

## *CURRICULUM VITAE (04.11.18)*

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### PERSONAL STATEMENT

In the context of my academic life, I have been studying the physiology and neurobiology of sensory and motor systems since 1998 with a special emphasis on the peripheral and central control of breathing behaviors in birds and mammals since 2003. Currently, I maintain an NIH-funded project that aims to understand the structure and function of brainstem rhythm-generating neural networks with particular emphasis on developing animals. The long-term goal of my research team is to understand how brainstem motor circuits that control life sustaining autonomous breathing patterns develop, mature and maintain rhythmic activity in the context of health and disease.

### EDUCATION

- 2006      **Ph.D., Biology** (Physiology emphasis)  
Biological Sciences  
Northern Arizona University, Flagstaff, AZ.  
Advisor: Dr. Steven C. Hempleman; Co-Advisor: Dr. David Pierotti
- 2000      **M.S., Kinesiology** (Exercise physiology emphasis)  
Center for the Study of Human Performance and Kinesiology  
Indiana University, Bloomington, IN.  
Advisor: Dr. William F. Brechue
- 1994      **B.S., Biology** (Physiology emphasis)  
Department of Biology  
Indiana University, Bloomington, IN.  
Research Advisor: Dr. William Roland

### EMPLOYMENT

- 2017-present      **Associate Professor of Biology**  
Department of Biological Sciences and Dental Sciences  
Idaho State University, Pocatello, ID
- 2011-2016      **Assistant Professor of Biology**  
Department of Biological Sciences and Dental Sciences  
Idaho State University, Pocatello, ID.
- 2011-present      **Adjunct Professor of Anatomy and Physiology**  
School of Dentistry  
Creighton University, Omaha, NE
- 2010-11      **Research Assistant Professor**  
Department of Physiology  
College of Medicine  
University of Arizona, Tucson, AZ.

2007-10      **Post-doctoral Fellow**  
 Department of Physiology  
 College of Medicine  
 University of Arizona, Tucson, AZ.  
 Advisor: Dr. Ralph F. Fregosi

2006-2007    **Lecturer/Postdoctoral Fellow in Physiology**  
 Department of Biological Sciences  
 Northern Arizona University, Flagstaff, AZ.

2000-06      **Graduate Teaching Assistant**  
 Department of Biological Sciences  
 Northern Arizona University, Flagstaff, AZ.

1998-00      **Graduate Teaching Assistant**  
 School of Public Health  
 Department of Kinesiology, Human Performance Laboratory  
 Indiana University, Bloomington, IN.  
 Advisor: Dr. W.F. Brechue

1996-98      **Research Technician**  
 Department of Dermatology and Biochemistry  
 University of California, Davis, CA.  
 Supervisor: Dr. Vincent Ziboh

1994-96      **Research Technician,**  
 Respiratory Toxicology  
 Illinois Institute of Technology, Chicago, IL.  
 Supervisor: Dr. James Gerhart

1994-96      **Research Technician**  
 Water Quality Department  
 John G. Shedd Aquarium, Chicago, IL.  
 Supervised by staff veterinarian

## SELECTED REASERCH FUNDING

### Extramural Grants

- National Institute of Health (NIH) - Academic Research Enhancement Award (1R15NS087521-01A1): National Institute of Neurological Disease and Stroke (NINDS RNS087521A).

*Mechanisms of respiratory-related rhythmic motor activity and plasticity in the avian brain stem*

Funding period: 09/30/14-08/31/18

Role: Principal Investigator

Total costs = \$362,626.00

*COMPLETED*

- National Institute of Health (NIH) - Small Grant Award. Funding institute: National Institute of Child Health and Human Development (NICHD; R03 HD0616)

*Effects of chronic nicotinic receptor excitation on central glutamatergic control of breathing*

Funding period: 2009-2011

Role: Principle investigator

Total costs = \$175,000

*COMPLETED*

### Intramural Grants

- University Research Committee Grant (URC)

Title: *Promoting Interdisciplinary Collaboration & Career Development Networking*

Funding period: 2014-2016

Role: Co-PI

Total Costs = \$2,000.00

*COMPLETED*

- University Research Committee Grant (URC)

