

## **JULIE E. MILLER, PHD**

Assistant Professor, Depts. of Neuroscience and Speech, Language and Hearing Sciences  
School of Mind, Brain & Behavior, University of Arizona  
Tucson, AZ 85721  
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Lab website: <http://juliemiller.lab.arizona.edu/>

## **EDUCATION**

- 1999-2005      Ph.D. Neuroscience, Univ. Arizona  
Mentor: Richard B. Levine, Ph.D. Professor of Neuroscience  
Thesis: “Wandering behavior in *Manduca sexta*: investigating steroid hormone effects on neural circuits for locomotor behavior”
- 1993-1997      B.A. *cum laude*, Biology and History, Honors in Biology, Wellesley College, MA  
Mentor: Barbara S. Beltz, Ph.D. Professor of Biology  
Thesis: “Neurogenesis in the embryonic and adult lobster”

## **EMPLOYMENT & RESEARCH EXPERIENCE**

- 2014-**            **Assistant Professor tenure-track, University of Arizona, Tucson (Univ. Arizona)**
- 2011-2013      Assistant Researcher, University of California Los Angeles (UCLA)  
2013              Summer writing tutor, Amgen Summer Scholars Program for Undergraduate Student Research at UCLA
- 2005-2011      Postdoctoral Training, UCLA  
Mentor: Stephanie A. White, Ph.D., Professor of Integrative Biology & Physiology  
Research: neurogenetics underlying normal and abnormal vocal behavior
- 1999              Intern, American Association for the Advancement of Science, Washington D.C.  
Office of Government Relations (formerly Center for Science, Technology & Congress)  
Supervisor: Joanne Carney, Director  
Activities: Researched federal funding trends, assisted with Congressional briefings, attended Congressional hearings and federal advisory committee meetings and reported on science and technology legislation
- 1997-1998      Predoctoral Intramural Research Trainee, National Institutes of Health, Bethesda, MD  
Pain and Neurosensory Mechanisms Branch, National Institute of Dental & Craniofacial Research  
Mentor: Maryann Ruda, Ph.D.  
Research: sex differences in molecular and behavioral neuropathic pain response in a rodent model  
Activities: co-organized the first NIH conference on sex differences in pain pathways
- 1995              Undergraduate Researcher, Massachusetts Institute of Technology (MIT), Boston, MA  
Mentor: David B. Schauer, Ph.D. Professor of Biological Engineering & Comparative Medicine  
Research: cloning strategies for investigating bacterial pathogenesis in humans
- 1991,1993      Summer Student Research Volunteer, Albany Medical College, Albany, NY  
Mentor: Frank Blumenstock, Ph.D. Professor of Physiology  
Research: investigation of circulatory proteins following burn injury in a rodent model

## **FUNDED GRANTS**

- 2014-2015      Faculty Seed Grant, University of Arizona. Title: “A Role For Synaptotagmin IV in Birdsong and Human Speech?” Role: Principal Investigator

- 2014-2015 Parkinson's and Movement Disorder Foundation (PMDF) to University of Arizona. Title: "How Dopamine Loss Contributes to Speech Deficits in Parkinson's Disease." Role: Principal Investigator
- 2012-2014 NIH NINDS R03 Grant #NS078511 to University of California, Los Angeles. Title: "Synaptotagmin 4: Role in Vocal Motor Function and Parkinson's Disease." Role: Principal Investigator

