



Postdoctoral Position: Implantable Biomechatronic Muscle-Tendon Systems in Animal Models

We have an immediate opening for a Postdoctoral Research Position to work on novel implantable assistive muscle-tendon systems in animal models. The postdoctoral researcher will interact closely within our cross-disciplinary team to help test, and develop, biocompatible implantable micro-actuators and elastic tendon constructs to assist impaired walking arising from muscle weakness (performed on avian bipedal animal models).

Experimental work will be performed in Dr. Rubenson's group (Muscle Function + Locomotion Laboratory and the Biomechanics Laboratory; Kinesiology Department / Integrative and Biomedical Physiology Program) at Penn State University. Dr. Rubenson's group adopts both whole-body biomechanical and energetic analyses and muscle-level analyses using *in vivo* and computational (e.g. OpenSim) techniques. Further experimental work and training in orthopaedic surgical techniques will take place in Dr. Aynardi's group in the Dept. of Orthopaedics and Rehabilitation at Penn State's College of Medicine. The Postdoctoral researcher will work closely with partners in the Dept. of Mechanical Engineering and Dept. of Engineering Science and Mechanics at Penn State (Dr. Bo Cheng and Dr. Larry Cheng) and the School of Mechanical Engineering at Georgia Tech (Dr. Gregory Sawicki), with opportunities for training in bio- and wearable robotics and actuation, biosensing, and closed-loop control. Opportunities exist for collaborative research and training visits to Dr. Sawicki's group at Georgia Tech.

The position is part of a new Penn State Huck Institutes of Life Sciences (<https://www.huck.psu.edu/>) program partnering Penn State's College of Health & Human Development, College of Medicine, and College of Engineering, and Georgia Tech's College of Engineering.

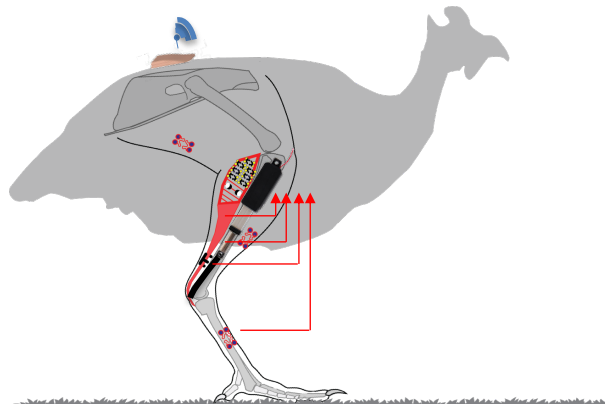
Candidates should have a PhD degree in biomedical engineering, mechanical engineering, kinesiology, orthopaedics, biology/physiology/zoology, or a related field. We seek candidates with experience in animal research with a strong biomechanical and/or orthopaedic background, and eager to learn state-of-the-art biomechatronic skills. Alternatively, those with a background in biorobotics/biomechatronics interested in exploring experimental/ *in vivo* research in animals may also apply. Strong technical skills including MATLAB programming and experience with motion analysis, *in vivo* instrumentation, cadaveric/orthopaedic analyses, and/or computational biomechanics, is highly desirable.

The appointment is initially for one year, with the potential for a second year contingent on performance and milestone assessment. We are planning for the postdoctoral position to start Sept 1, 2021, but can be somewhat flexible on the start date.

If you are interested, please send an email including a cover letter outlining your background and relevant experience, your CV, selected publications and contact information for three references to Dr. Jonas Rubenson (jonas@psu.edu) and cc. Dr. Gregory Sawicki (gregory.sawicki@me.gatech.edu).

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Synopsis



We aim to spawn a new class of adaptable biomedical implants - *embodied synthetic muscles*- to prevent loss of mobility by maintaining musculoskeletal function across the lifespan. We will implant micro-actuators that communicate with living tissues through an embedded network of biosensors. Our novel 'under-the-skin' approach moves beyond current assistive limb robotics that are worn externally, overcoming the key challenges of device nonadherence, accuracy, and adaptability to user physiology. On this platform, we will optimize load sharing between living and synthetic tissues, giving rise to regenerative robotics- a transformative solution for maintaining musculoskeletal health and preserving mobility in aging.

Project Partners

Jonas Rubenson (PI); Assoc. Prof., Kinesiology; member Integrative and Biomedical Physiology, PSU; [lab website](#).

Greg Sawicki (Co-I); Assoc. Prof., School of Mechanical Engineering and School of Biological Sciences, Georgia Tech; [lab website](#).

Michael Aynardi (Co-I); Assoc. Prof., MD, Department of Orthopaedics and Rehabilitation, College of Medicine, PSU; [lab website](#).

Bo Cheng (Co-I); Assist. Prof., Mechanical Engineering, PSU; [lab website](#).

Huanyu Cheng (Co-I); Assist. Prof., Engineering Science and Mechanics, Materials Research Institute, PSU; [lab website](#).