Maria **Jantz**

Graduate Student Researcher · Bioengineering

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Education

University of Pittsburgh, Swanson School of Engineering (Prof. Robert Gaunt) — *Pittsburgh, PA*

PhD Candidate, NDSEG Fellow — *Aug 2017 - Present*

- Investigate the use of epidural spinal cord stimulation to restore bladder control
- Chronic and acute animal experiments
- Finite element computational models of the sacral spinal cord
- Collaborations: Dorsal root ganglion stimulation for lower urinary tract function, electrode net bladder wall stimulation

Goshen College — *Goshen, IN*

B.A. in Physics, Interdisciplinary Studies (Informatics, Mathematics, Art) — *Aug 2011 - May 2015*

- Summa Cum Laude
- Presidential Leadership Award

Experience

University of Pittsburgh (Profs. Aaron Batista and Patrick Loughlin) — *Pittsburgh, PA*

Co-facilitator, Grant Writing — *Aug 2020 - Dec 2020*

- Designed syllabus and planned course activities.
- Taught grant writing and science communication concepts.

Northwestern University (Profs. Lee Miller and Matthew Tresch) — *Chicago, IL*

Research Technician — *Aug 2015 - July 2017*

- Implanted and recorded from acute and chronic EMG and stimulation electrodes in rats.
- Placed and recorded from epidural and intracortical arrays in rat motor cortex.
- Collected and analyzed EMG, neural and kinematic data.
- Designed and built lab equipment.

CodePurple — *Goshen, IN*

Computing Intern — *Jan 2013 - May 2015*

- Created websites using HTML and CSS.
- Met with clients to determine project goals.

Goshen College (Prof. John Ross Buschert) — *Goshen, IN*

Undergraduate Student Researcher — *Aug 2013 - Dec 2013*

- Designed infrared motion-tracking prosthesis using inverse kinematics algorithm.
- Earned Best in Show award after presenting at Goshen College Electronics Competition.

Goshen College — *Goshen, IN*

General Physics Teaching Assistant — *Aug 2012 - Dec 2014*

- Prepared and demonstrated laboratory experiments.
- Taught essential programming concepts.
- Graded student coursework and tutored students.

Study Service Term — *Candelaria, Nicaragua*

Environmental Engineering Field Worker — *May 2013 - Jul 2013*

- Installed and repaired biodigestors in order to transform manure into biogas for cooking stoves.
- Led initiative to increase efficiency of water use in cultivation of fruit and vegetables.
- Built cross-cultural relationships with host family and coworkers.

Goshen College Computer Help Desk — *Goshen, IN*

Student Technology Assistant — *May 2012 - Apr 2013*

- Communicated computer and technology solutions to callers.
- Performed in-person software and hardware troubleshooting.

AgCo Agricultural Company — *Hesston, KS*

Test Department Intern — *May - Aug 2011, 2012*

- Developed automatic testing system for control panel software.
- Established test procedures for tractor and combine systems.
- Debugged malfunctioning machinery and software.

Peer-Reviewed Publications

Lifting as We Climb: Experiences and Recommendations from Women in Neural Engineering *Nov 2022*
MK Jantz, J Mak, AN Dalyrymple, J Farooqui, EM Grigsby, AJ Herrera, E Pirondini, JL Collinger
Frontiers in Neuroscience, *Submitted*

A systematic review of computational models for the design of spinal cord stimulation therapies: from neural circuits to patient-specific simulations *Nov 2022*
L Liang, A Damiani, M Del Brocco, ER Rogers, MK Jantz, LE Fisher, RA Gaunt, M Capogrosso, SF Lempka, and E Pirondini
Journal of Physiology, *Accepted*

High-density spinal cord stimulation selectively activates lower urinary tract nerves *Nov 2022*
MK Jantz, C Gopinath, R Kumar, C Chin, L Wong, JI Ogren, LE Fisher, BL McLaughlin, RA Gaunt
Journal of Neural Engineering, *Accepted*

Decoding neural activity to predict rat locomotion using intracortical and epidural arrays *Mar 2019*
FO Barroso, B Yoder, D Tentler, JJ Wallner, AA Kinkhabwala, MK Jantz, RD Flint, PM Tostado, E Pei, ADR Satish, SK Brodnick, AJ Suminski, JC Williams, LE Miller, MC Tresch
Journal of Neural Engineering

