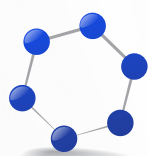


THE ONLY CONGRESS FOCUSING ON THE COMMERCIALISATION - CRITICAL DRIVERS OF  
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2<sup>ND</sup> ANNUAL

# GRAPHENE SUPPLY, APPLICATION & COMMERCIALISATION 2014

12<sup>th</sup>-13<sup>th</sup> June, 2014 | University of Manchester | UK

Assessing The Very Latest Graphene Success Stories To  
Determine The Commercial Viability Of Application And  
Revealing Current Capabilities For

The Scalable Production Of  
High Quality, Affordable Graphene To  
Enable Large Scale Application

What's New For 2014

BRAND NEW INDUSTRY-LED SPEAKERS FOR 2014

- **LOCATED AT THE BIRTHPLACE OF GRAPHENE:** This year, we are working in collaboration with Manchester University to combine the knowledge and contacts of London Business Conferences with those of the National Graphene Institute to deliver an even bigger, more content packed agenda for 2014.
- **UNIQUE FOCUS ON THE SUPPLY OF HIGH QUALITY GRAPHENE:** Presentations this year will focus not only on the latest applications success stories, but will also reveal solutions to one of the most critical hurdles in Graphene integration - the cost, quality and scalability of supply.
- **REVEALING ADVANCES IN PROCESSABILITY AND INTEGRATION IN MANUFACTURING:** This year we have included a brand new focus on how to successfully integrate graphene with manufacturing equipment to reduce the time and costs associated with industrialisation.
- **BRAND NEW APPLICATIONS SHOWCASE:** This year, the congress will be hosting industry pioneering end users who will be delivering new and exclusive case studies across flexible touch screens, transistors, sensors, composites, energy storage, coatings biomedical and thermal dissipation.
- **INVESTORS CRITERIA:** This year, a keynote panel will determine the criteria of investors in regards to graphene applications to find out what they need from the science community to justify further investment.
- **COMPARING GRAPHENE TO EXISTING AND FUTURE MATERIAL COMPETITORS:** We will be hosting a brand new session this year on the success of other 2D materials to optimise material selection for each application.



Seungmin Cho  
*Principal Research Engineer & Group Leader*  
**Samsung**



York Haemisch  
*Senior Director Corporate Technologies*  
**Phillips**



Siva Bohm  
*Principal Scientist, Surface Engineering Department*  
**Tata Steel**



Shu-Jen Han  
*Master Inventor & Manager Of Nanoelectronics Group*  
**IBM T.J. Watson Research Center**



Steve Sinton  
*Principal Chemist & LM Fellow*  
**Lockheed Martin**



Matthias Gester  
*Principal Scientist*  
**Procter & Gamble**



Antonio Paez Duenas  
*Senior Technology Consultant R&D*  
**Repsol**



Richard White  
*Principal Researcher, Nanotechnology*  
**Nokia**

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[www.graphene-applications-2014.com](http://www.graphene-applications-2014.com)

Dear Colleague,

**Graphene Supply, Application & Commercialisation 2014** has been designed to focus upon the needs of graphene application developers, academics and suppliers following extensive industry research. By assessing the very latest success stories across scalable production, material processability and manufacturing integration, this summit will determine the roadmap towards profitable commercialisation.

Following the **success of the 2013** events in London and California, the industry has already made tremendous progress with **advancements in production methods** and new commercial applications going to market. Now more than ever, dozens of industry sectors are eager to identify how they can turn graphene's unique properties into **profitable devices and services**.

As well as identifying marketable applications, industry end users must also hear from producers on the **availability of mass scale graphene** with repeatable and consistent quality. In addition, it's crucial to assess the **ease of integration into products**, overcoming the challenges of defect engineering, substrate design and the compatibility with other materials and manufacturing equipment.

**The 3<sup>rd</sup> in the global series**, this conference will deliver exclusive case studies from across the globe to understand the **business case for investment in graphene**, weighing the benefits of leveraging its unique properties with production and integration costs, **unveiling the implications** of graphene commercialisation for your industry sector.

**Day 1** will focus on **identifying the latest and most pioneering applications** from sectors including consumer electronics, composites, computing, energy, chemicals and defence as well as outlining expectations from **angel investors** to justify future financial support.

