

ENGINEERING THE KNEE: INNOVATION AT THE INTERFACES FOR IMPROVED SURGERY AND REHABILITATION

Institution of
**MECHANICAL
ENGINEERS**

Biomedical Engineering Association
Conference

10–11 December 2018
One Birdcage Walk, London

KEY SPEAKERS INCLUDE:

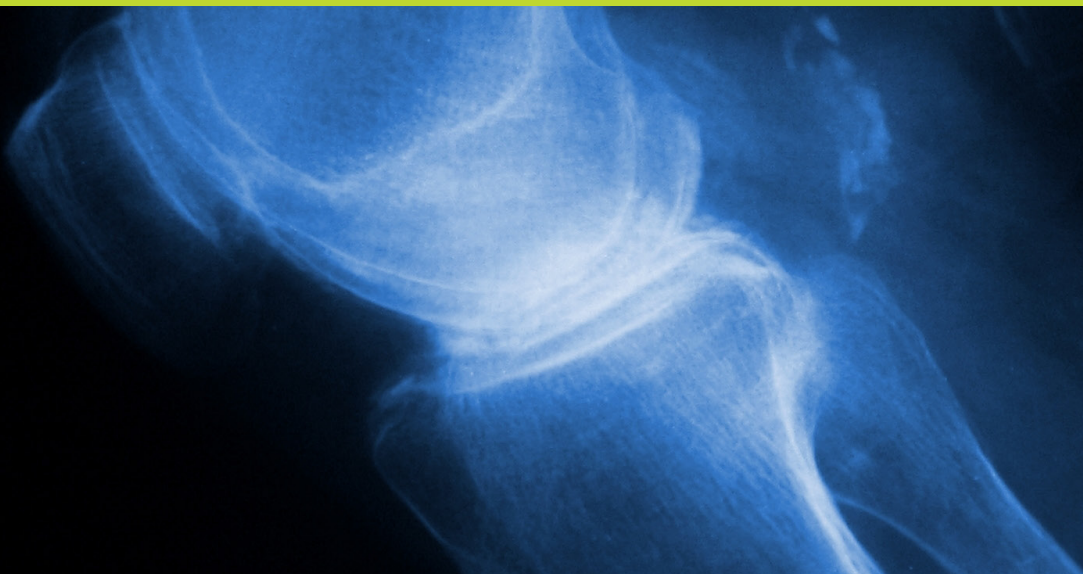
Dave Henson MBE, Department of Bioengineering,
Imperial College London

Nick Bishop, Professor of Biomechanics,
Hamburg University of Applied Sciences

Justin Cobb, Chair in Orthopaedic Surgery,
Imperial College London

Richie Gill, Deputy Head, Department of Mechanical
Engineering, **University of Bath**

Ruth Wilcox, Professor of Biomedical Engineering,
University of Leeds



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PROGRAMME

MONDAY, 10 DECEMBER 2018

08:30	REGISTRATION AND REFRESHMENTS
09:00	CHAIR'S WELCOME AND OPENING REMARKS
	NEW METHODS: TISSUE FUNCTION
09:20	KEYNOTE ADDRESS: USING 3D IMAGING TO DETERMINE THE EFFECT OF MEDICAL DEVICES ON BONE AND SOFT TISSUE STRAINS Alex Dickenson, University of Southampton
09:40	QUESTION AND ANSWER SESSION
09:50	THREE-DIMENSIONAL IMAGING TECHNIQUES FOR ARTICULAR CARTILAGE REGENERATION Jeff Clark, Imperial College London
10:00	DEVELOPMENT OF PRE-CLINICAL TEST METHODS FOR ASSESSING FUNCTIONAL PERFORMANCE OF OSTEOCHONDRAL GRAFTS IN THE TIBIOFEMORAL AND PATELLOFEMORAL JOINTS Louise M Jennings, University of Leeds
10:10	QUESTION AND ANSWER SESSION
	PRE-CLINICAL ANALYSIS
10:20	KEYNOTE ADDRESS: THE ROUTE TO MARKET, PAST PROBLEMS AND THE NEW MDR +/- BREXIT Keith Tucker, Beyond Compliance
10:40	QUESTION AND ANSWER SESSION
10:50	AN ALL-POLYMER TOTAL KNEE REPLACEMENT Louise M Jennings, University of Leeds
11:00	THIRD BODY WEAR OF UHMPWE-ON-PEEK-OPTIMA™ Raelene M Cowie, University of Leeds
11:10	QUESTION AND ANSWER SESSION
11:25	NETWORKING REFRESHMENT BREAK
	NEW METHODS: JOINT FUNCTION
11:55	KEYNOTE ADDRESS: KNEE MODELLING Ruth Wilcox, University of Leeds
12:15	QUESTION AND ANSWER SESSION
12:25	4D CT-BASED ANALYSIS OF KNEE KINEMATICS Andre Attard, University of Strathclyde
12:35	THE CLASSIFICATION OF KNEE REHABILITATION EXERCISES USING LOWER LIMB ACCELEROMETER DATA Philippa Jones, Cardiff University
12:45	DEVELOPMENT OF A FULLY 3D MUSCULOSKELETAL MODEL WITH PREDICTIVE MUSCLE ACTIVATION Junyan Li, Middlesex University
12:55	QUESTION AND ANSWER SESSION
13:10	NETWORKING REFRESHMENT BREAK
	HTO VS PARTIAL VS TOTAL KNEE
14:10	KEYNOTE ADDRESS: NANOMATERIALS FOR HIERARCHICAL COMPOSITES Richie Gill, University of Bath
14:30	QUESTION AND ANSWER SESSION

