



SOUTHWEST RESEARCH INSTITUTE

## Biomechanical Testing and Materials Characterization

Southwest Research Institute® (SwRI®) offers expertise in a diverse range of biomechanical testing and material characterization techniques with state-of-the-art laboratories and instrumentation. Numerous servo-hydraulic and servo-electric materials testing systems are employed to characterize the material and mechanical properties of biological materials and biomaterials. By applying a unique suite of advanced characterization techniques at multiple length scales, SwRI engineers gain new insights into the effects of aging, drug treatment, and genetic background on musculoskeletal health and medical device performance.

### Capabilities

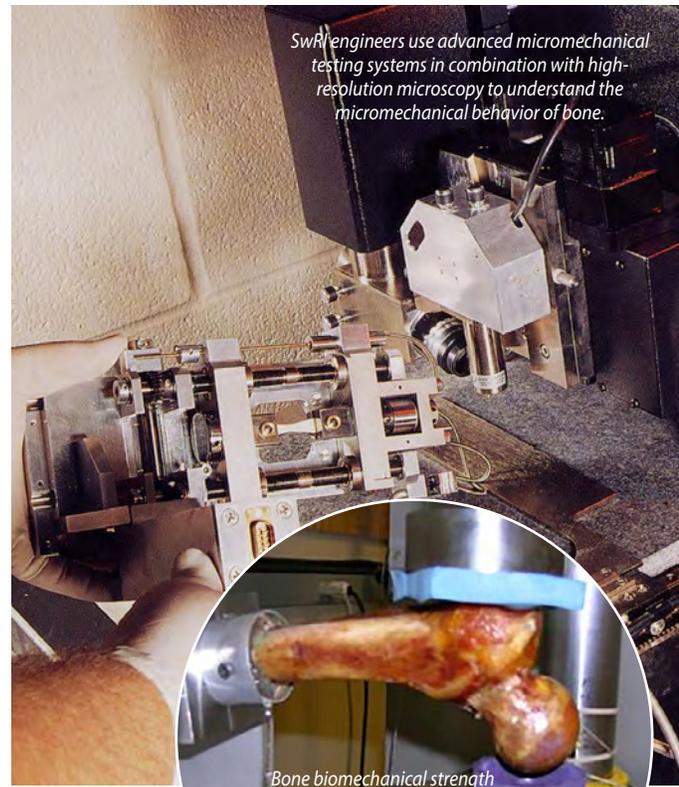
#### Biomechanical Testing

- Tension
- Compression
- Creep, relaxation
- Fatigue
- Fracture toughness
- Whole bone strength testing

#### Advanced Materials

#### Characterization

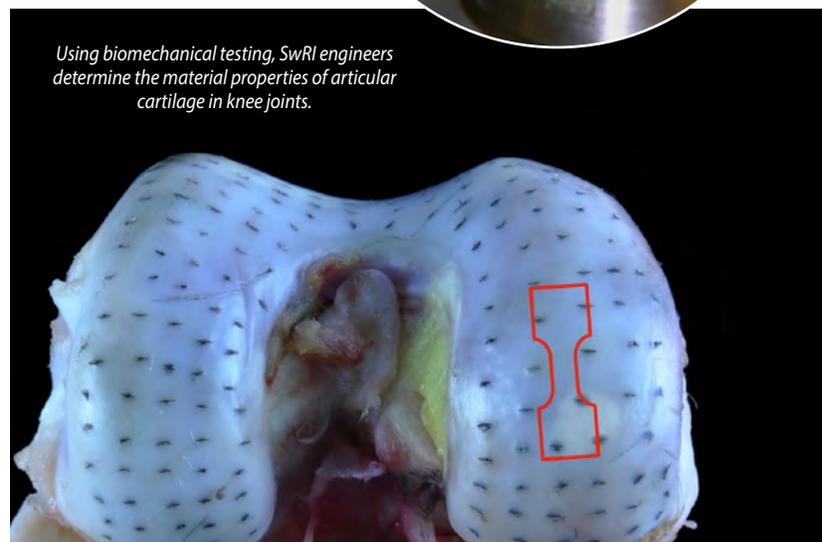
- Atomic force microscopy
- Nanoindentation
- Raman spectroscopy
- Nuclear magnetic resonance spectroscopy
- Environmental scanning electron microscopy
- X-ray diffraction
- MicroCT analysis



SwRI engineers use advanced micromechanical testing systems in combination with high-resolution microscopy to understand the micromechanical behavior of bone.



Bone biomechanical strength and structural integrity are determined using full-scale biomechanical test methods.

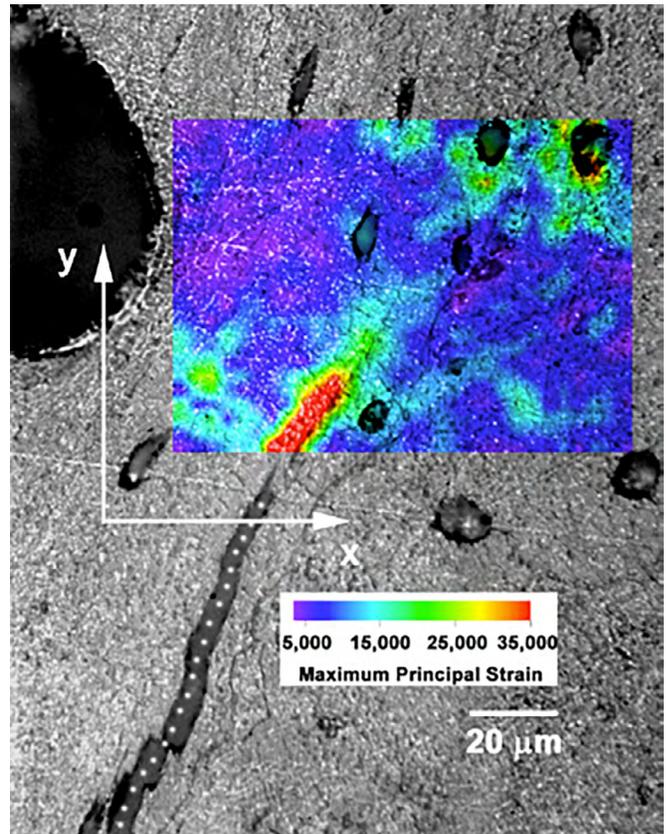


Using biomechanical testing, SwRI engineers determine the material properties of articular cartilage in knee joints.

## Applications

SwRI's biomechanics engineers develop and apply advanced computational and unique experimental techniques to address a variety of musculoskeletal biomechanics-related problems, including:

- Osteoporosis
- Osteoarthritis
- Bone fracture risk
- Musculoskeletal injury risk
- Musculoskeletal implant failure risk



*SwRI pioneered the use of advanced microscopybased biomechanical testing and analysis to investigate the micromechanical basis of bone fracture.*

**We welcome your inquiries.**

**For more information, please contact:**

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## SOUTHWEST RESEARCH INSTITUTE

Southwest Research Institute<sup>®</sup> is a premier independent, nonprofit research and development organization. With eleven technical divisions, we offer multidisciplinary services leveraging advanced science and applied technologies. Since 1947, we have provided solutions for some of the world's most challenging scientific and engineering problems.

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