**Day 2** will focus on advances in CVD and exfoliation **production methods**, the global standardisation of supply, the implications of defects and substrates and the health and safety and **manufacturing implications** of graphene use.

Please take a look through the enclosed agenda and visit [www.graphene-applications-2014.com](http://www.graphene-applications-2014.com) for the latest way to register:

We look forward to welcoming you to Manchester in June.

Kind Regards,

**The Graphene Innovations Team**

## Full Speaker Faculty:

- ✓ **Shu-Jen Han**, Master Inventor & Manager Of Nanoelectronics Group, **IBM T.J. Watson Research Center**
- ✓ **Siva Bohm**, Principal Scientist, Surface Engineering Department, **Tata Steel**
- ✓ **Seungmin Cho**, Principal Research Engineer & Group Leader, **Samsung**
- ✓ **Matthias Gester**, Principal Scientist, **Procter & Gamble**
- ✓ **Antonio Paez Duenas**, Senior Technology Consultant R&D, **Repsol**
- ✓ **Richard White**, Principal Researcher, Nanotechnology, **Nokia**
- ✓ **York Haemisch**, Senior Director Corporate Technologies, **Phillips**
- ✓ **Mark Davis**, Chief Science Officer, **Solan PV**
- ✓ **Robert Roelver**, Researcher, **Bosch**
- ✓ **Paolo Bondavalli**, Head of Nanomaterial Group, **Thales Group**
- ✓ **Dr Afshin Tarat**, Chief Scientist, **Perpetuus Energy**
- ✓ **Kitty Cha**, Research Scientist, Technology Incubator, **BASF**
- ✓ **Mark Lineker**, Business Manager, **TBA Electro Conductive Products**
- ✓ **Andrew Pollard**, Leader Of Surface & Nanoanalysis Group, **NPL**
- ✓ **Jani Kivioja**, Research Leader, **Nokia Research Centre**
- ✓ **Robert Young**, Professor Of Polymer Science & Technology, **University Of Manchester**
- ✓ **Johan Liu**, Professor, **Chalmers University**
- ✓ **Karl Coleman**, Professor, **Durham University**
- ✓ **Mercedes Vila Juarez**, Principal Investigator, Nanotechnology Research Division, **Universidade de Aveiro**
- ✓ **Craig Poland**, Research Scientist, **Institute of Occupational Medicine**
- ✓ **Mark Rahn**, Partner, **MTI Ventures**
- ✓ **Achim Hoffman**, Physical Sciences, **IP Group**
- ✓ **Steve Sinton**, Principal Chemist & LM Fellow, **Lockheed Martin**

## What Is The International Festival For Business 2014?

**The International Festival for Business (IFB) 2014** is the largest global concentration of business events during 2014.

The 50-day festival runs across 7 weeks in June and July and will attract business delegates and trade intermediaries from around the world.



## Venue Information:

The Summit Will Be Held At:

### University Of Manchester

The University of Manchester  
 Oxford Road  
 Manchester  
 M13 9PL

**Tel:** +44 (0) 161 306 6000

**Web:** [www.manchester.ac.uk](http://www.manchester.ac.uk)



# What's New For 2014?

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**Graphene Supply, Application & Commercialisation 2014** is the 3<sup>rd</sup> in the global series, previously located in London and California. Having already unveiled innovations from tennis rackets to filters, the June 2014 event builds upon the game-changing work of industry and academics over the last 12 months and incorporates new and exclusive presentation topics and organisations.

**BRAND NEW  
FOR THIS YEAR**

New Speakers And New Topics

## NEW SESSION

### DEFECT CHARACTERISATION



Determining Commercial Expectations In Regards To Graphene Applications To Assess What Investors Need From The Science Community To Justify Further Commitment



**Shu-Jen Han**

Master Inventor & Manager Of  
Nanoelectronics Group

**IBM T.J. Watson  
Research Center**



**Richard White**

Principal Researcher  
Nanotechnology

**NOKIA**



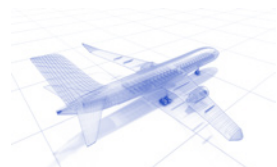
**Matthias Gester**

Principal Scientist

**Procter & Gamble**

## NEW SESSION

### AEROSPACE COMPOSITES



Improving The Doping And Processability Of Graphene Composites To Develop Lighter, Multi-Functional Aircraft Structures



