William A Liberti III

CONTACT INFORMATION

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RESEARCH INTERESTS

Systems Neuroscience, Neuroethology, Brain Machine Interfaces, Reinforcement Learning, Tool development, Motor Sequencing & Learning, Neuroprosthetics, Electrophysiology, Neurophotonics.

EDUCATION

Boston University Graduate Medical School, Boston, MA

Ph.D., Neuroscience, *July 2017*

- Advisor: Timothy Gardner, Ph.D

Boston University, Boston, MA

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

RESEARCH EXPERIENCE

Postdoctoral Fellow October 2017 to Present

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

Research Summary: Large-scale, multi-site, multi-electrode recordings and multi-photon calcium imaging recordings in awake behaving animals studying the neural circuits of neuroprosthetic skill learning.

Graduate Research Assistant May 2013 to July 2017

Graduate Program in Neuroscience, *Neurophotonics Graduate Fellow*

Research Summary: Designed and implemented 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.

REFEREED JOURNAL PUBLICATIONS

1. **Liberti WA**, Shen J, Perkins LN, Gardner TJ "Context dependent variability of HVC projection neurons." *In Preparation*
2. **Liberti WA**, Gong XL, Rosebery TR, Carmena JM, "Local network coordination supports neuroprosthetic control." *IEEE Transactions on Neural Systems and Rehabilitation Engineering (2019)*
3. **Liberti WA**, Perkins LN, Leman DP, Gardner TJ "An open source, wireless capable miniature microscope system" *Journal of Neural Engineering* 14.4 (2017): 045001.
4. **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.
5. 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.
6. 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).

PREPRINTS

7. Cohen Y, Shen J, Semu D, Leman DP, **Liberti WA**, Perkins LN, Gardner TJ "Hidden neural states underlie canary song syntax." *bioRxiv* 164228; doi: http://dx.doi.org/10.1101/561761. *In Submission*
8. Shen J*, Blute T*, **Liberti WA***, Yen W, Liberti DC, Kotten DN, Cruz-Martin A, Gardner TJ "Songbird neural-organotypic culture as an in-vitro model for interrogating self-organizing sparse networks" *bioRxiv* 164228; doi: https://doi.org/10.1101/164228 *In Submission*

* 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

- PLoS Young Investigator Award — 2018
- 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 Conference Abstracts

- "Local network coordination supports neuroprosthetic control" — *San Francisco, 2019*
- "Local network coordination supports neuroprosthetic control" — San Diego, 2018
- "Spatiotemporal credit assignment in neuroprosthetic control" — Janelia, 2018
- "Premotor network exploration during practice" — COSYNE, Denver CO, 2018
- "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

- UC Berkeley (Neuroscience), Cortex Club Seminar — February 2019
- Janelia Research Campus, (Mechanistic Cognition Meeting) — February 2019
- Faculty Debate Moderator, Helen Wills Neuroscience Retreat — October 2018
- 6th European Birdsong Meeting, (Odense, Denmark), Keynote — April 2018
- Georgia Tech (Neuroscience), Invited talk — April 2018
- Santa Clara U. (Bioengineering), Invited talk — February 2018
- 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 — 2013–2016

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

Public

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