M. Nicholas Musselwhite, PhD

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SKILLS

Analytical: Statistical modeling and analysis, Bayesian inference/analysis, frequentist statistics, generalized linear regression, mixed modeling, parametric and nonparametric hypothesis testing, PCA, k-means clustering, machine learning basics

Technical: R (RStudio, dplyr, ggplot2, tidyverse, lme4, etc.), Python, MS Excel, MS Word, MS PowerPoint, GraphPad Prism, CorelDRAW, Adobe Illustrator, Git basics, SQL basics, Tableau, Spike2 (Physiological data acquisition and analysis software), cardiorespiratory physiology data acquisition and analysis, (spirometry, plethysmography, end-tidal and blood gas, ECG, BP, subjective experience, etc.), electrophysiology data acquisition and analysis (EMG, neuron recording, etc.), behavioral data acquisition and analysis

Performative: Science communication, research design, data analysis, grant writing, data visualization, data-driven insight extraction and communication, technical and nontechnical writing, collaborative science, mentoring, leadership, and teaching, critical thinking and analysis, project management, compliance management (HIPAA, IRB, IACUC, OSHA, training, etc.)

EDUCATION

University of Florida — August 2020

PhD Veterinary Medical Sciences (Neuroscience/Neurophysiology)

- Phi Zeta Excellence in Doctoral Research Award
- Phi Zeta Excellence in Basic Science Research Award
- UF Alumni Graduate School Fellowship (Graduate School Preeminence Award)

University of North Florida — April 2012

- *BS Psychology (minor in Sociology) cum laude*
- UNF Academic Enrichment Grant
- Florida Medallion Scholar

RELEVANT EXPERIENCE

University of Louisville - Kentucky Spinal Cord Injury Research Center — November 2020 – Present

Postdoctoral Research Associate — *Louisville, KY*

- Investigated the influence of spinal cord injury and post operative opiates on airway protective behaviors and breathing in addition to potential pharmaceuticals to restore deficits in patient populations leading to publications at national and international conferences and publications in peer-reviewed journals
- Extended and adapted software written at the University of Florida to further analyze additional airway protective behaviors increasing the amount of data recorded per timepoint by 400%
- Created and distributed data visualization tool for mapping the brainstem with our multi-institutional research team reducing production time and increasing accuracy of reporting
- Mentored multiple graduate students, training them on key surgical, analytical, and technical skills used in the completion of their thesis projects and presentations
- Contributed to grant writing successfully securing funding from the NIH

University of Florida – Department of Physiological Sciences — December 2013 – November 2020

Graduate Research Fellow — *Gainesville, FL*

- Developed a dissertation project exploring neuroplasticity and modulation of the cough reflex and cardiorespiratory features under various perturbations to the system (pharmacological, metabolic, etc.), simultaneously recording from upwards of 22 EMGs and 32 neuron channels, and resulting in several presentations and presentations in peer-reviewed journals.

- Core contributor in a multi-disciplinary, multi-institutional team that has developed the most complete computational model of the respiratory neural network to date
- Wrote custom measurement and analysis scripts (R, Python, and Spike) to extract, transform, and load data into analysis toolkits significantly streamlining and unifying our data analysis pipeline
- Performed complex data analysis and visualization tasks related to my research including hypothesis testing, generalized linear regression/ANOVA, mixed-modeling, and Bayesian analysis
- Developed tools for online physiological state monitoring drastically reducing measurement and logging time by a factor of 10
- Supervised and trained undergraduate researchers and taught undergraduates and first year veterinary students core concepts in physiology and neuroscience
- Ensured labs and projects complied with ethical, safety, and regulatory standards established by internal and external regulatory bodies (IRB, IACUC, OSHA, etc.)
- Coordinated several events fostering interdepartmental communication among graduate students as Social Chair of the Veterinary Graduate Student Association

Other Awards

2019 9th Annual SfN NCF Chapter Conference Graduate Student Poster Competition First Place
2017 Phi Zeta Annual Research Symposium Best in Show Second Place

Service & Outreach

2016 – 2019 Brain Awareness Week Dissection Instructor
2017 Summer Health Professions Education Program (SHPEP) Volunteer
2017 Veterinary Graduate Student Association Executive Board Member
2012 – 2013 Jacksonville Zoo Behavior Observation Team Member

Selected Publications (3 of 7)

1. Shen TY, Poliacek I, Rose MJ, Musselwhite MN, Kotmanova Z, Martvon L, Pitts T, Davenport PW, and Bolser DC. (2021) The Role of Neuronal Excitation and Inhibition in the Pre-Bötzinger Complex on the Cough Reflex in the Cat. Journal of Neurophysiology. https://doi.org/10.1152/jn.00108.2021
2. Musselwhite MN, Shen TY, Rose MJ, Iceman KE, Poliacek I, Pitts T, and Bolser DC. (2021) Differential Effects of Acute Cerebellectomy on Cough in Spontaneously Breathing Cats. PLOS ONE. https://doi.org/10.1371/journal.pone.0253060
3. King SN, Shen TY, Musselwhite MN, Huff A, Reed MD, Poliacek I, Howland DR, Dixon W, Morris KF, Bolser DC, Iceman KE, Pitts T. (2020) Swallow Motor Pattern Is Modulated by Fixed or Stochastic Alterations in Afferent Feedback. Frontiers in Human Neuroscience. https://doi.org/10.3389/fnhum.2020.00112

Portfolios & Social Media Hyperlinks