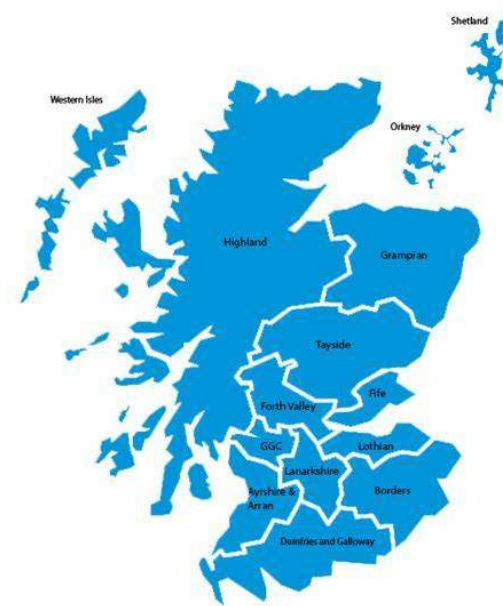


Rehabilitation Engineering at the SMART Centre

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MEng (Hons), MIPEM

SMART Centre - South East of Scotland Mobility and Rehabilitation Technology Centre (Lothian, Fife and the Borders)



- WestMARC Glasgow
- TORT Centre Dundee

- MARS Aberdeen
- Clinical Technology Service Inverness

Healthcare Scientists

- SMART centre
 - Healthcare Scientists
 - Clinical Scientists
 - Clinical Engineering
 - **Rehabilitation Engineering**
 - **Biomechanics**

Healthcare Scientists

- SMART centre
 - Environmental Control Service
 - Gait Analysis Service
 - Custom Design Service
 - Wheelchair and Special Seating
 - Prosthetics, Orthotics, Podiatry
 - Disabled Living Centre
 - Driving Assessment, Blue Badge

Environmental Controls

What is an environmental control system?

A system, which provides a means for people with disabilities to remotely control and operate electronic and electrical equipment that are part of the system within the living environment and is intended to enable users to function as independently as possible regardless of disability and environment.

Technical aids for disabled persons – environmental control systems for daily living EN ISO 16201:2006

Access/input method

Part of the system person physical activates i.e. switch



Controller

Receiving unit – handles information from input and sends output to target device.



Target Devices

Safety - Community alarm, pager, telephone

Security - intercom, door lock, door opener

Comfort - Fan, lamp, heater, electrically tilting bed/armchair

Entertainment - Smart TV, set-top box, apps, computer/tablet

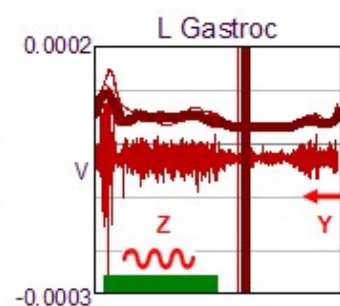
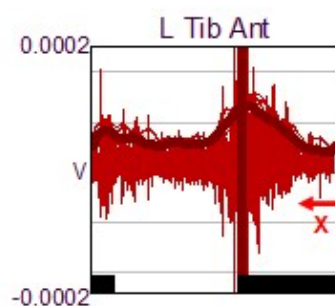
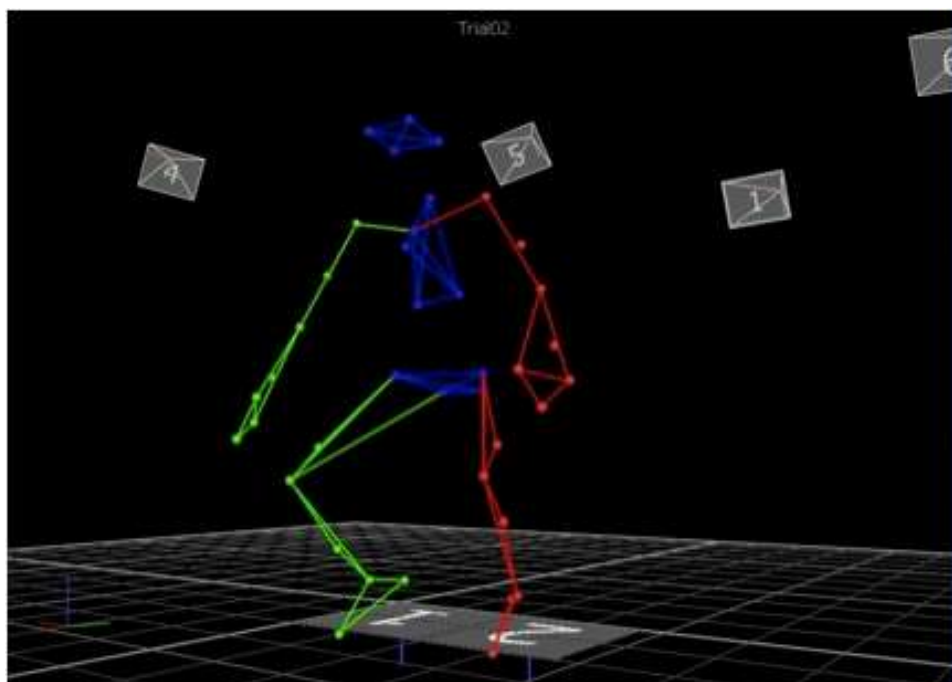


