

Daniel J. Rivera

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Education

- Northern Arizona University
 - BSE Mechanical Engineering (4.0 GPA) **Class of 2020**
 - Minor in Mathematics (4.0 GPA) **2019**
 - Minor in Biology (4.0 GPA) **2018**
- Coconino Community College:
 - Associates in Applied Science (4.0 GPA) **2016**
 - Emergency Medical Technician (9 credit certification, 4.0 GPA) **2013**
 - Firefighter 1&2 (9 credit certification, 4.0 GPA) **2013**

Awards

- **Goldwater Scholarship** **2018**
 - The most prestigious undergraduate STEM scholarship in America
 - Awarded for research in muscle modeling, GPA, and intent to pursue research career in wearable robotics and bio-inspired control
- **Northern Arizona University:**
 - Hooper Undergraduate Research Grant **2017**
 - Awarded \$3,400 in funding for muscle modeling research
 - CCC2NAU Raymond Scholarship **2016-2017**
 - Awarded \$4,000 for GPA accomplishments
 - GEMS Scholarship **2016-2018**
 - Awarded ~\$6,600 per year for 2 years for GPA accomplishments
- **Coconino Community College:**
 - Student of the Year for academic excellence in Applied Mathematics **2016**
 - Awarded for GPA, community building, and tutoring, And career aspirations.
 - NREMT/FF1&2 Certification **2014**
- **Other:**
 - Black Belt (Hapkido, Jujutsu CQDT cert.) **2006**

Publications

- **“Case Study: A Bio-inspired Control Algorithm for a Robotic Foot-Ankle Prosthesis Provides Robust Control of Level Walking and Stair Ascent.”** **2017**
 - Coauthor. Frontiers: <https://doi.org/10.3389/frobt.2018.00036>
- **“Verification of a Winding Filament Muscle Model”** **2020**
 - First Author, to be submitted spring 2020

Presentations

- **Dynamic Walking (IHMC Robotics, Pensacola FL)** **2018**
 - Only undergraduate speaker
 - Presented sum of research from 2016-2018
 - Link: <https://youtu.be/3F9x2IuS-ig>

- **Biomedical Engineering Society (Phoenix, AZ)** **2017**
 - Poster presentation of OpenSim muscle modelling research
- **Society for Integrative and Comparative Biology (New Orleans, LA)** **2016**
 - Poster presentation of mouse soleus muscle modelling research

Recently Funded Projects:

- **Biomechatronics Lab (\$6,000 via NSF grant), NAU** **2018-2019**
 - Developed controller for motorized lower limb prosthesis
 - Device is for patients with stroke induced weakness/lower leg
 - Controller is based off of previous and current modelling research
- **Biomechatronics Lab (\$3,400 via HURA grant), NAU** **2017-2018**
 - Test whether implementing muscle model developed through previous research can improve whole-body simulations in OpenSim
 - Implemented muscle model in OpenSim through MATLAB interface
 - Compared muscle model predictions in lower body, 54 muscle, 23 degree of freedom simulations.
- **Center for Bioengineering Innovation (\$10,000 via CBI), NAU** **2016-Ongoing**
 - Test whether including role for protein titin in muscle models can simulate length dependent changes in muscle forces
 - Comparisons made against ex-vivo mouse soleus experiments performed at NAU
 - Developed model of muscle activation to allow simulation of ex-vivo experiments
 - Helped conduct in person trials that show benefit of model for prosthesis applications

Unfunded Projects:

- **“Air-Vest” Head Protection System, NAU** **2018**
 - Light-weight wearable airbag vest for trail runners and cyclists
 - ANSYS simulations found design lowers head accelerations 30% compared to traditional helmets
 - Comparable cost and function with existing smart helmets
 - Increased wearer safety and comfort
- **“The 33 Special” Drone, NAU** **2017**
 - 3D printed competition drone designed for mid-air impact
 - Won best design in class
 - Won most creative design in student cohort

Research Interests

- Mathematical descriptions of biological systems and their use as control algorithms
- Biomimetics, bio-inspired design of assistive/rehabilitative wearable devices

Recent Work Experience

- **Ottobock, Cambridge MA** **Sum '19**
 - Implemented muscle-based control algorithm in wearable robotic ankle
 - Self-taught embedded systems approach to robotic control
 - Updated s-wifi protocol and hardware
 - Assisted with development of new wearable devices
- **Center for Bioengineering Innovation, NAU** **2016-20**
 - Developed new muscle model based on winding filament hypothesis
 - Assisted with testing of motorized ankle prosthesis
 - Hands-on work with patients with trans-tibial amputations
- **Science Lab, CCC** **2015**
 - Prepared equipment, chemicals, organisms, and experiments for classroom use
 - Maintained communication with instructors to adapt lab schedule
 - Worked independently with hazardous materials and infectious organisms
 - Maintained lab safety and cleanliness to state and county standards
- **Guardian Medical Transport** **2013-14**
 - Responded to 911 emergencies by ambulance
 - Integrated with variable agencies at emergency scenes
 - Effectively communicate with patients, their families, and hospital staff
 - Documented patient contact above standards set by Guardian Medical Transport
- **“Pizza Guy” Pizza Delivery** **2012-2013**
 - Manager, cook, and driver
 - Accounting duties, supply order
 - Comedic relief

Volunteer Experience

- Flagstaff Care and Share Food Bank
- Flagstaff Soup Kitchen
- Northern Arizona Humane Society

Associations\Fraternities\Clubs

- Tau Beta Pi Engineering Honor Society (Northern Arizona University)
 - Active Member
- Center for Bioengineering Innovation (Northern Arizona University)
 - Undergraduate researcher
- Biomechatronics Laboratory (Northern Arizona University)
 - Undergraduate researcher

References

- Rick Casler
Former VP of R&D, BionX
408-921-0293
- Kiisa C. Nishikawa, Ph.D.
Director, NAU Center for Bioengineering Innovation
Regents Professor
kiisa.nishikawa@nau.edu
- Zachary Lerner, Ph.D
Director, NAU Biomechatronics Lab
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- Shawn Nittman
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