

SMART ACTUATION 2016: INDUSTRIAL APPLICATIONS

Institution of
**MECHANICAL
ENGINEERS**

29 September 2016
IMechE Engineering
Training Centre, Sheffield

Mechatronics, Informatics and
Control Group, The Institution
of Mechanical Engineers

Seminar

Key Speakers Include:



- Stefan Mathuni, Lead Engineer - Piezo Systems, Physik Instrumente



- Jürgen Brünahl, Principal Engineer R&D Bulk – Technology, Xaar



- Thorsten Schmitz-Kempen, Chief Technical Systems, aixACCT



- Chris Bowen, European Research Council (ERC) Advanced Investigator in Novel Energy Materials, Department of Mechanical Engineering, University of Bath



**BOOK EARLY
AND SAVE
UP TO 10%**

**OFFER ENDS
5 AUGUST 2016
TERMS AND CONDITIONS APPLY**

EVENT PARTNERS:



Book your pass at

www.imeche.org/smartactuation

SMART ACTUATION 2016: INDUSTRIAL APPLICATIONS

29 September 2016, IMechE Engineering Training Centre, Sheffield



SMART ACTUATION 2016 WILL FEATURE CASE STUDIES FROM THOSE PIONEERING THE LATEST SMART ACTUATION TECHNOLOGY ACROSS ENGINEERING INDUSTRIES INCLUDING AUTOMOTIVE AND MEDICAL.

The programme will take you through the current developments in smart actuation, from best practice in harnessing the piezo technology to the latest smart materials such as shape memory alloys.

This is a must-attend event that will bring industry end-users and manufacturers together with the materials and systems specialists to discuss the developments in applications of smart actuation.

Now is the time to hear about the latest developments in industrial applications of smart actuation following exponential growth in this area.

This is the only event to be held in the UK for engineers focusing on the latest industrial applications of smart and advanced actuation technologies. Take this chance to learn from others and network with key industry figures.

Organising committee:

- Mechatronics, Informatics and Control Group,
The Institution of Mechanical Engineers
- Smart Materials and Systems Committee,
The Institute of Materials, Minerals and Mining (IOM3)

Members Credits:

- Professor Markys Cain, FIMMM, CPhys,
Director, **Electrosiences Ltd**
- Steve Morris, Knowledge Transfer Manager -
Smart Materials and Emerging Technologies,
Knowledge Transfer Network (KTN)
- John Webster, Part Time Experimental Officer,
University of Nottingham

Attend Smart Actuation 2016 to:

- Hear from **Physik Instrumente** about the benefits of harnessing actuation motion
- Hear about advances in piezoelectric actuation advances and best practice industrial application from **Xaar**
- Learn about the latest shape memory alloy actuation technology and its ground-breaking use in medical devices from **Brunel University**
- Discover the new Piezoelectric Transistor (PET) from **IBM** which, due to its transduction principle, opens a new power window
- Gain an understanding of the industrial requirements for precise actuation and how to meet these targets through developments in actuation technology
- Network with industry leaders, academia and cross-industry professionals working on the latest smart actuation concepts