Gait Analysis

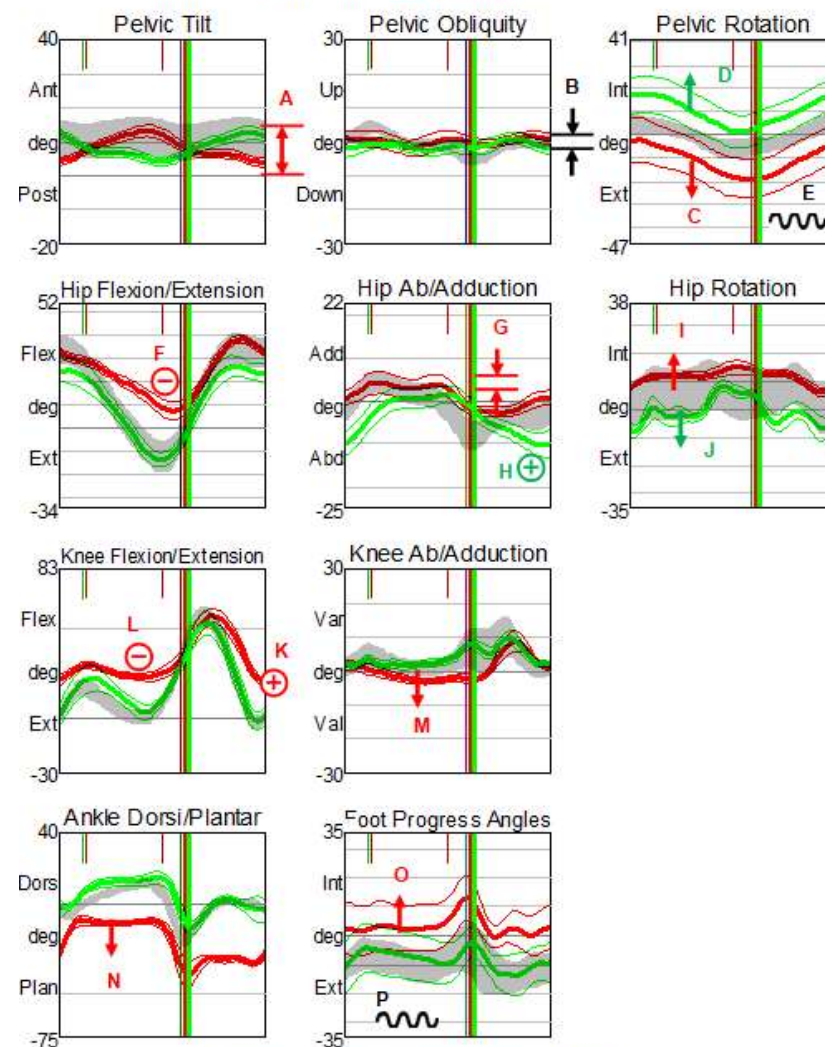
- We collect a wide range of biomechanical data including:
 - 3D optical motion capture
 - 2D video
 - Wireless electromyography (EMG)
 - Force plate data
 - Physical assessment data (range of motion, muscle strength, and tone)



