ENGINEERING
THE UPPER LIMB

12–13 December 2016
One Birdcage Walk, London

Biomedical Engineering Association
Conference

More details available at
www.imeche.org/upperlimb
WHY ATTEND ENGINEERING THE UPPER LIMB
12–13 December 2016
One Birdcage Walk, London

INDUSTRY, ACADEMIA AND CLINICAL PRACTICE UNITE ON THE LATEST WORK IN UPPER LIMB SURGERY AND REHABILITATION AND DIAGNOSTIC TECHNOLOGIES.

With the increased urbanisation of society and a growing, ageing, population, upper limb pathology, including conditions of ageing, trauma, and neurological conditions, are increasing in number and clinical significance.

The numbers of joint replacements and soft-tissue surgical procedures have increased dramatically over the past decade, advances in prostheses have resulted in headlines heralding the new age of robotic hands, and rehabilitation technologies, including functional electrical stimulation, are used routinely and extensively.

Interaction between engineers and clinicians is vital to enhance surgical execution, design, functionality and rehabilitation technologies.

Engineering the Upper Limb brings together key leaders in upper limb research: from industry, academia and clinical practice, both from the UK and internationally, to provide a forum on the future development of devices and technologies for the treatment of upper limb pathologies.

KEY TOPICS COVERED INCLUDE:
- Hand
- Wrist
- Elbow
- Shoulder
- Soft tissue surgery
- Arthroplasty
- Rehabilitation
- Functional electrical stimulation
- Prostheses and orthoses
- Rehabilitation robotics and assistive technology

WHY ATTEND:
- Understand the latest development in joint replacement and soft-tissue surgical procedures
- Hear about advances in prostheses including the new age of robotic hands and rehabilitation technologies, including functional electrical stimulation, and how they are used
- Address key orthopaedic challenges facing clinicians and engineers including ageing patients, trauma and neurological conditions, and how they are being addressed

ORGANISING COMMITTEE
Biomedical Engineering Association
The Institution of Mechanical Engineers

MEMBERS CREDITS:
Anthony Bull,
Head of the Department of Bioengineering
Imperial College London

Ed Chadwick,
Senior Lecturer - Biomedical Engineering,
Keele University

Jonathan Jeffers,
Senior Lecturer - Department of Mechanical Engineering
Imperial College London

Peter Reilly,
Consultant Orthopaedic Surgeon
Imperial College NHS Trust
### DAY 1