**Siva Bohm**

Principal Scientist, Surface  
Engineering Department

**TATA STEEL**



**Antonio Paez Duenas**

Senior Technology Consultant  
R&D

**REPSOL**

## NEW SESSION

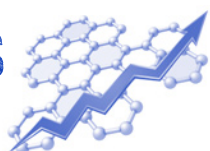
### TRANSISTORS AND SEMICONDUCTORS



Comparing The Properties Of Graphene With Silicon To Assess The Viability Of Using Graphene In Semiconductors And High Frequency Transistor Applications

## NEW SESSION

### ANGEL INVESTORS PANEL



Determining Commercial Expectations In Regards To Graphene Applications To Assess What Investors Need From The Science Community To Justify Further Commitment

## NEW SESSION

### ENERGY STORAGE



Determining The Potential Of Graphene's Conductivity To Enable The Engineering Of Supercapacitors And Batteries Beyond the Capability Of The Lithium Generation



**Kitty Cha**

Research Scientist,  
Technology Incubator

**BASF**



**Robert Young**

Professor Of Polymer Science  
& Technology

**The University  
Of Manchester**

**From The Previous Event In The Series**



“The post talk Q&A section was extremely beneficial and informative. I was really impressed at the ability to provide state of the art overview in 2 days.”

*Business Development Director,  
Applied Graphene Materials*

“Good all around, very open discussion with various presenters. Broad representation of the industry. Will definitely come next year!”

*Senior Material Engineer  
Bentley Motors*

“Good wide approach on the topic and the realistic view on graphene”

*Project Manager  
Swedish Defence Material*



**8.30 Chair's Opening Remarks**

**York Haemisch**, *Senior Director Corporate Technologies, Phillips*  
**WELCOME ADDRESS**

**8.40 Welcome Address To The University Of Manchester**

**James Baker**, *Business Director, National Graphene Institute*  
**KEYNOTE: SUPPLY PANEL**

**9.00 Hearing How Leading Graphene Producers Are Planning To Supply Graphene At The Right Quality, Quantity And Cost To Make Mass Application Commercially Feasible**

- Assessing the quality of graphene produced, such as the defect density, compared to the quality required to develop significant feature benefits for end products
- Comparing current production costs with the cost requirements for each application to assess the business case viability of commercialisation in the short term
- Benchmarking supply scalability and repeatability with quantity requirements for applications to identify optimal production methods for each industry
- Examining instrumentation used by end users for the mass characterisation of graphene including spectroscopy and microscopic techniques

**Shu-Jen Han**, *Master Inventor & Manager Of Nanoelectronics Group, IBM T.J. Watson Research Center*

**Jani Kivioja**, *Research Leader, Nokia*

**9.30 Question & Answer Session****KEYNOTE: INVESTORS PANEL****9.40 Determining Commercial Expectations In Regards To Graphene Applications To Assess What Investors Need From The Science Community To Justify Further Commitment**

- Reviewing the breakdown of current investment portfolios across industries to identify the commitment shown to each application
- Assessing the level of commitment currently shown by the investor community towards graphene compared to other new materials
- Outlining the factors and developments in the application roadmap that will affect the extent of future investor commitment
- Identifying the likely routes towards successful production, industrialisation and commercialisation of graphene applications to guide future investments

**Mark Rahn**, *Partner, MTI Ventures*

**Achim Hoffmann**, *Physical Sciences, IP Group*

**10.10 Question & Answer Session****10.20 Refreshment Briefing By Grafoid, Followed By Morning Refreshments In The Exhibition Showcase Area****KEYNOTE: COMMERCIALISATION SUCCESS STORY****10.50 Revealing How A Small Manchester Company Developed A Graphene-Based Conductive Sprayable Coating For Market**

- Understanding how the demand for a clear, permanently static dissipative could be met with graphene material properties
- Assessing the diverse industries from mining to baking interested in the product, with a potential market in excess of £100 million
- Reviewing the product's development history and showing how graphene could solve challenges that other materials such as CNT's could not
- Reviewing the product specifications achieved compared to ITO and topical alternatives to prove the cost-benefits of graphene commercialisation

**Mark Lineker**, *Business Manager, TBA Electro Conductive Products*

**11.10 Question & Answer Session****APPLICATIONS**

DELIVERING UPDATES ON THE PROGRESS OF PROJECTS BENCHMARKING THE QUALITY, SCALABILITY AND INTEGRATION REQUIREMENTS FOR EACH APPLICATION TO DETERMINE THE IMMEDIATE REQUIREMENTS FOR ADOPTION

**ELECTRONIC APPLICATIONS****DRIVING PROGRESS: REVEALING THE LATEST UPDATES ON THE APPLICATION OF GRAPHENE IN MASS PRODUCED, ELECTRONIC DEVICES AND ASSESSING INTEGRATION REQUIREMENTS FOR EACH APPLICATION**

This section has been designed both for industry professionals working in electronics and for professionals working in other industries who are seeking potential transferable insights from some of the most mature applications within electronics.

