

ANDRES PENA, PHD

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EDUCATION

Florida International University PhD in Biomedical Engineering Adviser: Ranu Jung, PhD Dissertation: <i>Enhanced Surface Electrical Neurostimulation (eSENS): A Non-invasive Platform for Peripheral Neuromodulation</i>	April 2020
Florida International University BS in Biomedical Engineering	April 2013
Florida International University BS in Electrical Engineering	April 2010

RESEARCH AND PROFESSIONAL EXPERIENCE

<u>Assistant Research Professor.</u> Institute for Integrative and Innovative Research <i>University of Arkansas</i>	2022 – Present <i>Fayetteville AR</i>
<u>Research Assistant Professor.</u> Dept. of Biomedical Engineering <i>Florida International University</i>	2021 – 2022 <i>Miami FL</i>
<u>Postdoctoral Research Fellow.</u> Adaptive Neural Systems Laboratory <i>Florida International University</i>	2020 – 2021 <i>Miami FL</i>
<u>Graduate Research Assistant.</u> Adaptive Neural Systems Laboratory <i>Florida International University</i>	2013 - 2020 <i>Miami FL</i>
<u>Biomedical Technology Specialist.</u> <i>Aplimed Supplies, Inc.</i>	2011 - 2014 <i>Doral FL</i>
<u>Undergraduate Research Assistant.</u> Adaptive Neural Systems Laboratory <i>Florida International University</i>	2011 - 2013 <i>Miami FL</i>

HONORS AND AWARDS

Project Grant: Making “Sense” of Sensorimotor Rehabilitation in VR Women’s Giving Circle, University of Arkansas, Fayetteville, AR	2022
Cade Prize: Third Place Winner (Project Team) Cade Museum, Gainesville, FL	2020
Dissertation Year Graduate Fellowship Florida International University – University Graduate School	2019-2020
Military Health System Research Symposium Award for Excellence - Poster presentation	2019

American Institute for Medical and Biological Engineering Travel award to the 2015 AIMBE Public Policy Institute in Washington DC	2015
Alpha Eta Mu Beta BME Honor Society Outstanding member award	2014
National Science Foundation's Bridge to the Doctorate Fellowship Florida Georgia Lois Stokes Alliance for Minority Participation (FGLSAMP).	2013 - 2015
Graduate Scholarship The FIU College of Engineering and Computing - Dean of Engineering Scholarship	2014
Florida International University Engineering Student Council Future Engineering leader's team Award	2005 - 2006

AWARDS TO MENTORED STUDENTS

Sierra Stocker (Highschool Intern), First Place – Engineering Category Broward Regional Science and Engineering Fair, Broward Country, FL	2021
Heriberto Nieves, Coulter Undergraduate Research Excellence scholarship Florida International University – Department of Biomedical Engineering	2020
Luis Herran, First Place, Conference for Undergraduate Research Florida International University	2019
Luis Herran, Coulter Undergraduate Research Excellence scholarship Florida International University – Department of Biomedical Engineering	2018
Luis Herran, Second Place, Undergraduate Research Day Conference Florida International University – Department of Biomedical Engineering	2018
Luis Herran, First Place, Conference for Undergraduate Research Florida International University	2018

TEACHING EXPERIENCE

<u>Graduate Teaching Assistant.</u> Department of Biomedical Engineering <i>Florida International University</i>	2015 - 2017 <i>Miami FL</i>
Undergraduate courses covering different engineering topics:	
- Introduction to Engineering (Freshmen course)	
- Orthopedic Biomechanics	
- Biomedical Engineering Laboratory (BME Lab) 1 and 2 (Senior courses)	

PATENTS

Issued

"Systems and Methods for Providing Haptic Feedback when Interacting with Virtual Objects", R. Jung, and A. Pena. U.S. Patent No. 11,199,903. 14 Dec. 2021.

"Systems and Methods for Delivering Focalized Neurostimulation". A. Pena, R. Jung, J. Abbas, K. Horch. U.S. Patent No. 11,478,639B2. 25 Oct. 2022

PUBLICATIONS

Journal Publications

Pena, A. E., Kuntaegowdanahalli, S. S., Abbas, J. J., Patrick, J., Horch, K. W., & Jung, R. (2017). Mechanical fatigue resistance of an implantable branched lead system for a distributed set of longitudinal intrafascicular electrodes. *Journal of neural engineering*, 14(6), 066014.

Pena, A. E., Rincon-Gonzalez, L., Abbas, J. J., & Jung, R. (2019). Effects of vibrotactile feedback and grasp interface compliance on perception and control of a sensorized myoelectric hand. *PLoS one*, 14(1), e0210956.

