

## **Eric E. Thomson**

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### **Education**

#### **University of California, San Diego**

*Ph.D.: Neuroscience* September 2004

Thesis Title: How the Leech and its Nervous System Discriminate Touch Location

Areas of Specialization: Sensory coding, behavioral neuroscience

Advisor: William B. Kristan

*M.A.: Philosophy* March 2004

Thesis Title: Concepts in People and Artificial Neural Networks

Areas of Specialization: Philosophy of mind, philosophy of science

Advisors: Patricia S. Churchland and Paul Churchland

#### **University of New Hampshire**

*Summa Cum Laude*

June 1996 *B.S. in Interdisciplinary Math Physics*

June 1994 *B.S. in Ecology and Evolutionary Biology*

June 1994 *B.A. in Philosophy*

### **Research Expertise**

- Fluent in Python and Matlab
- Experimental design
- Behavioral neuroscience
- Sensory coding and plasticity
- Rodent sensory prosthetic systems

### **Peer-Reviewed Publications** (\*: Authors contributed equally)

- Spry, K, Fry, S, DeFillip, J, Drye, S, Stevanovic, K., Hunnicutt, J, Bernstein, B, Thomson, E, Cushman, J (2021) 3D-Printed Capacitive Sensor Objects for Object Recognition Assays. *eNeuro* 8: 1-9.
- Thomson, E\*. Zea, I.\*, Windham, W., Thenaise, Y., Walker, C., Pedowitz, J., Franca, W., Graneiro, A., Nicolelis, MAL (2017) Cortical neuroprosthesis merges visible and invisible light without impairing native sensory function. *eNeuro* 4: 1-17.
- Hartmann, K.\*, Thomson, EE\*, Zea, I, Yun, R, Mullen, P, Canarick, J, Huh, A, Nicolelis, MAL (2016) Embedding a Panoramic Representation of Infrared Light in the Adult Rat Somatosensory Cortex through a Sensory Neuroprosthesis. *J. Neurosci.* 36: 2406 – 24.
- Thomson, EE, Lou, J, Sylvester, K, McDougal, A, Tica, S, Nicolelis, MAL (2014) Basal forebrain dynamics during a tactile discrimination task. *J. Neurophysiology* 112: 1179-1191.
- Thomson, EE, Carra, R, and Nicolelis, MAL (2013) Perceiving Invisible Light through a Somatosensory Cortical Prosthesis. *Nature Communications.* 4: 1482, 10.1038/ncomms2497.
- Wiest, MC\*, Thomson, EE\*, Pantoja, J, and Nicolelis, MAL (2010) Changes in S1 Neural Responses During Tactile Discrimination Learning. *Journal of Neurophysiology,* 104:300-312.
- Thomson E.E. and Kristan W.B. (2006) Encoding and Decoding Touch Location in the Leech CNS. *J. Neurosci.* 26: 8009-8016.
- Thomson E.E. and Kristan W.B. (2005) Quantifying stimulus discriminability: A comparison of information theory and ideal observer analysis. *Neural Computation* 17: 741-778.
- Baca S.M.\*, Thomson E.E.\*, and Kristan W.B. (2005) Location and intensity discrimination in the leech local bend response quantified using optic flow and principal components analysis. *J. Neurophys.* 93: 3560-72.

### **Review chapters and articles**

- Loring, M., Thomson, E., Naumann, E (2020) Whole-brain interactions underlying zebrafish behavior. *Curr Opin Neurobiol* 65: 88-99.
- Wiest, M, and Thomson, EE, Meloy, J (2008) Multielectrode recordings in the somatosensory system. Chapter 6 in Nicolelis MAL, editor. *Methods for Neural Ensemble Recordings.* 2nd edition. Boca Raton (FL): CRC Press.
- Wiest, MC, Thomson EE, Nicolelis MAL (2007). Twenty-Five Years of Multi-Electrode Recordings in the Somatosensory System. In: *The Senses: A Comprehensive Reference.* (eds-Basbaum et al) Academic Press, San Diego CA.