**FLEXIBLE TOUCH SCREENS****11.20 Determining Supply Availability And The Functional Viability Of Using Graphene In Flexible, Transparent Conductors To Drive Forward Commercialisation In Consumer Electronics**

- Quality: Assessing the availability of graphene at the uniform and optimal thickness required for touch screens, balancing conductivity with transparency
- Quantity: Evaluating the capability of roll-to-roll chemical vapour deposition to repeatedly deliver sufficient supply for mass scale commercialisation
- Integration Requirements: Reviewing substrate options and doping methods to reduce sheet resistance and optimise material properties
- Comparing the properties of graphene based devices with other materials such as ITO to justify the cost of integration into consumer devices
- Reviewing the mechanical robustness of graphene when integrated with a substrate to ensure maximum stress allowance is viable for use in consumer electronic

**Seungmin Cho**, *Principal Research Engineer & Group Leader, Samsung*

**11.50 Question & Answer Session****TRANSISTORS & SEMICONDUCTORS****12.00 Comparing The Properties Of Graphene With Silicon To Assess The Viability Of Using Graphene In Semiconductors And High Frequency Transistor Applications**

- Quality: Reviewing efforts to improve the purity of graphene to deliver adequate electron mobility and viability for use in high frequency transistors
- Quantity: Understanding the requirements for the cost and scalability of graphene to successfully compete with silicon on a global scale
- Integration Requirements: Assessing the interface and long term chemical stability between graphene and other semiconductor components
- Leveraging graphene's properties to break through barriers faced by silicon devices in regards to the speed and density of transistors

**Shu-Jen Han**, *Master Inventor & Manager Of Nanoelectronics Group, IBM T.J. Watson Research Center*

**12.30 Question & Answer Session****12.40 Networking Lunch In The Exhibition Showcase Area****SENSORS****1.40 Leveraging The Reduced Power Demands Of Graphene Sensors To Minimise Device Size And Justify Investment For Large Scale Commercialisation**

- Quality: Reviewing the lack of band gap in graphene and efforts to modify the quality and specifications to improve the viability for use in sensors
- Integration Requirements: Leveraging the low power consumption of graphene based sensors to reduce cooling requirements and justify the costs of graphene integration
- Assessing progress in overcoming the signal to noise ratio to focus the capabilities of graphene sensors and deliver commercially applicable products
- Outlining solutions to sensor instability induced by high and low temperatures to maintain robust quality of commercial devices

**Robert Roelver**, *Researcher, Bosch*

- Reviewing the properties of functionalized graphene inks compared to the requirements for state of the art sensing applications to identify application opportunities
- Outlining the development of ultrafast graphene oxide based humidity sensors to open up novel applications
- Understanding the development of quality management protocols required to make large scale commercialisation feasible

- Reviewing the reliability of sensors achieved through tests and benchmarking against the requirements for mass market applications

**Richard White**, *Principal Researcher, Nanotechnology, Nokia*

**2.30 Shared Question & Answer Session****AEROSPACE, ENERGY STORAGE & BIOMEDICAL APPLICATIONS****REVIEWING THE ROADMAP TOWARDS THE COMMERCIALISATION OF GRAPHENE COMPOSITES, ENERGY STORAGE, THERMAL MANAGEMENT & BIOMEDICAL APPLICATIONS****COMPOSITES****2.40 Improving The Doping And Processability Of Graphene Composites To Develop Lighter, Multi-Functional Structures For Aerospace**

- Quality: Assessing the ability of graphene to improve the strength to weight ratio and strength upon impact for highly critical aerospace and defense applications
- Quantity: Outlining advancements in the ability to perform uniform doping of graphene to produce large quantities of high quality composites
- Integration Requirements: Evaluating the challenges still to be overcome for the aerospace industry, including standardisation, supply chain, homogenous distribution and graphene behaviour in matrix systems
- Reviewing the multi-functionality potential of graphene based composites such as damage detection and lightning protection functionalities