## **SUBMITTED GRANTS/LETTERS OF INTENT**

- 2016 (May) Michael J. Fox Foundation for Parkinson's Research, University of Arizona. Title: "An alpha-synuclein model for vocal symptoms in Parkinson's disease." Role: Principal Investigator. (pending)
- 2016 (Feb.) NIH NIDCD R01, University of Arizona. Title: "Neuromolecular Mechanisms Underlying Vocal Function and Dysfunction." Role: Principal Investigator (not funded- under revision)
- 2016 (Mar.) American Federation of Aging Research (AFAR), University of Arizona. Title: "Neurobiology of the Aging Voice." (selected for full grant application, one of 37 out of 142 grants invited), Role: Principal Investigator
- 2015-2016 (Dec.-Jan) Brain Research Foundation (BRF) Fay/Frank Seed Grant Program, University of Arizona. Title: "Molecular Pathways for Neural Control of Speech and Language." (selected as the university's sole applicant for the letter of intent but not solicited for full grant submission), Role: Principal Investigator
- 2015 (May) Internal University of Arizona seed grant from College of Science. Title: "Screening for Early Vocal Changes in Parkinson's disease." (grant mechanism was cancelled), Role: Co-Principal Investigator with Dr. R. Samlan, SLHS.
- 2015 (April) Whitehall Foundation Letter of Intent for Grant-in-Aid, University of Arizona. Title: "Molecular Basis for Neural Variability in Motor Learning." Role: Principal Investigator (not solicited for full grant submission)
- 2015 (Feb) Lessons for Success Application, American Speech-Language-Hearing Association (ASHA) grant workshop (not selected)

## **HONORS, AWARDS, FELLOWSHIPS**

- 2016 Profiled in University News, 'UA News' "Birdsong Could Offer Clues to Human Speech Disorders."
- 2015 Selected as the University of Arizona institutional nominee for the Brain Research Foundation Fay/Frank Seed Grant Application
- 2014 Selected for Profile in Arizona Daily Star Newspaper, Science Section 'UA Scientists'
- 2009 'Hot topic' Abstract Selection, *SFN*, Chicago, IL  
'Birdsong as a Model System for Early Detection of Parkinson Disease'
- 2009 Travel Award, UCLA Brain Research/Semel Institute, *SFN*
- 2007-2008 NIH Postdoctoral Training Fellowship, UCLA Mental Retardation Research Center T32HD0007032
- 2006 Travel Award, Women in Neuroscience Committee, *SFN*
- 2006 Travel Award, UCLA Brain Research Institute/Fine Science Tools, *SFN*
- 2005-2007 NIH Postdoctoral Training Fellowship, UCLA Laboratory of Neuroendocrinology T32HD07228-24
- 2001-2003 NIH Predoctoral Training Fellowship, Univ. Arizona Motor Control Neurobiology T32NS07309
- 2000 Graduate Leadership Award, Univ. Arizona
- 2000 Flinn Foundation Predoctoral Developmental Neuroscience Fellowship, Univ. Arizona
- 1997 Biology Departmental Honors for Senior Thesis, Virginia Fiske Senior Prize in Biology, Sigma XI science honor society inductee, Wellesley College
- 1995 Undergraduate Summer Science Research Fellowship, MIT

## INVITED TALKS

- 2016 (May) University of Arizona Health Sciences Center Neurology Journal Club  
2016 (March) University of Arizona Cognitive Science Seminar Series  
2014 (May) University of Arizona SLHS Colloquium Series  
2014 (May) University Animal Care & AALAS meeting. “The Songbird Model: A Window into Understanding Neural & Peripheral Mechanisms Supporting Voice and Speech.”  
2014 (Feb) University of Arizona Undergraduate Biology Program ‘Conversations with Faculty’ series  
2014 (Jan) Neuroscience Data Blitz, Ph.D. Program in Neuroscience, Tucson Botanical Gardens  
2013 American Speech-Language-Hearing Association Conference, Chicago, IL  
“The Songbird Model: A Window into Understanding Neural and Peripheral Mechanisms Supporting Voice and Speech.”  
2011 Co-Chair & Speaker, American Speech-Language-Hearing Association Conference, San Diego, CA  
Invited Symposium, “Vocalization Deficits in Parkinson's Disease: Insights From Multiple Species.”  
2010 Chair & Speaker, Annual Meeting Society for Neuroscience (*SFN*), San Diego, CA  
Selected Minisymposium, “Neural Mechanisms Underlying Vocalization in Multiple Species: A Special Focus on Parkinson's Disease.”  
2010 Conference on Motor Speech, “Vocal Motor Deficits in a Songbird Model of Parkinson Disease.”  
Savannah, GA