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<td>10:00</td>
<td><strong>REGISTRATION AND REFRESHMENTS</strong></td>
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<tr>
<td>10:20</td>
<td><strong>CHAIRS OPENING REMARKS</strong> – ANTHONY BULL, IMPERIAL COLLEGE LONDON</td>
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<td><strong>CHAIR</strong> – ED CHADWICK, KEELE UNIVERSITY</td>
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<tr>
<td>10:30</td>
<td><strong>KEYNOTE</strong> – PROFESSOR RORY O’CONNOR</td>
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<td></td>
<td>Head of the Section of Rehabilitation Medicine, University of Leeds</td>
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<tr>
<td>11:20</td>
<td><strong>QUESTION AND ANSWER SESSION</strong></td>
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<tr>
<td>11:30</td>
<td><strong>HAND FUNCTION ASSESSMENT OF PATIENTS WITH STROKE THROUGH REDUCE KINEMATICS ANALYSIS</strong></td>
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<tr>
<td></td>
<td>Speaker: Veronica Gracia-Ibanez, UJI Castellón</td>
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<tr>
<td></td>
<td>Authors: Veronica Gracia-Ibanez, Joaquin L Sancho-Bru, Margarita Vergara, Denis Mottet, Isabelle Laffont, Karima Bahkti</td>
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<tr>
<td>11:40</td>
<td><strong>IN VIVO QUANTIFICATION OF THE DART THROWERS MOTION OF THE WRIST FOR REHABILITATION</strong></td>
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<td>Speaker: Vasiliki Vardakastani, Imperial College London</td>
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<tr>
<td></td>
<td>Authors: Vasiliki Vardakastani, Angela E Kedgley</td>
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<tr>
<td>11:50</td>
<td><strong>QUANTIFICATION AND VISUALIZATION OF UPPER LIMB JOINT COORDINATION DURING NON-CYCLIC MOTION</strong></td>
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<td>Speaker: Richard Fineman, Massachusetts Institute of Technology</td>
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<td></td>
<td>Authors: Richard Fineman, Leia Stirling</td>
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<tr>
<td>12:00</td>
<td><strong>SEMI-ACTIVE ORTHOSIS WITH PROPORTIONAL INTEGRAL CONTROL IMPLEMENTATION FOR SUPPRESSION OF UPPER LIMB PATHOLOGICAL TREMORS</strong></td>
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<td></td>
<td>Speaker: Ihtisham Qasim Kalimullah, BITS Pilani, Dubai</td>
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<tr>
<td></td>
<td>Authors: Ihtisham Qasim Kalimullah, Mohammed Shamroukh, Alan Chacko, Shreya Sharad Barlingay, V.Kalaichelvi</td>
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<tr>
<td>12:10</td>
<td><strong>SHOULDER PAIN AND FUNCTION IN PROFESSIONAL WHEELCHAIR TENNIS PLAYERS</strong></td>
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<td>Speaker: M Warner, University of Southampton</td>
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<tr>
<td></td>
<td>Authors: Warner M.B., Wilson, D, Heller, M.O, Wood, D, Webborn, N, Veeger, V.E.J, Batt, M.</td>
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<tr>
<td>12:20</td>
<td><strong>MIRROR MOTOR ACTIVITY IN CHILDREN WITH HEMIPLEGIC CEREBRAL PALSY AND ITS EFFECT ON UPPER LIMB FUNCTION</strong></td>
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<td>Speaker: Habiba Yasmin, Kings College London</td>
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<tr>
<td></td>
<td>Authors: Habiba Yasmin, Adam P Shortland, Monica Silva</td>
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<tr>
<td>12:30</td>
<td><strong>LUNCH</strong></td>
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<tr>
<td>13:20</td>
<td><strong>KEYNOTE</strong> – PROFESSOR DARIO FARINA</td>
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<td></td>
<td>Founding Director, Institute of Neurorehabilitation Systems, University Medical Center Gottingen, Georg-August University, Germany</td>
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<td>14:10</td>
<td><strong>SIMULATED GRIPPING WITH A REAL-TIME MUSCULOSKELETAL HAND MODEL: APPLICATION TO PROSTHESIS CONTROL</strong></td>
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<td>Speaker: Edward K Chadwick, Keele University</td>
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<td></td>
<td>Authors: Edward K Chadwick, Dimitra Blana, Amartya Ganguly, Antoine J van den Bogert, Wendy M Murray</td>
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<td>14:20</td>
<td><strong>THE REALITY OF USING A MYOELECTRIC PROSTHESIS</strong></td>
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<td>Speaker: Alix Chadwell, University of Salford</td>
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<td></td>
<td>Authors: Alix Chadwell</td>
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<tr>
<td>14:30</td>
<td><strong>DESIGN CONSIDERATIONS WHEN DEVELOPING UPPER LIMB PROSTHESSES</strong></td>
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<td>Speaker: Martin Wallace, Steeper Group</td>
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<td>Authors: Martin Wallace</td>
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<tr>
<td>14:40</td>
<td><strong>3D PRINTED ANTHROPOMORPHIC HAND AND EXPERIMENTAL EVALUATION SYSTEM FOR HAND PROSTHESSES</strong></td>
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<td>Speaker: Immaculada Liop-Harillo, UJI Castellón</td>
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<td>Authors: Immaculada Liop-Harillo, Antonio Perez Gonzalez</td>
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For the most up-to-date and detailed programme for the event, please visit: [www.imeche.org/upperlimb](http://www.imeche.org/upperlimb)

- This programme is subject to change.
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### Day 1

**14:50**  
**CLASSIFICATION AND DECOMPOSITION OF EMG SIGNALS USING ARTIFICIAL NEURAL NETWORKS**  
Speaker: R. Vepa, Queen Mary University  
Authors: S Shams, M. H. Shaheed, R. Twycross-Lewis, R. Vepa

