



**Priority Statement Title:** A Bridge Between Biomechanics and Personalized Rehabilitation

**Priority Statement Code:** LF3A

**Domain:** Cross-domain

### **Priority Statement**

#### **Background and Relevance**

In current rehabilitation practice, approaches are commonly “one-size fits all” and the linkage between an individual’s neural impairment, biomechanical function, and activity/participation is, at best, ill-defined and poorly understood. Frances Collins, Director of The National Institutes of Health, advanced a view that over the next five years, the NIH has exceptional opportunities in five areas that include attempting to re-engineer the Health Care system in the United States to improve outcomes and lower costs. Dr. Collins has advanced a priority to collect data to guide clinical decisions that are based on evidence. Biomechanics is key to providing evidence to guide clinical decisions in rehabilitation. Neuromechanical frameworks for explaining impaired movements in clinical populations can link performance of an activity to an individual’s underlying impairments. Because pathologies manifest uniquely (subject-specific), there is a need to identify neurobiomechanical markers of subject-specific manifestations of impairments that are related to specific activity/participation limitations. Biomechanists need to be integrally involved in establishing a theoretical framework for clinical assessment and providing evidence that can guide personalized rehabilitation.

#### **Objectives**

- Promote rehabilitation research that is tailored to the patient rather than “one size fits all”.
- Identify neurobiomechanical markers of impairments.
- Link impairment to activity and participation.
- Recommend personalized interventions based on a myriad/hierarchy of biomechanical assessments.

#### **Recommended Actions**

- Develop tools and methods to probe the physical functioning of an individual at multiple levels to understand the underlying pathology and its impact on activity
- Develop causal models that link impairment to activity and participation.
- Identify quantifiable tasks that reveal important sensory motor skills and critical neuromotor factors essential to their performance.