Title: *The development of motor circuits for feeding*

Funding period: 2012-present

Role: Co-PI

Total Costs = \$11,856.00

COMPLETED

## RESEARCH INTERESTS, TECHNIQUES, and CURRENT PROJECTS

### Interests and techniques

- Respiratory related motor rhythm generation and neural control of brainstem neural circuits
- Cellular aspects of CO<sub>2</sub> signal transduction
- Stress physiology
- Developmental respiratory physiology and neuroplasticity

### Current Projects

#### **Project 1: The development and maturation of brainstem motor circuits using birds as a model.**

The avian egg provides early and straightforward access to the developing embryo to study the development and plasticity of central pattern generators (CPGs), i.e., breathing, walking, suckling and chewing. These studies aim to understand the mechanisms of rhythmogenesis during early development, as well as whether neural activity during the embryonic period plays a role in circuit formation and execution. We are also interested in the effects of afferent input to these circuits, such as the development and maturation of CO<sub>2</sub> chemoreception.

**Project 2: Ionic plasticity in the development of brainstem neural circuits.** Nicotine acetylcholine receptors (nAChRs) are found throughout the CNS, including the brainstem where autonomic and automatic behaviors are regulated and produced. We undertake studies aimed at understanding the role of normal and pathologically desensitized nAChRs in synaptic function and the development of autonomous rhythms. Avian glossopharyngeal motoneurons and rhythmogenic interneurons are being studied.

## PUBLICATIONS (peer-reviewed)

### Journals (\*indicates undergraduate researcher working with Dr. Pilarski at ISU)

\*Pickett, K.L., \*Stein, P.S., \*Vincen-Brown, M.A., **Pilarski, J.Q.** Role of inhibition in the development of respiratory rhythm and pattern in the zebra finch brainstem. *Dev Neurobiol.* 2018 Aug 29. doi: 10.1002/dneu.22632. [Epub ahead of print] PMID: 30160056

\*Vincen-Brown, M.A. Revill, A.E. and **Pilarski, J.Q.** Activity-dependent plasticity in the isolated embryonic avian brainstem following manipulations of rhythmic spontaneous neural activity *Respiratory Physiology & Neurobiology*, March 2016; doi: 10.1016/j.resp.2016.03.013. Epub 2016 Mar 26

Wollman, L.B., Haggerty, J., **Pilarski, J.Q.**, Levine, R.B., and R.F. Fregosi. Developmental nicotine exposure alters cholinergic control of breathing frequency in neonatal rats. *Developmental Neurobiology*, 2016; doi: 10.1002/dneu.22380. [Epub ahead of print]

\*Vincen-Brown, M.A., \*Whitesitt, K. C., \*Quick, F.G., **Pilarski, J.Q.** Studying respiratory rhythm generation in a developing bird: Hatching a new experimental model using the classic in vitro brainstem-spinal cord preparation. *Respiration Physiology & Neurobiology*, 2015; doi: 10.1016/j.resp.2015.08.007. Epub 2015 Aug 24

Jaiswal, S.J., Wollman, L.B., Harrison, C.M., **Pilarski, J.Q.**, Fregosi, R.F. Developmental nicotine exposure enhances inhibitory synaptic transmission in motor neurons and interneurons critical for normal breathing. *Developmental Neurobiology*, 2015; doi: 10.1002/dneu.22318. Epub 2015 Jun 29

Jaiswal, S.J., **Pilarski, J.Q.**, Fregosi, R.F. Developmental nicotine exposure alters AMPA neurotransmission in the hypoglossal motor nucleus and preBötzing complex of neonatal rats. *J Neuroscience* 2013 Feb 6; 33(6):2616-25

**Pilarski, J.Q.**, Wakefield, H.E., Fregosi, R.F. Increased nicotinic receptor desensitization in hypoglossal motor neurons following chronic developmental nicotine exposure. *J Neurophysiol.* 2012 Jan; 107(1):257-64. Epub 2011 Oct 19.

