

GRAPHENE 2015: ENGINEERING A 21ST CENTURY WONDER MATERIAL

Organised by

Institution of
**MECHANICAL
ENGINEERS**

Structural Technology and Materials Group
Conference

16-17 September 2015
London

www.imeche.org/graphene

KEYNOTE SPEAKERS:

Alec Reader,
Director Nanotechnology, KTN

James Baker,
Business Director, National Graphene Institute

Graphene at a glance:

- Address the **role of engineers** in the production and manufacture of graphene
- Network with over **70 industry leaders** as they seek to enhance graphene's commercialisation

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GRAPHENE 2015: ENGINEERING A 21ST CENTURY WONDER MATERIAL

16-17 September 2015, London
www.imeche.org/graphene



HOW WILL ENGINEERS SUPPORT THE MASS PRODUCTION AND COMMERCIALISATION OF GRAPHENE?

Graphene is set to revolutionise a number of industries as it is one of the world's thinnest and durable materials. With its resilient strength, ability to conduct electricity and trap liquid, there has been more than £1 billion invested in developing its potential in the UK alone.

Graphene 2015 will unite all those across the world involved in the graphene industry. Join us in London this September and find out about the role that engineers take in all stages of graphene's development, application and commercialisation.

Presenting companies include:

- National Graphene Institute
- Graphenea
- Haydale
- Cambridge Graphene Centre

EVENT PARTNER



The Institute of Materials, Minerals and Mining,
Materials Science and Technology Division

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BENEFITS OF ATTENDANCE:

-  **Address** the role of engineers in the production and manufacture of graphene
-  **Hear** from the National Graphene Institute as they prepare to open the Graphene Engineering Innovation Centre
-  **Identify** with Fullerex the advantages of trading and investing in graphene on the stock market
-  **Understand** how Tata Steel are utilising graphene's properties to enrich their research and development projects
-  **Network** with over 70 industry leaders as they seek to enhance graphene's commercialisation

PROGRAMME

DAY 1

WEDNESDAY 16 SEPTEMBER 2015

08:30 REGISTRATION AND REFRESHMENTS

09:00 CHAIR'S OPENING REMARKS
Helen Meese, Head of Engineering in Society, Institution of Mechanical Engineers

CURRENT PROCESSES TO BOOST GRAPHENE TECHNOLOGY

09:10 OPENING ADDRESS: THE GRAPHENE LANDSCAPE: EXCITING POTENTIAL AND REAL-WORLD CHALLENGES

Andrew Pollard, Research Leader, NPL

- The many amazing properties already explored and the commercial application areas predicted for graphene
- The characterisation and quality control issues that must be overcome for this emerging industry
- Current international standardisation activity for graphene and other 2D materials

09:40 THE ROLE OF TECHNOLOGY IN GRAPHENE'S PRODUCTION

Jon Mabbitt, CEO, Applied Graphene Materials

- Implementing successful processes to drive the engineering of graphene
- Developing and supporting a sustainable supply chain
- Working to generate future research areas to enhance graphene's performance

10:10 KEYNOTE ADDRESS: SUPPORTING THE UK GRAPHENE INDUSTRY

Alec Reader, Director Nanotechnology, KTN

- An overview of the KTN's relationship with graphene
- Sharing our knowledge and expertise with industry through collaboration projects such as Graphene-SIG (Special Interest Group)
- Future technological possibilities to boost graphene's applications

10:40 NETWORKING REFRESHMENT BREAK

11:00 THE EUROPEAN ROADMAP FOR SCIENCE AND TECHNOLOGY OF GRAPHENE AND RELATED MATERIALS

Professor Andrea Ferrari, Director, Cambridge Graphene Centre

- The science and technology roadmap for graphene
- 2D crystals and hybrid systems developed within the framework of the European Graphene Flagship
- Emerging application areas, such as the integration of graphene with silicon photonics and flexible devices

11:30 AN EVOLUTION OF PROCESSES TO CREATE IMPURITY-FREE GRAPHENE

Jerome Joaug, Co-Founder and Managing Director, Cambridge Nanosystems

- Establishing the correct processes to produce a high level of impurity-free graphene
- Understanding the evolution in these processes from conception to production
- Sustaining a high level of processing to accommodate commercialisation

12:00 MORNING Q&A PANEL SESSION

An opportunity to ask questions to the morning's presenters or make any comments on the presentations that have been given.