**15:00**  
**NETWORKING REFRESHMENT BREAK**

**15:30**  
**KEYNOTE – BERNHARD GRAIMANN**  
Head of Translational Research, Ottobock

**16:00**  
**EMG-TRIGGERED SURFACE FES FOR ARM REACHING IN TETRAPLEGIA**  
Speaker: Dimitra Blana, Keele University  
Authors: Dimitra Blana, Neil Postans, Simon Pickard, Edward K Chadwick

**16:30**  
**CLOSED-LOOP FUNCTIONAL ELECTRICAL STIMULATION FOR UPPER-LIMB REHABILITATION FOLLOWING STROKE**  
Speaker: Ed Hodkin, Newcastle University  
Authors: Ed Hodkin, Isabel Glover, Dr Hrishikesh Kumar, Prof Helen Rodgers, Dr Andrew Jackson

**16:40**  
**TETRAGRIP: A FOUR CHANNEL FES DEVICE FOR IMPROVING THE HAND FUNCTIONS FOR PEOPLE WITH C5/C6 TETRAPLEGIA**  
Speaker: Lalitha Venugopalan, Bournemouth University  
Authors: Lalitha Venugopalan, Dr Paul Taylor, Dr Jon Cobb, Prof Ian Swain

**16:50**  
**FES-UPP – A NOVEL FUNCTIONAL ELECTRICAL STIMULATION SYSTEM TO SUPPORT UPPER LIMB FUNCTIONAL TASK PRACTICE FOLLOWING STROKE**  
Speaker: Kenney, L, University of Salford  

**17:00**  
**END OF DAY 1**

### Day 2

**08:30**  
**REGISTRATION AND REFRESHMENTS**

**09:00**  
**ORTHOPAEDIC UPPER LIMB**  
**CHAIR - TBC**

**09:00**  
**KEYNOTE – ROGER EMERY**  
Ethical development of a shoulder prosthesis

**09:50**  
**DEVELOPMENT OF A TOTAL ELBOW REPLACEMENT SYSTEM FOR DOGS: CHALLENGES OF CANINE VS HUMAN TERT**  
Speaker: Paul Smithithwaite, Osteogen  
Authors: Paul Smithithwaite, John Innes, Rob Pettitt

**10:00**  
**WEAR TESTS OF A CONTEMPORARY TOTAL SHOULDER REPLACEMENT IN A UNIQUE SHOULDER SIMULATOR**  
Speaker: Simon Smith, Newcastle University  
Authors: Tom Joyce, Simon Smith

**10:10**  
**PROSTHETIC GLENOID FIXATION: LATERALISATION OF THE CENTRE OF ROTATION OF A FIXED-FULCRUM TOTAL SHOULDER REPLACEMENT IS NOT ASSOCIATED WITH SUBOPTIMAL GLENOID BONE FORMATION DURING A FUNCTIONALLY-RELEVANT LOADING PROTOCOL**  
Speaker: S Lambert, De Montfort University  
Authors: K Chin, S Taylor, G Blunn, S Lambert

**10:20**  
**SURGICAL RECONSTRUCTIONS FOLLOWING TRAPEZIECTOMY: COMPARISON USING A PHYSIOLOGIC WRIST SIMULATOR**  
Speaker: Shah, D.S, Imperial College London  
Authors: Shah, D.S, Middleton, C, Gurdezi, S, Horwitz, M, Kedgley, A

**10:30**  
**NETWORKING REFRESHMENT BREAK**

**11:00**  
**ORTHOPAEDIC UPPER LIMB**  
**CHAIR - TBC**

**11:00**  
**KEYNOTE – ANDREW HOPKINS**  
Zimmer

**11:50**  
**THE HUMAN HAND: A UNIQUE CHALLENGE FOR MUSCULOSKELETAL MODELLING**  
Speaker: Angela E Kedgley, Imperial College London  
Authors: Angela E Kedgley
12:00  TOPOGRAPHICAL EVALUATION OF PYROLYTIC CARBON FINGER PROSTHESIS  
Speaker: Andrew Naylor, Newcastle University  
Authors: Andrew Naylor, Martin Bone, Sumedh Talwalkar, Ian Trail, Grey Giddins, Thomas J Joyce  

