

# Stanford

---



## Muhammad Abdulla

- Ph.D. Student in Electrical Engineering, admitted Autumn 2022
- REU Graduate Coordinator, Electrical Engineering
- Student Assistant, Electrical Engineering
- 📄 Resume available Online

### Bio

---

#### HONORS AND AWARDS

- Neurotech Fellowship Trainee, Center of Mind, Brain, Computation, and Technology (2023)
- NSF Graduate Fellowship, National Science Foundation (2022)
- Goldwater Scholarship, The Barry Goldwater Scholarship and Excellence in Education Foundation (2021)

#### EDUCATION AND CERTIFICATIONS

- M.S., Stanford University , Electrical Engineering (2025)
- B.S., University of Florida , Mathematics (2022)

### Research & Scholarship

---

#### CURRENT RESEARCH AND SCHOLARLY INTERESTS

I have always been fascinated by how interactions that occur at the smallest scale can create the large-scale systems that we observe in our daily lives. This is especially important in neuroscience today, as advances in technology allow us to record in vivo activity of neuronal networks, and combine cellular and systems level views of the brain. I am interested in studying how phenomena in systems neuroscience, particularly the generation of movement, arises from interactions at the neuronal level. I strongly believe that mathematics is the proper language to describe relationships that transcend scales. My research interests are highly inter-disciplinary and lay at the intersection of mathematics, computation, neuroscience, and engineering.

I am currently a member of the Brain Interfacing Lab and am pursuing research that harnesses dynamical systems theory to model how spiking activity in recorded motor cortical neurons yields motor control. On the theoretical side, my research involves developing new mathematical frameworks for analyzing neural data and modeling relationships between neurons and behavior. This ties into my computational work, which involves building pipelines for processing large sets of neural data, and utilizing tools from machine learning, optimization, and statistical signal processing to apply theoretical frameworks to real-world data. I engage in experimental research and help design paradigms for testing novel hypotheses about the nature of motor control. Finally, as an engineer, I also design systems for interfacing with hardware, and ultimately improving brain-machine interfaces. By combining theory, computation, experiments, and engineering, I hope to test and better understand how the brain works.

#### LAB AFFILIATIONS

- Paul Nuyujukian, Brain Interfacing Laboratory (4/3/2023)

## Publications

---

### PUBLICATIONS

- **Dynamics of ramping bursts in a respiratory neuron model** *JOURNAL OF COMPUTATIONAL NEUROSCIENCE*  
Abdulla, M. U., Phillips, R. S., Rubin, J. E.  
2022; 50 (2): 161-180
- **Classification of the Second Minimal Orbits in the Sharkovski Ordering** *AXIOMS*  
Abdulla, U. G., Iqbal, N. H., Abdulla, M. U., Abdulla, R. U.  
2025; 14 (3)
- **Second Minimal Orbits, Sharkovski Ordering and Universality in Chaos** *INTERNATIONAL JOURNAL OF BIFURCATION AND CHAOS*  
Abdulla, U. G., Abdulla, R. U., Abdulla, M. U., Iqbal, N. H.  
2017; 27 (5)

### PRESENTATIONS

- Latent subspaces, axis alignment, and labeled features for brain machine interfaces, an offline analysis - Society for Neuroscience (10/7/2024)