

Daniel Scott Borrus, Ph.D.

Curriculum vitae

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Born: June 2, 1995—Branford, Connecticut
Nationality: American

Current position

Researcher, Applied Science Dept., William & Mary

Education

Jan 2022	Ph.D. in Computational Neuroscience William & Mary
May 2017	Bachelor of Science William & Mary Major: Neuroscience Minor: Computational & Applied Mathematics & Statistics

Research Experience

Sept 2017 - Present	Graduate researcher at the Respiratory Neurobiology Lab at William & Mary. Advisors: Christopher Del Negro and Gregory Conradi Smith
Jan 2015 - May 2017	Undergraduate researcher at the Computational Biology Lab at William & Mary. Advisor: Gregory Conradi Smith

Work Experience

Summer 2014, Summer 2015, Summer 2016	Intern at Molecular NeuroImaging and The Institute for Neurodegenerative Disorders New Haven, CT
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Publications

2020 Borrus DS, Grover C, Conradi Smith GD, Del Negro CA (2020) *Role of synaptic inhibition in the coupling of the respiratory rhythms that underlie eupnea and sigh behaviors*. eNeuro 7.

PH.D. DISSERTATION

2022 Borrus DS (2022) *Cellular and Synaptic Mechanisms that Underlie Eupnea and Sigh Rhythms for Breathing Behavior in Mice*.

UNDERGRADUATE THESIS

2017 Borrus DS (2017) *Plateau Potential Fluctuations and Intrinsic Membrane Noise*.

Presentations

Nov 2021 Dissertation Defense
Cellular and synaptic mechanisms that underlie eupnea and sigh rhythms for breathing behavior in mice

July 2021 William & Mary Summer Seminar Series
Neural origins of the breathing rhythms - eupnea and sighs.

Oct 2020 Biomathematics Journal Club at William & Mary
Modeling Sigh Rhythm Generation.

Sept 2020 Molecular Neuroscience Journal Club at William & Mary
Release of ATP by preBötzinger complex astrocytes contributes to the hypoxic ventilatory response via a Ca^{2+} -dependent $P2Y_1$ receptor mechanism.

Mar 2019 William & Mary Graduate Research Symposium
Examining the Role of Inhibition in Coupling the Eupnea and Sigh Rhythms.

Apr 2019 Guest Speaker for Computational Neuroscience class at William & Mary
How does one identify and investigate a CPG?

Mar 2019 Biomathematics Journal Club at William & Mary
The Peptidergic Control of Sighing.

Oct 2018 Biomathematics Journal Club at William & Mary
Unraveling the Mechanisms Behind the Eupnea and Sigh Rhythms.

Poster

2021 Collaborative Research in Computational Neuroscience PI meeting, New York
The preBötzinger complex generates inspiratory rhythm through recurrent excitation and sigh rhythm via calcium oscillations

2019 Society for Neuroscience 2019, Chicago
Role of synaptic inhibition in the coupling of the respiratory rhythms that underlie eupnea and sigh behaviors

Research Interests

Computational Neuroscience
Mathematical Biology
Electrophysiology
Fractals

Technical Skills

COMPUTER SKILLS

MATLAB
 \LaTeX
Python
HTML
PostgreSQL
XppAUT
Shell

LAB SKILLS

Can prepare in-vitro slice preparation from neonatal mice for electrophysiology recordings, including patch clamp technique.