The Medical Signals & Imaging research group uses signals and images to gain a better understanding of the living human body, to better diagnose diseases, to allow better intervention, and better monitoring of disease state or the effect of treatment.

Well known signals include electrocardiograms (ECG) to measure the activity of the heart and electroencephalograms (EEG) to record brain activity, but modern techniques allow measurements of a wide variety of properties of the skin, blood, and endocrine system, to provide more complete information.

Image data includes X-rays, computed tomography (CT) scans, positron emission tomography (PET) scans, magnetic resonance imaging (MRI), ordinary visual images, and a variety of multidimensional data arrays that blur the boundary between images and signals.

Research within FMDAT includes theoretical work on processing signals and images such as: Multi-modal and multi-channel signal processing; Image segmentation; Image understanding; Signal and image representation; Machine learning; Hardware design; Clustering; Visualisation; and Human–computer interaction.

Current research projects in the Medical Signals & Imaging program include:

- **Early detection of breast cancer** — Computer programs are being developed to assist radiologists in interpreting screening mammograms with the objective of detecting breast cancer sooner, and hence, reduce the morbidity and mortality due to this disease.

- **EEG for Epilepsy** — This work involves the development of algorithms and software for analysis of EEG with the aim to learn the mechanisms of epileptogenesis, and seek clinical benefits in the diagnosis and treatment of epilepsy.

- **Enhanced brain and muscle signal separation verified by electrical scalp recordings from paralysed awake humans** — Development of algorithms to separate brain signals from muscle signals in electrical recordings from the scalp. Clearer brain signal measurement enables improvements in understanding how the brain works, the diagnosis and management of neurological diseases, and the development of brain-controlled devices for very disabled people.

- **Heart rate variability** — Investigation into heart rate variability in an attempt to identify the effect of opioids on airway tone.

**inspiring achievement**

[www.flinders.edu.au](http://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

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