Pena, A. E., Abbas, J. J., & Jung, R. (2021). Channel-hopping during surface electrical neurostimulation elicits selective, comfortable, distally referred sensations. *Journal of neural engineering*, 18(5), 055004.

Shell A.K., Pena A. E., Abbas J.J., & Jung R. (2022) Novel Neurostimulation-Based Haptic Feedback Platform for Grasp Interactions with Virtual Objects. *Front. Virtual Real.* 3:910379.

PRESENTATIONS

Invited Talks

Pena, A. E., & Jung, R. (2018, April). The Bioethics of Implantable Biohybrid Systems. Invited Talk at the Barry University Chapter of Sigma Xi Induction Ceremony and 20th Anniversary Celebration, Miami, FL

Pena, A. E., (2023, April 27). From Research to Reality: Translating Neurotechnology Research into Real-World Solutions. Invited Seminar Speaker at the Department of Bioengineering, George Mason University, Fairfax, VA

Conference Presentations (Selected)

(Oral Presentations)

Pena, A. E., Rincon-Gonzalez, L., Abbas, J. J., & Jung, R. (2017, November). Effect of vibrotactile feedback and hand interface compliance on grasp force and hand opening. Annual Society for Neuroscience Conference, Washington, DC

Pena, A. E., & Jung, R. (2018, February). Longitudinal Intrafascicular Electrodes (LIFE)s: Restoring Sensation with a Neural-Enabled Prosthetic Hand System for Home Use: A First-in-Human Study. Electrodes Session of the 2018 DARPA HAPTIX Program Review Meeting, Charleston, SC

Pena, A. E., & Jung, R. (2018, April). The Bioethics of Implantable Biohybrid Systems. 9th International Conference on Ethics in Biology, Engineering & Medicine, Miami, FL

Abbas, J. J., Kuntaegowdanahalli, S. S., Thota, A. K., Pena, A. E., Jung, R. (2018, August). Development of a Sensory-enabled Neuroprosthetic Hand System. 2018 Military Health System Research Symposium, Kissimmee, FL

(Poster Presentations)

Pena, A. E., Kuntaegowdanahalli, S. S., Abbas, J., & Jung, R. (2013, May). Design and development of hand-opening and pinch force sensors. In *Biomedical Engineering Conference (SBEC), 2013 29th Southern* (pp. 167-168). IEEE. doi: 10.1109/SBEC.2013.92

Pena, A. E., Kuntaegowdanahalli, S. S., Jung, R., & Abbas, J. J. (2014, February). Modular multi-channel inline connector system to link electrodes to percutaneous leads or an implanted electrical device. 2014 DARPA RE-NET Program Review, Scottsdale, AZ

Pena, A. E., Kuntaegowdanahalli, S. S., Abbas, J. J., & Jung, R. (2014, June). Fatigue testing of longitudinal intrafascicular electrodes as a peripheral nerve interface. In *Neuromodulation*, 17(5), e103. Issn Print: 1094-7159. Annual Neural Interface Conference, Dallas TX

Mustafa, L., Pena, A. E., Jung, R., & Battle, J.C. (2015, October). Developing Patient-Specific, Dynamic Biomechanical Models of the Knee for Surgical Simulations. Annual Biomedical Engineering Society Conference, Tampa, FL

Pena, A. E., Kuntaegowdanahalli, S. S., Abbas, J. J., & Jung, R. (2015, October). Mechanical fatigue testing of an implantable intrafascicular electrode system. Annual Society for Neuroscience Conference, Chicago, IL

Pena, A. E., Kuntaegowdanahalli, S. S., Abbas, J. J., & Jung, R. (2016, February). Mechanical fatigue testing of an implantable intrafascicular electrode system. Annual Louis Stokes Alliances for Minority Participation Research Symposium, National Harbor, MD

Pena, A. E., Rincon-Gonzalez, L., Aguilar, D., Abbas, J. J., & Jung, R. (2016, November). A sensory substitution system for providing grasping force and hand opening feedback from a sensorized myoelectric hand. Annual Society for Neuroscience Conference, San Diego, CA

Herran, L., Pena, A. E., & Jung, R. (2018, October). Evoked Referred Sensations Through Quadripolar Transcutaneous Electrical Neurostimulation. Annual Biomedical Engineering Society Conference, Atlanta, GA

Jung, R., Kuntaegowdanahalli, S. S., Thota, A. K., Pena, A. E., Horch, K. W., Patrick, J., & Abbas, J. J. (2018, November). Neural-Enabled Prosthetic Hand System to Restore Sensation in Upper-Limb Amputees. Annual Society for Neuroscience Conference, San Diego, CA

