



**EPSRC-NIHR HTC Partnership Award: Medical Devices and Vulnerable Skin  
Network - Optimising Safety in Design**

**26<sup>th</sup> November 2014**

**Programme and Agenda**

Registration from 10am in the Herb Garden with coffee and pastries

**MORNING SESSION: LORD SELBORNE ROOM**

**Partners in the Medical Devices and Vulnerable Skin Network (MDVSN)**

**chaired by Professor Dan Bader**

**10:45 University of Southampton – Professor Dan Bader, Professor of Bioengineering and Tissue Health**

**Synopsis:**

- Motivation for the Network
- Research directed towards the maintenance of Skin Health at the University of Southampton
- Examples of current collaborative projects involving medical devices and vulnerable skin
- Future opportunities for collaborations within the Network

**11:10 Kings College London –Dr Patricia Grocott, Reader in Palliative Wound Care**

**Synopsis:**

- King's contribution to the Network draws on four components of a Programme of Research: participatory research design; a model of user engagement in medical device design and development; n-of-1 research design for proof of concept testing; advanced mobile digital technology and patient recorded outcomes
- An exemplar project: Wound care for Epidermolysis Bullosa (WEB)
- Project outline: Prophylactic device retention systems for infants suffering from Epidermolysis Bullosa

**11.30 NIHR Healthcare Technology Co-operative for Devices for Dignity – Dr Nicola Heron  
Programme Manager**

**Synopsis:**

- An overview of Devices for Dignity; explaining how the HTC's can combine key factors for successful healthcare technology innovation
- Case studies of successful collaborations delivering new medical devices
- Initial ideas for clinical needs of potential interest for this network

**11.50 NIHR WoundTec Healthcare Technology Co-operative - Professor Peter Vowden,  
Clinical Director and Senior Vascular Surgeon.**

**Synopsis:**

- The impact of wounds
- What is WoundTec HTC
- How is WoundTec aiming to make a difference to wound care

**12.10 Jo Milnes Consultancy – Jo Milnes: An industrial perspective on the state-of-the-art  
in medical device design and the impact on the end user.**

**Synopsis:**

- Drivers for Development
- Impacts of the constraints that use in a hospital/clinical environment requires
- The Balancing act

**12.30 – 13.30 LUNCH AND NETWORKING - HERB GARDEN**

**AFTERNOON SESSION: LORD SELBORNE ROOM**

Technology Themes, chaired by Professor Dan Bader

**13.30**            **Improving Wound Management Through Measurement - Professor Graham Machin, Fellow and Head of Temperature Standards, National Physical Laboratory (NPL)**

**Synopsis:**

- Improving wound management through measurement
- The key to managing and preventing wounds is informed decision making based on sound and reliable measurements.
- The talk will describe a number of innovative measurement methods investigated at NPL in the field of wounds; these span the whole range of issues including wound prevention in vulnerable skin (diabetic foot ulcers), tissue scaffolding and biomarker measurement in wounds to dimensional (volume) measurement of wounds to monitor the healing process.

**14:00**            **The role of Computational Modelling - Dr Georges Limbert, Lecturer in Mathematical Modelling in Biotribology, University of Southampton**

**Synopsis:**

- Material and structural properties of the skin
- Modelling techniques for skin biophysics
- Applications: skin wrinkles, skin interactions with external devices, biomimetics

**14.30**            **Medical Device Designs – Dr Javier Munguia, Design, Manufacture and Materials research Group, School of Mechanical and Systems Engineering, Newcastle University.**

**Synopsis:**

- Trends and medical applications of additive manufacturing
- Recent applications relevant to the vulnerable skin theme
- Work undertaken at Newcastle and the MeDe centre

**15.00**            **The role of Physiological Sensing – Prof Steve Morgan, Professor of Biomedical Engineering, University of Nottingham**

**Synopsis:**

- Optical blood flow imaging and monitoring
- The integration of optical fibres and textiles for physiological and biochemical monitoring
- The application of fibre optic sensing in intensive care units

**15.30**            **Summary and closing remarks – Dr Peter Worsley, Senior Research Fellow, University of Southampton**