Hempleman, S.C, **Pilarski, J.Q.** Prenatal development of respiratory chemoreception in endothermic vertebrates. *Respir Physiol Neurobiol* 2011 Aug 31; 178(1): 156-62. Epub 2011 May 6.

**Pilarski, J.Q.**, Wakefield H.E., Fuglevand A.J., Levine R.B., Fregosi R.F. Developmental nicotine exposure alters neurotransmission and excitability in hypoglossal motor neurons. *J Neurophysiol.* 2010 Nov 10. [Epub ahead of print]

**Pilarski, J.Q.**, Fregosi RF. Prenatal nicotine exposure alters medullary nicotinic and AMPA-mediated control of respiratory frequency in vitro. *Respir Physiol Neurobiol.* 2009 Jul 31. [Epub ahead of print]

**Pilarski, JQ**, Solomon, I.C., Kilgore, DL. Hempleman, S.C. Effects of aerobic and anaerobic metabolic inhibitors on avian intrapulmonary chemoreceptor discharge. *Am. J. Physiol. Reg., Integr Comp. Physiol.* 2009 May; 296(5): R1576-84. Epub 2009 Mar 18.

Fregosi, RF and **Pilarski, JQ**. Prenatal nicotine exposure and development of GABAergic and nicotinic control of breathing. *Respir. Physiol. Neurobiol.* May 2008; Epub ahead of print  
doi:10.1016/j.resp.2008.05.008

**Pilarski, JQ**, Hempleman SC. Development of avian intrapulmonary chemoreceptor. *Respir. Physiol. Neurobiol.* 2007 Aug 1;157(2-3):393-402. Epub 2007 Jan 30.

Hempleman, SC, Egan, SX, **Pilarski, JQ**, Adamson, TP, Solomon, IC. Calcium and avian intrapulmonary chemoreceptor response to CO<sub>2</sub>. *J. Appl. Physiol.* 2006 101(6): 1565-1575.

Lappin, A.K., Monroy, JA, **Pilarski, JQ**, Zepnewski, E, Pierotti, DJ, Nishikawa KC. Storage and recovery of elastic potential energy increases power of ballistic mouth opening in toads. *J. Exp. Biol.* 2006 Jul; 209 (Pt. 13):2535-53.

**Pilarski JQ**, Hempleman SC. Imidazole binding reagent diethyl pyrocarbonate (DEPC) inhibits avian intrapulmonary chemoreceptor discharge in vivo. *Resp. Physiol. Neurobiol.* 2006 Feb 28; 150(2-3):144-54. Epub 2005 Jun 13.

### **Book Chapters**

Hempleman, S C, **Pilarski, JQ**. Chapter 10: Mechanisms of CO<sub>2</sub> sensing in avian intrapulmonary chemoreceptors. In: Structure, evolution, and function of airway chemoreceptors in the vertebrates. (Eds.) G. Zaccone, E. Cutz, D. Adrianensen, C. Nurse, and A. Mauceri, Science Publishers, Enfield, NH. June 2009.

### **Manuscripts in preparation**

Fregosi, R.F., Leiter, J. and **J.Q. Pilarski**. Development and the activation patterns of the muscle of breathing in vertebrates. *Submitted to Comprehensive Physiology, 2018.*

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### **ABSTRACTS (\*oral presentations)**

Lybbert, C, Whitaker, J, Leon, J, and **J.Q. Pilarski**. Role of pH chemosensitivity in the generation and maintenance of early breathing behaviors. INBRE Research Conference, Moscow, ID, August, 2017.

Leon, J., Lybbert, C., Whitaker, J., and **J.Q. Pilarski**. A technique for retrograde labeling of motoneurons in the zebra finch embryo. INBRE Research Conference, Moscow, ID, August, 2017.

\***Pilarski, J.Q.** Using comparative neurobiological approaches to understand how perinatal insults alter development of ventilatory control. FASEB, 2017.

Pickett, K.L., Stein, P.S., and **J. Q. Pilarski**. Age dependent changes in breathing-associated GABAergic and glycinergic neurotransmission in the embryonic zebra finch brainstem. INBRE Moscow, ID., August, 2016.

