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The future of wound measurements - 3D printing and scanning

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# The future of wound measurements

ISiIP  
3D - Technologies

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## Overview

- Technologies
  - Textiles
  - Multi-disciplinary Innovation
  - 3D printing product
- Innovation – prototypes, innovation, projects/research
  - Wiggle bag
  - Paxman cooling cap
  - 21<sup>st</sup> Century Medical Bag
  - TSB project (Orthox, 3T, Cardiff University)
- The challenge of measurement

## Technologies

### 3D Printing and knitting ADA

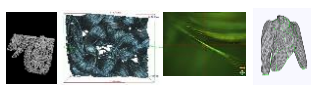


10gg Shima Seiki FIRST (wholegarment knitting machine)



ZCorp 650  
ZBuilder Ultra  
Stratasys Fortus FDM 360  
Projet 5500x – prints flexible materials

### 3D visualisation software



Computerized Tomography Scan (CT), Infinite focus Microscopy (IFM) 3D Microscopy, X-Ray Florescence (XRF) – chemical composition (Calvet, Power, Ryall, Bills - 2014)

Test sculpture for pattern making experiment by MA Postgraduate students (Taylor and Univer, 2013)

## “Wigglebag”

### Harness to improve well-being of children with cancer

- Ergonomically designed
- Comfort / functionality/ dignity
- Stylish
- Antibacterial



## Paxman cap

Dr Unver worked with product Design team on externally funded Paxman cap design and manufacturing. This project currently being patented.

Paxman required new innovative, low cost and mass manufacturable of new caps. To challenge this, Paxman engaged the expertise of researchers at two of the University of Huddersfield’s academic schools. Initially funded by an Innovation Voucher from Kirklees Council, Paxman started working with the School of Applied Sciences, using its cutting-edge cell biology techniques to help identify the mechanisms that govern patients’ variable responses to scalp cooling. Following additional funding from [Knowledge Transfer Partnership](#) (KTP) and [Technology Strategy Board](#) (TSB) grants and from the Collaborative Ventures Fund at the University, the School of Art, Design and Architecture then joined the team to investigate the design of the scalp cooling cap



## Cartilage repair



### TSB project (Orthox, 3T, Cardiff University)

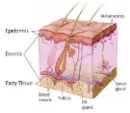
“Development of single protein fibre matrix composites for high performance cartilage repair devices” [Silkworm silk technologies for cartilage repair](#)



The knitted structure lays in the device to enable sutures to be anchored through the textile structure to the bone.

## Why is measurement important?

- Assessing functionality and performance
  - Wound healing
  - Integrity
  - Risk
  - Device development

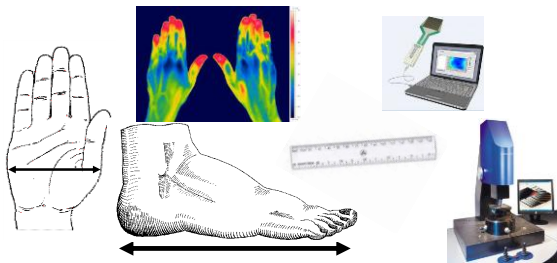


- Barrier
- Contact
- Support
- Delivery

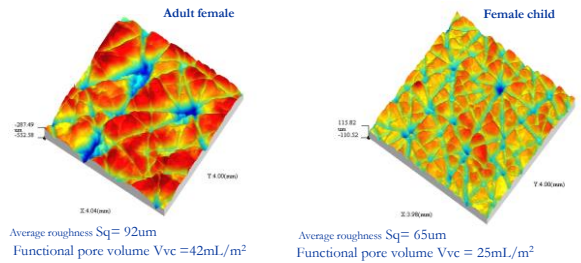
## Measurement of Skin Integrity

- Contact – Pressure, area
- Condition – Texture, moisture, temperature, integrity
- Performance – Hydration, absorption, elasticity, strength
- Interaction – Pressure, shear, friction, temperature

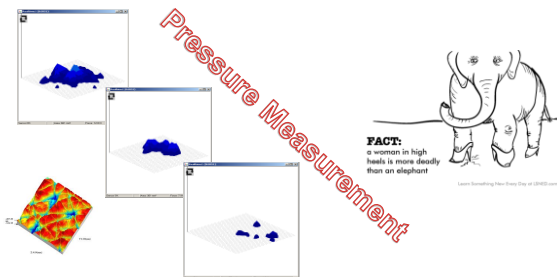
## Measurement



## Measurement of skin texture



## Assessing Pressure Care



## Assessing Pressure Care





- Integrity of the system
- Scale of the accuracy
- Repeatability
- Reliability
- Non-standard geometry (free form surfaces)
- Varying textures
- Hydrated surfaces
- Infection prevention
- Standardisation
- .....etc