Talks & Non-Peer-Reviewed Publications

Epidural Spinal Cord Stimulation Can Modulate Bladder Activity in an Awake Environment *Nov 2022*
A Leon-Vargas, MK Jantz, C Gopinath, RA Gaunt
Ingenium Undergraduate Journal, *Mentor for submitting student*

Spinal Cord Stimulation for Bladder Function Evokes Sporadic Nerve Activity *Nov 2022*
SC Waymer, MK Jantz, C Gopinath, RA Gaunt
Ingenium Undergraduate Journal, *Mentor for submitting student*

A Computational Study of Lower Urinary Tract Nerve Recruitment with Epidural Stimulation of the Lumbosacral Spinal Cord *Jul 2022*
MK Jantz*, L Liang, A Damiani, LE Fisher, T Newton, E Neufeld, TK Hitchens, E Pirondini, M Capogrosso, RA Gaunt
IEEE Engineering in Medicine and Biology Conference, *Conference Paper; Finalist in Student Paper Competition*

An Open-Source Computational Model of Neurostimulation of the Spinal Pudendo-Vesical Reflex for the Recovery of Bladder Control after Spinal Cord Injury *Jul 2022*
X Fang, S Collins, MK Jantz*, AC Nanivadekar, RA Gaunt, M Capogrosso
IEEE Engineering in Medicine and Biology Conference, *Conference Paper, Talk*

Working Toward Diversity and Inclusion in Neural Engineering *Oct 2021*
JA de Lima, AN Dalrymple, MK Jantz, C Charlebois and C Weber
IEEE Pulse, *Paper*

Optimizing spinal cord stimulation for bladder control using evoked nerve and muscle responses *Oct 2020*
MK Jantz*, CH Gopinath, R Kumar, RA Gaunt
Neuromatch 3.0 Conference, *Talk*

Epidural spinal cord stimulation for selective activation of lower urinary tract nerves *Jul 2019*
MK Jantz*, CH Gopinath, BL McLaughlin, RA Gaunt
International Society for Autonomic Neuroscience Conference, *Talk*

Selectively activating lower urinary tract nerves with epidural spinal cord stimulation *Nov 2018*
MK Jantz*, CH Gopinath, L Wong, JI Ogren, BL McLaughlin, AC Nanivadekar, LE Fisher, RA Gaunt
Society for Pelvic Research Conference, *Talk*

To Pee or Not to Pee: Rehabilitation Following Spinal Cord Injury *Oct 2018*
MK Jantz*
Goshen College Science Speakers Seminar, *Invited Talk*

Beginning Python: Python essentials for anyone past fifth grade *Oct 2017*
MK Jantz
Amazon Digital Services LLC

Posters

An ultra-realistic model of spinal cord stimulation to control lower urinary tract function and optimize bladder neuroprosthetics *Nov 2022*
MK Jantz*, X Fang, A Damiani, L Liang, C Gopinath, U Agbor, T Newton, E Neufeld, A Fasse, TK Hitchens, LE Fisher, E Pirondini, M Capogrosso, RA Gaunt
Society for Neuroscience, *Poster*

Epidural spinal cord stimulation for bladder control *Jul 2022*
MK Jantz, RA Gaunt
NDSEG Fellows Conference

The Sweet Sounds of Coding: Promoting Digital Inclusion Via Remote Instruction of Introductory Python in a Musical Context *Feb 2022*
MK Jantz*, S Anjum*, J Churilla, K Holbrook, SD Abramowitch (*Contributed Equally)
Collaborative Network for Engineering and Computing Diversity

Lower Urinary Tract Activity Evoked by Spinal Cord Stimulation is Frequency-Modulated *May 2021*
MK Jantz, CH Gopinath, R Kumar, BL McLaughlin, RA Gaunt
IEEE Conference on Neural Engineering

Optimizing spinal cord stimulation for bladder control using evoked nerve and muscle responses *May 2020*
MK Jantz, CH Gopinath, R Kumar, NM Greenlee, BL McLaughlin, RA Gaunt
American Urological Association

Current Steering To Selectively Recruit Nerves Of The Lower Urinary Tract *Apr 2020*
MK Jantz, CH Gopinath, R Kumar, NM Greenlee, L Wong, JI Ogren, BL McLaughlin, RA Gaunt
Experimental Biology

