William A Liberti III

CONTACT INFORMATION

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RESEARCH INTERESTS

Tool development, Systems and Computational Neuroscience, Motor Sequencing & Learning, Electrophysiology, Neurophotonics, Calcium Imaging, Nonlinear Optics and Microscopy.

EDUCATION

Boston University Graduate Medical School, Boston, MA

Ph.D., Neuroscience, *Expected:* July 2017

- Advisor: Timothy Gardner, Ph.D

Boston University, Boston, MA

B.S., Biochemistry & Molecular Biology *With Distinction*, May 2012

RESEARCH EXPERIENCE

Visiting Postdoctoral Scholar September 2017 to September 2018

U.C. Berkeley, Department of Electrical Engineering & Computer Science

Research Summary: Large-scale, multi-site, multi-electrode recordings and multiphoton calcium imaging recordings in awake behaving rodents studying the neural circuits of neuro-prosthetic skill learning.

Graduate Research Assistant May 2013 to September 2017

Graduate Program in Neuroscience, *Neurophotonics Graduate Fellow*

Research Summary: Designed and implementated of tools for Electrophysiology and Calcium imaging in awake behaving Zebra Finches to study motor learning and the stability of motor sequencing. The key finding was that the flexible participation of excitatory projection neurons (stabilized by mesoscopic-level inhibition), forms the mechanistic basis of memory maintenance and and motor stability in the songbird.

FIRST-AUTHOR REFEREED JOURNAL PUBLICATIONS

1. **Liberti WA**, Shen J, Leman DP, Perkins LN, Gardner TJ "Premotor sequence exploration and reinforcement during practice" *In Preparation*
2. Moorman S*, **Liberti WA***, Perkins LN, Markowitz JE, Gardner TJ "Noisy and synchronous network activity during sleep predicts future premotor sequence trajectories" *In Preparation*
3. Shen J*, Blute T*, **Liberti WA***, Cruz-Martin A, Gardner TJ "Songbird neural-organotypic culture as an in-vitro model for interrogating self-organizing sparse networks" *In Submission*
4. **Liberti WA**, Perkins LN, Leman DP, Gardner TJ "An open source, wireless capable miniature microscope system" *Journal of Neural Engineering* 14.4 (2017): 045001.
5. **Liberti WA***, Markowitz JE*, Perkins LN, Leman DP, Liberti DC, Guitchounts G, Velho T, Lois C, Kotton DN, Gardner TJ "Unstable neurons underlie a stable learned behavior" *Nature Neuroscience* 19.12 (2016): 1665-1671.
6. Markowitz JE*, **Liberti, WA***, Guitchounts G, Velho T, Lois C, Gardner, TJ "Mesoscopic patterns of neural activity support songbird cortical sequences" *PLoS Biology*, 13.6 (2015): e1002158.
7. Guitchounts G,*, Markowitz JE,*, **Liberti WA***, Gardner TJ "A carbon-fiber electrode array for long-term neural recording." *Journal of Neural Engineering*, 10, 046016 (2013).

* indicates co-authorship

PATENTS

Minimally invasive splaying microfiber electrode array and methods of fabricating and implanting the same. U.S. Patent Application 14/902,734, 2014

AWARDS

Student Awards — Boston University, Graduate School

- GPN 1st place poster prize 2016, 2017
- Neurophotonics Graduate Fellowship 2016
- BioWeek 1st place poster prize 2015
- B.U. Computational Neuroscience Fellowship 2013
- Department of Biology Teaching Fellowship 2012–2015
- Department of Chemistry Teaching Fellowship 2011–2012

Presentations

First Author Abstracts

- "Social context mediated pre-motor encoding" — *Washington DC, 2017*
- "Structured illumination ready Miniscopes" (Second co-author) — Janelia, 2017
- "Rules for motor planning and order in the songbird HVC " — San Diego, 2017
- "Sleep promote maintenance of stable motor performance in songbirds" — San Diego, 2016
- "Unstable neurons underlie a stable learned behavior" — Salt Lake City, 2016
- "Stability and drift in songbird cortical sequencing" — Chicago, 2015
- "Mesoscopic patterns of neural activity support songbird cortical sequences" — Washington DC, 2014
- "A carbon-fiber electrode array for long-term neural recording." — New Orleans, 2012

Invited Talks

- Emory (Neuroscience), Invited talk — *September 2017*
- Tufts (Neuroscience), Invited talk — *July 2017*
- Duke (Neuroscience), Invited talk — April 2017
- UC Berkeley (Neuroscience), Invited talk — March 2017
- UC Berkeley (EE& CS), Invited talk — February 2017
- NSF-NRT Neurophotonics Spotlight — September 2016
- Computational and Systems Neuroscience (COSYNE) — February 2016
- Boston College Neuroscience Seminar Guest Speaker — January 2016
- Boston U. Neuroscience Seminar Series — May 2015, Sept 2016, April 2017
- Boston U. Biology Seminar Series — March 2015
- Boston U. Graduate Program in Neuroscience Retreat — June 2015

Teaching Experience

CHEMISTRY Boston University

CH203 - Organic Chemistry — 2011–2012

CH131- Inorganic Chemistry for Engineers — 2011–2012

NEUROSCIENCE/BIOLOGY Boston University

BI315 - Systems Physiology — 2012–2013

BI644/NE644 - Neuroscience Design Lab — 2013–2015

Mentorship

Daniel Leman — 2014–2017
Undergraduate Researcher; *Developed surgical/optical methods to longitudinally record cells in HVC. Received UROP award every semester from 2015-2017. Authorship on two published works: [4 & 5]*

Michelle Crough — 2015–2017
Undergraduate Researcher; *Pioneered cell-type specific imaging in the songbird HVC*

Miko Dimov — 2015–2016
Undergraduate Researcher; *Adapted optical recording rigs to study motor systems in canaries*

Carlos Gomez — 2015–2016
Biomedical Engineering Senior design project; *Designed proof-of-concept wireless miniature microscopes. Contributed to publication [4],*

Ale Eguren — 2015–2016
Biomedical Engineering Senior design project; *Designed proof-of-concept multi-wavelength capable miniature microscopes. Contributed to publication [4]*

Christe Ye — 2016–2017
Research for credit; *Explored the effects of sleep on the stability of vocal motor production*

Service

CELEST Electronics & Experimental Design Course — 2013–2015
Course Overview: Through NSF initiative CELEST: (Center of Excellence for Learning in Education, Science and Technology). Taught students from traditionally underrepresented backgrounds in science to program in C, and design simple circuits.

Graduate Resident Assistant — 2011–2017
Overview: Support diverse student populations in living/learning communities on Boston University's campus.

Ad Hoc Referee: *PLoS ONE* — 2016–present

Skills

Programming:

- Matlab, Python, R, Processing. *Familiar with:* C, C++, LabView, Swift2, HTML, CSS, Javascript.

Molecular Biology, Biochemistry, & Neurophysiology:

- Gel electrophoresis, PCR, ELISA, Immunohistochemistry, *in-vivo* Electrophysiology(Extracellular multi-electrode, Intracellular), *in-vivo* Microscopy(Multi-Photon, and Single-photon fluorescence.)

Misc:

- Arduino, Processing, LaTeX, Eagle PCB, Fritzing, Git, SolidWorks, SketchUp, TDT DSP, AutoCAD, ZEMAX, Illustrator.

Public

- www.github.com/WALIII
- waliii.github.io