

## **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**

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

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

- 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**

- 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.

### **Conference Abstracts**

- 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**

- 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. NIPS workshop December 2006.
- Coding and decoding touch location in the leech. NIPS workshop December 2006.

## **Awards and Fellowships**

- 2012: Best postdoc talk Duke University Neurobiology Retreat
- 2001-2002: Merck Pharmaceuticals Research Fellow
- 2000: Systems and Integrative Neurosciences (SAIN) Training Grant
- 1995: Phi Beta Kappa
- 1993: UNH Summer Undergraduate Research Fellowship

## **Research Experience**

**Spring 2018-Present:** Duke University Research Associate (Durham, NC)  
*Topics:* Sensorimotor processing in the zebrafish.  
*Advisor:* Eva Naumann

**Fall 2004-Spring 2018:** Duke University Postdoctoral Fellow (Durham, NC)  
*Topics:* Sensory coding and plasticity in the rat somatosensory cortex. Sensory prosthetics.  
*Methods:* Construction and implantation of recording and stimulating electrodes in rats. Extensive analysis of video and physiological data (Matlab) from awake behaving rats.  
*Advisor:* Miguel Nicolelis

**Spring 2000-Summer 2004:** University of California, San Diego.  
*Topic:* Touch location discrimination in the leech and its CNS.  
*Methods:* Intracellular and extracellular recording and stimulation from pairs of neurons in the leech; multiple-site electromyography (EMG) ; image processing; extensive coding in Matlab.  
*Advisor:* William B. Kristan

**Fall 1999-Winter 2000:** Salk Institute (La Jolla, CA)  
*Topic:* Analysis of motion coding in primate retinal ganglion cells.  
*Methods:* Analysis of multielectrode data acquired from retinal ganglion cells.  
*Advisor:* E.J. Chichilnisky

References available upon request