We utilize multiscale approaches to study composition, architecture, mechanical integrity, and fracture resistance throughout the hierarchy of bone:

- To understand differences induced with disease
- To modify tissue properties to intervene
- To increase fracture resistance even if tissue is defective
- To focus on critical role collagen plays in bone health

**Pharmaceutical Treatment**

- Bisphosphonates
- Selective Estrogen Receptor Modulators (SERM)

**Multi-scale characterization**

- Bone Disease Models
  - Osteogenesis imperfecta
  - Lathyrism
  - Osteoporosis
  - Diabetes
  - Chronic kidney disease
  - Down Syndrome

**External mechanical stimulation**

- (in vitro and in vivo)
- Exercise (running)
- Tibial Limb Loading
- Fluid Flow

**Bone Bending Test**

**Atomic Force Microscopy**

**Fracture Toughness**

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