## CONFERENCES ATTENDED BUT NOT PRESENTED

- 2016 Motor Speech, Newport, CA  
2015 Arizona Parkinson's Disease Research Summit: Creating a Roadmap for a Shake-Free Environment,  
Mayo Clinic Hospital, Phoenix

## PUBLICATIONS

1. \***Miller J.E.**, Hafzalla G.W., Burkett Z.D, Fox C.M. and S.A. White (2015) Reduced vocal variability in a zebra finch model of dopamine depletion: implications for Parkinson disease. *Physiol Rep*, 3 (11), 2015, e12599, doi: 10.14814/phy2.12599; \*equal authorship, PMID: 26564062
2. \*Grant L.M., \*F.R. Richter, **J.E. Miller**, S.A. White, C.M. Fox, M.F. Chesselet and M.R. Ciucci (2014) “Vocalization deficits in mice over-expressing alpha-synuclein, a model of pre-manifest Parkinson's disease.” *Behav Neurosci* 128: 110-121. \*equal authorship; PMID: 24773432.
3. Hilliard A.T., **J.E. Miller**, S. Horvath, and S.A. White (2012) “Distinct Neurogenomic States in Basal Ganglia Subregions Relate Differently to Singing Behavior in Songbirds.” *PLoS Comput Biol* Nov 8 (11):e1002773. PMID: 23144607
4. Hilliard A.T.\*, **J.E. Miller\***, E.R. Fraley, S. Horvath, and S.A. White (2012) “Molecular Microcircuitry Underlies Functional Specification in a Basal Ganglia Circuit Dedicated to Vocal Learning.” *Neuron*, Feb 9 Epub. 73: 537–552. PMID: 22325205 \*equal authorship
5. **Miller JE**, A.T. Hilliard and S.A. White (2010) Song Practice Promotes Acute Vocal Variability at a Key Stage of Sensorimotor Learning. *PLoS One* Jan 6; 5(1): e8592. PMID: 20066039
6. **Miller J.E.**, E. Spiteri, M.C. Condro, R.T. Dosumu-Johnson\*, D.H. Geschwind and S.A. White (2008) Birdsong Decreases Protein Levels of FoxP2, a Molecule Required for Human Speech. *J Neurophysiol* 100: 2015-2025. PMID: 18701760 \*undergraduate author
7. **Miller J.E.** and S.A. White (2007) “The Sleeping Bird Gets the Song,” Focus on ‘HVC Neural Sleep Activity Increases With Development and Parallels Nightly Changes in Song Behavior.’ *J Neurophysiol* 98: 3-4. PMID: 17475721
8. **Miller J.E.** and R.B. Levine (2006) Steroid Hormone Activation of Wandering in the Isolated Nervous System of *Manduca sexta*. *J Comp Physiol A Sens Neur Behav* 192: 1049-62. PMID: 16788816
9. Bradshaw H.B., **J. Miller**, Q. Ling, K. Malsnee and M.A. Ruda (2000) Sex Differences and Phases of the Estrous Cycle Alter the Response of Spinal Cord Dynorphin Neurons to Peripheral Inflammation and Hyperalgesia. *Pain* 85: 93-99. PMID: 10692607
10. Harzsch S., **J. Miller**, J. Benton and B. Beltz (1999) From Embryo to Adult: Persistent Neurogenesis and Apoptotic Cell Death Shape the Lobster Deutocerebrum. *J Neurosci* 19: 3472-3485. PMID: 10212307
11. Harzsch S., **J. Miller**, J. Benton, R.R. Dawirs and B. Beltz (1998) Neurogenesis in the Thoracic Neuromeres of Two