Stein, P.S., Pickett, K.L., Vincen-Brown, M.A., **Pilarski, J.Q.** Role of inhibition in the development of respiratory rhythm and pattern in the zebra finch. FASEB, J. April, 2016, San Diego, CA.

Stein, P.S., Vincen-Brown, M.A., and **J.Q. Pilarski**. Role of GABA/glycine antagonism in the development of respiratory rhythmogenesis in the zebra finch. INBRE, Boise, ID., 2015

Wollman, L., Haggerty, J.M., **Pilarski, J.Q.**, Levine, R.B., Fregosi, R.F. Developmental nicotine exposure alters the respiratory frequency response to muscarine. FASEB J. April, 1, 2015.

Vincen-Brown, M.A., Quick, F.G., and **J.Q. Pilarski**. Ontogeny of respiratory-related rhythmic motor patterns in the avian brainstem. FASEB J. April, 2015, Boston, MA. (*Undergrad award winner APS*)

Quick, F.G. Benson, M.A., Winston, V.D., and **J.Q. Pilarski**. Exploring a transgenic approach to understanding neural circuits that control breathing behaviors in birds. Idea Network of Biomedical Research Excellence (INBRE) Summer Research Conference, 2014. Boise, ID.

Vincen-Brown, M.A., Stills, K.D., and **J.Q. Pilarski**. Rapid plasticity in the developing brainstem following chronic nicotine exposure. *FASEB J.* April 14, San Diego, CA.

Vincen-Brown, M.A., Stills, K.D., F.G. Quick and **J.Q. Pilarski**. Homeostatic regulation in the developing avian brainstem following chronic nicotine exposure. Idea Network of Biomedical Research Excellence (INBRE) Summer Research Conference. Moscow, ID. 2013

Vincen-Brown, M.A., Stills, K.D., and **J.Q. Pilarski**. An avian model for exploring brain stem during development. *FASEB J.* April, 2013, Boston, MA.

Vincen-Brown, M.A., Stills, K.D., and **J.Q. Pilarski**. Investigating the neural control of breathing using an avian model during early development. Idea Network of Biomedical Research Excellence (INBRE) Summer Research Conference. Moscow, ID., 2012. (*Undergrad award winner APS*)

Jaiswal, S. **Pilarski, J.Q.**, Fregosi, R.F. Developmental Nicotine Exposure alters GABAergic inhibition in the hypoglossal motor nucleus. *Society for Neuroscience*. Nov. 2011.

Haggerty, J.M., **Pilarski, J.Q.**, Fregosi, R.F. Influence of developmental nicotine exposure on central respiratory-related cholinergic neurotransmission in the brainstem spinal cord preparation. *FASEB J.* April, 2011, Washington, D.C. (*Undergrad award winner APS*)

**Pilarski, J.Q.**, Wakefield, H.E., Fuglevand, A.J., Levine, R.B., and Ralph Fregosi. Properties of nicotinic acetylcholine receptors expressed on developing hypoglossal motoneurons following prolonged nicotinic receptor stimulation. *Society for Neuroscience*. November, 2010, San Diego, CA.

Wakefield, H.E., **Pilarski, J.Q.**, Fuglevand, A.J., Levine, R.B., and Ralph Fregosi. Current-injected depolarization and receptor-mediated excitation produce similar maximal firing responses in hypoglossal motor neurons. *Society for Neuroscience*. November, 2010, San Diego, CA

**Pilarski, J.Q.**, Wakefield, H.E., Fregosi, R.F. Chronic nicotinic exposure decreases the synaptic strength of nAChR-mediated glutamatergic input onto neonatal hypoglossal motoneurons. *FASEB J*. Anaheim, CA. April 24-28, 2010.

Wakefield, HE, **Pilarski, JQ**, Fugelvand, AJ, and RF Fregosi. Prenatal nicotine exposure alters intrinsic properties of neonatal hypoglossal motor neurons in the rhythmic medullary slice preparation. *FASEB J*. Anaheim, CA. April 24-28, 2010

**Pilarski, J.Q.** Promer, K, Fregosi, R.F. Removal of the parafacial respiratory region eliminates the decrease in rhythmic motor output following prenatal nicotine exposure in the brainstem spinal cord preparation. *Society for Neuroscience*. 2009. Chicago, IL.

