Name: Alejandra Valdivia Padilla

Position Title: PhD Student, Physiology, Biophysics & Systems Biology, Weill Cornell Medicine, Graduate Research Fellow, Houston Methodist Academic Institute

A. Personal Statement

My research focuses on the development of neuromodulatory strategies to restore sensorimotor functions in individuals with spinal cord injury (SCI). Our current work aims to elucidate the electrophysiological mechanisms of neuromodulation to design stimulation-based interventions that could enhance function. By integrating physiology, systems neuroscience, and bioengineering, I am committed to advancing translational therapies that enhance quality of life for patients living with paralysis.

I am currently pursuing a PhD in Physiology, Biophysics, and Systems Biology (PBSB) at Weill Cornell Medicine and hold a position of Graduate Research Fellow at Houston Methodist. I earned my B.A. in Biosciences from Tec de Monterrey, where I graduated with a Diploma of Excellence in Professional Development in recognition of my research achievements. My undergraduate training provided me with a strong foundation in translational medicine, biochemistry, and diverse experimental models, fostering a lasting interest in multidisciplinary approaches to solving complex biomedical problems. In 2025, I joined the Neuromodulation and Recovery Lab, where I continue to build upon this foundation by investigating how targeted electrical stimulation can drive neuroplasticity and circuit reorganization after SCI. My long-term goal is to contribute to the translation of neuromodulatory technologies into clinical practice, bridging basic science and patient care to develop therapies that restore independence and function in individuals affected by neurological injury.

B. Education

2024-present	Ph.D. in Physiology, Biophysics & Systems Biology (PBSB), Weill Cornell Graduate School of Medical Sciences, New York, NY
2019-2024	B.A. in Biosciences, School of Medicine and Health Sciences at Tecnologico de Monterrey, Mexico top graduate in professional development.
2017-2019	DP Diploma Programme, International Baccalaureate, Mexico

C. Honors

2024	Houston Methodist Graduate Research Fellowship, Weill Cornell Graduate School
2024	Excellence Diploma & Borrego de Oro, Tecnologico de Monterrey Top graduate in professional development (1 out of ~2000) Highest award for co-curricular and academic excellence.
2024	Student Speaker Award, U21 Health Sciences Group ($1600 USD) to present at U21 HSG ’24, selected from MSc/BSc research projects across 21 universities on all continents.
2023	ENLACE Scholarship, University of California San Diego ($2,538 USD) to participate in the ENLACE 2023 program
2023	Outreach Award (Student Government Association), Tecnologico de Monterry Highest recognition for leadership in fostering institutional and external collaborations.

2023 Ambassador, Tecnologico de Monterrey
Distinction to select students who exemplify academic excellence, leadership, and institutional representation at national and international levels.
2019 Academic Talent Scholarship, Tecnologico de Monterrey

D. Contributions to Science

Closed loop multiorgan-on-chips platform

Research Intern, Harvard Medical School, Brightman's and Women's Hospital
Developed a project on cryogenics in cell preservation and contributed to developing a multiorgan-on-chip platform for controlled oxygenation. Designed and fabricated chips integrated for oxygen measurement and optimized the system for functionality. Conducted cell culture and encapsulation within GelMA hydrogel dots and hypoxia experiments and assessed microtissue viability, proliferation, and functionality. Advisor: Yu Shrike Zhang

1. Jiang N, Ying G, Yin Y, Guo J, Lozada J, Valdivia Padilla A, Gómez A, Gomes de Melo BA, Lugo Mestre F, Gansevoort M, Palumbo M, Calá N, Garciamendez-Mijares CE, Kim GA, Takayama S, Gerhard-Herman MD, Zhang YS. A closed-loop modular multiorgan-on-chips platform for self-sustaining and tightly controlled oxygenation. Proc Natl Acad Sci U S A. 2024 Nov 19;121(47):e2413684121. doi: 10.1073/pnas.2413684121. Epub 2024 Nov 14. PMID: 39541351; PMCID: PMC11588096.[HTTPS://PUBMED.NCBI.NLM.NIH.GOV/39541351/]
2. Valdivia Padilla A, Wang Z, Zhang YS. Exploring Cryoink Efficacy in Cell Preservation: A Comprehensive Evaluation Across Cell Lines. National Undergraduate Research Seminar, Tecnologico de Monterrey, Guadalajara, Mexico, 2024 (Oral and Poster Presentation)

Mechanisms of cardiovascular senescence

Research Intern, UT Health MD Anderson Cancer Center
Contributed to a project on atherosclerosis, heart failure following cancer treatments, and aging-related heart disease. Conducted cell culture, performed histological analysis (H&E staining), and utilized Western blot techniques to investigate disease mechanisms. Advisor: Jun-ichi Abe.