**BOOK EARLY
AND SAVE
UP TO 10%**

WWW.IMECHE.ORG/SMARTACTUATION

PROGRAMME

29 SEPTEMBER 2016

| | |
|--|--|
| 08:30 | REGISTRATION AND REFRESHMENTS |
| 09:00 | CHAIR'S OPENING REMARKS Markys Cain, Director, Electrosiences Ltd |
| LATEST DEVELOPMENTS IN PIEZO ACTUATION | |
| 09:10 | HARNESSING THE HIGH PRECISION ACTUATION OF THE PIEZO EFFECT Stefan Mathuni, Lead Engineer - Piezo Systems, Physik Instrumente <ul style="list-style-type: none">• Explore the basic design principles of piezo actuation• Learn about the methodologies of harnessing the actuation motion and create a high precision drive• Discover drive applications that benefit from greater velocity, precision, reliability and repeatability |
| 09:40 | CASE STUDY: PIEZOELECTRIC ACTUATORS FOR INDUSTRIAL INKJET PRINTING Jürgen Brünahl, Principal Engineer R&D Bulk – Technology, Xaar <ul style="list-style-type: none">• Introduction to Xaar bulk shear mode and thin film direct mode inkjet technologies• Design challenges for high efficiency actuation and how to overcome them• Understand how to achieve reliability and productivity in industrial printing applications |
| 10:10 | STRAIN-BASED TRANSDUCTION DEVICE FOR FAST LOW POWER DIGITAL SWITCHING AT THE NANOSCALE: THE PIEZOELECTRONIC TRANSISTOR (PET) Glenn Martyna, Research Staff Member, IBM <ul style="list-style-type: none">• Hear about the need for replacement technologies for complementary metal–oxide–semiconductor (CMOS) based technology• Discover the new switching device, the PET, with applications from digital logic to RF applications• Appreciate how the PET, due to its transduction principle, offers a new revolutionary power performance window |
| 10:40 | NETWORKING REFRESHMENT BREAK |
| 11:10 | NEW DEVELOPMENTS IN PIEZOELECTRIC CHARACTERISATION Thorsten Schmitz-Kempen, Chief Technical Systems, aixACCT <ul style="list-style-type: none">• Explore the details of high temperature bulk material testing• Gain insight into material testing under stress conditions• The challenges and opportunities of thin film piezoelectric characterisation |
| 11:40 | HIGH POWER ACTUATORS FOR SMART MANUFACTURING AND TESTING Aurélien Riquier, Sales Engineer, Cedrat Technologies <ul style="list-style-type: none">• Overview of the use of mechatronics for manufacturing: vibrating assistance, vibration damping, fast and precise positioning• High frequency cycling and vibration testing with piezoelectric actuators• The importance of heat management and driving electronics for high power actuators |
| 12:10 | MINIATURE HYDRAULIC ACTUATION IN F1 CARS Martin Jones, Motorsport Market Manager – Europe, Moog Controls <ul style="list-style-type: none">• Overview of the history of powered hydraulics in motorsport and today's hydraulic systems in the 2016 F1 cars• Other motorsport series using this technology and its benefits• Unconventional applications of this technology in other industries and future developments |
| 12:40 | NETWORKING LUNCH |
| THE USE OF SMART MATERIALS IN ACTUATION | |
| 13:40 | PIEZOELECTRIC COMPOSITES FOR ACTUATION Chris Bowen, European Research Council (ERC) Advanced Investigator in Novel Energy Materials, Department of Mechanical Engineering, University of Bath <ul style="list-style-type: none">• Overview of the latest piezoelectric materials and composites• Comparison with other materials used in actuation• Application areas and future prospects for composites across industry |
| 14:10 | MORPHING STRUCTURES USING SHAPE MEMORY ALLOY PLATE Jem Rongong, Senior Lecturer, University of Sheffield <ul style="list-style-type: none">• Application examples including adjustable nozzle and guide vane• Numerical modelling approaches to morphing structures using shape memory alloy plates• Understanding material properties in flexure and under vibration loading |
| 14:40 | DIGITAL TO ANALOGUE: DYNAMIC PROPORTIONAL CONTROL OF NEAR EQUI-ATOMIC NICKEL TITANIUM SHAPE MEMORY ALLOY ACTUATORS Tony Anson, Associate Professor, The Experimental Techniques Centre, Brunel University <ul style="list-style-type: none">• Understand the use of intermittent heating regimes to carry out shape recovery and consequent actuation with micron precision• Explore the commercial potential of novel low-profile actuators in the industrial and medical arenas• Research and characterisation of the functional properties of Ni/Ti alloys defining potential cyclic life |
| 15:10 | NETWORKING REFRESHMENT BREAK |
| 15:40 | MATERIAL TAILORING FOR LIGHTWEIGHT AND MORPHING STRUCTURES – THE SHAPE OF THINGS TO COME Paul Weaver, Professor in Lightweight Structures, Bristol University <ul style="list-style-type: none">• Discover the creation of new engineering products with enhanced efficiency and functionality by using structures that change purposefully• Understand the use of combinations of material properties, structural shape and pre-stress to carry out structural changes• Overview of potential applications drawn from aerospace, automotive and renewable energy industries |
| 16:10 | PANEL DISCUSSION: LOOKING TO THE FUTURE OF SMART ACTUATION <ul style="list-style-type: none">• Discuss the energy requirements and efficiencies for future actuation technologies• What are the latest industries investing in smart actuation and where are the future opportunities?• How can we encourage companies across industry to harness the power of smart actuation? |
| 16:50 | CHAIR'S CLOSING REMARKS |
| 17:00 | END OF SEMINAR |

