

# SHAWN D. BURTON

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## EDUCATION

### Ph.D., Biological Sciences

2011 – present

Carnegie Mellon University, Pittsburgh, PA, USA  
Center for the Neural Basis of Cognition, Pittsburgh, PA, USA  
Advisor: Nathaniel N. Urban

Thesis: “Novel inhibitory circuits in the mammalian main olfactory bulb”

Contributions to Science:

1. Identification and functional characterization of glomerular layer-projecting deep short-axon cells and their role in regulating glomerular activation patterns in the main olfactory bulb (Burton et al., *in prep.*)
2. Identification of feedforward inhibition onto granule cells as a core feature of main olfactory bulb circuitry and systematic investigation of how feedforward inhibition and asynchronous excitation regulate sub- and supra-threshold granule cell activity (Burton and Urban, 2015)
3. Functional differentiation of the parallel pathways formed by mitral and tufted cells, the two classes of principal neurons in the main olfactory bulb (Burton and Urban, 2014), and their distinct lateral inhibitory circuits formed with deep and superficial granule cells, respectively (Geramita et al., *in prep.*)
4. Characterization of the intrinsic biophysical properties and physiological heterogeneity among main olfactory bulb mitral cells (Burton et al., 2012; Yu et al., 2015) and the influence of physiological heterogeneity on oscillatory synchrony (Burton et al., 2012; Zhou et al., 2013)

### M.S., Bioengineering

2008 – 2011

University of Pittsburgh, Pittsburgh, PA, USA  
Advisors: Henry C. Zeringue, Stephen D. Meriney  
Thesis: “Investigating the roles of cell adhesion molecules in synapse formation and function”  
Contributions to Science:

5. Characterization of the distinct roles of cell adhesion molecules Neuroligin-1 and SynCAM1 in synapse initiation and maturation, respectively, in primary hippocampal neuronal cultures (Burton et al., 2012)

### B.S., Bioengineering

2003 – 2008

### B.S., Microbiology

### Minor, Chemistry

University of Pittsburgh, Pittsburgh, PA, USA  
\**Summa Cum Laude*

## PUBLICATIONS

Burton SD, LaRocca G, Liu A, Cheetham CE, Urban NN (2016) Deep short-axon cells regulate multi-glomerular activation patterns in the mammalian main olfactory bulb. (*in prep.*)

Geramita MA, Burton SD, Urban NN (2015) Distinct lateral inhibitory circuits drive parallel processing of sensory information in the mammalian olfactory bulb. (*in prep.*)

Yu Y, Burton SD, Tripathy SJ, Urban NN (2015) Postnatal development of mitral cell intrinsic biophysical properties facilitates stimulus encoding. *J Neurophysiol*, *in press*.

Zhou P, Burton SD, Snyder AC, Smith MA, Urban NN, Kass RE (2015) Characterization of the statistical relationship between network oscillations and spike synchrony. *PLoS Comput Biol*, *in press*.

Burton SD, Urban NN (2015) Rapid feedforward inhibition and asynchronous excitation regulate granule cell activity in the mammalian main olfactory bulb. *J Neurosci*, *in press*.

Tripathy SJ, Burton SD, Geramita M, Gerkin RC, Urban NN (2015) Brain-wide analysis of electrophysiological diversity yields novel categorization of mammalian neuron types. *J Neurophysiol* 113:3474–3489.

**Burton SD**, Urban NN (2014) Greater excitability and firing irregularity of tufted cells underlies distinct afferent-evoked activity of olfactory bulb mitral and tufted cells. *J Physiol (Lond)* 592:2097–2118 (*cover*).

Tripathy SJ, Savitskaya J, **Burton SD**, Urban NN, Gerkin RC (2014) NeuroElectro: A window to the world's neurophysiology data. *Front Neuroinform* 8:40.

Zhou P, **Burton SD**, Urban NN, Ermentrout GB (2013) Impact of neuronal heterogeneity on correlated colored noise-induced synchronization. *Front Comput Neurosci* 7:113.

