

## **PhD Position Available: integrative biomechanics, computational modeling, nonlinear dynamics**

The Department of Mathematics and Statistics in collaboration with the Department of Biology at Georgia State University is accepting applications for a PhD position. The project involves the computational modeling and mathematical analysis of biomechanical and neural control systems.

We are looking for an excellent and highly motivated candidate with an education in mathematics, physics, computer science, or comparable background. Previous experience in programming and an interest or experience in neuroscience is strongly desirable.

The successful candidate will join one of the two participating departments based on their experience and interests. He or she will participate in the GSU Brains and Behavior Program ([brainsbehavior.gsu.edu](http://brainsbehavior.gsu.edu)), which supports interdisciplinary research in neuroscience. Support will be nationally competitive.

Modeling the neural control of motion involves connecting very different domains of representation: for instance, between neural activity, muscle activation, joint torques and spatial motion. Typically, realistic models for each domain involve strong nonlinearities and multiple scales, and are challenging to develop in themselves. Further challenges lie in the appropriate integration of these models to create a unified model of neuromuscular control. Our goal is to understand how to create experimentally data-driven models and to integrate them effectively across the multiple domains of representation. The Department of Biology has developed an advanced simulation tool (AnimatLab) and a detailed model of the Crayfish (<http://www2.gsu.edu/~biodhe/#Research>). These are being used to study the Crayfish swim escape mechanism as a case study in integrative biomechanical modeling.

The aims of this PhD project are: (1) to develop a software interface between biomechanical simulation and model optimization algorithms; (2) to apply concepts from the theory of nonlinear dynamical systems to the model optimization process, and hence improve our ability to develop integrated biomechanical models; (3) apply these methods to a system such as the Crayfish.

For more information, please send a brief statement of research interests and experience to Dr. Robert Clewley, Dept. of Mathematics and Statistics, [rclewley \[AT\] gsu \[DOT\] edu](mailto:rclewley@gsu.edu). Applications can be made immediately. Early applications are encouraged.