Leo J Wood

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https://leojw.github.io

Research Experience

GATECH POWER LAB | PHD ROTATION STUDENT - ANALYSIS OF ACTIVE MUSCLE WITH SPINDLE CELL AFFERENTS
January 2021 - Current

- Development of analysis pipeline for large dataset of rat soleus muscle under various passive and active conditions with simultaneous spindle cell afferent recordings

UBC ALTSHULER LAB | MSC STUDENT RESEARCHER - MUSCULAR DYNAMICS OF AVIAN WING MORPHING
August 2018 - June 2020

- Study on dynamics and interactions of multiple muscle systems towards avian wing morphing
- Surgical and behavioral experiments with live birds. High-speed 3-dimensional kinematics with *in vivo* recordings from wing musculature in flight. *In situ* muscle characterization with servomotor/stimulator preparation in conjunction with optical IR tracking and electrode recordings
- Phylogeny estimation from gene data, use of phylogenetic comparative methods on morphological data from >50 species

NASA GLENN RESEARCH CENTER | INTERN - SHAPE MEMORY ALLOY ANALYSIS AND DEVELOPMENT
June 2017 - August 2017, January 2018 - August 2018

- Shape Memory Alloy (SMA) actuator development. Automated analysis pipeline of NiTiHf actuators durability, mechanical testing of laser-welded high temperature SMAs, testing and analysis of large-scale SMA tube actuator designs
- SMA thermal solutions for X-57 electric aircraft. Analysis of SMA endothermic/exothermic phase reactions, automated DSC analysis software tools, designed and wind tunnel tested passive SMA cooling system
- Additional projects in areas such as statistical analysis, controller design, and apparatus fabrication

TEXAS A&M UNIVERSITY MAESTRO LAB | UNDERGRADUATE RESEARCHER - ORIGAMI ENGINEERING
May 2015 - December 2017

- SMA actuated self-folding origami. SMA actuator design, characterization, and modeling via optimization methods

Teaching Experience

TEACHING ASSISTANT | GEORGIA TECH

- Intro to Physics for Life Sciences — 1 semester

TEACHING ASSISTANT | UBC

- Laboratory in Animal Physiology — 2 semesters
- Zoological Physics — 2 semesters

PEER TEACHER | TEXAS A&M

- Statics and Particle Dynamics — 1 semester

Academics

PhD: Georgia Tech
Major: Quantitative Biosciences
GPA: 4.0

MSc: University of British Columbia
Major: Zoology
GPA: 88%

BSc: Texas A&M University
Major: Mechanical Engineering
Minor: Electrical Engineering
GPA: 3.48

Honors and Awards

- Tau Beta Pi Honors Society
  Treasurer, Fall 2017
- Pi Tau Sigma Honors Society
- Eagle Scout

Skills

PROGRAMMING

Fluent: Python, R, Matlab
Experienced: Mathematica
Some Projects: C, C++, Verilog, Java, Fortran

- Avid user of LaTeX, experienced with git
- Comfortable with range of software tools including BEAST, Spike2, Solidworks, Pspice, many others

FABRICATION

- Machining, welding, additive manufacturing
- Microcontrollers and analog electronics, some PCB design

EXPERIMENTATION

- Digital Image Correlation/optical tracking with IR and high speed cameras
- Surgical procedures for *in situ* muscle and nerve preparations, *in vivo* sensor implantation
- *In vitro* tissue preparations
- Thermomechanical testing in variety of loading modes
- Differential Scanning Calorimetry

Publications

JOURNAL ARTICLES

- Oliveira, JP, Schell, N, Zhou, N, Wood, L, Benafan O. (2018) Laser welding of precipitation strengthened Ni-rich NiTiHf high temperature shape memory alloys: Microstructure and mechanical properties. *Materials In Design*

INTERNAL REPORTS

- Benafan, O, Bigelow, GS, Wood, L. (2019) Ruggedness Evaluation of ASTM International Standard Test Methods for Shape Memory Materials: E3097 Standard Test Method for Mechanical Uniaxial Constant Force Thermal Cycling of Shape Memory Alloys

CONFERENCE PAPERS

- IDETC 2016 - “An Origami-Inspired, SMA Actuated Lifting Structure”

CONFERENCE PRESENTATIONS

- SICB 2019 - “How a Specialized Muscular System Enables Highly Dynamic Wing Motions in Passerine Birds”
- SMASIS 2018 - “On the Ruggedness Evaluation of ASTM Standard Test Methods for Shape Memory Alloy Materials”
- SMASIS 2016 - “Use of Torsional SMA in an Origami Inspired Lifting Structure”

References

DR.DOUG ALTSHULER I PROFESSOR I UNIVERSITY OF BRITISH COLUMBIA

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