Erik C. Johnson, Ph.D.

Intelligent Systems Center
Johns Hopkins University Applied Physics Laboratory

Education

University of Illinois *Urbana-Champaign, IL*

- Doctor of Philosophy, Electrical Engineering, 2016 Advisor: Douglas L. Jones
- Master of Science, Electrical Engineering, 2013 Advisor: Douglas L. Jones
- Bachelor of Science, Electrical Engineering, 2008; Minor: Physics

Research Positions

- Johns Hopkins University Applied Physics Laboratory (Laurel, MD)- Senior Research Engineer, 2017-Present
- Sprite Robotics (Champaign, IL)- Research Engineer, 2016-2017
- University of Illinois at Urbana-Champaign (Champaign, IL)- Research Assistant, 2011-2016
- University of Texas San Antonio (San Antonio, TX)- Visiting Researcher, 2012
- University of Illinois at Urbana-Champaign (Champaign, IL)- Graduate Fellow, 2009-2011

Publications

Thesis

- Johnson, E. C. **Minimum-Error, Energy-Constrained Source Coding by Sensory Neurons.** Ph.D. thesis, University of Illinois at Urbana-Champaign, Urbana-Champaign, IL (2016).
- Johnson, E. C. **Recovery of Sparse Signals and Parameter Perturbations from Parameterized Signal Models.** M. sc. thesis, University of Illinois at Urbana-Champaign, Urbana-Champaign, IL (2013).

Papers

- Matelsky, J., Kiar, G., Johnson, E., Rivera, C., Toma, M., & Gray-Roncal, W. **Container-Based Clinical Solutions for Portable and Reproducible Image Analysis.** *Journal of digital imaging* 31.3 (2018): 315-320.
- Kaloti A. S., Johnson E. C., Bresee C. S., Naufel S. N., Perich M. G., Jones D. L., and Hartmann M. J. Z. **Representation of stimulus speed and direction in vibrissal-sensitive regions of the trigeminal nuclei: a comparison of single unit and population responses.** PLoS ONE 11(7):e0158399 (2016)
- Johnson E. C., Jones, D. L., Ratnam, R. **A Minimum-Error, Energy-Constrained Neural Code is an Instantaneous Rate Code.** Journal of Computational Neuroscience, 40.2 (2016): 193-206.
- Johnson E. C., Robbins, B. A., Loui, M. C. **What Do Students Experience as Peer Leaders of Learning Teams?** Advances in Engineering Education 4.4 (2015).

- Jones D. L., Johnson E. C., Ratnam R. **A stimulus-dependent spike threshold is an optimal neural coder.** Frontiers in Computational Neuroscience 9:61 (2015).
- Loui, M. C., Robbins, B. A., Johnson, E. C., Venkatesan, N. **Assessment of Peer-led Team Learning in an Engineering Course for Freshmen.** International Journal of Engineering Education Volume 29:6 (2013).

Conference Papers

- Norman-Tenazas, R., Matelsky J., Katyal K., Johnson E., Gray-Roncal W. **Worminator: A platform to enable bio-inspired (C. elegans) robotics**. Cognitive and Computational Neuroscience 2018, Philadelphia, PA. (https://doi.org/10.32470/CCN.2018.1149-0)
- Johnson E. C., Jones D. L., Ratnam R. **Minimum squared-error, energy-constrained encoding by adaptive threshold models of neurons.** In Proc. of IEEE ISIT, 2015, pp. 1337–1341
- Johnson, E. C., Norton, J. S., Jun, D. M., Bretl, T., Jones, D. L. **Sequential Selection of Window Length for Improved SSVEP-Based BCI Classification.** Engineering in Medicine and Biology Society (EMBC), 2013 35th Annual International Conference of the IEEE., pp. 7060-7063.
- Johnson, E. C., Jones, D. L. **Joint Recovery of Sparse Signals and Parameter Perturbations with Parameterized Measurement Models.** In Acoustics, Speech and Signal Processing (ICASSP), 2013 IEEE International Conference on (pp. 5900-5904). IEEE.
- Johnson, E. C. and Loui, M. C. 2009. **Work in progress - how do students benefit as peer leaders of learning teams?** In Proceedings of the 39th IEEE international Conference on Frontiers in Education Conference (San Antonio, Texas, USA, October 18 - 21, 2009), 645-646.

Conference Presentations

- Johnson, E. C., Lee, D. H., Jones, D. L., Aronoff, J., Ratnam, R. **A Neural Timing Code Improves Speech Perception in Vocoder Simulations of Cochlear Implant Sound Coding.** PS 21. ARO Midwinter Meeting, 2017. Baltimore, MD.
- Bresee, C. S., Bush, N. E., Kaloti, A. S., Johnson, E. C., Naufel, S. N., Perich, M. G., Jones, D. L., Hartmann, M. J. Z. **Evidence for tuning to stimulus directionality in the responses of neurons with multi-whisker receptive fields in spinal trigeminal nucleus interpolaris.** Program No. 706.16/S17. 2015 Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2015. Online.
- Johnson, E. C., Jones, D. L., Ratnam, R. **An optimal neural encoding model predicts anticorrelated spike-trains in the p-type afferents of a weakly electric fish.** Program No. 90.09/AA17. 2015 Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2015. Online.
- Johnson, E. C., Jones, D. L., Ratnam, R. **A Minimum-Error, Energy-Constrained Neural Encoder Predicts an Instantaneous Spike-Rate code.** BMC Neuroscience 2015, 16(Suppl 1):P201
- Johnson, E. C., Jones, D. L., Ratnam, R. **Encoding of sensory signals by an energy-constrained neural source encoding mechanism.** Program No. 372.18/VV82. 2014 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2014. Online.

- Maduram, A., Johnson, E. C., Catanho, M., Rubakhin, S., Jones, D. L., Gillete, R., Sweedler, J. **Morphological and electrophysiological parameters of spatially complex networks of peripheral sensory neurons formed in microfluidic devices.** Program No. 520.27. 2011 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2011. Online.
- Vega Leonel, J. C. M., Catanho, M. J., Quinn, C. J., Johnson, E. C., Jones, D. L., Coleman, T. P., Leckband, D. E., Kong, H. **Electrophysiological and neuronal localization techniques for cultured aplysia neurons.** Program No. 873.12. 2011 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2011. Online.

Teaching Experience

- Graduate Teaching Assistant, Computer Systems and Programming- Spring 2015, Fall 2015, Spring 2016, University of Illinois
- Graduate Teaching Assistant, Introduction to Electrical and Computer Engineering- Fall 2008, Spring 2009, University of Illinois
- Graduate Teaching Assistant, Digital Signal Processing Summer School- June-July 2008, Ho Chi Minh City Technical University, Vietnam
- Volunteer Teaching Assistant, Introduction to Electrical and Computer Engineering- Spring 2008, University of Illinois

Honors

- University of Illinois Graduate College Focal Point Grant Recipient, 2011, 2013
- Burroughs Wellcome Fund Collaborative Travel Grant Recipient, 2012
- NSF Neuroengineering IGERT Fellow, 2009-2011
- University of Illinois Bronze Tablet Award- highest university graduation honor for undergraduates, 2008