

**R. Michael Burger Jr., Ph.D.**

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Assistant Professor, Neuroscience  
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**Education:**

**University of Texas at Austin: Ph.D.**, Zoology, Section of Neurobiology  
*Degree conferred: November 2000*

**Ithaca College: B.A.**, *cum laude*, double major: Psychology and Anthropology  
*Degree conferred: May 1993*

*Coursework at other institutions:*

**Cold Spring Harbor Laboratories:** Physiological Approaches to Ion Channels 2001  
**Cornell University**, Shoals Marine Laboratory: Systems Neurobiology 1993

**Professional Employment:**

2006-Pres: Assistant Professor of Biological Sciences, Lehigh University  
2005-2006: Alexander von Humboldt Foundation Fellow, University of Munich  
2000-2005: NRSA/Senior Postdoctoral Fellow University of Washington  
1994-2000: Graduate Research Assistant University of Texas at Austin  
1993-1994: Laboratory Technician, Cornell University

**Professional Societies:**

Association for Research in Otolaryngology  
Society for Neuroscience  
American Physiological Society  
American Association for the Advancement of Science

## Publications:

### Book Chapters:

**Burger, R. M.** and Rubel, E. W. *Encoding of interaural timing for sound localization*. The Senses: a Comprehensive Reference, Audition. Eds. Hoy, R., Dallos, P., and Oertel, D., Elsevier Inc., Dec 2007.

### Refereed Research Papers:

Fischl, M.J., Combs, T.D., Klug, A.K., Grothe, B., and **Burger, R.M.** (*provisional acceptance*) Modulation of synaptic input by GABA<sub>B</sub> receptors improves coincidence detection for computation of sound location. Revision pending at *Journal of Physiology: London*.

Gerhart, S.V., Eble, E.M., **Burger, R.M.**, Oline, S.N., Vacaru, A., Edepli, K.S., Jefferis, R., Iovine, M.K., (2012) Differential subcellular localization of Cx40.8 is determined by a small domain within its carboxy terminus. In Press: *Plos One*.

Tabor, K., Coleman, W.L., Rubel, E.W., and **Burger, R.M.** (2012) Tonotopic organization of the superior olivary nucleus in the chicken (*Gallus gallus*). In Press: *The Journal of Comparative Neurology*.

Coleman, W.L., Fischl, M.J., Weimann, S.R., and **Burger, R.M.** (2011) GABAergic and glycinergic inhibition modulate monaural auditory response properties in the avian superior olivary nucleus. *The Journal of Neurophysiology*, May; 105(5):2405-20.

**Burger, R.M.**, Fukui, I., Ohmori, H., and Rubel, E.W. (2011) Inhibition in the balance: binaurally coupled inhibitory feedback in sound localization circuitry. *The Journal of Neurophysiology*, Jul. 106(1):4-14. Review.

Fukui, I., **Burger, R.M.**, Ohmori, H., and Rubel, E.W., (2010) GABAergic inhibition sharpens the frequency tuning and enhances phase locking in chicken nucleus magnocellularis neurons. *The Journal of Neuroscience*, 30: 12075 - 12083

Howard, M.A., **Burger, R.M.**, and Rubel, E.W., (2007) A developmental switch from GABAergic excitation to inhibition controlled by K<sup>+</sup> conductances. *The Journal of Neuroscience*, 27(8):2112-2123.

**Burger, R.M.**, Pfeiffer, J.D., Westrum, L.E., Bernard, A., and Rubel, E.W., (2005) Expression of GABA<sub>B</sub> receptor in the avian auditory brainstem: ontogeny, afferent deprivation, and ultrastructure. *Journal of Comparative Neurology*, 489(1): 11-22

Lu, Y., **Burger, R.M.**, and Rubel, E.W. (2005) GABA<sub>B</sub> Receptor Activation Modulates GABA<sub>A</sub> Receptor-mediated Inhibition in Chicken Nucleus Magnocellularis Neurons. *Journal of Neurophysiology*, 93(3): 1429-1438,

**Burger, R.M.**, Cramer, K.S., Pfeiffer, J.D., and Rubel, E.W. (2005) The avian superior olivary nucleus provides divergent inhibitory input to parallel auditory pathways. *Journal of Comparative Neurology*. 481(1): 6-18

Pollak G.D., **Burger, R.M.**, Klug A. (2003) Dissecting the circuitry of the auditory system. *Trends in Neurosciences*. 26(1): 33-9. Review.

Pollak G.D., **Burger, R.M.**, Park T.J., Klug A., Bauer E.E. (2002) Roles of inhibition for transforming binaural properties in the brainstem auditory system. *Hearing Research*. 168(1-2): 60-78.