For the most up-to-date and detailed programme for the event, please visit:
www.imeche.org/knee

- This programme is subject to change.
- The Institution is not responsible for the views or opinions expressed by individual speakers.

PROGRAMME

14:40	COMBINED EFFECT OF WIDE STANCE GAIT AND HIGH TIBIAL OSTEOTOMY ON KNEE ADDUCTION MOMENT IN PATIENTS WITH VARUS KNEE DEFORMITY Jake Bowd, Cardiff University
14:50	COMBINED PARTIAL KNEE ARTHROPLASTY IS ASSOCIATED WITH MORE NORMAL GAIT AND HIGHER PATIENT SATISFACTION THAN TOTAL KNEE ARTHROPLASTY Amy Garner, Imperial College London
15:10	QUESTION AND ANSWER SESSION
15:25	NETWORKING REFRESHMENT BREAK
	DIAGNOSIS & SURGICAL TECHNIQUE
15:55	KEYNOTE ADDRESS: JOINT SPARING KNEE ARTHROPLASTY - HOW DETAILED DIAGNOSES DRIVE PATIENT SPECIFIC SURGERY Justin Cobb, Imperial College London
16:15	QUESTION AND ANSWER SESSION
16:25	KNEE MECHANICS OF ROBOTIC ASSISTED UNICOMPARTMENTAL KNEE ARTHROPLASTY IN COMPARISON TO CONVENTIONAL METHODS AT A FIVE-YEAR FOLLOW UP Lindsay Millar, University of Strathclyde
16:35	USE OF THE FLOW 50 WEREWOLF RADIOFREQUENCY COBLATION DEVICE WITHIN THE KNEE; CLINICAL INDICATIONS, SURGICAL EXPERIENCE AND PATIENT OUTCOME James R Murray, Southmead Hospital, Bristol UK
16:45	IMAGE-FREE HANDHELD ROBOT FOR TOTAL KNEE ARTHROPLASTY - LEARNING CURVE AND ALIGNMENT ASSESSMENT Alan Rossington, Smith & Nephew
16:55	QUESTION AND ANSWER SESSION
17:10	END OF DAY 1

TUESDAY, 11 DECEMBER 2018

08:30	REGISTRATION AND REFRESHMENTS
09:00	CHAIR'S WELCOME AND OPENING REMARKS
	KNEE RECONSTRUCTION
09:10	KEYNOTE ADDRESS Dave Henson MBE, Department of Bioengineering, Imperial College London
09:30	QUESTION AND ANSWER SESSION
	SOFT TISSUE TKA
09:40	A NEW GEOMETRIC RATIO FOR LIGAMENT BALANCING IN ANTERIOR AND POSTERIOR REFERENCED TKA Carl Imhauser, New York Hospital for Special Surgery
09:50	EXPERIMENTAL SIMULATION MODEL OF THE NATURAL PORCINE KNEE: THE EFFECT OF VARIATION IN DIFFERENT LIGAMENOUS CONSTRAINTS ON JOINT MECHANICS Aiqin Liu, University of Leeds
10:00	THE KINEMATICS AND WEAR OF A TOTAL KNEE REPLACEMENT UNDER DIFFERENT SOFT TISSUE CONDITIONS Helena Johnston, University of Leeds
10:10	QUESTION AND ANSWER SESSION
10:30	NETWORKING REFRESHMENT BREAK
	OATECH NETWORK