12:30 NETWORKING LUNCH

INVESTING IN A WONDER MATERIAL

13:30 ENGINEERING AND GRAPHENE: LINKING IT ALL UP

Achim Hoffman, Business Development Director, IP Group

- Understanding the science: which commercially relevant problem is graphene solving, using one of its many specifications?
- Understanding the market: does it have a meaningful competitive advantage over alternative solutions?
- Understanding engineering: can it be produced with the required commercial specifications?

14:00	IDENTIFYING AND CAPTURING OPPORTUNITIES FOR GROWTH Tom Eldridge, CEO, Fullerex <ul style="list-style-type: none"> • Developing the market for nanomaterials including graphene • Quantifying the commercial variables for end-users and investors • Mechanisms to access trade and project finance on the INSCX exchange, enabling capital to support the production and trade process
14:30	NETWORKING REFRESHMENT BREAK
15:00	ESTABLISHING A TAILORED GRAPHENE SUPPLY CHAIN Ray Gibbs, CEO, Haydale <ul style="list-style-type: none"> • Ensuring a consistent supply of graphene to industry • Sustaining production of a high quality material • Making graphene a commercially viable product
15:30	REALISTIC OPPORTUNITIES FOR GRAPHENE Tim Harper, CEO, Cientifica <ul style="list-style-type: none"> • All emerging technologies suffer from hype, which isn't always a bad thing • Graphene offers a wide range of potential applications over a long timescale • Methodologies for exploiting tomorrow's materials today
16:00	AFTERNOON Q&A PANEL SESSION An opportunity to ask questions to the afternoon's presenters or make any comments on the presentations that have been given.
16:20	CHAIR'S CLOSING REMARKS
16:30	END OF DAY ONE

DAY 2
THURSDAY 17 SEPTEMBER 2015

08:30	REGISTRATION AND REFRESHMENTS
09:00	CHAIR'S OPENING REMARKS Simon Quinn, Chairman, Structural Technology and Materials Group, Institution of Mechanical Engineers
PREPARING FOR LARGE SCALE MANUFACTURING	
09:10	KEYNOTE ADDRESS: LEADING THE UK'S RESEARCH AND DEVELOPMENT OF GRAPHENE James Baker, Business Director, National Graphene Institute <ul style="list-style-type: none"> • Current areas of focus for the National Graphene Institute • The benefits of bringing commercial experience into a research and development environment • Preparing for the opening of the Graphene Engineering Innovation Centre (GEIC)
09:40	SUCCESSFULLY MANUFACTURING GRAPHENE FOR THE COMMERCIAL MARKET Amaia Zurutuza, Scientific Director, Graphenea <ul style="list-style-type: none"> • An overview of Graphenea's role in the production of graphene • Exploiting graphene's potential on a commercial basis • Helping to boost graphene's future applications
10:10	A PATHWAY TO HIGH PURITY, NON-OXIDISED GRAPHENE Paul Ladislaus, Senior Chemical Engineer, Thomas Swan <ul style="list-style-type: none"> • The technical challenges and opportunities encountered with scaling up a process within an SME environment • How Thomas Swan built and developed relationships with external organisations, such as universities, equipment vendors and government agencies to develop the company process • Methods of understanding and monitoring our process and using this to understand the impact on the end product
10:40	NETWORKING REFRESHMENT BREAK

- 11:00** **PROJECT CASE STUDY: GRAPHENE COMPOSITES**
Ian Kinloch, Professor of Materials Science, The University of Manchester and Billy Beggs, Engineering Innovation Manager, University of Central Lancashire
- An early demonstrator of a prototype using graphene-enhanced materials
 - Collaborative project working with universities and SME's to rapidly develop a graphene-featured demonstrator for an aerospace application
 - Exploiting the features and benefits of graphene in 3D printing, utilising graphene composites and a novel engineering application
 - Developing and accelerating a roadmap for future products and applications
- 11:30** **ROUND TABLES:**
 Join one of our expert-led round tables and offer your thoughts and experience on the topic. Delegates will have around 40 minutes to discuss their respective topics. Each facilitator will then share the key points that were raised during the discussion with the Chair and audience.
- TABLE 1: WILL REGULATIONS HINDER FUTURE RESEARCH AND DEVELOPMENT?**
 Confirmed representative, National Physical Laboratory
- TABLE 2: DEFINING THE ROLE OF ENGINEERS IN THE GRAPHENE INDUSTRY**
 Helen Meese, Head of Engineering in Society, Institution of Mechanical Engineers
- TABLE 3: WHAT ACTIONS SHOULD INDUSTRY BE TAKING TO ENSURE INVESTMENT HAPPENS?**
 Tom Eldridge, CEO, Fullerex
- TABLE 4: GRAPHENE – THE TRANSITION FROM LABORATORY TO COMMERCIAL PRODUCTS**
 Andy Goodwin, Commercial Director, Thomas Swan
- 12:30** **NETWORKING LUNCH**

