

Ortiz Research Group @ MIT:

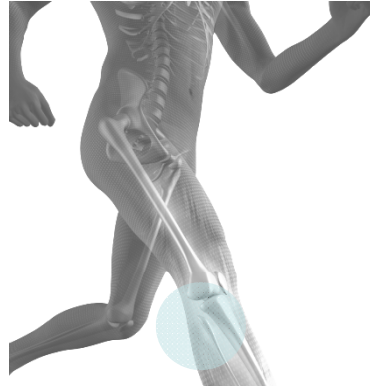
Multiscale Mechanics of Structural Biological Materials

- nanoscale forces and displacements (F, δ), constitutive laws (σ/ε)
- local, spatially-specific material properties (E, σ_y, H , energy dissipation, etc.)
 - molecular-level structure-property relationships
- novel mechanical phenomena (e.g. nanogranular friction, fracture localization, etc.)

Musculoskeletal (internal to the body)

Medical motivation:

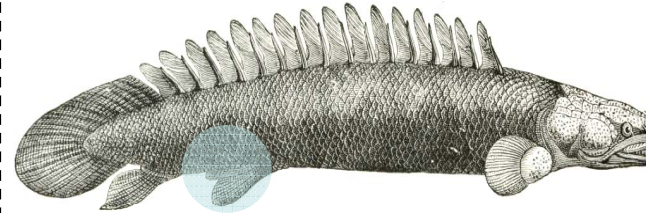
- to facilitate the development of improved clinical treatments for disease & injury through tissue repair and/or replacement → regenerative medicine / tissue engineering



Exoskeletal (external to the body)

Engineering motivation:

- bio-inspiration and guidance for improved materials for protective and structural applications



multiscale approach :

single molecules → biomimetic assemblies → single cell matrix → in-tact tissue → live animal biomechanics

Overall Objective :

A Fundamental, Mechanistic-Based Understanding of Tissue Function, Quality, and Pathology