**16: 00**            **Tea, biscuits and networking - Herb Garden**

## Speaker Biographies

### **Professor Dan Bader, Professor of Bioengineering and Tissue Health, University of Southampton**

Professor Dan L Bader BSc, MSc, PhD, DSc studied Physics at Liverpool University, followed by an MSc in Medical Physics and a PhD at Southampton University. He moved to the Oxford Orthopaedic Engineering Centre, University of Oxford, where his research focused on engineering aspects of pressure ulcer prevention. He later moved to Queen Mary, University of London (QMUL) as a lecturer in biomaterials and a core academic in the IRC in Biomedical Materials. In 1999, he was appointed Professor of Medical Engineering in the Department of Engineering (QMUL).

In 2011, he joined the Faculty of Health Sciences at the University of Southampton to lead the Skin Health research group. Since 2000, he has been a Part-Time Professor in Soft Tissue Remodelling at Eindhoven University of Technology, the Netherlands. He is Editor-in-Chief of Journal of Tissue Viability

Research interests:

- Development of screening techniques to assess soft tissue susceptibility to pressure-induced damage.
- Design of novel support surfaces and medical devices at the patient-body interfaces
- Biomechanics of soft tissues in health and disease at different hierarchical levels;
- Quantifiable imaging of soft tissues
- Biomechanical conditioning of cell seeded constructs for tissue engineering

### **Dr Patricia Grocott, Reader in Palliative Wound Care, Kings College London**

Dr Patricia Grocott PhS BSc(Hons DipN (Lon) RGN is a Reader in Palliative Wound Care King's College London. Patricia is working on a programme of translational research involving the co-design and development of medical devices and systems of care for people who are vulnerable to skin damage.

The focus is on using patients' and clinicians' experiences of devices and healthcare systems to identify their shortfalls and to work with patients, designers and industry to co-design devices and systems to meet personal needs and the needs of health care systems and providers.

### **Dr Nicola Heron Programme Manager, NIHR Healthcare Technology Co-operative for Devices for Dignity**

Nicola is the Programme Manager for the NIHR Devices for Dignity Healthcare Technology Cooperative (D4D). She gained her PhD in Organic Chemistry in Boston, US in 1998 and joined AstraZeneca Pharmaceuticals where she specialised in oncology and osteoarthritis; and was involved in range of drug discovery and pre-delivery programmes. Nicola joined D4D in 2009.

In her role as Programme Manager she is responsible for the operational leadership of this national initiative. Nicola had over 17 years' experience of healthcare research across both the private and public sector, with broad experience in both pharmaceutical and medical technology R&D.

She has published over 45 research papers and patent and is a member of the Sheffield Children's Hospital Research and Innovation Board. Nicola has recently completed an executive MBA, with a special interest in new product development and adoption within the medical technology field.

**Professor Peter Vowden, Clinical Director and Senior Vascular Surgeon, NIHR WoundTec Healthcare Technology Co-operative**

Professor Vowden is senior surgeon in the Department of Vascular Surgery at the Bradford Royal Infirmary and Clinical Director of The NIHR Healthcare Co-operative for Wound Prevention and Treatment at Bradford Teaching Hospitals NHS Foundation Trust. He is currently Visiting Professor in Wound Healing Research at the University of Bradford. His research interests include wound measurement, vascular assessment, wound diagnostics, wound debridement, and compression therapy. He has published widely on wound care and has authored several book chapters on wound management. He is a Past President of The European Wound Management Association and is still actively involved in the Association.

He is currently Chair of the National Advanced Wound Care Group, a specialty interest group within the UK's Knowledge Transfer Network. He serves on the editorial board of a number of wound care journals including International Wound Journal, The Journal of Wound Care, and Wounds UK. He has been actively involved in both EWMA Position Documents and the World Union of Wound Healing Societies Consensus Statements and in 2010 he was awarded The Medilink Beacon Award acknowledging his outstanding contribution to wound care. Professor Vowden has recently been appointed as the Medical Director for the charity "Woundcare4Heros"

**Jo Milnes, Jo Milnes Consultancy**

Jo set up Jo Milnes Ltd Consultancy in May 2013, having previously spent seventeen years in technical textiles manufacture and research. During this time she developed an unusual range of skills that bridge research, manufacturing, regulatory and marketing areas.

