Timothy M. Otchy

Curriculum Vitae | February 2018

24 Cummington Mall
Life Science and Engineering, Rm 402
Boston, MA 02215
857.928.9183
tim.otchy@gmail.com
http://www.timotchy.com

Academic Appointments

Research Assistant Professor of Biology
Department of Biology
Boston University, Boston, MA (2017-present)

Postdoctoral Fellow
Department of Biology
Boston University, Boston, MA (2016-2017)

Education

Harvard University, Cambridge, MA (2016)
Ph.D. in Neuroscience (AOS: Behavioral and Systems Neuroscience)
Dissertation Title: "Neural Circuit Mechanisms Supporting Skill Learning, Adaptation, and Maintenance"
Advisor: B. P. Ölveczky

Newcastle University, Newcastle-on-Tyne, UK (2016)
Optimizing Surgical Techniques and Perioperative Care in Laboratory Rodents
Course Head: P. Flecknell

Tufts University, Medford, MA (2009)
M.A. in Philosophy (AOS: Philosophy of Science and Language)
Thesis Title: "On Seeing and Not: Observation and the Methods of Causal Analysis"

Georgia State University, Atlanta, GA (2005)
B.A. in Philosophy
Highest Honors in Philosophy

Georgia Institute of Technology, Atlanta, GA (2000)
B.S. in Mechanical Engineering (AOS: Control Dynamics and Biomedical Device Design)
High Honors in Engineering

Research and Training

Gardner Lab, Boston University
Postdoctoral Fellow (2016-2017)
Developing implantable devices and techniques for probing and perturbing circuit dynamics within the peripheral nervous system of the viscera. Such devices aim to decipher and modulate neural signaling patterns, achieving therapeutic effects that are targeted at single functions of specific organs to treat chronic diseases including rheumatoid arthritis, hypertension, and polycystic ovarian syndrome.

Ölveczky Lab, Harvard University
Graduate Student (2012-2016)
Sr. Research Assistant (2008-2011)
Using a variety of electrophysiological, pharmacological, and behavioral techniques, probed the neural circuit mechanisms underlying the acquisition, adaptation, and maintenance of complex motor behaviors in songbirds and rodents.

Engert Lab, Harvard University
Graduate Student (2011-2012)
Developed a closed-loop system enabling paralyzed larval zebrafish to fictively navigate two-dimensional virtual environment in conjunction with two-photon calcium imaging of large populations of neurons in the hindbrain.

Ting Lab, Georgia Institute of Technology
Research Engineer (2005)
Designed and fabricated a perturbation platform with an integrated motion capture system and telemetered EMG to investigate the interactions between the nervous and musculoskeletal systems that give rise to coordinated movements in humans and felines.

FAS, Inc., Atlanta, GA
System Design Engineer (2000-2005)
Engineer-In-Training (1998-2000)
Developed custom, highly automated robotic and machine vision systems for research and manufacturing applications in the pharmaceutical, biotechnology, and electronics industries.

Publications

WF Gillis, J Shen, M Pasquali, F Vitale, BJ Holinski, DJ Chew, TJ Gardner, **TM Otchy**, "Acute and chronic recording in small diameter peripheral nerves," (*in preparation*).

TM Otchy, C Michas, TJ Gardner, "A 3D-printed interface for precise recording and control of fine peripheral nerves," *(in preparation)*.

TM Otchy, J Garst-Orozco, BP Ölveczky, "Early sensory deprivation is associated with reduced synaptic pruning in motor circuits," *(in review)*.

BW Pearre, C Michas, JM Tsang, TJ Gardner, **TM Otchy**, "Micro-scale direct laser writing with a resonant scanning two-photon microscope," *arXiv* (2018).

WF Gillis, CA Lissandrello, J Shen, BW Pearre, A Mertiri, F Deku, S Cogan, BJ Holinski, DJ Chew, AE White, TJ Gardner, **TM Otchy**, "Carbon fiber on polyimide ultra-microelectrodes," *J Neural Eng*, Jan 2018.

