The Mission of the Experimental Biomechanics Core (EBC) is to provide collaborating investigators with state-of-the-art equipment and trained personnel to facilitate mechanical testing and measurement of mechanical properties of biological and man-made materials, structures, and constructs.

The Vision for the EBC is to be a self-contained, fully supported experimental Core facility, with trained staff and fully maintained state-of-the-art equipment to support research activities as described in the Mission.

Mission & Vision

High Force Testing

MTS 858 MiniBionix
Two of these mechanical testing systems are available for high force testing (N – kN) – single overload and cyclic modes. An extensometer, strain gauges and a high speed infrared camera may be used concurrently for accurate displacement measurement of test coupons.

Impact testing
Two impact test systems: Instron Drop Tower and a Via Systems pneumatic impactor (shown). These systems provide impact forces, decelerations and energy absorption during impact events.

Low Force Testing

Bose Testbench
This mechanical testing system is useful for test conditions that require low forces (gm – N) & small deformations (microns – mm). A non-contact strain measurement system and dynamic mechanical analysis (DMA) are also available.

MTS G200 Nanoindenter
This system uses a Berkovitch diamond indenter tip to probe surfaces of materials, providing hardness and modulus at a micron scale. Features include continuous stiffness measurement (CSM) and topographical mapping of output measures.

Wear Testing

AMTI Orthopod Friction & Wear Tester
This 6-station pin-on-disk device is programmable to allow variable forces and wear patterns for submerged specimens in a heated bath. Friction coefficients are provided by three triaxial load cells, which allows for screening of new materials for total joint replacement & other applications.

Example Projects & Collaborators

Impact characterization of new composites – Uday Vaidya, PhD, Material Science & Engineering
Characterization of mouse cartilage in an osteoarthritis mouse model – Rosa Serra, PhD, Pathology
Wear testing of nanostructured diamond coatings for TMJ implants – Yogesh Vohra, PhD, Physics
Nanoindentation properties of bone-implant interfaces – Jack Lemons, PhD, Dentistry
Characterization of IGF-1 knockout mouse bones in 3-point bending – Tom Clemens, PhD, Pathology
Effects of repeated insertion on pull-out strength in metaphyseal bone – Brent Ponce, MD, Orthopedic Surgery

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Dept. of Biomedical Engineering
School of Engineering
Division of Orthopedic Surgery

Fee Structure & Contact Info

Full day, equipment only (except Orthopod): $200
Half day, equipment only (except Orthopod): $100
Full day Orthopod: $50
Half day Orthopod: $25
Training/instruction (Eberhardt) $77/hr
Training/assistance (graduate student) $15/hr

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