Arthur JG, **Burton SD**, Ermentrout GB (2013) Stimulus features, resetting curves, and the dependence on adaptation. *J Comput Neurosci* 34:505–520.

**Burton SD**, Ermentrout GB, Urban NN (2012) Intrinsic heterogeneity in oscillatory dynamics limits correlation-induced neural synchronization. *J Neurophys* 108:2115–2133.

**Burton SD**, Johnson JW, Zeringue HC, Meriney SD (2012) Distinct roles of neuroligin-1 and SynCAM1 in synapse formation and function in primary hippocampal neuronal cultures. *Neuroscience* 215:1–16. (*corresponding author*)

Nguyen TD, Liang R, Woo SL, **Burton SD**, Wu C, Almarza A, Sacks MS, Abramowitch S (2009) Effects of cell seeding and cyclic stretch on the fiber remodeling in an extracellular matrix-derived bioscaffold. *Tissue Eng Part A* 15:957–63.

### **CONFERENCE PRESENTATIONS (select)**

**Burton SD**, LaRocca G, Liu A, Cheetham CE, Urban NN. Deep short-axon cells regulate multi-glomerular activation patterns in the mammalian main olfactory bulb. Program No. 786.01. 2015 Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2015. *Poster*.

Geramita MA, **Burton SD**, Urban NN. Lateral inhibition differences between mitral and tufted cells: Causes and consequences. Program No. 561.07. 2015 Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2015. *Symposium*.

**Burton SD**, LaRocca G, Liu A, Urban NN. Deep short-axon cells mediate interglomerular disinhibition in the mammalian main olfactory bulb. Association for Chemoreception Sciences 37<sup>th</sup> Annual Meeting. Bonita Springs, FL. 2015. *Poster*.

**Burton SD**, Urban NN. Feedforward inhibition regulates granule cell recruitment in the mammalian main olfactory bulb. Program No. 719.20. 2014 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2014. *Poster*.

Zhou P, **Burton SD**, Kelly RC, Smith MA, Urban NN, Kass RE. Statistical association of oscillatory lfp and neural synchrony. Program No. 853.05. 2014 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2014. *Poster*.

Tripathy SJ, Alder J, **Burton SD**, Harviston M, Marques D, Urban NN, De Waard A. The UrbanLegend Project: a system for cellular neurophysiology data management and exploration. *Front Neuroinform Conference Abstract: Neuroinformatics 2014. Demo*.

Rho Y-A, **Burton SD**, Ermentrout GB, Urban NN. Effect of changing density of A-type and H-type currents on stochastic synchrony. Program No. 450.02. 2013 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2013. *Poster*.

Tripathy SJ, Gerkin RC, **Burton SD**, Geramita MA, Chandrasekaran S, Gittis AH, Urban NN. NeuroElectro: A literature-based brain wide analysis of the electrophysiological diversity of mammalian neuron types. Program No. 615.10. 2013 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2013. *Poster*.

Tripathy SJ, De Waard A, Gerkin RC, Marques D, **Burton SD**, Urban NN. Towards reusable experiments: making metadata while you measure. *Front Neuroinform Conference Abstract: Neuroinformatics 2013. Oral presentation*.

**Burton SD**, Ermentrout GB, Urban NN. Intrinsic heterogeneity in oscillatory dynamics limits correlation-induced neural synchronization. Program No. 782.19. 2012 Neuroscience Meeting Planner. New Orleans, LA: Society for Neuroscience, 2012. *Poster*.

Douthitt H, McCann S, Luo F, **Burton S**, Tarr T, Meriney SD. Dynasore, an inhibitor of dynamin, increases the probability of transmitter release. Program No. 242.4. 2010 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2010. *Poster*.