To find out more about our speakers, please visit www.imeche.org/smartactuation

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

HOW TO BOOK YOUR PLACE

FEES AND CHARGES

Registration fees include entry to the sessions, refreshments, and a copy of selected presentations.

| Delegate Type | Early Bird Rate Available until 5 August 2016 | Standard Rate |
|--|---|---------------|
| Member, IMechE/Supporting Organisation | £270 + VAT | £299 + VAT |
| Non-Member | £360 + VAT | £399 + VAT |
| Student/Retired | N/A | £150 + VAT |

THREE WAYS TO BOOK

- 1 Online:
www.imeche.org/smartactuation
- 2 Email:
eventenquiries@imeche.org
- 3 Phone:
+44 (0)20 7973 1251

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 this form.

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

Engineering Training Centre, 4 Europa View, Sheffield Business Park, Sheffield S9 1XH

ACCOMMODATION

https://www.tripadvisor.co.uk/Hotels-g190734-Rotherham_South_Yorkshire_England-Hotels.html

SPONSORSHIP & EXHIBITION OPPORTUNITIES

GET INVOLVED

Attending this event as either an exhibitor or sponsor will give you the opportunity to display your solutions, services and products to the right people at the right time.

BENEFITS OF SPONSORING

- **Showcase** new products
- **Raise** awareness of your operation
- **Improve** perception of your brand
- **Influence** other organisations' spending plans

This is an excellent way to enhance your company profile and communicate effectively to your target audience.

For more information please call
+44(0)20 7973 1249
or email sponsorship@imeche.org

PE

DOWNLOAD
THE PE APP

Access
the latest
engineering
news

www.imeche.org/peapp



Institution of
**MECHANICAL
ENGINEERS**

The Institution of Mechanical Engineers is a registered charity (no 206882) VAT No GB299930493.

One Birdcage Walk
Westminster
London
SW1H 9JJ

T +44 (0)20 7222 7899
www.imeche.org

FORWARD THINKING

We are the market leader among professional engineering bodies. We've been supporting engineers since 1847 and have 113,000 members in over 140 countries, working in the world's most dynamic and important industries. Our comprehensive events programme brings you the latest research and best practice from industry and academia.

OTHER EVENTS TO LOOK FOR



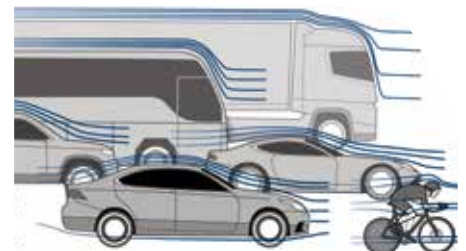
VIBRATIONS IN ROTATING MACHINERY – VIRM 11

13-15 September 2016

University of Manchester

Redefining the challenges in rotordynamics, rub, whirl instability and more with international, industrial and academic experts, manufacturers and researchers.

www.imeche.org/VIRM



INTERNATIONAL CONFERENCE ON VEHICLE AERODYNAMICS 2016: AERODYNAMICS BY DESIGN

21-22 September 2016

Coventry Transport Museum

The next conference in this proven and successful series will cover the full range of automotive aerodynamic concepts with international presentations and case studies.

www.imeche.org/aerodynamics

The Institution of Mechanical Engineers organise 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.

Follow us on Twitter

twitter.com/imechevents