## ABSTRACTS/PRESENTATIONS

### In Current Faculty Rank

1. Role of Alpha-synuclein in Area X of Adult Male Zebra Finches: implications for acoustic variability in birdsong. S.J. Munger, C.A. Medina, L.Y. So, K.B. Church, J.L. Ritter, J.E. Miller. Dept. of Neuroscience, University of Arizona, Tucson. Society for Neuroscience (SFN), 2016.
2. Behavioral Regulation of Dopamine Biomarkers in Area X of Adult Male Zebra Finch Songbirds. L.Y. So, S.J. Munger, J.E. Miller. Dept. of Neuroscience, University of Arizona, Tucson. Society for Neuroscience (SFN), 2016.
3. Consequences of Experimental Dopamine Depletion in the Songbird Basal Ganglia. George Hafzalla<sup>1,2</sup>, Stephanie A. White<sup>2</sup> and **Julie E. Miller**<sup>3</sup>. <sup>1</sup>Physiological Science, University of California, Los Angeles, <sup>2</sup>Department of Integrative Biology and Physiology, University of California, Los Angeles, <sup>3</sup>Departments of Neuroscience and Speech, Language and Hearing Sciences, University of Arizona, Tucson. International Congress on Neuroethology, Sapporo, Japan, 2014.

### Postdoctoral/Assistant Researcher Rank at UCLA

1. Characterization of Dopamine Levels and Vocal Motor Deficits in Zebra Finch After Injection of 6-Hydroxydopamine into Area X. \*Lee D.L, G.W. Hafzalla, Z.D. Burkett, **J.E. Miller** and S.A. White. \*undergraduate author, Undergraduate Poster Day, 2012.
2. Ultrasonic Vocalizations in Mice Overexpressing Human Wild-type Alpha-Synuclein. Shier J.N., L.M. Grant, F. Richter, K. De La Rosa, **J.E. Miller**, C.M. Fox, S.A. White, E. Masliah, M-F. Chesselet, and M.R. Ciucci *SFN*, 2011.
3. Autism Susceptibility Gene Contactin Associated Protein-like 2 Expression in a Songbird Model for Vocal Learning. Condro M.C., **J. E. Miller** and S.A.White, *SFN*, 2011.
4. Vocal Motor Deficits in a Songbird Model of Parkinson's Disease. **Miller J.E.**, Z.D. Burkett, C. M. Fox, and S. A. White. *Movement Disorder Society's 15th International Congress*, 2011, Toronto, ON, Canada.
5. Ultrasonic Vocalizations in Mice Overexpressing Wild-Type Human  $\alpha$ -Synuclein. Richter F., J. N Shier, L. Grant, **J.E. Miller**, C. M. Fox, S. A White, M-F. Chesselet and M. R. Ciucci. *UCLA – Oxford Parkinson's Conference*, 2010.
6. Investigation of Vocal and Non-Vocal Motor Deficits in a Songbird Parkinson's Disease Model. Burkett Z.D., V. Vakhshori\*, **J.E. Miller**, C.M. Fox and S.A. White *UCLA – Oxford Parkinson's Conference*, 2010. \*undergraduate author.
7. Hilliard A.T., **J.E. Miller**, S. Horvath and S.A. White. Differential Gene Network Connectivity Underlies Unique Behavior-Driven Gene Regulation in Songbird Striatal Region Area X, *SFN*, 2010.
8. **Miller J.E.**, Z. D. Burkett and S.A. White. Birdsong as a Model System for Early Detection of Parkinson Disease. *SFN*, 2009.
9. Hilliard A.T., **J.E. Miller** and S.A. White. Network Analysis of Gene Expression in Area X During Singing. *SFN*, 2009.
10. **Miller J.E.**, E. Spiteri, D.H. Geschwind and S.A White. On-line Regulation of FoxP2 Protein in Adult Songbirds. *SFN*, 2006.

