physical effort, risk, and reward." March 1, 2013, Salt Lake City, UT.

Invited speaker: University of Arizona Neuroscience DataBlitz "Action and Effort in the Anterior Cingulate Cortex", Aug 28 2012, Tucson AZ.

Invited speaker: **Decision Making in Rodents and Primates Conference,** "Actions first, outcomes second: Sensorimotor and outcome processing in the dmPFC", Sept. 28, 2012, Heidelberg, Germany.

Invited speaker: Inter-departmental University of Arizona seminars including the Cognitive Science Brown Bag, Neuroscience Seminar Series, and Neurology Journal Club, Biochemistry Journal Club (2012).

Invited lecturer "What is computational neuroscience", Frances Parker High School, May 2011 San Diego, CA.

Invited lecturer Title: "Embodied Cognition" for the Casa de Mañana retirement community, the Minding the Brian Symposium, May 2010 San Diego, CA.

Consultant for the Science and Entertainment Exchange (National Academy of Sciences) 2010 Los Angeles, CA

OUTREACH

Tucson Festival of Books Presenter. Spring 2017. Our lab developed an electronic-brain demonstration system for teaching K-12 students about neurophysiology (NSF funded). My students and I demonstrated the device at the Festival of Books.

Science and Entertainment Exchange (National Academy of Sciences). *Ad hoc* scientific consultant. Worked with Sid Mohanty Fall 2016 on script development related to parietal hemineglect (conference calls and emails).

Speaker/Organizer: Flandrau Science Center Science Café Series. Tucson, Spring 2016. "Brain waves, drugs, and the chemical basis for hallucinations."

Arizona Public Media NPR broadcast interview. Summarized my research in memory and decision-making. Spring 2016.

Speaker: Arizona Integrated Wellness Cooperative (AIWC). Tucson, September 22, 2015 Title: "Memories are made of this: How our brains create the past."

Speaker: NAWBO Women's Business Wellness Workshop, Tucson, January 12, 2015 "Move it or lose it: How our bodies empower our brains"

Tucson Festival of Books Presenter. Spring 2014. Assisted with the cockroach neuroscience hands-one demonstration that teaches K-12 children about nerve conduction.

Judge: FIRST robotics competition: Lego League for grade school children. 2010

Judge: San Diego Science Fair. 2011

Microbusiness consultant: Peace Corps, Honduras (2 years)

Martial arts instructor: 40+ students (5 years)

PROFESSIONAL MEMBERSHIPS AND SERVICE

2017	Ph.D. Prelim Committee: Yaohui Ding (Psychology)
2017	Ph.D. Prelim Committee: Stephanie Nagl (Psychology)
2017	Chair of Masters Committee: Blaine Harper (Psychology)
2017	*Ad hoc* grant reviewer for Michael J Fox Foundation
2017	*Spring:* Faculty Search Committee Chair, Psychology Department
2017	Member: Undergraduate Curriculum Committee, Psychology Department
2016	Chair Ph.D. Dissertation Committee: Tony Ye (Psychology)
2016	Member: graduate student admission committee for the Neuroscience GIDP (Neuroscience)
2016	Member: Undergraduate Curriculum Committee, Psychology Department
2016	Chair Ph.D. Prelim Committee: Lindsey Crown (Psychology)
2016	Master's Thesis Committee: Danielle DePorter (Nutritional Sciences)
2016	Ph.D. Prelim Committee: Samer Masri (Neuroscience)
2016	Ph.D. Dissertation Committee: Lusine Gomtsian (Pharmacology)
2016	Ph.D. Prelim Committee: Lauritz Diekman (Psychology)
2016	Ph.D. Dissertation Committee: Phillip Putnam (Neuroscience)
2015	Ph.D. Dissertation Committee: Kelsey Nation (Neuroscience)
2015	Member of the graduate student admission committee for the Neuroscience GIDP (Neuroscience)
2015	*Fall:* Host and emcee for the Neuroscience Data Blitz, Tucson, AZ
2015	*Fall:* Faculty Search Committee Chair, Psychology Department
2015	*Spring:* Faculty Search Committee Member, Psychology Department
2015	Ph.D. Dissertation Committee: Jean-Paul Wiegand (Neuroscience).
2015	Ph.D. Dissertation Committee: Daniel Gray (Neuroscience).
2015	Ph.D. Dissertation Committee: JJ Morrow (Neuroscience).
2015	Chair: Outstanding Senior Selection Committee, Psychology Department
2015	Member: Undergraduate Curriculum Committee, Psychology Department
2015	Member: Five-Year Strategic Planning Committee, Psychology Department
2015	Chair: *Ad hoc* Grade Appeal Committee, Psychology Department
2015	Faculty Search Committee Member, Neuroscience Department
2015	Faculty: Cognitive Science Graduate Interdisciplinary Program.