### **Posters**

- Thomson, EE, Harfouche, M ... Horstmeyer, R, and Naumann, EA (2019) Gigapixel-scale behavioral and neural activity imaging with a multicamera array microscope. Cold Spring Harbor Zebrafish Neural Circuits and Behavior conference.
- Thomson, EE, Naumann, E (2018) Asymmetries of motion processing in the zebrafish. Duke Neurobiology Retreat.
- Thomson, EE, Zea, I, Thenaisie, Y, Franca, W, Windham, W, Nicolelis, MAL (2016) Integrated multimodal representations investigated using a distributed IR prosthetic system. SFN Abstract 805.07.
- Thomson, EE, Hartmann, K, Nicolelis, MAL (2015) Constructing a distributed infrared sensory modality in the adult rat. SFN Abstract 419.06.
- Thomson, EE, Sylvester, K, Takigami, A, Lou, J, Nicolelis, MAL (2013) Population

coding of stimulus and reward in rat basal forebrain. SFN Abstract 581.07.  
Thomson, EE, Lou, J, McDonough, A, Nicolelis, MAL (2011) Basal forebrain activity during a tactile discrimination task. SFN Abstract 495.24.  
Thomson, EE, Meloy, J, and Nicolelis, MAL (2010) Whisker-based aperture width discrimination in the mouse. SFN Abstract 285.17.  
Thomson, EE, Lehew, G, and Nicolelis, MAL (2007) Multielectrode design for simultaneously recording from rat primary and secondary somatosensory cortices. SFN Abstract 403.16.  
Thomson, EE, Wiest, MC, Pereira, A, and Nicolelis, M (2005) A behavioral paradigm for the study of category discrimination in the rat whisker system. SFN Abstracts 883.6.  
Thomson, E.E., and Kristan W.B. (2004) Encoding and decoding touch location in the leech. Computational and Systems Neuroscience (CoSyne) abstract (Cold Spring Harbor).  
Thomson, E.E. and Kristan W.B. (2003) Mechanoreceptor latency encodes touch location in the leech. SFN Abstracts 269.4.  
Thomson E.E., Churchland P.S., and Kristan W.B. (2001) EMG in the leech (*H. medicinalis*) body wall: A signal-to-noise analysis. SFN Abstracts 518.4.

## Talks

Deep processing of ridiculously large images. Triangle Python User's Group, Durham NC; September 2019.  
Large-scale behavioral and neural imaging with a multi-camera array microscope (MCAM). Triangle Zebrafish Symposium. Duke University, Durham, NC; April 2019.  
Perceiving Invisible Light through a Somatosensory Cortical Prosthesis. Barrels XXV New Orleans, LA, October 2012; NIH Bethesda, August 2012; Duke Neurobiology Retreat November 2012.  
A comparison of information theory and ideal observer analysis in the study of coding. NeurIPS December 2006.  
Coding and decoding touch location in the leech. NeurIPS December 2006.

## Experience

**Spring 2020 – Present:** NIH Bioinformatics Scientist (Durham, NC)

*Responsibilities:* Work with multiple neurobiology laboratories to design and analyze neuronal and behavioral experiments. Examine data using Python and Matlab.

**Spring 2018-Spring 2020:** Duke University Research Associate (Durham, NC)

*Responsibilities:* Large-scale imaging with a multicamera array microscope. Python-based image acquisition and analysis. Deep learning-based object detection.

*Supervisors:* Eva Naumann and Roarke Horstmeyer

**Fall 2004-Spring 2018:** Duke University Postdoctoral Fellow (Durham, NC)

*Responsibilities:* Sensory coding and plasticity in the rat somatosensory cortex. Sensory prosthetics. Construction and implantation of recording and stimulating electrodes in rats. Extensive analysis of video and physiological data (Matlab) from awake behaving rats.

*Supervisor:* Miguel Nicolelis

**Spring 2000-Summer 2004:** University of California, San Diego.

*Responsibilities:* Touch location discrimination in the leech and its CNS.

Intracellular/extracellular recording and stimulation from neurons in the leech; multiple-site electromyography (EMG); image processing; extensive coding in Matlab.

*Advisor:* William B. Kristan

References available upon request