

MARCELA HOLMES MADRUGA

Education

Federal University of Paraiba João Pessoa, PB **Bachelor of Science in Physiotherapy, Neurorehabilitation. GPA: 3.64**
2021

Thesis: Clinical and electroencephalographic predictors of response to Transcranial Direct Current Stimulation in fibromyalgia.

Federal University of Paraiba João Pessoa, PB **Master of Science in Cognitive Neuroscience and Behavior. GPA: 4.00**
2024

Thesis: Different Polarities of High-Definition Transcranial Direct Current Stimulation in Chronic Obstructive Pulmonary Disease: An fNIRS Study.

- **Full scholarship recipient** for academic excellence in securing first place in the master's selection process, funded by Research Support Foundation of Paraiba (FAPESQ).

Inspirar College João Pessoa, PB **Postgraduate Degree in Intensive Care Therapy.**
2023

Academic Experience

Federal University of Paraiba João Pessoa, PB **Clinical Research Project 2022-2024 Effects of HD-tDCS on Cortical Hemodynamics in Individuals with Cardiorespiratory Conditions**

- Analyzed cerebral hemodynamic activity in individuals with Chronic Obstructive Pulmonary Disease (COPD) and Heart Failure (HF) using functional near-infrared spectroscopy (fNIRS);
- Conducted data collection and evaluations in both outpatient and hospital settings, ensuring standardization of experimental protocols, including non-invasive neuromodulation interventions;
- Supervised the development of undergraduate (4) students, contributing to their research training.

Federal University of Paraiba João Pessoa, PB **Clinical Research Project 2020-2021 Effects of COVID-19 Pandemic Circumstances on Women with Fibromyalgia**

- Investigated the impact of the COVID-19 pandemic on the clinical symptoms and quality of life of women with fibromyalgia;
- Conducted an analysis of biopsychosocial factors related to chronic pain during the pandemic context in Brazil; ● Collaborated in producing findings that contributed to understanding the challenges faced by this clinical group.

Federal University of Paraiba João Pessoa, PB **Clinical Research Project 2018-2021 Assessment of Cortical Electrical Activity and Correlations with Fibromyalgia Symptoms**

- **Undergraduate Research Scholarship** recipient for excellence in scientific research, founded by Brazilian Federal Agency for Support and Evaluation of Graduate Education (CAPES).
- Analyzed resting-state cortical electrical activity in women with fibromyalgia using electroencephalography (EEG);

- Identified brainwave patterns (delta, theta, alpha, beta, and gamma) across different cerebral lobes (frontal, parietal, temporal, and occipital);
- Deepened understanding of the correlations between cortical electrical activity and clinical symptoms of fibromyalgia;
- Explored the effects of transcranial direct current stimulation (tDCS) in treating fibromyalgia, highlighting gaps in the literature.

Federal University of Paraiba João Pessoa, PB **Community Outreach Program 2018-2019 Expansion of Target Audience for Multidisciplinary Care at the Federal University of Paraiba Health Reference and Care Center**

- Led a project aimed at expanding the target audience for multidisciplinary healthcare services at the university;
- Coordinated the implementation of a recategorization process to reintegrate new users into the target group, ensuring comprehensive service delivery by a multidisciplinary team;
- Successfully completed the project, ensuring broader access to health services for the university community.

Federal University of Paraiba João Pessoa, PB **Community Outreach Program 2020-2020 Physiological Science in Schools: Teaching and Popularizing Human Physiology for Public High School Students**

- Developed and conducted remote educational activities during the COVID-19 pandemic to introduce high school students from public schools in João Pessoa to practical and applied concepts of Physiological Science;
- Assessed the program's impact through qualitative surveys with students, teachers, and school administrators, aiming to foster curiosity and interest in the field of science.

Teaching Experience

Federal University of Paraiba João Pessoa, PB **Assistant Professor Kinesiology**, Department of Physiotherapy **2023-2023**

- Conducted practical exams, ensuring accurate assessment of students' applied knowledge and skills;
- Delivered lectures and lab sessions;
- Developed educational materials and interactive learning resources to improve student engagement;
- Collaborated with faculty members to refine course content and teaching methodologies.

Federal University of Paraiba João Pessoa, PB **Teaching assistant Bioinformatics**, Department of Physiotherapy **2020-2020**

- Assisted in delivering lectures and practical sessions on bioinformatics tools and techniques, including data analysis, and statistical programming;
- Provided one-on-one tutoring and clarification during office hours, addressing students' queries on complex topics.

Federal University of Paraiba João Pessoa, PB **Teaching assistant Human Physiology**, Department of Morphology **2018-2019**

- Developed an award-winning educational resource recognized by the university to enhance student learning and engagement;
- Assisted in delivering lectures and lab sessions on human anatomy and physiological processes;
- Provided support to students in understanding complex topics such as the cardiovascular, respiratory, and nervous systems;
- Graded assignments and quizzes, offering constructive feedback to students for improvement.

Professional Experience

Paraíba Foundation for Health Management João Pessoa, PB **Hospital Physical Therapist, Metropolitan Hospital Dom José Maria Pires 2022 - PRESENT**

- Provides specialized physiotherapy care in a reference hospital for neurosurgery and neurology;
- Develops and implements rehabilitation protocols for patients with neurological conditions;
- Trains and supervises students, junior staff, and physiotherapy residents in neurological physiotherapy techniques, having trained 10 residents to date.