**Burger, R.M.** and Pollak, G. D. (2001) Reversible inactivation of the dorsal nucleus of the lateral lemniscus reveals its role for processing multiple sound sources in the inferior colliculus. *The Journal of Neuroscience*. 21(13): 4830-4843.

Klug, A.K., Khan, A., **Burger, R.M.**, Bauer, E.E., Hurley, L.M., Yang, L., Grothe, B., Halvorsen, M.B., and Park T.J. (2000) Latency as a function of intensity in auditory neurons: transformations along the neuraxis. *Hearing Research*, 148:107-123.

**Burger, R.M.** and Pollak, G.D. (1998) Analysis of the role of inhibition in shaping responses to sinusoidally amplitude-modulated signals in the inferior colliculus. *Journal of Neurophysiology* 80: 1686-1701.

*Published conference proceedings:*

Fukui, I., **Burger, R.M.**, Ohmori, H., and Rubel, E.W. (2008) Role of inhibition on the cochlear nucleus of chicken in vivo. *Neuroscience Research*, 61:S246.

Pfeiffer, J.D., **Burger, R.M.**, Klug, A., and Grothe, B. (2006) Axonal tracing and calyceal imaging in the mammalian medial nucleus of the trapezoid body. *Journal of Investigative Medicine*, 54:S143

*Other Press:*

Work Featured in *Hearing Health Magazine*:

Morrison, J (2009) "DRF support Leads to Major NIH Grant," in Under the Scope: Hearing Health Magazine, Summer Issue, pg 46-47. Publisher: Deafness Research Foundation, NY, NY. (Now: Hearing Health Foundation)

### Professional Assignments, Honors and Awards:

Faculty Grant for International Connections, Lehigh U. 2011  
Alexander von Humboldt Return Fellowship, 2011  
Inducted into Sigma Xi, 2008  
Alexander von Humboldt Foundation Fellowship, 2005-2006  
National Research Service Award, National Institutes of Health, 2000-2003  
Cold Spring Harbor Laboratories Course Scholarship, 2001  
Zoology Scholarship Endowment for Excellence, UT Dept. of Zoology  
Professional Development Award, UT Graduate School  
Grass Foundation Scholarship, Cornell University (SML) 1993  
Psi Chi: Psychology Honors Society, Ithaca College, 1992  
Cum Laude: Ithaca College, 1993

### Research Funding (current funding in **bold italics**):

**2010-2012 NIH: R03, role: Senior Personnel \$225,000 total cost, PI:lovine**  
**2009-2014 NIH/NIDCD: R01, role: Principal Investigator, \$1.8 Million total cost**  
2009 BDSI course development support: \$34,000  
*Collaborator: Dr. Mayuresh Kothare*  
2008 Deafness Research Foundation Project Grant, PI \$25,000  
2008 HHMI Biosystems Dynamics Grant, Co-PI \$58,000  
*Collaborators: Drs. Linghai Zhang, and Ping-Shi Wu*  
2007 HHMI Biosystems Dynamics Grant, Co-PI \$62,000  
*Collaborator: Dr. Linghai Zhang*  
2006 Lehigh Faculty Research Grant, PI \$2,000  
2005-2006 Alexander von Humboldt Foundation Postdoctoral Fellowship, PI  
2000-2003 Ruth Kirschstein National Research Service Award, NIH

### Scholarly Presentations:

#### *\*Invited Lectures:*

Burger, R.M. "It's a matter of time: tuning neural responses with inhibition for sound localization" *Department of Biological Sciences, Cedar Crest College*. Oct. 4, 2011.

Burger, R.M. "The role of feedback inhibition in sound localization circuitry of birds" invited lecture, *Ninth International Workshop on Auditory Processing*, Cody, Wyoming, Sept. 2011.

Burger, R.M. "The role of feedback inhibition in sound localization circuitry of birds" invited lecture, *Dept. of Biology II, University of Leipzig, Germany* July, 2011.

Burger, R. M. Synaptic gain control by GABA<sub>B</sub> receptors improves precision in sound localization circuitry" invited lecture, *U. of Colorado School of Medicine*, Denver Colorado, January 2011.

Burger, R. M. Synaptic gain control by GABA<sub>B</sub> receptors improves precision in sound localization circuitry" invited speaker, Symposium "When is an inhibitory synapse NOT inhibitory?" Chair, C. Kopp-Scheinflug, Ph.D., *Winter Conference on Brain Research*, Keystone CO, January 2011.

Burger, R. M. " Synaptic gain control by GABA<sub>B</sub> receptors improves precision in sound localization circuitry" invited lecture, *The University of Texas at Austin: Section of Neurobiology*, April 2010.