### Graduate Studies and Post-Baccalaureate

1. **Miller J.E.** and R.B. Levine. Steroid Hormone Activation of Locomotion in the Insect *Manduca sexta*. Univ. Arizona, *SFN*, 2003.
2. Ruda M.A., H.B. Bradshaw, **J.E. Miller**, and Q.D. Ling. Comparisons of Pain Responses in Male Rats Versus Female Rats During Different Stages of the Estrous Cycle. Pain and Neurosensory Mechanisms Branch, NIDCR, NIH, *SFN*, 1998.

### Undergraduate Studies

1. Harzsch S., **J. Miller**, J. Benton and B. Beltz. Persistent Neurogenesis and Apoptotic Cell Death in the Developing

Crustacean Deutocerebrum: Evidence for a Turnover of Olfactory Interneurons. Dept of Biology, Wellesley College, *SFN*, 1998.

2. Harzsch S., **J. Miller**, J. Benton and B. Beltz. Neurogenesis in the Developing Lobster CNS. *SFN*, 1997.

3. Harzsch S., **J. Miller**, J. Benton and B. Beltz. Embryonic Development of the CNS in the American Lobster: Neurogenesis, Expression of Engrailed, and Neuropil Formation. *Annual German Neurosciences Meeting*, 1997.

## **TEACHING/MENTORING/SERVICE, UNIVERSITY OF ARIZONA**

### TEACHING & PROFESSIONAL DEVELOPMENT

Spring 2016 Co-Instructor, NSCS 200: Fundamentals of Neuroscience and Cognitive Science  
Spring 2014, 2015 Primary Instructor, SLHS 261, Anatomy and Physiology of the Speech Mechanism  
Spring 2015 Member, STEM Faculty Learning Community  
2002 Graduate Teaching Associate, Neural Systems and Behavior, Marine Biological Laboratory, Woods Hole, MA  
2000 Graduate Teaching Associate, Introduction to Neurobiology

### MENTORING

#### *Undergraduate:*

Summer 2016-on-going Undergraduate honors student, Areen Badwal, major in Neuroscience & Cognitive Science  
Fall 2015-ongoing Undergraduate honors student Amaris Tapia, Arizona Mentors Program  
Fall 2015-ongoing Undergraduate Kendall Church, major in Speech and Hearing Sciences  
Summer 2015 Undergraduate Melissa Gottschlich, co-mentored with Dr. Robin Samlan  
Spring 2015 Preceptors for SLHS 261: Angelica McCarron, Lupita De Los Santos, Lauren Milovich, Katie Russell, Christina Logan, Julia Harris, Megan Clarke  
Spring 2014 Preceptors for SLHS 261: Jaclyn Bendroff, Alyssa Heeman, Jaclyn Tom  
Fall 2014-2016 Undergraduate Research (392), Joshua Ritter, major in Speech & Hearing Sciences

#### *Graduate:*

Spring 2016-on-going, Cesar Medina, Ph.D. student, Program in Neuroscience  
Spring 2015-on-going, Lisa So, Ph.D. student, Program in Neuroscience  
Spring 2016, Lab Rotation, Cesar Medina, First year Neuroscience Ph.D. student  
Spring 2015, Lab Rotation, Oscar Mendez, First year Neuroscience Ph.D. student  
Fall 2014, Lab Rotation, Cecilia Brown, First year Neuroscience Ph.D. student  
  
Spring 2014 SLHS 261, Teaching Assistants: Marissa Kryger, Matthew Ricca, Sam Deitering, Sam Ricks  
Spring 2015 SLHS 261, Teaching Assistants: Sam Deitering, Sam Ricks, Sarah Olson, Jacklyn Hellman  
Spring 2016 NSCS 200, Teaching Assistants: Samer Masri, Katie Newman-Smith, Stacey Pest

