

# MedTech Flagship: Assistive Technologies

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Assistive technologies integrate and translate knowledge from engineering, design, rehabilitation and health psychology to develop solutions that work for the people who need them

**Our vision is to couple personalised data with computational models and appropriate behavioural change to enable those experiencing disability to manage their own long-term health, and reduce the burden of health care.**



# Who are our team members?



**THE UNIVERSITY OF AUCKLAND**  
NEW ZEALAND

**Thor Besier**  
Angus McMorland  
Winston Byblow  
Iain Anderson  
Andrew Taberner  
Bryan Ruddy



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**Paula Kersten**  
Nicola Kayes  
Duncan Babbage  
Brian Robinson  
Stephen Reay  
Dave Parry

**CallaghanInnovation**

**Marcus King**  
Kit Wong  
Gregor Neumayr

**Industry partners**



**I Measure U** **StretchSense™**



**Im-Able**  
Independence through mobility

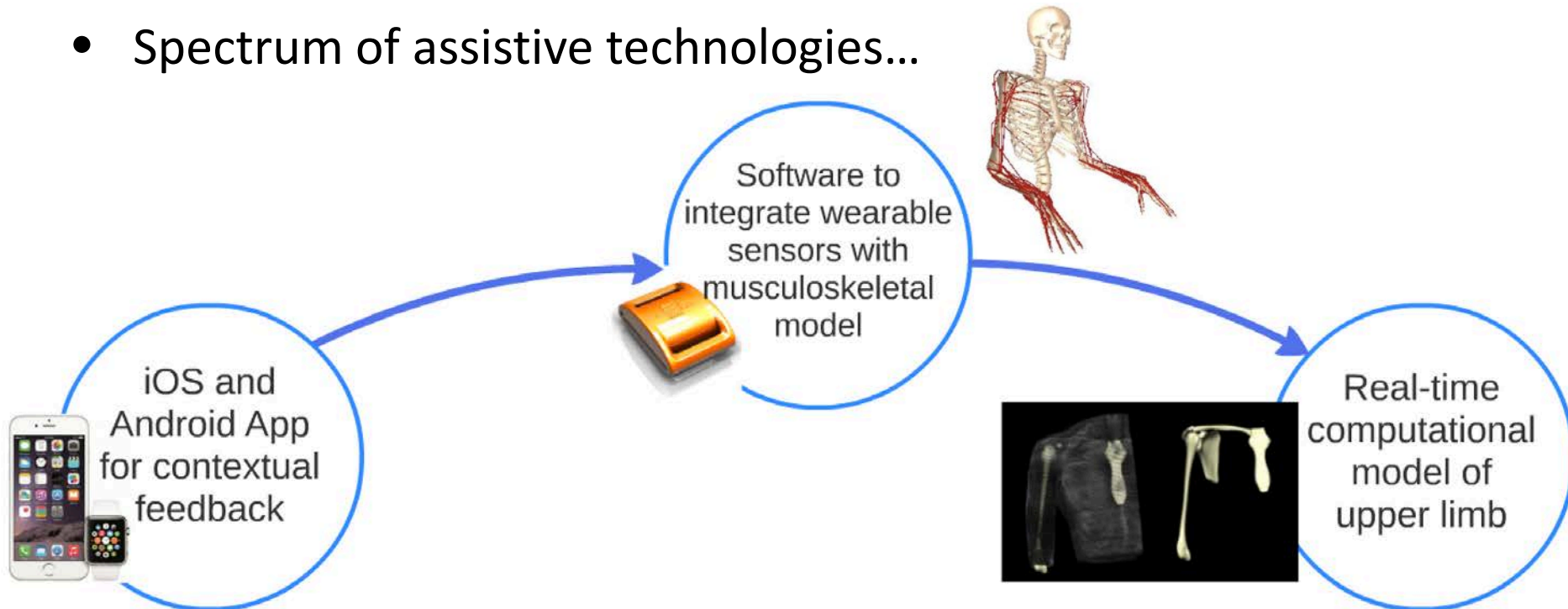


**VICTORIA**  
UNIVERSITY OF WELLINGTON  
TE WHARE WĀNANGA  
O TE ŌPOKO O TE IKA A MĀUI

**Edgar Rodriguez**  
Kah Chan Will Browne

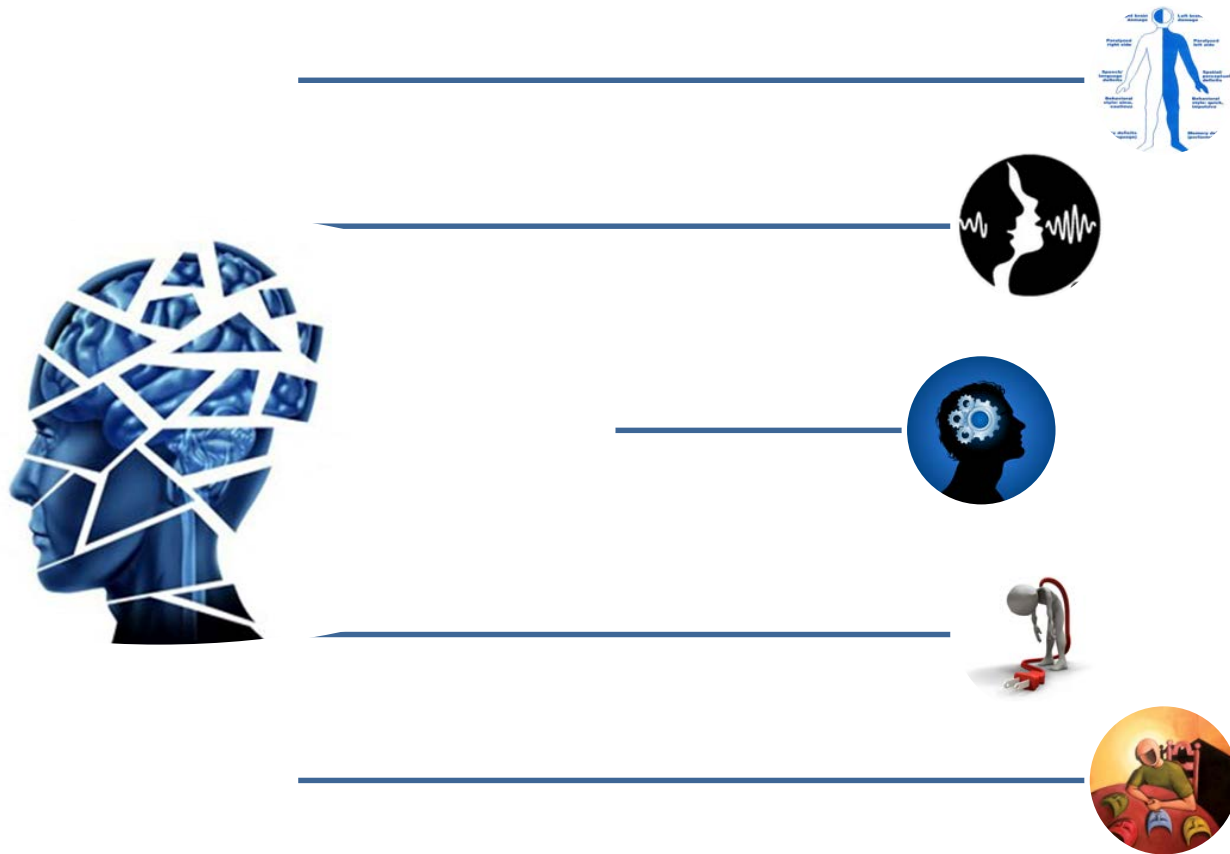
# What healthcare problem do we address?