Powell, G.L., **Pilarski, J.Q.**, Fregosi, R.F., and Fellous, J.M. Computational neural model of the alterations in respiratory rhythm generation caused by developmental, environmental, and genetic abnormalities. *Society for Neuroscience*, 2009. Chicago, IL.

Wakefield, HE, **Pilarski, JQ**, Fugelvand, AJ, and RF Fregosi. Effects of prenatal nicotine exposure on intrinsic properties of neonatal hypoglossal motor neurons in the medullary slice preparation. AZ. Arizona Chapter, *American Physiological Society*. Tucson, AZ. Nov. 2009

\***Pilarski, J.Q.**, Fregosi, R.F. Influence of prenatal nicotine exposure on in vitro central respiratory-related cholinergic neurotransmission. *FASEB J*. 2008 22:954.10

**Pilarski, J.Q.** Fregosi, R.F. Prenatal nicotine exposure potentiates respiratory-related glutamatergic neurotransmission *in vitro*. *Society for Neuroscience*. 2008. Washington, D.C.

**Pilarski JQ**, Solomon IC, Hempleman SC. Intracellular energy metabolism in avian intrapulmonary chemoreceptors. *FASEB J*. 21 (6): A919-A919 APR 2007

## TEACHING EXPERIENCE

**Introduction to Research and Bioethics:** 2-credit seminar course with laboratory opportunities. Consists of assigned reading of primary literature, discussion, assessment and laboratory projects using chicken and Zebra Finch embryos as a model. Designed for 1<sup>st</sup> year Dental students (graduate) matriculating to Creighton University School of Dentistry for year two.

**Idaho State University, Pocatello, ID. Principal instructor (8 graduate students)—Spring, 2012-current.**

**Human Development:** 3-credit course with histology laboratory. Consists of lectures, discussion and assessment (both in class lecture exams and laboratory practicals). Designed for upper division undergraduates and 1<sup>st</sup> year Dental students (graduate students) matriculating to Creighton University School of Dentistry.

**Idaho State University, Pocatello, ID. Principal instructor (40 students)—Fall, 2011-current.**

**Head and Neck Anatomy & Physiology (with human cadaver laboratory):** 5-credit course consisting of lectures, discussion and assessment (both in class lecture exams and cadaver laboratory practicals). Laboratory component includes prosection of head and neck regions by instructor and students. Designed for upper division undergraduates and 1<sup>st</sup> year Dental students matriculating to Creighton University School of Dentistry. Laboratory involves only graduate students.

**Idaho State University, Pocatello, ID. Principal instructor (48 students)—Fall, 2011-current.**

**Systems Physiology (human focus):** 3-credit course consisting of lectures, discussion sections throughout the week, and assessment. Designed for non-majors interested in understanding their own bodies.

**University of Arizona, Tucson, AZ. Lecturer for 3 weeks (70-80 students)—Spring, 2010.**

**Comparative Vertebrate Physiology:** 3-credit course that explored the physiological and morphological diversity of the animal kingdom, designed for advanced undergraduate.

**University of Arizona, Tucson, AZ. Guest lecturer (30-40 students)—comparative respiratory physiology section —2008-2009.**

**Human Anatomy & Physiology I and II:** 4-credit course consisting of lectures, discussion sections outside of class, and laboratory sections. Designed for undergraduate interested in biomedical careers.

**Northern Arizona University, Flagstaff, AZ. Principal Instructor (200 students each semester)—2007, Fall and Spring semesters.**

**Human Anatomy & Physiology I and II:** 4-credit course consisting of lectures, discussion sections outside of class, and laboratory sections. Designed for undergraduate interested in biomedical careers.

**Northern Arizona University, Flagstaff, AZ. Guest lecturer (200 students)—2002-2006.**

**Graduate Colloquium “Electricity in Neural Circuits”.** 1-credit hour graduate colloquium discussion and modeling electrical circuits after biological circuits. Designed for advanced undergraduates and graduate students.