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11:00	OATECH NETWORK SESSION Speakers include: Cathy Holt, Cardiff University Philip Rowe, University of Strathclyde Deborah Mason, Cardiff University
12:30	NETWORKING LUNCH
	IMPLANT FIXATION AND IMPACTION
13:30	KEYNOTE ADDRESS: IMPLANT ANCHORAGE IN BONE Nick Bishop, Hamburg University of Applied Science
13:50	QUESTION AND ANSWER SESSION
14:00	DEVELOPMENT OF AN INTRA-OPERATIVE TIBIAL CEMENT FIXATION TEST PROTOCOL Ioan Cracaoanu, Research and Test Engineer, DePuy Synthes
14:10	ADDITIVE MANUFACTURED IMPLANT FIXATION Richard van Arkel, Imperial College London
14:20	SURGICAL INSTRUMENTS UNDER IMPACT LOADING: DESIGN, ANALYSIS, AND TESTING METHODS Mark Reason, DePuy Synthes
14:30	AN IN-VITRO MODEL OF IMPACTION IN ARTHROPLASTY Ruben Doyle, Imperial College London
14:40	QUESTION AND ANSWER SESSION
15:00	NETWORKING REFRESHMENT BREAK
	RETRIEVALS AND WEAR
15:30	KEYNOTE ADDRESS: IMPLANT RETRIEVAL ANALYSIS AND THE THINGS WE CAN LEARN Richard Cook, University of Southampton
15:50	QUESTION AND ANSWER SESSION
16:00	A SURFACE TOPOGRAPHICAL ANALYSIS OF RETRIEVED KNEE REPLACEMENT PROSTHESES Emma Kennard, Newcastle University
16:10	KINEMATICS, MECHANICS AND WEAR PERFORMANCE OF A TOTAL KNEE REPLACEMENT UNDER DIFFERENT INTERNATIONAL STANDARDS ORGANIZATION (ISO) CONTROL REGIMES AND SIMULATION INPUTS Abdellatif Abdelgaied, University of Leeds
16:20	ASSESSMENT OF RETRIEVED OXINIUM PATELLOFEMORAL PROSTHESES Shannen Chacko Rajan, Newcastle University
16:30	QUESTION AND ANSWER SESSION
16:50	END OF DAY 2

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ENGINEERING THE KNEE: INNOVATION AT THE INTERFACES FOR IMPROVED SURGERY AND REHABILITATION

10–11 December 2018, One Birdcage Walk, London

THIS TWO-DAY CONFERENCE WILL PROVIDE A FORUM FOR LEADERS IN THE FIELD AND EARLY CAREER RESEARCHERS TO DISCUSS THE LATEST INNOVATIVE TECHNOLOGIES AND APPROACHES FOR IMPROVING KNEE INTERFACES. THE EVENT WILL ALSO ADDRESS THE COMMUNICATION CHALLENGES BETWEEN RESEARCHERS AND THE PATIENTS AND HEALTHCARE PROFESSIONALS THEIR RESEARCH AIMS TO SERVE.

Biomechanical engineers and clinical researchers investigating the knee, will come together to address studies that examine knee interfaces. These studies will include modular and articulating implant components, implants and the body, and the role of key stakeholders. This event will improve your understanding of both the technological and clinical challenges facing the industry today.

KEY TOPICS INCLUDE:

- **Osteoarthritis Technology NetworkPlus** identify and address technology-based knowledge gaps in the field of osteoarthritis
- **Beyond Compliance** discuss the new Medical Device Regulations coming out of Europe in light of Brexit.
- The **University of Leeds** address the aims and challenges of preclinical testing of the knee, providing an overview of current methodologies and progress in computational modelling
- **Imperial College London** discuss how science and technology will transform the replacement of sore knees, from being expensive, dangerous and of limited effectiveness into a better value, safer and more effective intervention
- The **University of Southampton** will address the reasoning behind implant retrieval analysis and what information we can obtain from this practice

“THERE WAS AN EXCELLENT AND TRULY INTERDISCIPLINARY MIX OF CLINICIANS, INDUSTRY EXPERTS WHICH ENABLED US TO LEARN A LOT FROM EACH OTHER”

UNIVERSITY OF SHEFFIELD

ATTEND THIS EVENT TO:

- Hear innovative research focusing on the engineering contribution in relation to arthroplasty as well as interfaces
- Bridge the gap of communication across disciplines with **over five hours of networking opportunities** across two days with those leading the field in both academia and industry
- **Join the conference dinner at the end of Day One** for further networking opportunities with other innovators in the field
- **Join DePuy Orthopaedics** as they host an invitation-only networking breakfast for early career researchers
- Take the opportunity to hear from those closing the gap between medicine and engineering

ORGANISING COMMITTEE:

Biomedical Engineering Association
Institution of Mechanical Engineers

MEMBER CREDITS:

Richard van Arkel
Lecturer in the Department of Mechanical Engineering,
Imperial College London

Mahsa Avadi
Product Development Engineer
DePuy Synthes

Alex Dickinson
Lecturer within Engineering and Physical Sciences
University of Southampton

“AN EXCELLENT SUMMARY OF WHERE KNEE TREATMENT TECHNOLOGIES ARE TODAY”

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FEES AND CHARGES

Registration details, payment details and invoice details usually do not change. Please advise of any changes if required.

Fees and charges	Standard Rates
Member, Institution of Mechanical Engineers / Supporting Organisation	£380 + VAT = £456
Non-member	£480 + VAT = £576
Full-time Student/Retired	£125 + VAT = £150
Presenting Author	£125 + VAT = £150
Clinician	£125 + VAT = £150

THREE WAYS TO BOOK

- 1 Online:
www.imeche.org/knee
- 2 Email:
eventenquiries@imeche.org
- 3 Phone:
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Please read the information listed below as each booking is subject to the Institution's standard terms and conditions.

CONDITIONS OF BOOKING

Completed application forms should be returned to the address above, along with the correct payment. Attendance at the event will be confirmed on receipt of the full balance. All participants are advised to bring a copy of their confirmation with them on the day, to ensure the fastest possible entry.

SPECIAL REQUIREMENTS

Please inform us of any special requirements, ie dietary or access, on the relevant section of the booking form or email eventenquiries@imeche.org

Cancellation

For a refund (minus £25+VAT admin charge), cancellations must be received at least 30 days prior to the event. Replacement delegates are welcome at any time. The Institution reserves the right to cancel any event. In this case, the full fee will be refunded unless a mutually convenient transfer can be arranged. In the event that the Institution postpones an event for any reason and the delegate is unable or unwilling to attend on the rescheduled date, they will receive a full refund of the fee paid. The Institution is not responsible for any loss or damage as a result

of a substitution, alteration or cancellation/postponement of an event. The Institution shall assume no liability whatsoever if this event is cancelled, rescheduled or postponed due to a fortuitous event, Act of God, unforeseen occurrence or any other event that renders performance of this conference impracticable, illegal or impossible. For the purposes of this clause, a fortuitous event shall include, but not be limited to: war, fire, labour strike, extreme weather or other emergency.

Please note that while speakers and topics were confirmed at the time of publishing, circumstances beyond the control of the organisers may necessitate substitutions, alterations or cancellations of the speakers and/or topics. The Institution reserves the right to alter or modify the advertised speakers and/or topics if necessary without any liability to you whatsoever. Any substitutions or alterations will be updated on the event's webpage as soon as possible.

LIABILITY

The organisers do not accept liability for any injuries or losses of any nature incurred by delegates and/or accompanying persons, nor for loss or damage to their luggage and/or personal belongings.

CONFERENCE VENUE

Institution of Mechanical Engineers
One Birdcage Walk
Westminster
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OTHER EVENTS TO LOOK FOR



THE INSTITUTION OF MECHANICAL ENGINEERS' ANNUAL DINNER 2018

22 November 2018, Bristol

Join the Institution in celebration of engineering excellence – and in particular 50 years of supersonic travel – at the newly-opened museum Aerospace Bristol, housing the final Concorde ever built, which will provide the spectacular backdrop for a memorable night of networking and fine dining.

www.imeche.org/annualdinner



INCONTINENCE: THE ENGINEERING CHALLENGE XI

13-14 November 2019, London

Incontinence: The Engineering Challenge XII – Europe's only regular international, multi-disciplinary conference on incontinence technology - is scheduled for 13-14 November 2019, and we invite you to "save the date" in your diary. The organising committee are finalising an exciting conference programme including new innovations, materials and approaches, full details to come soon.

www.imeche.org/incontinence

The Institution of Mechanical Engineers organises over 120 events a year, including free-to-attend lectures as well as conferences, seminars, annual luncheons and dinners. Please visit www.imeche.org/events for the complete list of events.

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