TM Otchy, SBE Wolff, JY Rhee, C Pehlevan, R Kawai, A Kempf, SMH Gobes, BP Ölveczky, "Off-target effects of local circuit manipulations," *Nature,* Dec 2015.

F Ali, **TM Otchy**, C Pehlevan, AL Fantana, Y Burak, BP Ölveczky, "The basal ganglia is necessary for learning spectral, but not temporal features of birdsong," *Neuron*, Nov 2013.

TM Otchy, BP Ölveczky, "Design and assembly of an ultra-light motorized microdrive for chronic neural recordings in small animals," *J Vis Exp*, e4314, Nov 2012.

BP Ölveczky, **TM Otchy**, JH Goldberg, D Aronov, MS Fee, "Changes in the neural control of a complex motor sequence during learning," *J Neurophys*, Jul 2011.

A Dubreuil, Y Burak, **TM Otchy**, BP Ölveczky, "Neural mechanisms underlying the reduction in behavioral variability during trial-and-error learning," *Front Neurosci Conf Abstr: Comp and Sys Neuro,* Feb 2010.

TM Otchy, "Hacking Davidson," *Aporia,* Fall 2005.

Patents

BW Pearre, C Michas, TJ Gardner, **TM Otchy**, "Resonant scanning two-photon stereolithography for ultra-rapid nanofabrication," US Provisional Patent Serial No. TBD (pending).

CA Lissandrello, WF Gillis, J Shen, **TM Otchy**, C Michas, BJ Holinski, DJ Chew, AE White and TJ Gardner, "Nerve cuff, methods of fabricating the same and methods of use," US Patent PR66142P US Serial No. 62/367,975 (pending).

Poster Presentations

TM Otchy, C Michas, K Gopalan, D Semu, TJ Gardner, "A 3D-printed interface for precise recording and control of fine peripheral nerves," GRC: Bioelectronic Interfaces, Mar 2018.

TM Otchy, C Michas, K Gopalan, D Semu, TJ Gardner, "The Nanoclip: a microscale, printable neural interface for recording and manipulating activity in small nerves," Society for Neuroscience Abstr, Nov 2017.

TM Otchy, C Michas, K Gopalan, D Semu, TJ Gardner, "The Nanoclip: a microscale, printable neural interface for recording and manipulating activity in small nerves," Asilomar Bioelectronics Symposium, Sept 2017.

TM Otchy, SBE Wolff, JY Rhee, C Pehlevan, R Kawai, A Kempf, SMH Gobes, BP Ölveczky, "Off-target effects of local circuit manipulations," Songbird 5, Oct 2015.

F Ali, **TM Otchy**, C Pehlevan, AL Fantana, Y Burak, BP Ölveczky, "Different neural circuits underlie learning of spectral and temporal aspects of birdsong," Society for Neuroscience Abstr, Nov 2013.

J Garst-Orozco, **TM Otchy**, BP Ölveczky, "Early sensory experience-dependent synaptic elimination in the songbird motor control circuit," Society for Neuroscience Abstr, Nov 2013.

C Pehlevan, F Ali, **TM Otchy**, BP Ölveczky, "A network model for learning timing in birdsong," COSYNE Abstr, Feb 2013.

TM Otchy, BP Ölveczky, "Effects of sensory experience on the development and maintenance of a motor program underlying a complex motor sequence," Harvard-LMU Young Scientists Forum, Jul 2012.

TM Otchy, BP Ölveczky, "Effects of sensory experience on the development and maintenance of a motor program underlying a complex motor sequence," Society for Neuroscience Abstr, Nov 2011.

Y Burak, A Dubreuil, **TM Otchy**, BP Ölveczky, "Neural mechanisms underlying the reduction in behavioral variability during trial and error learning," Society for Neuroscience Abstr, Nov 2010.

A Dubreuil, Y Burak, **TM Otchy**, BP Ölveczky, "Neural mechanisms underlying the reduction in behavioral variability during trial and error learning," Harvard Center for Brain Science Retreat, Abstr, May 2010.

A Dubreuil, Y Burak, **TM Otchy**, BP Ölveczky, "Neural mechanisms underlying the reduction in behavioral variability during trial and error learning," COSYNE Abstr, Feb 2010.