**Northern Arizona University, Flagstaff, AZ. Guest lecturer (10 students), Spring 2005.**

**Animal Physiology Laboratory:** 3-credit laboratory course for advanced undergraduate students consisting of hands-on experiments highlighting fundamental physiological concepts in an evolutionary context.

**Northern Arizona University, Flagstaff, AZ. Principal Instructor (40-50 students), Spring-Fall, 2003-2005.**

**Comparative Animal Physiology:** 3-credit course consisting of lectures and discussion. Explored the diversity of functional and structural adaptations of many different organisms in the animal kingdom with a focus on basic physiological principles.

**Northern Arizona University, Flagstaff, AZ. Guest lecturer (40-50 students), Spring-Fall, 2003-2005.**

**Laboratory course in Human Anatomy and Physiology I & II:** 3-hour laboratory sections 3 times weekly in concert with separate lecture. Consisted of various animal dissections and laboratory experiments. Topics included cells, tissues, and organ systems.

**Northern Arizona University, Flagstaff, AZ. Principal instructor (20-25 students each section), Spring-Fall, 2000-2004.**

**Laboratory courses in Kinesiology:** 1-credit course consisted of a variety of recreational athletic courses, including basic swimming, tennis, and basketball.

**Indiana University, Bloomington, IN. Principal instructor (20-30 students each section), Spring-Fall, 1999.**

#### **AWARDS and HONORS (competitive review)**

Finalist for Idaho State University Distinguished Teacher Award-Named Outstanding Master Teacher, 2017-2018

INBRE undergraduate poster awards to Janet Leon (1<sup>st</sup> place) and Casetin Lybbert (3<sup>rd</sup> place), Idaho State University (Pilarski Lab), August 2017

Department of Biological Sciences, Best Undergraduate Student Award to Michael Vincen-Brown (Pilarski Lab), Idaho State University, 2015

American Physiological Society, Best Undergraduate Poster Award to Michael Vincen-Brown (Pilarski Lab), FASEB, 2015, Boston, M.A.  
IDeA Network of Biomedical Research Excellence (INBRE) Summer Research Award, Faculty/Staff Choice Award to undergraduate Michael Vincen-Brown (Pilarski Lab), 2012.  
Research Fellowship in Motor Neuroscience (PI-Andrea Nistri) at the School for Advanced Studies, Trieste, Italy (withdrew from appointment due to the acceptance of ISU tenure track Assistant Professor position), 2011.  
David S. Bruce Excellence in Undergraduate Research Abstract Award—Mentor to undergraduate Jarl Haggarty, Experimental Biology, Wash, DC, University of Arizona, 2011.  
Nominated for undergraduate mentorship teaching award Northern Arizona U., Spring, 2007.  
Scholander Competition Participant, FASEB, 2004-2005.  
Teaching Assistant of the Year, Biological Sciences, NAU, 2002.  
Nominated for Campus-wide Teaching Assistant of the Year, NAU 2002.  
Best Student Poster, 89th Annual AOCs Meeting and Expo, Chicago, IL. 1998.

## INVITED PRESENTATIONS

2017 Experimental Biology Mini-Symposia, Ventilatory control and function following perinatal insults, Chicago, IL., 2017.  
2017 Women and Work STEM Conference, ISU, March 8, Pocatello, ID.  
2015 Brain Awareness Day, Snake River Chapter for Neuroscience, ISU, Pocatello, ID.  
2014 Soliloquy Spring Research Conference, ISU, Pocatello, ID.  
2013 IDeA Network of Biomedical Research Excellence (INBRE) Summer Research Conference, Moscow, ID.  
2013 Brain Awareness Day, Idaho State University  
2013 Journal club at the University of Alberta, Physiological Sciences, Edmonton, Canada  
2011 Department of Biological Sciences, Idaho State University, Pocatello, ID  
2010 Dept. of Physiology, U. of Arizona, Tucson, AZ. June 4, Tucson Botanical Garden  
2010 Dept. of Biological Sciences, University of Idaho, Moscow, ID.  
2009 Physiological Sciences Faculty Retreat, Central control of breathing, nicotine, and neuroplasticity, U. of Arizona, Tucson, AZ. June 12.  
2008 Neuroscience Data Blitz, Tucson Botanical Garden, U. of Arizona, Dec. 2.  
2008 Dept. Research Seminar (Physiology Forum), U. of Arizona, Tucson, AZ.  
2007 Dept. Research Seminar, Physiological Sciences, U. of Arizona, Tucson, AZ.  
2006 Dept. Research Seminar, Biological Sciences, NAU, Flagstaff, AZ.  
2006 Dept. Research Seminar, Physiological Sciences “The Doings”, U. of Arizona, Tucson, AZ.

