Biomechanics & Implants

Flinders Medical Devices & Technologies

Researching, Developing, Applying and Commercialising Medical Devices & Technologies

Flinders Medical Devices and Technologies (FMDAT) is a network of multi-disciplinary researchers, highly skilled in the development and application of a diverse range of medical technologies.

FMDAT’s collaborative approach to research allows for the development and delivery of innovative solutions and services. This makes us an ideal single site for product development and testing – taking projects from fundamental concepts right through to clinical trial.

The Biomechanics & Implants program includes basic and applied research in the broad field of joints, soft tissues, bones and implants. The group studies the behaviour of soft tissues, bones and ligaments at the nano-, micro- and macro-scopic levels, with some projects using computational and mathematical modelling and experimental validation of these methods.

Facilities include a state-of-the-art hexapod robot which allows us to simulate measured three-dimensional joint motions that lead to a variety of applications. These include:

- Mapping the structure-function relationships of normal and diseased tissue.
- Comparing healthy with diseased tissue.
- Understanding how joints function.

Relative motion can also be measured between implants and bone at the micrometer resolution level – to less than one-tenth the width of a strand of human hair, having a width of 100 microns.

Current research projects in the Biomechanics & Implants program include:

- Nanomechanical tensile behaviour of collagen type I in spinal disc tissue.
- Computer modelling and experimental validation of osteoporotic/fragile bone mechanical properties at the microscale and design of an improved screw for osteoporotic fracture fixation.
- Development of a micro-finite element model of the disc using sub-modelling techniques.
- Measurement of internal disc tissue strains during repetitive spinal movements that place discs at risk of herniation injury.
- Realistically simulating the in-vivo knee loading conditions using the hexapod robot after measuring knee motion in a kinematic gait analysis system.
- Investigations into improved methods for anterior cruciate ligament (knee) reconstruction and repair.
- Development of a mathematical model to accurately describe the viscoelastic behaviour of the disc.

inspiring achievement

www.flinders.edu.au
Why work with an FMDAT member?

- Benefit from expertise of researchers and clinicians from Flinders University, Flinders Medical Centre and the Repatriation General Hospital.
- Gain access to a variety of facilities and services.
- Tap into a network of contacts from around the world.
- Benefit from shared experience in R&D and commercialisation.
- Benefit from the credibility of University based research.

Financial benefits and opportunities for industry members

- Access to Federal Government R&D tax incentives (subject to satisfying eligibility criteria).
- Ability to leverage your R&D spend through a variety of additional grant funding bodies such as the Australian Research Council (ARC) Linkage, National Health and Medical Research Council (NHMRC), AusIndustry and others.
- Opportunity to kick-start your project through the Medical Device Partnering Program (MDPP).

Benefits to FMDAT members

- Greater engagement with both end-users and industry.
- Benefit from a unified and streamlined approach to medical device research.
- Increased relevance of research and the opportunity for new challenges.
- Stronger links to industry resulting in increased opportunities for co-applications to funding bodies.

FMDAT includes more than fifty researchers and clinicians from Flinders University, Flinders Medical Centre and the Repatriation General Hospital who collaborate in research, development, application and commercialisation of medical devices and technologies to benefit the community. The network provides expertise in several related areas, including Assistive Technologies, Biomechanics & Implants, Health Informatics, Medical Devices & Instrumentation, Medical Signals & Imaging and Medical Simulation & Modelling.

Facilities available

- Ability to undertake pre-clinical and clinical trials
- Biomechanical materials testing laboratory
- CORe Surgical Facility
- Flinders Microscopy
- Fully equipped electronic and mechanical workshops
- Hexapod robot technology
- 3D Rapid Prototyping

Services available

- Contract research services
- Collaborations / Partnerships
- Expert advice and consultancy

Further information

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