Burger, R. M. "Inhibition in the auditory brainstem: implications for sound localization" Invited Lecture, *National Institute for Deafness and other Communication Disorders*, NIH March 2007.

Rubel, E.W\*. Harris, J.A., Howard, M.A. and Burger, R. M. "Regulation of a Unique Physiological Phenotype and Neuron Number in Developing Cochlear Nucleus" *Abstracts of the 30th Midwinter Research Meeting of the Association for Research in Otolaryngology*, New Orleans, LA, Feb. 2007.

Burger, R. M. "Inhibition in the auditory brainstem: implications for sound localization" Invited Lecture, *Dept. of Otolaryngology, University of West Virginia*. January 2007.

Burger, R. M. "Developmental Plasticity in an auditory time coding circuit" Invited Lecture, *Auditory Group, Dept. of Neurobiology, Northeast Ohio Medical University*, Dec 8, 2006.

Burger, R. M. "Inhibition in the auditory brainstem: implications for sound localization" Invited Lecture, *Dept. of Neurobiology, Northeast Ohio Medical University*, Dec 7 2006.

Burger, R.M. "Inhibition in the auditory brainstem: implications for sound localization" Symposium: The Calyx of Held: A model for studying synaptic transmission in mammals. *Institute for Biologie II, University of Leipzig*, Dec. 2005.

\*Recent Refereed Presentations and abstracts accepted for presentation (prior to 2005 omitted):

Fischl, M.J., and Burger R.M. "Heterogeneity of intrinsic membrane properties in the avian superior olivary nucleus" *Abstracts of the Meeting of the Society for Neuroscience*, Washington, DC, Nov. 2011.

Fischl, M., Coleman, W., Oline, S., Weimann, S., and Burger, R.M., *Sorting Synaptic Inputs: Novel Inhibitory Function in Neural Circuits for Sound Localization*. Academic Symposium: Exhibition of Student Research and Scholarship, Lehigh University, Bethlehem, PA, March 2011.

Leese, J.M., Weimann, S.R., Burger, R.M., and Itzkowitz, M. "A comparison of acoustic

repertoires of sympatric damselfish" *Lehigh Valley Ecology and Evolution Symposium*, April 2011.

Tabor, K., Coleman, W., Rubel, E., and Burger, R.M. "Tonotopic Organization of the Superior Olivary Nucleus in Chicken (*Gallus gallus*)" *Abstracts of the 34th Midwinter Research Meeting of the Association for Research in Otolaryngology*, Baltimore, Md., Feb. 2011.

Coleman, W., Weimann, S., and Burger, R.M., "Monaural Response Properties in the Avian Superior Olivary Nucleus are Modulated by GABAergic and Glycinergic Inhibitory Inputs: and *In Vivo* Study" *Abstracts of the 34th Midwinter Research Meeting of the Association for Research in Otolaryngology*, Baltimore, Md., Feb. 2011.

Fischl, M., Oline, S., and Burger, R.M., "GABA and Glycinergic Synaptic Input to the Avian Superior Olivary Nucleus" *Abstracts of the 34th Midwinter Research Meeting of the Association for Research in Otolaryngology*, Baltimore, Md., Feb. 2011.

Coleman, W.L., Fischl, M.J., Trause, D.A., and Burger, R.M. "Physiological heterogeneity of the avian superior olivary nucleus" *Abstracts of the 33rd Midwinter Research Meeting of the Association for Research in Otolaryngology*, Anaheim, CA, Feb. 2010.

Combs, T.D., Fischl, M.J., Klug, A.K., Grothe, B., and Burger, R.M. "GABAB receptor activation as a possible mechanism for maintaining precise ITD selectivity across varying stimulus conditions: an *In Vitro* study" *Abstracts of the 33rd Midwinter Research Meeting of the Association for Research in Otolaryngology*, Anaheim, CA, Feb. 2010.

Fischl, M., Combs, T.D., and Burger, R.M. "Response characteristics of the avian superior olivary nucleus." *Abstracts of the 32nd Midwinter Research Meeting of the Association for Research in Otolaryngology*, Baltimore, MD, Feb. 2009.

Burger, R.M., Alexandrova, O., Grothe, B., and Klug, A. "The role of GABA<sub>B</sub> receptors in development of inhibitory projections to the MSO" *Abstracts of the 30th Midwinter Research Meeting of the Association for Research in Otolaryngology*, New Orleans, LA, Feb. 2007.

Burger, R. M., Rubsamen, R., and Rubel, E. W. Inhibition shapes monaural response properties in avian Nucleus Magnocellularis neurons. Submitted: *Abstracts of the 28th Midwinter Research Meeting of the Association for Research in Otolaryngology*, New Orleans, LA, Feb. 2005.