Rebecca Stinson

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Education:

Case Western Reserve University — May, 2028
PhD in Biomedical Engineering
GPA: 4.00

Bucknell University — May, 2023
Bachelors of Science, Biomedical Engineering
GPA: 3.81 - Magna Cum Laude - Tau Beta Pi honors society

Research Experience:

CWRU: Research under PI Dr. Chris Pulliam, Ph. D: August, 2023 - present
Developing methods for monitoring gait impairments caused by Parkinson's disease. Evaluating machine learning algorithm performance on classifying gait characteristics. Establishing pipelines for EMG, IMU data collection. Literature review on autonomic dysfunction in Parkinson's disease.

Bucknell's Computational Neuromodulation Lab, Dr. Karlo Malaga, Ph. D: May, 2022 - May, 2023. Work on computational modeling of thalamic segmentation and deep brain stimulation for use in the treatment of Essential Tremor. Using MATLAB to create an atlas independent segmentation algorithm of the thalamus to improve electrode placement during deep brain stimulation surgery. Evaluate the algorithm using COMSOL models of stimulation and patient outcome data.

Presentations:

CWRU Neural Engineering Center Seminar Series — September, 2024
Rebecca Stinson: *Gait Impairment and Autonomic Dysfunction in Parkinson's Disease: Current Methods of Treatment and Assessment*

Biomedical Engineering Society Annual Meeting 2022 - San Antonio, Texas — October, 2022
Rebecca Stinson, Karlo A. Malaga, Ph.D: *Stability Assessment and Validation of Thalamic Segmentation using Alternative Numbers of Clusters*

Susquehanna Valley Undergraduate Research Symposium - Geisinger Medical Center, Danville PA — August, 2022
Rebecca Stinson, Karlo A. Malaga, Ph.D: *Accessing Stability of Thalamic Segmentation using Diffusion Tensor MRI*

Senior Capstone:

Senior Capstone Project: Work in a team of four students to identify clinical needs in the field of Pediatric Surgery, generate solutions, develop a prototype, and perform testing over the course of a year. Work in conjunction with Geisinger Medical System.

Undergraduate Technical Projects:

Impact of Spring Force on Fluid Flow in AutoInjectors
BMEG 300: Biotransport I, Spring 2022

- Investigate the impacts different springs have on the fluid flow within an autoinjector
- Used COMSOL to run a parametric study looking at fluid within the autoinjector

- Created a poster summarizing the process and results of the model

Agent Based Viral Mutation Model

BMEG 220: Introduction to Engineering Computing, Fall 2021

- Develop a computational model to study the impact mutations have on the spread of a viral disease
- Work with a partner to write code in MATLAB to run parametric studies simulating different infection and mutation rates
- Presented a summary of the model and results, and prepared a user manual to accompany the finished code

Circulatory System Display and Heart Rate Monitor

BMEG 350: Signals and Systems, Fall 2021

- Create a museum display that teaches principles of the circulatory system to children
- Used sensors and arduino to read and process heart rate signals and send pulses to LEDs within a circuit
- Demonstrated display to a panel of university faculty

Motion Capture of Joint Hypermobility

BMEG 250: Biomechanics, Fall 2020

- Develop a quantitative method for measuring joint hypermobility
- Used a VICON motion capture system and data processing in excel to determine range of motion
- Produced a poster documenting the results and presented at a department-wide poster session

Assessment of Bluetooth Blood Pressure Cuff

BMEG 408: Medical Device Development and Assessment, Spring 2022

- Analyze the value proposition of a blood pressure cuff currently on the market
- Researched existing patents, FDA approvals, market analysis, and additional relevant information
- Gave 15 minute presentation to department faculty panel

Improvement Proposal of Blood Glucose Monitoring System

BMEG 408: Medical Device Development and Assessment, Spring 2022

- Propose an improvement to a currently on the market blood glucose monitoring device
- Completed failure mode analysis and evaluation of existing market shares and stakeholder needs
- Delivered a 15 presentation to a department faculty panel proposing a selected improvement

Biocompatibility Report and Cell Culture

BMEG 409: Fabrication and Experimental Design, Fall 2020

- Evaluate the biocompatibility of 3D printing filament for use in implants
- Ran a cytotoxicity assay on a cell line maintained in a BSL2 lab in accordance with ISO 10993
- Delivered a biocompatibility report assessing the filament

Work Experience:

Bucknell University Teaching and Learning Center

New-Staff Supervisor (Jan. 2022-May 2023)

Create material and lead training meetings for 120 student staff members to strengthen facilitating and tutoring skills, focusing on areas including learning styles, metacognition, and inclusion.

Study Group Facilitator (Sep. 2020-Dec. 2021)

Lead a weekly study group of 12 students in reviewing and practicing concepts from introductory physics courses.

Course Work:

Graduate Studies: Methods for Modeling Physiological Systems, Neuromuscular Analysis, Convex Optimization for Engineering, Neurological Anatomy, Statistical Methods in Biological and Medical Sciences, Principles of Physiology, Instrumentation and Signals

Biomedical Engineering: Biomechanics, Neural Engineering, Signals and Systems, Materials Science, Medical Imaging, Fabrication and Experimental Design, Biotransport (fluid mechanics, heat and mass transfer), Bioinstrumentation

Additional Coursework: Intro to Molecules and Cells, Physiology, Principles of Chemistry, Organic Chemistry I, Introduction to Psychology, Developmental Psychology, Physics, Observational Astrophysics

Technical Skills:

MATLAB, Python, R, OpenSim (biomechanics modeling), COMSOL, Excel data processing, OnShape (CAD), Delsys sensor systems, 3D printing, engineering drawings, VICON (motion capture), cell culture, sterile lab techniques, material strength testing