### SERVICE

2016-on-going Member, Curriculum Committee, Undergraduate Program in Neuroscience and Cognitive Science  
2016-on-going Member, APR Self-Study Committee for Department and NSCS Program  
2014-2016 Member, Neuroscience Department faculty search committee  
2016-on-going Dissertation Committee Member for Samer Masri and Oscar Mendez, Neuroscience Ph.D. students  
2015-on-going Co-organizer of Speech, Language and Hearing Sciences Colloquium Series  
2015 Admissions Committee, Ph.D. Program in Neuroscience  
2014-2016 Speaker Selection Committee, GIDP Neuroscience program  
2014-on-going Dissertation Committee Member for Judith Tello, Ph.D. candidate in Neuroscience  
2014-2015 Dissertation Committee Member for Milos Babic, Ph.D. candidate in Neuroscience  
  
1999-2000 Student Representative, Graduate Admissions and Recruitment Committee, Univ. Arizona

## TEACHING/MENTORING, UCLA

2013 Instructor, Neuroscience 101: Neurobiology of Birdsong Module (undergraduate) lecture & laboratory  
2012 Instructor, Physiological Science 177: Neuroethology (undergraduate)  
2009 Guest lecturer, Physiological Science 149: Molecular Mechanisms of Disease (undergraduate)  
2009 Guest lecturer, Physiological Science 177: Neuroethology (undergraduate)

### Graduate:

2012-2014 George Hafzalla, Master's Degree Candidate in Physiological Science  
2010-2011 Elizabeth Fraley, Ph.D. Candidate in Molecular, Cellular, Integrative Physiology Program  
co-author on Hilliard, Miller et al. *Neuron*, 2012  
2008-2010 Zachary D. Burkett, Master's Degree Candidate in Physiological Science  
Current position: Ph.D. Candidate in Molecular, Cellular, Integrative Physiology Program  
co-author on Miller et al., *Physiological Reports*, 2015

### Undergraduate:

2010-2013 Debora Lee, Ecology and Evolutionary Biology  
Two-time Fellowship Recipient, Junior Undergraduate Research Scholars Program,  
College of Letters and Science  
Current position: dental student, UC Irvine  
2010-2011 Venus Vakhshori, Neuroscience  
Award Recipient Undergraduate Neuroscience Poster Day, 2011  
Current position: medical resident, University of Southern California (USC)  
2008 Ryan Dosumu-Johnson, Minority Access to Research Careers student  
co-author on Miller et al. *Journal of Neurophysiology*, 2008  
Current position: MD/Ph.D. student, Harvard Medical School  
2005-2007 Carol's Montes, CARE scholar  
Current position: Medical Student, UC Davis

## ACTIVE COLLABORATIONS

2016- "Alpha-synuclein-mediated changes in neuronal firing patterns in songbird basal ganglia Area X" with  
Psychology Faculty member Stephen Cowen  
2016- "Comparison of Birdsong and Human Voice Data in Parkinson's disease" with SLHS Faculty member  
Robin Samlan.

## PUBLIC OUTREACH

2003 Guest lecturer, Southern Arizona Health Borders Program  
Sunnyside High School, Tucson, AZ  
2000-2004 Demonstrator, Brain Awareness Week, Univ. Arizona  
2001-2002 Host, middle school students visit to graduate research laboratory  
2000 Guest lecturer, Pistor Middle School, Tucson, AZ (laboratory exercises)

## EXTERNAL SERVICE

2014 Reviewer, Development Neurobiology  
2013 Reviewer, European Journal of Neuroscience  
2011 Reviewer, Journal of Experimental Biology  
2010 Invited External Reviewer, Academic Program Review Committee for the Univ. Arizona  
Ph.D. Program in Neuroscience

## PROFESSIONAL SOCIETIES

2002-Present Member, Society for Neuroscience  
2014- Member, American Speech-Language-Hearing Association (ASHA)