

Open Position: Postdoctoral Researcher

Project Title: Tissue Engineered Motor Units for Neuromuscular Modeling and Repair

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Description: Postdoctoral Researcher needed to work in the area of **Neuromuscular Engineering and Regeneration**. Major musculoskeletal trauma, such as volumetric muscle loss (VML), requires advanced regenerative therapies capable of bulk muscle tissue replacement while promoting myogenesis and neurovascular integration. The Cullen Lab is pioneering the development of Tissue Engineered Motor Units (TEMU) as a novel 3D neuromuscular construct comprising dense centimeter-scale bundles of fascicle-like, aligned myofibers fabricated through the guided self-assembly of human induced pluripotent stem cell derived skeletal myocytes with axonal inputs from discrete pools of sensory and/or motor neurons. TEMUs are a new class of 3D engineered composite soft tissue capable of serving as a biofidelic testbed to study neuromuscular development as well as an implantable substrate to replace lost muscle and augment regeneration following VML. The current project will advance this versatile platform technology by achieving key milestones for (1) Biofabrication of self-assembled centimeter-scale TEMUs, (2) Light-mediated spatiotemporal control of sensory and motor units development and function and (3) Bulk muscle replacement and functional restoration following implantation in rodent VML model.

The postdoctoral researcher will manage aspects of these studies that will include iPSC derived neural and skeletal myocyte culture, 3D bioprinting, optogenetic transduction of human cells, histology/immunohistochemistry, construct maturation and function assessment *in vitro* and *in vivo* including electrophysiology, sensory/motor effects, and real-time confocal/2-photon microscopy. Researcher will be expected to significantly contribute to technology development, study design and interpretation. Preparation of grants, conference presentations, and manuscripts will be highly encouraged.

Qualifications: A Ph.D. with focus in 3D bioprinting, stem cell culture and neural engineering, neuroscience or a closely related field is preferred. The candidate should be highly motivated with strong written and verbal communication skills, experience in data presentation and statistical analysis, and a demonstrated publication record. Attention to detail, organizational skills, and reliability are required. Project-specific training will be provided; however, experience in 3D bioprinting, optogenetics, stem cell culture, advanced microscopy, and/or neural tissue engineering is preferred. An ability to work independently as well as cooperatively with others will be essential.

Timing: *Position open immediately, with funding for up to a five-year period through an NIH grant.*

Environment: Penn Medicine and Engineering are integrated within the same campus, and this collaborative environment facilitates multidisciplinary projects crossing clinical, engineering, and basic science research – enabling our multidisciplinary approach to understanding, probing, and modulating neuromuscular system function in order to facilitate regeneration and functional restoration following neuromuscular trauma and/or degenerative disease.

Interested applicants should send their CV, a cover letter, and contact information for 3 references (including email addresses).