12:10  GLENOID COMPONENT FOR ANATOMICAL SHOULDER ARTHROPLASTY  
Speaker: Diogo Geraldes, Imperial College London  
Authors: Diogo Geraldes, Ulrich Hansen, Andrew A Amis  

12:20  QUANTIFYING THE CRITICAL SIZE OF A GLENOID OSEOUS DEFECT CAUSING ANTERIOR SHOULDER INSTABILITY  
Speaker: Christian Klemt, Imperial College London  
Authors: Christian Klemt, Daniel Nolte, Peter Reilly, Erica Di Federico, Anthony M J Bull  

12:30  LUNCH  

UPPER LIMB BIOMECHANICS/ KINEMATICS  
CHAIR – ED CHADWICK  

13:30  KEYNOTE – DR. WENDY MURRAY  
Associate Professor, Northwestern University and Director, Applied Research in Musculoskeletal Simulation (ARMS), Rehabilitation Institute of Chicago  

14:20  BALL VELOCITY AND UPPER LIMB JOINT MOMENTS IN FASTBALL PITCHING  
Speaker: Xavier Gasparutto, Delft University of Technology  
Authors: Xavier Gasparutto, Erik van der Graaf, Dirkjan Veeger, Frans van der Helm  

14:30  FROM THE YOUNG TO THE ELDERLY: PROSPECTIVE STUDY INVESTIGATING MUSCULOSKELETAL MODELLING OF SITTING AND STANDING  
Speaker: Samuel Smith, Imperial College London  
Authors: Samuel Smith, Peter Reilly, Anthony M J Bull  

14:40  DOMINANCE AND AGE VARIATIONS IN THE UPWARD ROTATION OF THE SCAPULA IN YOUTH ELITE BASEBALL PITCHERS  
Speaker: Erik Van der Graaf, VU Amsterdam  
Authors: Erik Van der Graaf, Femke van Dil, Xavier Gasparutto, Bengt Kom, Marco Hoozemans, Dirkjan Veeger  

14:50  DO SIMULATED MOVEMENTS OF THE UPPER-LIMB REPLICATE FUNCTIONAL DAILY LIVING ACTIVITIES?  
Speaker: Aliah Shaheen, University of Surrey  
Authors: Aliah Shaheen, Sarah Taylor, Angela Kedgley, Alexander Humphries  

15:00  NETWORKING REFRESHMENT BREAK  

UPPER LIMB BIOMECHANICS/ KINEMATICS  
CHAIR - TBC  

15:30  JOINT CONSTRAINTS AND MARKER SET TO ACCURATELY ESTIMATE SCAPULA KINEMATICS  
Speaker: Benjamin Michaud, Université de Montréal  
Authors: Benjamin Michaud, Alexandre Naaim, Raphael Dumas, Mickael Begon  

15:40  IMPACT OF WHEELCHAIR CONFIGURATIONS ON UPPER BODY BIOMECHANICS OF MANUAL WHEELCHAIR USERS  
Speaker: Hassanain Ali Lafta, Cardiff University  
Authors: Hassanain Ali Lafta, Robert Guppy, Gemma Whatling, Cathy Holt  

15:50  MUSCULOSKELETAL MODEL BASED CHARACTERISATION OF COMPENSATORY MOVEMENTS IN FUNCTIONAL PROSTHETIC ARM USAGE  
Speaker: Vikranth Nagaraja, St Hilda’s College, University of Oxford  
Authors: Vikranth Nagaraja, Jeroen H Bergmann, Michael S Andersen, Mark S Thompson  

16:00  CHAIRS CLOSING REMARKS  
16:15  END OF EVENT  

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<td>Member, Supporting organisation</td>
<td>£368.00</td>
<td>£73.60</td>
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<td>Student/Retired</td>
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<td>Non-member</td>
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<td>Care/Clinician</td>
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2. Email: eventenquiries@imeche.org
3. Phone: +44 (0)20 7973 1251

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Manufacturing Group, Coventry

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