Abbas, J. J., Kuntaegowdanahalli, S. S., Horch, K. W., Rincon-Gonzalez, L., Pena, A. E., Thota, A. K., Hillen, B. K., Aguilar, D., & Jung, R. (2018, November). Assessment of Functional Benefits Afforded by Sensory-Enabled Prostheses to Upper-Limb Amputees. Annual Society for Neuroscience Conference, San Diego, CA

Pena, A. E., Herran, L., Jung, R. Enhanced Non-invasive Peripheral Nerve Stimulation for Sensory Restoration and Neuropathic Pain Treatment. Abstract #MHSRS-19-01649 – Rehabilitation Following Limb Trauma and Amputation, Military Health Systems Research Symposium. August 19-22, 2019, Kissimmee, FL, USA

Nieves, H., Patel, K., Stocker, S., Pena, A. E., & Jung, R. (2020, October). Non-Invasive Neuromodulation to Provide Haptic Feedback During Virtual Object Classification. Annual Biomedical Engineering Society Conference, Virtual.

MEDIA APPEARANCES

Interviews (Selected)

"Escuela de ingeniería de FIU diseña primer implante inalámbrico." [Television Broadcast] Arrebatados, América TeVé, 18 May 2016., <https://www.youtube.com/watch?v=gs4FzwAzFkc>

Schuster, Teresa, and Joshua Ceballos. "Amputees will feel again thanks to FIU research." PantherNOW, 18 Nov. 2019 [Miami, FL], <https://panthernow.com/2019/11/18/amputees-will-feel-again-thanks-to-fiu-research/>

Schuster, Teresa, and Albert, Gerard. "Giving The Biggest Presentation of Your Life, On Zoom" PantherNOW, 1 Apr. 2020 [Miami, FL], <https://panthernow.com/2020/04/01/giving-the-biggest-presentation-of-your-life-on-zoom/>

Documentaries

"React." Human: The world within, Netflix-PBS, 2 June 2021., <https://www.pbs.org/video/react-ond5g6/>

PROFESSIONAL TRAINING

Concept to Clinic: Commercializing Innovation (C3i) Program

National Institute of Biomedical Imaging and Bioengineering (NIBIB) and the Coulter Foundation, Online, 2020-2022
Provided a comprehensive curriculum and mentoring to guide the successful transition of biomedical technologies from concept to market. The program consisted of three phases: Education for assessing commercial value, Validation & Execution for identifying market needs and developing pitches, and Acceleration for providing product development and business support to expedite translation into a market-ready product.

Clinical Trial Technologies for Sites

WIRB-Copernicus Group, Online, August 2022

Building an Innovative Clinical Trial Technology Roadmap for Your Research Program.

Micro Device Fabrication and Materials Analysis

The Advanced Materials Engineering Research Institute (AMERI), Miami, FL 2016

A two-day training workshop on micro/nano device fabrication, materials analytical techniques, and failure analysis.

The Institute on Teaching and Mentoring, Atlanta, GA, 2014

Four-day conference provides doctoral scholars with the skills necessary to succeed in graduate study and to prepare them for success as minority faculty members.

PROFESSIONAL AFFILIATIONS

Institute of Electrical and Electronics Engineers (IEEE)

IEEE Engineering in Medicine and Biology (EMB) Society

Alpha Eta Mu Beta - BME Honor Society

Tau Beta Pi – Engineering Honor Society

Biomedical Engineering Society (BMES)

National Science Foundation Bridge to the Doctorate Fellowship

Theta Tau - Professional Engineering Fraternity

COMMUNITY SERVICE / OUTREACH

Team Mentor, Alpha Eta Mu Beta MINDS Program (2022-2023)

Alumni Advisor, Theta Tau Professional Engineering Fraternity (2021 - 2022)

Guest editor, Special Issue "Neural Electrodes in Bioelectronic Medicine", *Micromachines* (2021, 2022)

Volunteer, 3D-printing PPE for healthcare workers during COVID-19 pandemic, 2020

Founder/Advisor, Panther Bionics Student Organization at FIU, 2017

Volunteer, FIU CEC Engineering Expo, 2006-2018

Alumni Panelist, BME Undergraduate Research Day, 2017

Volunteer, Engineers on Wheels, 2016, 2017

Project Judge, BME Technology Expo and Competition (Senior Design) - 2016, 2017

President, Alpha Eta Mu Beta Honor Society at FIU, 2014

Vice-President, Biomedical Engineering Society at FIU, 2013