Jo has been actively involved in the NPUAP Standards group and chairs the BHTA Working Group for Mattress standards. She has also been active in liaising with the UK competent authority on the impact of REACH, and the Environment Agency on Process Guidance notes.

**Professor Graham Machin, Fellow and Head of Temperature Standards, National Physical Laboratory (NPL)**

Graham has a BSc (Hons) in Physics with Astrophysics from Birmingham University and a DPhil from Oxford University in the field of high energy astrophysics. He is head of the NPL Temperature and Humidity Group, chairs the Euramet Technical Committee for Thermometry (TC-T), represents the UK on the Consultative Committee of Thermometry (CCT) and IMEKO TC12, chairs the CCT Noncontact thermometry group, is a member of EPSRC Physical Sciences Strategic Advisory Team, serves on the Institute of Measurement and Control Council and contributes to a number of other committees.

He has published 150+ technical papers and given numerous talks on temperature related topics. He has been a guest researcher to NMIJ (Japanx2), NIST (USA) and NIM (Chinax3). He holds visiting Professorships at the University of Valladolid, Spain and the University of South Wales. He is a Fellow of the Institute of Physics and of the Institute of Measurement and Control and was awarded the 2012 InstMC Callendar medal for innovations in temperature measurement.

Current research interests are primary thermometry (acoustic and radiometric), radiation thermometry and thermal imaging, new thermocouples, self-validation methods, reliable temperature measurement in hostile environments, clinical thermometry (contact, non-contact and internal) and sensing methods for improved wound management.

**Dr Georges Limbert, Lecturer in Mathematical Modelling in Biotribology, University of Southampton**

Georges Limbert is a Lecturer in Mathematical Modelling in Biotribology at the University of Southampton (Faculty of Engineering and the Environment) and an Honorary Senior Lecturer at the University of Cape Town (South Africa) (Department of Human Biology, Faculty of Health Sciences). His current research focuses on the modelling of skin biophysics, the continuum mechanics of biological soft tissue structures and biomaterials and novel computational techniques for thin structures. Georges has expertise in non-linear continuum/computational mechanics and the formulation of constitutive models for biomaterials, biological tissues and structures. In this capacity, he acts as a consultant for Fortune 500/FTSE 100 and SME companies (consumer goods, cosmetics, pharmaceuticals, biomedical, law, software).

Georges holds Masters in Engineering Mechanics, Theoretical Mechanics and a PhD in Computational Biomechanics. He is a Chartered Engineer, Fellow of the Institution of Mechanical Engineers (IMechE) and board member of its Engineering in Health and Medicine Division since 2004.

**Dr Javier Munguia, Design, Manufacture and Materials research Group, School of Mechanical and Systems Engineering, Newcastle University.**

Dr Munguia is part of the Design, Manufacture and Materials research group at the School of Mechanical and Systems Engineering (Newcastle University). His current work is focused on the design of medical devices for the arthroscopic delivery of bioactive materials; this research is undertaken within MeDe-Centre for Innovative Manufacturing in Medical Devices (<http://mede-innovation.ac.uk>).

Dr Munguia is also part of the Centre for Doctoral training in Additive Manufacturing @Newcastle (<http://www.nottingham.ac.uk/additivemanufacturing>) One of his main interest is the practical application of Additive Manufacturing to a wide range of fields from medical and bio-mechanics to engineering design and consumer products. Overall research activities encompass materials characterization, machinery design, test-bench design, fatigue/long cycle materials tests, 3D CAD design and analysis and design optimization. And in general all activities pertaining to digital manufacturing.

**Prof Steve Morgan, Professor of Biomedical Engineering, University of Nottingham**

Stephen Morgan is Professor of Biomedical Engineering at the University of Nottingham. Since 1992 he has investigated novel optical techniques for imaging and sensing of tissue using techniques such as laser Doppler flowmetry, acousto-optic imaging and hyperspectral imaging. His research involves the development of novel optical devices to monitoring tissue for applications such as wound healing and regenerative medicine.

He is one of the developers of a laser Doppler blood flow imaging device currently sold by Moor Instruments, UK. His other main research interest is currently fibre optic sensors for use in photonic textiles and in monitoring in intensive care units.