## PROFESSIONAL SERVICES

### Intramural service

Member and Assistant Chair of ISU Institutional Animal Care and Use Committee (IACUC)  
2015-current  
Seminar series coordinator, ISU, Dept. of Biology, Pocatello, ID., 2013-current  
Graduate Student committee service, ISU, ongoing  
Cadaver Tours for local area High Schools in Southeastern Idaho (community service)  
Idea Network of Biomedical Research Excellence (INBRE) participant, ISU, ongoing  
Neurophysiology Journal Club, University of Arizona, Tucson, AZ., 2007-current.  
Brain Awareness Week Organizational Committee and Participant, University of Arizona, Tucson, AZ., 2007.  
Graduate Program Committee, NAU, Flagstaff, AZ., 2004-2006.  
Biology Graduate Student Association, NAU, Flagstaff, AZ., 2000-2006.  
Participant, Learner Centered Education Symposium, NAU, Flagstaff, AZ., 2004.

### Extramural service (Discipline and community)



Early Career Reviewer Program, National Institutes of Health, Respiratory Integrative Biology and Translational Research Study Section, June, 2016

*Ad hoc* Reviewer, Neuroscience

*Ad hoc* Reviewer, Respiratory Physiology & Neurobiology

*Ad hoc* Reviewer, Journal of Applied Physiology

*Ad hoc* Reviewer, Journal of Comparative Biochemistry and Physiology

*Ad hoc* Reviewer, Thieme Medical Publishers, Inc. (textbooks)

Subcontractor, Arizona and California Desert Tortoise Project (Kiva Biological Consulting), 2009-2010

Presenter, Arizona's Children Association, 2005

Participant, Flagstaff Bicycle Advisory Committee, 2002-2004

Member, Flagstaff Biking Organization, 2005-2011

Member, International Mountain Biking Association, 2004-2006

Subcontractor, USGS Regional Herpetology surveys, 2003-2004

### **Memberships in learned societies**

American Physiological Society 2002-present

Society for Integrative and Comparative Biology 2000-2007, 2015-2017

Society for Neuroscience 2008-2012

National Postdoctoral Associations 2006-2008

American Physiological Society, Arizona Chapter (founding member) 2008-2011

American Association of Laboratory Animal Science 1994-1998

## STUDENTS Mentored and Advised

### Student Mentoring & Supervision

#### *Graduate students: Primary Advisor or \*co-advisor*

2016-present Jessica Whittaker (Ph.D. student, ISU, Project: "Avian breathing rhythmogenesis and CO<sub>2</sub>/pH chemoreception"—specific project to be determined.

2016-2017 Katrina Chapman (M.S. student, ISU, Project: "Ontogeny of ionic conductances that produce breathing behaviors in birds"

2015-2017 \*Tiffany L. Smith (M.S. student, ISU), Project: "The role of NMDA receptors in breathing rhythmogenesis during tadpole metamorphosis"

2009-2011 \*Marina Cholianian (Ph.D. student, UA), Project: "Biophysical properties of neurosecretory Neurokinin B neurons in the mammalian hypothalamus"

2007-2011 \*Stuti Jaiswal (Physiology and Neuroscience Ph.D./M.D. student, UA), Project: "Effects of chronic nicotine exposure on inhibitory neurotransmission in the XII motor nucleus and the preBotzinger complex"

2007-2010 \*Hilary Wakefield (Ph.D. student, UA), Project: "Understanding synaptic integration in the hypoglossal motor nucleus"