- We then use the data to analyse a patient's gait (the pattern of movement of the limbs) to guide surgeons, orthotists and prosthetists, physiotherapists and consultants on appropriate interventions.



Barefoot mean kinematics Left vs. Right vs. normal

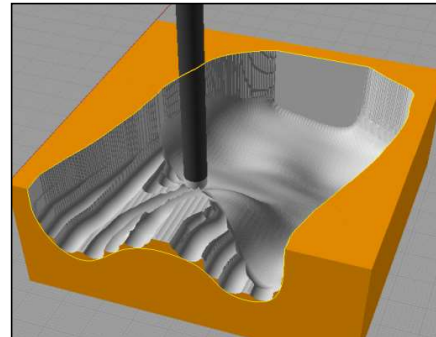
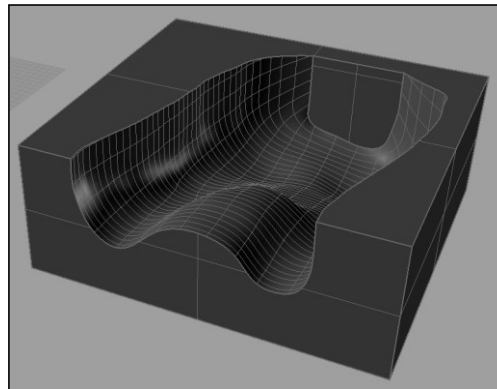
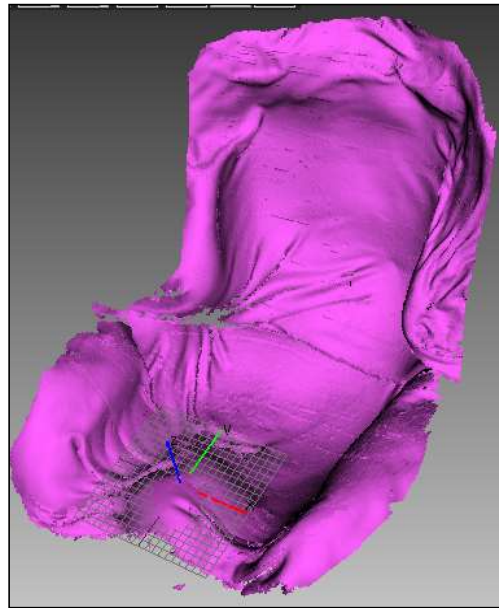


Avg 8-16 Normals (8-16 Normals 2017 v2.pxd)

Left Barefoot-MEAN (Barefoot-MEAN) Right Barefoot-MEAN (Barefoot-MEAN)

Wheelchair and Special Seating

- Provides a service to nearly 20,000 adults and 2,000 children across Lothian, Fife and Borders.
- Special wheelchair seating is required to manage posture for non-ambulant individuals with neurological conditions.
- The postural decision: accommodate or correct or both.
- Designing and building the seating the easy bit – the interaction between the service user / seating unit with the service user's social, functional and environmental needs brings about the challenge.