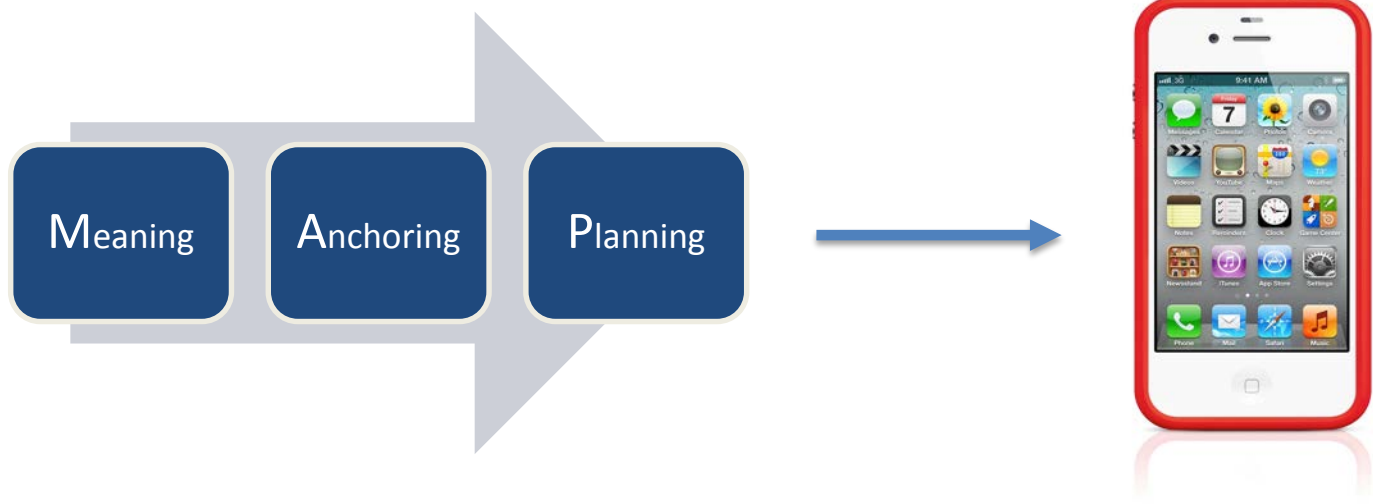
- Patients recovering from stroke and traumatic brain injury
  - Facilitating engagement and behavioural adaptation
  - Measure and monitor movement in the home
  - Improve rehabilitation strategies to maximise recovery
  - Facilitate and accelerate rehabilitation using robotic exoskeletons
- Spectrum of assistive technologies...



## Engagement and behavioural adaptation

*A smart phone App to facilitate engagement in rehabilitation and develop skills for managing long-term health and well-being*





## Measuring and monitoring motion

*A software platform that integrates low-cost wearable sensors with computational models of the musculoskeletal system*



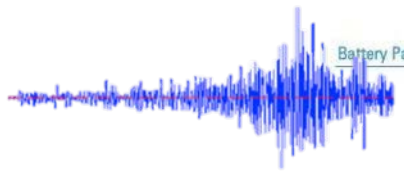
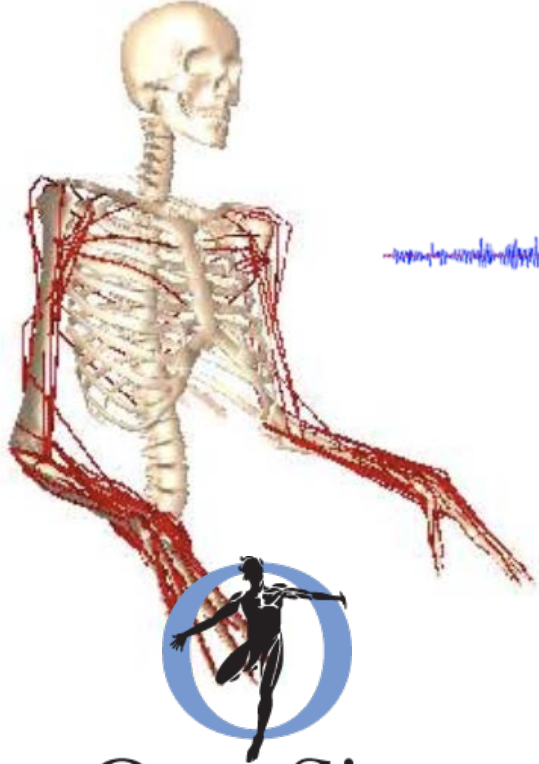


OpenSim

## Controlling robotic exoskeletons

*A real-time computational model of the upper limb that uses muscle synergies from EMG to predict forces and motion*

HAL



Power Units for upper limb (+Angle Sensor)

Battery Pack

Power Units for lower limb (+Angle Sensor)

Control Unit on back

Bio-electric Signal Sensors

Floor



# What are the challenges?

## *Technical*

- Mobile computing power
- Bluetooth bandwidth
- Modelling the shoulder

## *Clinical*

- A complex neurological population
- Bridging
  - Technology and health
  - Researchers, clinicians and patients
- Ensuring the solution fits the problem