Invited Talks

"The mark of experience in neural circuit development"
Massachusetts Eye and Ear, Mar 2018

"Linking brain to behavior: a tricky business"
Grand Rounds, Rutgers New Jersey Medical School, Jul 2017

"Neural circuit mechanisms of motor learning"
MCB 105 (Systems Neuroscience) Guest Lecture, Harvard University, Apr 2017.

"Linking brain to behavior: a tricky business"
NE741 (Neural Systems) Guest Lecture, Boston University, Apr 2017.

"Nanoclips as peripheral neural interfaces"
GSK/Galvani Investigators Meeting, Nov 2016.

"Off-target effects of local circuit manipulations"
Cold Spring Harbor Laboratory, Aug 2015.

"Neural circuit mechanisms of motor learning"
MCB 105 (Systems Neuroscience) Guest Lecture, Harvard University, Apr 2016.

"Songbirds in neuroscience"
MCB 105 (Systems Neuroscience) Guest Lecture, Harvard University, Apr 2014.

"Following the tune: the neural mechanisms underlying sensorimotor learning"
Neuroscience Seminar, Wellesley College, Oct 2011.

Fellowships, Awards, and Honors

Derek Bok Center's Certificate of Distinction in Teaching, Harvard University (2012, 2014, 2015 & 2016)
GSC Travel Fellowship, Harvard University (2015)
Pierce Fellowship, Harvard University (2011; *declined*)
Graduate Institute for Teaching Fellow, Tufts University (2006)
Department Fellowship, Philosophy Program, Tufts University (2005-2007)
George Beiswanger Award for Outstanding Undergraduate Student, Georgia State University (2005)
B.A. awarded with highest honor, Georgia State University (2005)
B.S. awarded with high honor, Georgia Institute of Technology (2000)
AP Scholar with Distinction, The College Board (1996)
National Merit Scholar Finalist (1996)

Teaching Experience

Teaching Fellow
"Animal Behavior", OEB 57, Harvard University, Spring 2013, Spring 2016★
"Neurobiology of Motor Control", OEB 105, Harvard University, Fall 2011★, Fall 2013★, Fall 2015★
"Cellular Basis of Neuronal Function", MCB 115, Harvard University, Fall 2014★
"Formal Logic," Phil 33, Tufts University, Fall 2006, Fall 2007
"Classics of American Thought," Phil 123E, Harvard University, Fall 2006
"Metaphysics," Phil 118E, Harvard University, Spring 2007, Spring 2008
"Ethics," Phil 121, Tufts University, Spring 2008
(★ = Bok Center Distinction in Teaching Award)

Lead Instructor
"Existentialism," Phil 92, Tufts University, Summer 2006

Professional Service

Reviewer for *Journal of Neural Engineering, Journal of Physiology-Paris, Journal of Physics D: Applied Physics, PLoS One, Journal of Visualized Experiments*
Ad hoc reviewer (ECR) for the National Institutes of Health

Research Supervision and Mentoring

Blaire Lee, B.A. in Biology, Boston University, Boston, MA (May 2017-present)
"Precision modulation of the nervous system"

Krithi Gopalan, B.S. in Biomedical Engineering, Boston University, Boston, MA (Jan 2017-present)
"Functional recovery following peripheral nerve implant"

Pranav Krishnan, S.B. in Neurobiology, Harvard University, Cambridge, MA (Sept 2014-May 2016)
"Sensory feedback independent mechanisms of motor skill maintenance"

Esther Bosch, B.S. in Molecular Medicine, University of Tübingen, Tübingen, Germany (Feb-Aug 2015)
"Critical period experience and the development of a motor skill"

Alexandre Kempf, M.S. in Neuroscience, ENS, Paris, France (Feb-Jun 2014)
"Temporal control of a motor behavior: the role of nucleus Nif in song structure"

Christine Ashton, S.B. in Neurobiology, Harvard University, Cambridge, MA (Apr-Aug 2011)
"A characterization of the development of isolate zebra finch song"

Professional Associations

Society for Neuroscience (2009-present)
American Society of Mechanical Engineers (1998-2011)