Custom Design Service

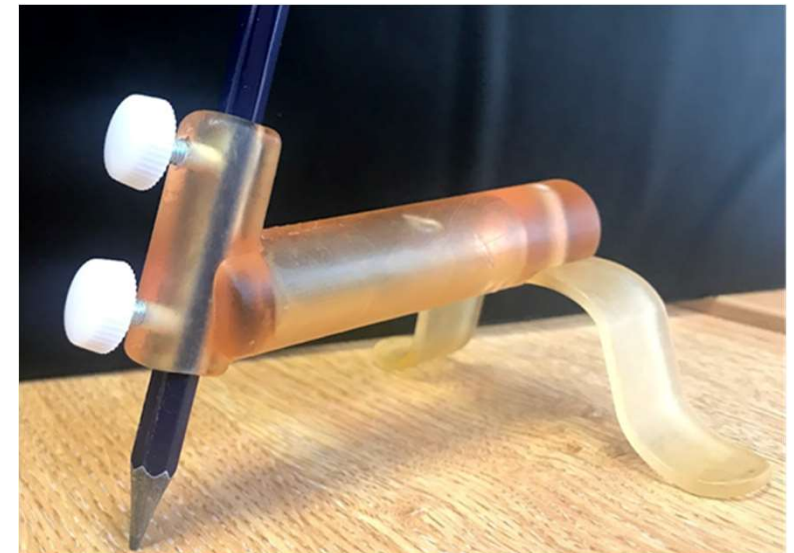
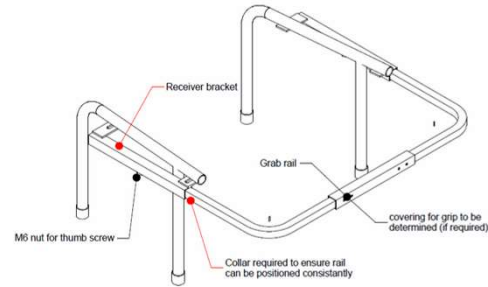
Custom design or **Modified** equipment where commercially available equipment is not available.

Objective:

Assist people in meeting their rehabilitation aims within **home** and **workplace** or to facilitate **established leisure interests**.

Mainly involved with the following categories of equipment:

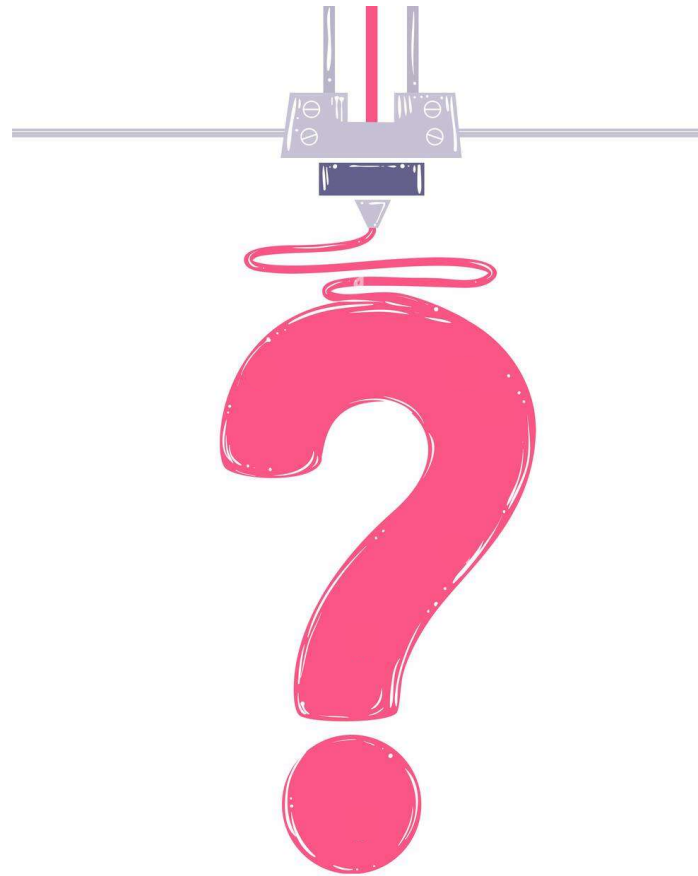
- **Aids for Daily Living** e.g. equipment for eating, drinking and care.
- **Mobility aids** e.g. walkers.
- **Therapeutic equipment** e.g. sleeping support, armchair supports.



Custom solutions and in-house manufacturing



Any Questions?



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