1. Jain A*, Casanova D*, Valdivia Padilla A*, Paniagua Bojorges A*, Kotla S, Ko KA, Samanthapudi VSK, Chau K, Nguyen MTH, Wen J, Hernandez Gonzalez SL, Rodgers SP, Olmsted-Davis EA, Hamilton DJ, Reyes-Gibby C, Yeung SJ, Cooke JP, Herrmann J, Chini EN, Xu X, Yusuf SW, Yoshimoto M, Lorenzi PL, Hobbs B, Krishnan S, Koutroumpakis E, Palaskas NL, Wang G, Deswal A, Lin SH, Abe JI, Le NT. Premature senescence and cardiovascular disease following cancer treatments: mechanistic insights. Front Cardiovasc Med. 2023 Sep 14;10:1212174. doi: 10.3389/fcvm.2023.1212174. PMID: 37781317; PMCID: PMC10540075. [HTTPS://PUBMED.NCBI.NLM.NIH.GOV/37781317/]

Respiratory Complications in Cancer: Pleural and Airway Disease

Clinical Research Intern, UT Health MD Anderson Cancer Center
Contributed to a project on malignant pleural effusion (MPE) analysis and prognosis in cancer. Utilized

RedCap for data management, Stata for statistical analysis, and applied biostatistical methods to evaluate clinical outcomes. Advisor: Horiana Grosu

1. Valdivia Padilla A, Tellez-Garcia E, Grosu H. A Case of Recurrent Respiratory Papillomatosis With Lung Involvement and Malignant Transformation. Cureus. 2022 Apr 22;14(4):e24370. doi: 10.7759/cureus.24370. PMID: 35619833; PMCID: PMC9126428. [HTTPS://PMC.NCBI.NLM.NIH.GOV/ARTICLES/PMC9126428/]
2. Tellez-Garcia E, Valdivia Padilla A, Grosu H. Immunotherapy-Induced Eosinophilic Tracheitis. Cureus. 2022 Apr 13;14(4):e24130. doi: 10.7759/cureus.24130. PMID: 35573537; PMCID: PMC9106536.[HTTPS://PMC.NCBI.NLM.NIH.GOV/ARTICLES/PMC9126428/]

E. Presentations

- MEA-Based Analysis of 4-Aminopyridine Effects in Atrial and Ventricular iPSC-Derived Cardiomyocytes Du Vigneud Research Symposium (Poster Presentation)
- Spinal Electrical Stimulation and 4-aminopyridine Pharmacomodulation Drive Functional Recovery of Damaged Sensory-motor Circuitry After Spinal Cord Injury AANS2025 – (Poster Presentation)
- Synergistic Effects of Spinal Electrical Stimulation and 4-Aminopyridine on Motor Recovery After Spinal Cord Injury. Zusman Workshop, 2025 (Poster Presentation)
- Valdivia Padilla A, Candela-Leal MO. Digital Twins in Education: Enhancing Student Well-being and Academic Performance with Biometric Insights and Machine Learning. U21 Health Sciences Group Annual Meeting, University of Amsterdam, Amsterdam, Netherlands, 2024 (Oral Presentation, Speaker Award) [HTTPS://U21HEALTH.ORG/STUDENT-SPEAKER-FUNDING]
- . The physical role of mitochondrial fragmentation on protein expression and mitochondrial dysfunction. University of California San Diego, La Jolla, California, 2023 (Poster Presentation) [HTTPS://RESILIENTMATERIALS.UCSD.EDU/SITES/RESILIENTMATERIALS.UCSD.EDU/FILES/2021-06/ENLACE2023_ANNOUNCEMENT.PDF]
- A. Proposal for a multidisciplinary model in a primary health care clinic case study: Clinica Rosa, Juarez NL. University of Texas at Austin and Tecnologico de Monterrey, Virtual, 2023 (Oral Presentation)
- How can we improve health equity and prevent the next pandemic? U21 Health Sciences Group Interprofessional Education International Student Challenge 2022, Virtual. 2022 [HTTPS://U21HEALTH.ORG/INTERPROFESSIONAL-EDUCATION-INTEREST-GROUP-CHALLENGE-2022] (Commended Team and Oral Presentation)
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F. Professional Associations

2024-present	Member, National Postdoctoral Association (NPA)
2024-present	Member, New York Academy of Sciences (NYAS)
2023-present	Member, Advancing Chicanos/Hispanics & Native Americans in Science (SACNAS)

G. University and community service

2025	Judge, MAPTA Summer Science Symposium
2024	Representative, SACNAS 2024 NDiSTEM Conference, Phoenix, AZ.
2023	Teacher, Club de Margulis, Alfa Fundación, Monterrey, Nuevo León