2014	Hosted and emceed the Neuroscience Data Blitz at the Tucson Museum of Contemporary Art.
2014	Ph.D. Dissertation Committee: Christopher Atcherley (Chemistry and Biochemistry).
2014	Faculty Search Committee Member, Psychology Department
2014	Comprehensive Exam Committee: Mike Miller (Neuroscience).
2014	Comprehensive Exam Committee: Ryan Smith (Psychology).
2014	Faculty: Applied Biosciences Graduate Interdisciplinary Program.
2014	Faculty: Physiology Graduate Interdisciplinary Program.
2014	Faculty Host: Dr. Doug Nitz. CNS Seminar Series Talk: "Cell Assemblies of the Basal Forebrain"
2014	*Ad hoc* grant reviewer Arizona Alzheimer's Disease Core Center
2014	Member Faculty Search Committee (Neuroscience)
2013	Curriculum Development Committee: Cognition and Neural Systems, Psychology Department
2013	Panelist: Career advisory panel for undergraduate students in the Mind, Brain, and Behavior program
2013	Comprehensive Exam Committee: Stacey Pest (Neuroscience)
2012	Faculty: Neuroscience Graduate Interdisciplinary program.
2008-present	*Ad hoc* reviewer for Neuron, The Journal of Neuroscience, Frontiers in Neuroscience, Journal of Neuropharmacology, Cerebral Cortex, Future Medicine: Nanotechnology, Current Opinion in Behavioral Sciences, Journal of Neural Engineering, ACS Chemical Neuroscience, PLOS Biology, Neurobiology of Aging
1998-present	Member, Society for Neuroscience

SELECTED PRESENTATIONS BY MENTORED GRADUATE STUDENTS

September 23, 2016: Jean Paul Wiegand: World Parkinson's Congress "Increased cortical spindle power in a LRRK2 mouse model of Parkinson's Disease", Portland OR.

September 23, 2016: Tony Ye: World Parkinson's Congress "Gamma-band oscillatory activity in the motor cortex is progressively enhanced following repeated ketamine administration in 6-OHDA-lesioned rats.", Portland OR.

Fall 2016: Jean Paul Wiegand, Tony Ye: Poster presentations at the Society for Neuroscience meeting, San Diego, CA.

April 29 2016: Jean Paul Wiegand: Speaker at the Science of Consciousness Conference "Age-Related Changes in Theta-Delta Ratio Measures of Slow-Wave Sleep", Tucson AZ.

April 29 2016: Lindsey Crown: Speaker at the Science of Consciousness Conference. "Ketamine rapidly and acutely reduces tonic dopamine in the rat dorsal striatum", Tucson AZ.

Fall 2015: Mike Miller, Jean Paul Wiegand, Tony Ye: Poster presentation at the Society for Neuroscience meeting, Washington DC.

Spring 2015: Jean Paul Wiegand (Ph.D. Student): Formal Presentation to the to the Arizona Alzheimer's Research Consortium, Phoenix, AZ.

Spring 2015: Mike Miller (Masters Student): Poster presentation to the to the Arizona Alzheimer's Research Consortium, Phoenix, AZ.

Fall 2014: Mike Miller, Jean Paul Wiegand, Daniel Hill: Poster presentation at the Society for Neuroscience meeting, New Orleans, LA.

AWARDS AND HONORS

Recipient of a 1998-1999 National Science Foundation training grant.

Awarded the 2010 Blasker-Rose-Miah technology development grant from The San Diego Foundation.

ADDITIONAL EDUCATION

Summer 2005 *Okinawa Institute of Science and Technology* *Okinawa, Japan*
Attended the Okinawa Computational Neuroscience Course and invited to present research at RIKEN (Tokyo, Japan).

Summer 2000 *Marine Biological Laboratory* *Woods Hole, MA*
Completed the Methods in Computational Neuroscience course on information-theoretic methods for neural data analysis.

Summer 1997 *Carnegie Mellon University* *Pittsburgh, PA*
Completed the Pittsburgh Supercomputing Center course in Computational Modeling.