INDUSTRY CASE STUDIES

- 13:30** **CASE STUDY: EXAMINING GRAPHENE'S POTENTIAL TO SUPPORT TATA STEEL PROJECTS**
Sai Shivareddy, Research Scientist, Tata Steel Europe
- Investigating efficient industrial scale processes to obtain graphene-coated steels
 - Utilising graphene's benefits as a simultaneous electrical conductor and anti-corrosion barrier layer
 - Adding value to steel through advanced manufacturing of graphene-based steel products
- 14:00** **CASE STUDY: USING GRAPHENE TO SUPPORT ENERGY STORAGE**
Steve Griffiths, Executive Director, Masdar Institute, UAE
- Understanding nanostructured novel energy storage materials
 - Identifying the benefits of existing 2D materials to support energy storage
 - Fabricating graphene and graphene oxide for energy storage
- 14:30** **NETWORKING REFRESHMENT BREAK**
- 15:00** **CASE STUDY: TAKING GRAPHENE TO THE NEXT LEVEL**
Richard White, Senior Researcher Nanotechnology, Nokia (Invited)
- Nokia's experience in graphene research and development
 - Exploring opportunities to utilise graphene's properties to support phone batteries
 - Considerations for future graphene applications within Nokia projects and research
- 15:30** **FINAL AFTERNOON Q&A PANEL SESSION**
 An opportunity to ask questions to the afternoon's presenters or make any comments on the presentations that have been given.
- 15:50** **CHAIR'S CLOSING REMARKS**
- 16:00** **END OF CONFERENCE**

Find out more about our speakers at www.imeche.org/graphene

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

Organising committee:

Helen Meese, Head of Engineering in Society, Institution of Mechanical Engineers
 Structural Technology and Materials Group

SPEAKERS AND CONTRIBUTORS

JAMES BAKER KEYNOTE SPEAKER BUSINESS DIRECTOR, NATIONAL GRAPHENE INSTITUTE

James Baker joined the University of Manchester after 25 years in industry, where most recently he was Vice President of Technology Collaboration Programmes and Managing Director of the Advanced Technology Centres for BAE Systems in the UK. As Business Director, which includes the responsibilities for the National Graphene Institute and Graphene Engineering Innovation Centre, he will be looking to develop the industrial partnerships and collaborations to accelerate the commercialisation opportunities for graphene. James is a Chartered Engineer and a Fellow of the Institution of Engineering and Technology.

PROFESSOR ANDREA FERRARI DIRECTOR, CAMBRIDGE GRAPHENE CENTRE

Andrea Ferrari is Professor of Nanotechnology and is a Royal Society Wolfson Research Merit Award Holder. He is the Director of the Cambridge Graphene Centre and Head of the Nanomaterials and Spectroscopy Group at the University of Cambridge Engineering Department and Nanoscience Centre. Andrea is also Professorial Fellow of Pembroke College.

AMAIA ZURUTUZA SCIENTIFIC DIRECTOR, GRAPHENEA

Amaia Zurutuza obtained her PhD in Polymer Chemistry from the University of Strathclyde, Glasgow, in 2002. During her PhD she worked in the research of novel polymers for biomedical applications. After completing her PhD she completed two post-doctoral fellowships working within two European projects in the field of molecularly imprinted polymers. In 2004, she joined Controlled Therapeutics Scotland as Senior Polymer Scientist working in the R&D of new controlled drug delivery systems. Her research contribution led to the publication of three patents in novel biodegradable and biostable polymers for controlling drug delivery. In April 2010 she joined Graphenea as Scientific Director.

