

**BIOGRAPHICAL SKETCH**

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NAME: Mclver, Eileen Louise

eRA COMMONS USER NAME (credential, e.g., agency login): EMCIVER

POSITION TITLE: Graduate student

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Cornell University, Ithaca NY	B.S.	05/2011	Neurobiology & Behavior
Northwestern University, Chicago IL	PhDc	expected 06/2017	Neuroscience

**A. Personal Statement**

My career goal is to conduct translational neuroscience research as an academic PI. As an undergraduate at Cornell University, I conducted research in the labs of Drs. Sandra Vehrencamp and Andrew Bass investigating acoustic behaviors in the house wren and midshipman fish, respectively. While at Cornell I took advantage of laboratory courses in molecular and electrophysiological techniques that have become the groundwork for my training as a graduate student at Northwestern, where I joined the Bevan Lab to pursue my interest in neurodegenerative disease. Dr. Bevan has extensive expertise in the neurophysiology of the basal ganglia in health and disease, and has worked with me to design a thesis project that incorporates the therapeutic use of chemogenetics to manipulate autonomous firing of the subthalamic nucleus (STN) in a mouse model of Parkinson's disease (PD). I am acquiring a wide range of techniques in the Bevan lab that will equip me to investigate disease processes at each level—from molecular and membrane properties of cells, to whole-circuit in vivo physiology, to behavioral manifestations of the underlying neurological processes. I intend to use these skills to continue working toward a comprehensive understanding of neurological diseases and potential therapies for them.

**B. Positions and Honors**

ACTIVITY/OCCUPATION	YEARS	FIELD/COURSE	INSTITUTION/COMPANY	SUPERVISOR(S)
Research Intern	2008	Pharmacology & Therapeutics	Roswell Park Cancer Institute	Drs. Jenny and Adrian Black
Undergrad Researcher	2009	Neurobiology & Behavior	Cornell University	Dr. Sandra Vehrencamp
Undergrad TA	2010	Intro Biology	Cornell University	Dr. Melissa Brechner
Undergrad Researcher	2010-11	Neurobiology & Behavior	Cornell University	Dr. Andrew Bass
Undergrad TA	2011	Neurophysiology	Cornell University	Dr. Bruce Johnson
Graduate TA	2012-13	Fundamentals of Neuroscience	Northwestern University	Drs. James Baker and CJ Heckman
Graduate Researcher	2012-	Physiology	Northwestern University	Dr. Mark Bevan

## **Academic and Professional Honors**

- 2011 Awarded Cornell's Howard Hughes Summer Research Scholarship, presented at symposium  
2011 Graduated *cum laude* from Cornell University  
2013-14 Awarded General Motor Control Mechanisms and Disease training fellowships, Northwestern Univ.  
2014 Awarded Ruth L. Kirschstein National Research Service Award (F31)

## **C. Contributions to Science**

I. Undergraduate Research: I was awarded a Howard Hughes Summer Research Scholarship to complete a project characterizing and analyzing the acoustic repertoire of the plainfin midshipman fish in the lab of Dr. Andrew Bass at Cornell University. These fish provide an ideal model for studying the encoding of sound production and perception, as the variety of calls are produced by contracting vocal muscles surrounding the swim bladder at a 1:1 ratio with the resulting fundamental frequency. Using over 60 hours of hydrophone recordings from natural nests, I defined parameters and generated an ethogram describing the array of acoustic behaviors in *Porichthys notatus*, and how the parameters are affected by environmental and individual properties (such as temperature, concurrent vocalizations, nest occupants, and body size.) The resulting publication (McIver *et al* 2014) is the first comprehensive characterization and analysis of the midshipman's vocal repertoire in its natural environment, and will provide a basis for further analyses of behavioral correlates, fictive call design, comparative neurobiology, and their encoding in the brain.

## **Publications**

**McIver, E.L.**, Marchaterre, M.A., Rice, A.N., and Bass, A.H. (2014) Novel underwater soundscape: acoustic repertoire of plainfin midshipman fish. *J Exp Biol* 217, 2377-2389.

II. Graduate Research: I am currently investigating the cellular mechanism and behavioral consequences of autonomous subthalamic nucleus (STN) firing disruption in a mouse model of Parkinson's disease (PD). The STN occupies a key position in the cortico-basal ganglia-thalamo-cortical loop, as it receives input from the movement-inhibiting indirect and hyperdirect pathways. The integration of these pathways is rendered phase-dependent by the STN's autonomous firing, which becomes disrupted or lost following dopamine depletion through an NMDA receptor (R)-mediated activation of the ATP-sensitive potassium channel. I have found that restoration of intrinsic STN firing with NMDAR knockdown and chemogenetic techniques also reverses movement impairment. These findings suggest the loss of autonomous STN activity may contribute to the pathologically synchronous circuit activity that correlates with PD symptoms, and that stimulating the STN chemogenetically may provide a novel therapeutic approach to treating PD.

## **Abstracts**

**McIver, E.L.**, Atherton, J.F., Surmeier, J.D., and Bevan, M.D. (2015) NMDA receptor-mediated disruption of autonomous subthalamic nucleus activity in a mouse model of Parkinson's disease. Prize poster session at: 2015 Winter Conference on Brain Research; Big Sky, MT.

**McIver, E.L.**, Atherton, J.F., Surmeier, J.D., and Bevan, M.D. (2015) Chemogenetic restoration of autonomous subthalamic nucleus activity ameliorates motor deficits in experimental Parkinson's disease. Abstract submitted for poster session at: 2015 Society for Neuroscience Annual Meeting; Chicago, IL.

## **Complete List of Published Work**

<https://scholar.google.com/citations?user=-zmWL4gAAAAJ&hl=en>

## **D. Research Support**

### **Ongoing Research Support**

5F31 NS090845 Mclver (PI) 12/01/2014 – 11/30/2017  
NIH/NINDS

Targeting NMDA receptor-mediated disruption of subthalamic neurons to ameliorate motor symptoms in a mouse model of Parkinson's disease

The objectives are to determine the cellular mechanisms of autonomous subthalamic nucleus activity disruption following loss of dopamine, and the functional consequences of its restoration.

Role: PI

2R37NS041280 Bevan (PI) 04/01/2001 – 05/31/2016 (2019)  
NIH/NINDS

Synaptic Transmission, Plasticity and Integration in the Subthalamic Nucleus

The objectives are to determine the underlying mechanisms and impact of external globus pallidus-subthalamic nucleus synaptic proliferation following loss of dopamine.

Role: Graduate student researcher (2012-present)

P50NS047085 Surmeier (DIR) Bevan (PI) 09/30/2003 – 07/31/2018  
NIH/NINDS

Rhythmicity and Synchrony in the Basal Ganglia

The objectives are to determine how dopamine and chronic loss of dopamine regulate the patterning of the subthalamic nucleus by motor cortical inputs.

Role: Graduate student researcher (2012-present)

### **Past Research Support**

5T32 NS041234-12 Surmeier (PI) 04/01/2013 - 11/30/2014  
NIH/NINDS

General Motor Control Mechanisms and Disease Training Program

The objectives are to provide interdisciplinary research training and networking opportunities to trainees studying motor control mechanisms in health and disease.

Role: Graduate student researcher