#### *Graduate students: Committee member at ISU*

2016-present Virona Nicolae, Ph.D. student, ISU, Project: "Zebrafish as a model of undergraduate research to study neurological development: Gene expression patterns induced by the usage of psychoactive pharmaceuticals and personal care products

2016-2017 Sierra Kauer, Ph.D. student, ISU, Project: "Developmental Plasticity of Coordinated Action Patterns in the Perinatal Rat"

2015-present Tiffany L. Smith, M.S. student, ISU, Project: "The role of NMDA receptors in breathing rhythmogenesis during tadpole metamorphosis"

2013-2017 Jonathan Dudko, Ph.D. student, ISU, Project: "Incubation physiology of the Greater Sage grouse"

2013-2017 Matthew Osborne, Ph.D. student, ISU, Project: "Understanding the blood brain barrier in a model of hyperhomocysteinemia"

2013-present Hillary Swann, Ph.D. student, ISU, Project: "Locomotor and Posture Development in Immature Rats: Comparison of Open Field versus Nest Behavior"

- 2013-2015 Jamie Mayo, Ph.D. student, ISU, Project: “Stimulating A Microvascular Cell For Cell Therapy Applications: “Pericyte Potential For Manipulating Central Nervous System Vasculature”
- 2011-2013 Jessica Roberts, M.S. student, ISU, Project: “OPTIMIZATION OF THE  $\alpha 3\beta 2$  NICOTINIC ACETYLCHOLINE RECEPTOR EXPRESSION SYSTEM”
- 2011-2013 Andrew Carroll, M.S. student, ISU, Project: “Anatomical description of the development of hypoglossal motoneurons in tadpoles and adult *Rana pipiens*”

*Selected Undergraduate Student Research Advising and Supervision*

– *These students have contributed substantively to published work*

- 2017-present Kory Andersen, ISU, Project: “Ex ovo cell culture using the altricial zebra finch”
- 2017-present Jennie Nelson, ISU, Project: “Ionic plasticity during the early embryonic development of the atricial zebra finch respiratory network”
- 2017-present Erik Nakkon, ISU, Project: “The role of the cucullaris muscle for breathing in birds”
- 2017 Janet Leon, ISU, STEM high school program via INBRE, Project: “Back labeling the cucullaris muscle in birds”
- 2015-present Casetin Lybbert, ISU, Project: “Isolation of the central pattern and rhythm generator for breathing rhythmogenesis in birds”
- 2015-2017 Kaci Pickett, ISU, ISU, Project: “Age dependent changes in the development of GABAergic and glycinergic neurotransmission in the zebra finch respiratory-related brainstem”
- 2014-2016 Paxton Stein, ISU, Project: “Role of inhibition in the development of respiratory rhythmogenesis in the zebra finch”
- 2014-2017 Kaitlynn Whitesitt, ISU, Project: “Ontogeny of neurotransmitter systems that control breathing in birds”
- 2012-2015 Michael Vincen Brown, ISU, Project: “An avian model for exploring brain stem breathing-related rhythmogenic behavior during early development”
- 2012-2015 Forrest Quick, ISU, “A transgenic approach to understanding neural circuits that control breathing behaviors in birds”
- 2011-2014 Katie Still, ISU, Project: “Homeostatic plasticity and neurotransmitter switching in breathing related cranial motor circuits in the chick embryo”
- 2008-2011 \*Jarl Haggerty (Mathematics undergraduate student, UA and the 2011 David S. Bruce Excellence in Undergraduate research Award, Annual Meeting of Experimental Biology, Wash, D.C.), Project: “Influence of developmental nicotine exposure on central respiratory-related cholinergic neurotransmission in the brainstem spinal cord preparation”
- 2007-2009 \*Katherine Promer (Pre-med undergraduate, UA), Project: “Removal of the parafacial respiratory region eliminates the decrease in rhythmic motor output following prenatal nicotine exposure in the brainstem spinal cord preparation”

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**PERSONAL INTERESTS**

Distance running and bicycling; backcountry hiking and skiing, river rafting, foraging; vegetable gardening; bicycle advocacy; ecological physiology; herpetology

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**REFERENCES**

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