SAI SHIVAREDDY RESEARCH SCIENTIST, TATA STEEL EUROPE

Sai Shivareddy is a research scientist with Tata Steel R&D, based at the Cambridge Graphene Centre. He leads Tata Steel's collaborative R&D activities on the application of graphene for high value steel products and processes. Sai obtained his PhD in Engineering from St John's College, University of Cambridge, and has over seven years of experience in the industrial applications of nano-carbons. Current research interests include the scaling up of graphene synthesis within the steel context and advanced manufacturing of graphene-coated steel strips for energy storage and conversion.

TIM HARPER CEO, CIENTIFICA

Tim Harper is a former scientist and engineer and is comfortable in the lab as well as leading a buyout, with plenty of experience of balancing the expectations of scientific company founders and their investors. Tim has instigated research, commissioned, written and published highly cited reports on the economic potential of nanotechnologies and life sciences at Cientifica, the World Economic Forum and World Gold Council. His work has been used by governments and public policy organisations, the financial sector and international business in setting, defining and measuring effectiveness of R&D programs, technology policy and innovation strategy.

ALEC READER DIRECTOR NANOTECHNOLOGY, KTN

Alec Reader has over 30 years of experience in the micro and nano-electronics industries, working most recently at Innos and Polymer Vision. He is accredited with establishing Innos at the forefront of industrial R&D, championing the company's ability to bridge the gap between emergent technologies and commercial exploitation. His tenure at Innos (Polymer Vision) was a continuation of a successful career that includes prominent positions as International Marketing Manager and Head of Department at ST-Microelectronics and Business Line Manager at Philips Analytical (Semiconductors). Prior to developing a business-oriented career, Alec was a post-doctoral fellow at Delft Technical University.

JON MABBITT CEO, APPLIED GRAPHENE MATERIALS

Jon Mabbitt has 25 years of experience in senior positions in manufacturing and engineering. From 2008 to October 2012, Jon was Managing Director of Umeco Composite Structural Materials, one of two divisions within Umeco plc, a £250 million revenue business listed on the London Stock Exchange's Main Market. Prior to that, Jon was the Managing Director of Advanced Composite Group Limited, a subsidiary of Umeco, which was acquired in 2004. In this role he was responsible for 350 people and led the company through a period of significant organic growth and targeted acquisitions in the UK and the US.

STEVE GRIFFITHS EXECUTIVE DIRECTOR, MASDAR INSTITUTE, UAE

Steve Griffiths is the Executive Director of Institute Initiatives and a Professor of Practice at Masdar Institute of Science and Technology. Steve has overall responsibility for research, including large-scale, collaborative research programmes and centres, research development, sponsored programmes, technology transfer, and research laboratories. Additionally, Steve has an active role in multiple industry, research and innovation bodies outside of Masdar Institute, including the Middle East Solar Industry Association (MESIA) Board of Directors and the Zayed Future Energy Prize Selection Committee.

BOOKING FORM

EVENT CODE: C6235AB

EARLY BIRD ENDS 26 JUNE 2015

**GRAPHENE 2015:
ENGINEERING A 21ST CENTURY
WONDER MATERIAL**
16-17 September 2015
London

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Member, Institution of Mechanical Engineers	£595.00+VAT	£700.00+VAT	£
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Payment must accompany this registration form. Registration will be confirmed only on receipt of full payment.

PLEASE INDICATE METHOD OF PAYMENT:

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9 June 2015
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21-22 October 2015
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This event will unite representatives from the British Army, Royal Navy and RAF to highlight how important military engineering roles are in the Defence industry.

www.imeche.org/armedforces2015

ANNUAL DINNER 2015



19 November 2015
London

THE INSTITUTION OF MECHANICAL ENGINEERS' ANNUAL DINNER

The Institution's Annual Dinner will be returning to London's Dorchester hotel, to celebrate the engineering profession this November.

www.imeche.org/annualdinner

JOURNALS

The journals of the Institution of Mechanical Engineers are published by SAGE, comprised of 16 journals covering a broad range of engineering disciplines. Our journals can be accessed via uk.sagepub.com/imeche_home. sp as well as through Scitopia and other leading scholarly search services.

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