# PHYSICS CAREERS

## Kinesiology

**How does the body move? This question is just one of the many that kinesiology continually asks. To learn more about kinesiology as a career, read the interview with Lisa Griffin, who teaches in the Department of Kinesiology and Health Education at the University of Texas at Austin.**

Lisa Griffin applies an electrical stimulus to a nerve in a patient's wrist. This experiment tested the best patterns of stimulation to recreate movement in paralyzed hands.

### *What training did you receive in order to become a kinesiologist?*

I received a B.Sc. degree in human kinetics with a minor in biochemistry and M.Sc. and Ph.D. degrees in neuroscience. Kinesiology typically covers motor control, biomechanics, and exercise physiology. People who work in these branches are known as neuroscientists, biomechanists, and physiologists, respectively.

### *What makes kinesiology interesting to you?*

The field of kinesiology allows me to explore how the central nervous system (CNS) controls human movement. Thus we work with people, and the findings of our work can be used to help others.

### *What is the nature of your research?*

We record force output and single motor unit firing patterns from the muscles of human participants during fatigue and training. We then use these frequency patterns to stimulate their hands artificially with electrical stimulation. We are working toward developing an electrical stimulation system that people with paralysis could use to generate limb movement. This could help many who have spinal cord injuries from accidents or brain damage from stroke.

### *How does your work address two-dimensional motion and vectors?*

I investigate motor unit firing frequencies required to generate force output from muscle over time. Thus we record muscle contraction with strain gauge force transducers, bridge amplifiers, an analog to digital converter, and a computer data acquisition and analysis program. For example, the muscles of the thumb produce force in both $x$ and $y$ directions. We record the $x$ and $y$ forces on two different channels, and then we calculate the resultant force online so that we can view the net output during contraction.

### *What are your most and least favorite things about your work?*

My favorite thing is coming up with new ideas and working with students who are excited about their work. The thing I would most like to change is the amount of time it takes to get the results of the experiments after you think of the ideas.

### *What advice would you offer to students who are interested in this field?*

Do not underestimate the depth of the questions that can be addressed with human participants.