## **FUNDING AND AWARDS**

<b>AChemS Annual Meeting Student Travel/Housing Award</b> Association for Chemoreception Sciences	2015
<b>Ruth L. Kirschstein National Research Service Award for Individual Predoctoral Fellows</b> National Institute on Deafness and Other Communication Disorders Grant F31DC013490	2013 – 2016
<b>Fleischner Award</b> Achievement Rewards for College Scientists Foundation	2011 – 2014
<b>Interdisciplinary Traineeship in Computational Neuroscience</b> National Institute on Drug Abuse Predoctoral Training Grant 2T90DA022762-06	2011 – 2012
<b>Presidential Fellowship in the Life Sciences</b> Richard King Mellon Foundation	2011 – 2012
<b>Integrative Graduate Education and Research Traineeship</b> National Science Foundation Grant DGE-0549352	2009 – 2011
<b>Dean’s Fellowship</b> Department of Bioengineering, University of Pittsburgh, Pittsburgh, PA, USA	2008 – 2009
<b>Computational Neuroscience Research Fellowship</b> Center for the Neural Basis of Cognition, Pittsburgh, PA, USA	2007 – 2008
<b>Research Experiences for Undergraduates Internship</b> University of Pittsburgh, Pittsburgh, PA, USA	2005
<b>Howard Hughes Crystal Quest Traineeship</b> University of Pittsburgh, Pittsburgh, PA, USA	2004
<b>Honors Full Tuition Scholarship</b> University of Pittsburgh, Pittsburgh, PA, USA	2003 – 2008

## **TEACHING EXPERIENCES**

<b>Teaching assistant for “Cellular Neuroscience”</b> Department of Biological Sciences, Carnegie Mellon University, Pittsburgh, PA, USA	2013
<b>Mentor for Ph.D. rotation student</b> Department of Biological Sciences, Carnegie Mellon University, Pittsburgh, PA, USA	2012
<b>Mentor for undergraduate student</b> National Science Foundation Research Experiences for Undergraduates Department of Biological Sciences, Carnegie Mellon University, Pittsburgh, PA, USA	2012
<b>Teaching assistant for “Bioengineering Thermodynamics”</b> Department of Bioengineering, University of Pittsburgh, Pittsburgh, PA, USA <i>*Outstanding Teaching Assistant Award</i>	2010
<b>Teaching assistant for “Biotransport Phenomena”</b> Department of Bioengineering, University of Pittsburgh, Pittsburgh, PA, USA <i>*Outstanding Teaching Assistant Award</i>	2009
<b>Mentor for undergraduate student</b> Summer Internship Program Pittsburgh Tissue Engineering Initiative, University of Pittsburgh, Pittsburgh, PA, USA	2008
<b>Teaching assistant for “Intramural Internship”</b> Department of Bioengineering, University of Pittsburgh, Pittsburgh, PA, USA	2008

**Mentor for undergraduate student** 2007  
Intramural Internship  
Department of Bioengineering, University of Pittsburgh, Pittsburgh, PA, USA

## **PROFESSIONAL EXPERIENCES**

**Ad hoc reviewer** 2015 – present  
*Journal of Neurophysiology*

**Large-scale Modeling of Olfactory Processing Investigative Workshop participant** 2015  
National Institute for Mathematical and Biological Synthesis, Knoxville, TN, USA

**Cellular and Molecular Neuroscience Faculty Search Committee participant** 2014 – 2015  
Department of Biological Sciences, Carnegie Mellon University, Pittsburgh, PA, USA

**“Brain Bag” Lecture Series Committee co-chair** 2011 – 2012  
Center for the Neural Basis of Cognition, Pittsburgh, PA, USA

**Education Committee co-chair** 2010 – 2011  
Center for the Neural Basis of Cognition, Pittsburgh, PA, USA

## **SOCIETY MEMBERSHIPS**

**Association for Chemoreception Sciences** 2013 – present

**Society for Neuroscience** 2011 – present

## **REFERENCES**

**Nathaniel N. Urban**  
Vice Provost for Special Projects  
Professor and Associate Chair, Department of Neurobiology  
Co-Director, Center for the Neural Basis of Cognition  
Associate Director, Pittsburgh Brain Institute  
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