Publications

Peer-reviewed articles

Andrade SM, de Araújo Silvestre MC, de França EÉT, Queiroz MHBS, de Jesus Santana K, **Madrugá MLLH**, ... & Bikson M. (2022). Efficacy and safety of HD-tDCS and respiratory rehabilitation for critically ill patients with COVID-19 The HD-RECOVERY randomized clinical trial. *Brain Stimulation*, 15(3), 780-788.

de Melo GA, **Madrugá MLLH**, Oliveira MBRD, & Torro N. (2022). Possible repercussions of the COVID-19 pandemic on women with fibromyalgia: longitudinal study. *Brazilian Journal of Pain*, 5(3), 195-199.

de Melo GA, **Madrugá MLLH**, & Torro N. (2021). Electroencephalographic evaluation in fibromyalgia: a systematic review. *Clinical EEG and Neuroscience*, 55(1), 76-87.

de Melo GA, **Madrugá MLLH**, Silva CJDA, & Torro N (2021). Association between pain, anxiety, and alpha2 frontal activity in women with fibromyalgia. *Acta Sci Health Sci*, 43, e49846.

Manuscripts in preparation

Madrugá MLLH, Sato JR & Andrade SM (2025). A Technical Framework for integrating HD-tDCS with fNIRS in COPD Hospitalized Patients. *Manuscripts in preparation, final draft stage*.

Madrugá MLLH, Sato JR & Andrade SM (2025). Hemodynamic Changes Induced by High-Definition Transcranial Direct Current Stimulation in Patients with Chronic Obstructive Pulmonary disease: An exploratory fNIRS Study. *Manuscripts in preparation, final draft stage*.

Book Chapters

Madrugá MLLH, França AS, Freire JCG., Pereira LVAL, & Amaral, LMG (2023). Perspectives on physiotherapeutic care in a Continuous Integrated Care Unit: An experience report. In T. M. de Matos, W. C. Torelli, F. P. de Oliveira, H. M. Wanderley Filho, N. S. Medeiros, & R. D. da Cunha (Eds.), **O SUS é nosso lugar** (Vol. 1, pp. 126-130). João Pessoa.

Madrugá MLLH, Maciel MLF, & Pontes, VA. (2021). Definition and clinical picture of fibromyalgia. In G. A. de Melo (Ed.), **Unraveling fibromyalgia: From diagnosis to treatment** (Vol. 1, pp. 21-32). Ideia.

Madrugá MLLH, Melo GA, Pontes VA, & Magalhães MC. (2021). Brain aging. In A. M. R. da Silva, A. M. Vasconcelos, & G. A. de Melo (Eds.), **Neuroscience and Aging: In search of longevity** (Vol. 1, pp. 23-34). Ideia.

Madrugá MLLH, Melo GA, Vasconcelos AM, & Silva AMR. (2021). Neuroplasticity and motor performance. In A. M. R. da Silva, A. M. Vasconcelos, & G. A. de Melo (Eds.), **Neuroscience and Aging: In search of longevity** (Vol. 1, pp. 35-49). Ideia.

Additional Publications

- Published **(6) articles** in non-indexed national journals, covering topics in Neuroscience; ● Co-authored **(6) book chapters**, contributing to scientific production on Rehabilitation sciences.

Presentations and Conferences

- Published 26 abstracts in national and international conferences;
- Invited speaker at Conference on Cardiorespiratory Physiotherapy and Intensive Care, Natal, Rio Grande do Norte, Brazil, 2024;
- Invited speaker at III Seminar on Digital Transformation, Secretaria de Ciência e Tecnologia, Government of Paraíba, João Pessoa, Brazil, 2024;

Awards and Honors

César Ades Award - 1st Place

Brazilian Institute of Neuropsychology and Behavior **2021** ● Recognized for outstanding contribution in the field of neuroscience with the study "Implications of Social Isolation Due to the COVID-19 Pandemic on Pain and Anxiety in Women with Fibromyalgia".

Honorable Mention - Cognitive Neuroscience and Behavior Conference

Federal University of Paraíba **2021** ● Best Works in neuroscience and behavioral research with the study "Effects of tDCS as an adjunct to therapeutic exercise on anxiety in women with FM".

Honorable Mention - III Scientific Congress of Physiotherapy

Federal University of Paraíba **2019** ● Recognized for high-quality research in motor behavior with the study "Effects of transcranial direct current stimulation (tDCS) on the clinical presentation of fibromyalgia".

Honorable Mention - I Congress of Neurophysiology

Federal University of Pernambuco **2019** ● Acknowledged for contribution to neuro-physiology research with the study "The Relationship Between Endogenous Melatonin and the Chronic Pain Process: A Systematic Review."

Teaching Initiation Award

Federal University of Paraíba **2018** ● Awarded for the production of educational resources in teaching human physiology

Additional information

- Secured a position through a highly competitive public service examination, reflecting strong analytical and problem-solving skills;
- Served as a member of (11) evaluation committees for undergraduate thesis projects, providing critical analysis and feedback to enhance academic research;
- Organized (7) academic events, including seminars, workshops, and conferences, fostering knowledge exchange and professional development in the field of Rehabilitation sciences;
- Supervised (1) postgraduate thesis, guiding research development and contributing to the academic growth of emerging professionals;
- Guided (24) students in scientific methodology, promoting effective online learning.

Skills

Technical

- EEG Data Analysis – Advanced
- fNIRS Data Processing – Advanced
- RStudio (R Programming) – Intermediate
- MATLAB – Basic

Language

- English – Comprehends Well, Speaks Well, Reads Well, Writes Well
- Portuguese – Comprehends Well, Speaks Well, Reads Well, Writes Well
- Spanish – Comprehends Reasonably, Speaks Little, Reads Reasonably, Writes Little
- French – Comprehends Reasonably, Speaks Little, Reads Reasonably, Writes Little