M. Nicholas Musselwhite, PhD

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SUMMARY

- Neuroscientist with 10+ years of experience in data analysis and scientific research
- Authored multiple publications (7) and presented results at several national/international conferences (28)
- Interdisciplinary collaborator with colleagues spanning across the globe and mentor to undergraduate, graduate, and professional students
- Innovative problem-solver who thrives under novel challenges, is committed to lifelong learning, and works well both independently and as part of a team

SKILLS

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

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

Performative: Research design, data analysis, data visualization, data-driven insight extraction and communication, technical and nontechnical writing, science communication, collaborative science, mentorship, critical thinking and analysis

EDUCATION

University of Florida 2020
PhD Veterinary Medical Sciences (Neuroscience/Physiology)

University of North Florida 2012
BS Psychology (minor Sociology) *cum laude*

RELEVANT EXPERIENCE

University of Louisville, Postdoctoral Associate 2020-Present
Kentucky Spinal Cord Injury Research Center

- Quantified changes in airway musculature after spinal cord injury revealing novel connections between the brainstem and spinal cord, providing insight into adverse health outcomes for spinal cord injury patients
- Investigated the influence of novel pharmaceuticals on the swallow pattern generator using electrophysiology, laryngoscopy, and videofluoroscopy, laying the groundwork for the development of new therapeutic drugs for the treatment of swallow dysfunction
- Examined the influence of postoperative opioids on swallow via videofluoroscopic and laryngoscopic analysis discovering previously unknown complications contributing to post-op swallow impairment
- Programmed custom waveform analysis software for the analysis of airway protective behaviors
- Wrote R code utilizing a variety of analysis, data wrangling, and visualization packages (tidyverse, dplyr, ggplot2, lme4, nlme, brms, etc.) to perform statistical analysis and visualization of data
- Delivered scientific product both by presenting research at local, national, and international conferences in person and virtually via posters and PowerPoint presentations and by publishing research projects in peer-reviewed journals
- Mentored graduate students in their research projects and trained students on surgical, analytical, technical, and performative skills necessary for their careers

University of Florida, Graduate Research Fellow 2013-2020
Department of Physiological Sciences

- Investigated the effects of several pharmaceutical agents on the spatiotemporal features of cough and breathing motor patterns
- Revealed the stabilizing effect of the cerebellum on the cough motor pattern and expanded understanding of this structure's role in neurodegenerative disease
- Quantified the effects of a neuroplastic process that occurs with repetitive coughing and used computational modeling to propose potential sites along the cough reflex arc that are implicated in this process
- Discovered the robustness of the cough motor pattern to changes in blood-gas levels of carbon dioxide
- Programmed custom waveform analysis software for the analysis of breathing and cardiovascular parameters
- Wrote R code utilizing a variety of analysis, data wrangling, and visualization packages (tidyverse, dplyr, ggplot2, lme4, nlme, brms, etc.) to perform statistical analysis and visualization of data
- Delivered scientific product both by presenting research at local, national, and international conferences via posters and PowerPoint presentations and by publishing research projects in peer-reviewed journals
- Mentored undergraduate students and trained students on surgical, analytical, technical, and performative skills necessary for their careers

University of North Florida, Research Assistant 2011-2013
Department of Psychology

- Investigated the effect of operant task acquisitions methods in the efficiency and adaptability of learning novel behaviors elucidating unknown advantages of each methodology
- Built, maintained, and programmed devices to record and measure behavioral data

AWARDS

2019 Phi Zeta Excellence in Doctoral Research Award
2019 9th Annual SfN NCF Chapter Conference Graduate Student Poster Competition First Place
2018 Phi Zeta Excellence in Basic Science Research Award
2017 Phi Zeta Annual Research Symposium Best in Show Second Place
2014 UF Alumni Graduate School Fellowship (Graduate School Preeminence Award)

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

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

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