Recruitment of lower urinary tract peripheral afferents and muscles in response to spinal stimulation *Oct 2019*
MK Jantz, CH Gopinath, R Kumar, L Wong, JI Ogren, G Chitnis, BL McLaughlin, RA Gaunt
Society for Neuroscience

Epidural spinal cord stimulation selectively recruits bladder afferent pathways *Oct 2018*
MK Jantz, CH Gopinath, AC Nanivadekar, JI Ogren, G Chitnis, L Wong, LE Fisher, BL McLaughlin, RA Gaunt
Society for Neuroscience

Selective recruitment of bladder afferent pathways through epidural spinal cord stimulation *Jun 2018*
MK Jantz, CH Gopinath, AC Nanivadekar, JI Ogren, G Chitnis, L Wong, LE Fisher, BL McLaughlin, RA Gaunt
Neural Interfaces Conference

Decoding neural data to predict locomotion with intracortical and epidural arrays *Nov 2017*
MK Jantz, PM Tostado, AA Kinkhabwala, FO Barroso, E Pei, MC Tresch, LE Miller
Society for Neuroscience 2017

Development of cortically-controlled muscle stimulation to restore treadmill locomotion and overground navigation in spinal cord injured rats *Nov 2016*
AA Kinkhabwala, MK Jantz, JA Gallego, TA Vernon, MC Tresch, LE Miller
Society for Neuroscience

FES Control for Restoring Complex Functional Hindlimb Movements in the Rat *Jul 2016*
MK Jantz, AA Kinkhabwala, JA Gallego, LE Miller, MC Tresch
International Society for Electrophysiology and Kinesiology

Leap-Enabled Arm Following System (LEAFS) Prosthesis *Dec 2013*
MK Jantz, PH Biddle, SA Miller, JR Buschert
Goshen College Electronics competition

Honors & Awards

Jul 2022 **Finalist,** IEEE Engineering in Medicine and Biology Conference 2022 Student Paper Competition
Apr 2022 **Winner,** University of Pittsburgh 3 Minute Thesis Competition
Apr 2022 **Winner,** Graduate and Professional Student Government Leadership and Service Award
May 2021 **Winner,** IEEE EMBS Conference on Neural Engineering Diversity, Equity and Inclusion Award
Dec 2019 **Associate STEM Teaching Certification,** University of Pittsburgh Center for Research, Teaching, and Learning
Mar 2019 **Fellow,** NDSEG (National Defense Science and Engineering Graduate Fellowship)
Dec 2018 **Best Oral Presentation,** Society for Pelvic Research
Dec 2018 **Winner,** Engineering Graduate Students Organization Travel Award
Oct 2018 **Winner,** Society for Neuroscience Ripple Travel Award
May 2018 **Winner,** Neural Interfaces Conference Diversity Travel Award
Apr 2018 **Honorable Mention,** National Science Foundation Graduate Research Fellowship
May 2014 **NAIA Scholar Athlete,** Track and Field, Goshen College
Mar 2011 **Scholar,** National Merit Foundation

Skills

Programming MATLAB, Python, C/C++, HTML/CSS, LabView, LaTeX
Interfaces Arduino, Raspberry Pi, Ripple Grapevine, Vicon Motion Tracking, Leap Motion IR Sensor
Surgery Muscle and nerve implants, Cortical electrode placement, Tracheostomy, Laminectomy, Rodent and feline models
Machining Table saw, Drill press, Mill, Lathe, Hand tools

Extracurricular Activity

Outreach RNEL Inclusion and Diversity Committee, Bioengineering Outreach Student Society, FIRST Robotics programming mentor, Programming clinic for middle school girls, Science Olympiad, Goshen Women in Science club founder & president, Engineering with fifth graders
Leadership University of Pittsburgh Ingenium Journal Review Board, Northeast Biomedical Engineering Conference Reviewer, Center for Neural Basis in Cognition Student Committee, Rehab Neural Engineering Labs Graduate Student Representative, Biomedical Engineering Society First-Year Representative
Memberships Society for Neuroscience, IEEE Engineering in Medicine and Biology, Center for the Neural Basis in Cognition
Activities Gymnastics, Rock climbing, Running, Glassblowing, Ceramic art