**Matthias Geistbeck**, *Team Leader Polymer & Process Engineering, Airbus Group Innovations*

**Robert Young**, *Professor Of Polymer Science & Technology, University Of Manchester*

**3.20 Question & Answer Session****3.30 Afternoon Refreshments In The Exhibition Showcase Area****BARRIER APPLICATIONS****4.00 Assessing The Role Of Graphene As A Transparent, Cheap And Scalable Barrier Coating To Protect Metals From Corrosion**

- Identifying roles for graphene as an anti-corrosion barrier coating to mitigate oxidation and water contact
- Reviewing production and processing techniques for reducing the thickness of graphene coatings and barriers while maintaining consistent quality
- Benchmarking the quality and business case for graphene sheets through CVD production versus graphene platelets in barrier applications
- Understanding the importance of the transparency and liquid and gas impermeability of graphene and ensuring these are retained through production and processing

**Steve Sinton**, *Principal Chemist & LM Fellow, Lockheed Martin*

**Matthias Gester**, *Principal Scientist, Procter & Gamble*

**Karl Coleman**, *Professor, Durham University*

**5.00 Question & Answer Session****THERMAL DISSIPATION****5.10 Using Graphene As A Thermal Interface Material To Reduce Thermal Runaway And Deliver Increased Efficiencies In Global Applications Such As Computing And Electronics**

- Quality: Highlighting production methods to enhance the low thermal resistance properties of graphene suitable for thermal management applications
- Quantity: Reviewing the development of exfoliation techniques to provide viable quantities of platelets for the plethora of global computing and electronic applications
- Integration Requirements: How to ensure thermal dissipation properties do not degrade when in platelet or multi-layer graphene form
- Understanding the extent to which graphene based thermal dissipaters can improve temperature management for electronics and hence justify the business case for investment

**Johan Liu**, *Professor, Chalmers University of Technology*

**5.40 Question & Answer Session****5.50 Chair's Closing Remarks****6.00-7.00 Networking Drinks In The Exhibition Showcase Area**

## PRODUCTION, SUPPLY & PROCESSABILITY

### UNVEILING PRODUCTION METHODS FOR SCALING UP THE SUPPLY OF HIGH QUALITY GRAPHENE AND OPTIMISING MANUFACTURING INTEGRATION TO DELIVER COMPETITIVE GRAPHENE PRODUCTS

#### 8.30 Chair's Opening Remarks

**York Haemisch**, *Senior Director Corporate Technologies, Phillips*  
**STANDARDISATION OF SUPPLY**

#### 8.40 Taking Steps To Ensure Every Graphene Sheet And Platelet Share Consistent And Uniform Characteristics To Meet Product Manufacturing Requirements For Mass Market Applications

- Determining global standards for graphene quality to ensure consistent properties and quality across multiple production sites
- Assessing the reliability of producing a consistent thickness, morphology, shape and size of both graphene sheets and platelets
- Analysing the uniformity of platelet production and distribution of doping to reveal the consistency of material characteristics when embedded within a substrate
- Revealing methods available for the bulk testing of graphene quality to enable confidence and integration into large scale quality-controlled manufacturing processes

**Kitty Cha**, *Research Scientist, Technology Incubator, BASF*

#### 9.10 Question & Answer Session

**GRAPHENE PRODUCTION METHODS  
UPDATING THE INDUSTRY ON THE LATEST  
DEVELOPMENTS IN PRODUCING SCALABLE GRAPHENE  
SHEETS AND PLATELETS OF UNIFORM QUALITY TO  
MEET SPECIFICATIONS FOR COMMERCIALISATION**

#### A: EXFOLIATION

#### 9.20 Unveiling Advancements In The Exfoliation Method To Develop Large Quantities Of High Quality Graphene Platelets: Evaluating The Economic Feasibility Of Its Use In Composites And Coatings

- Outlining developments in the scalability and costs of graphene platelet production for use in mass scale applications such as composites and coatings
- Benchmarking the quality of graphene platelets, including thickness, size, uniformity of properties and repeatability of production
- Reviewing the development of scalable functional anti-corrosion coatings for metals with graphene produced using on-site exfoliation
- Identifying hazards within the exfoliation process and methods for reducing exposure to minimise health and safety risks and hence maximise commercial potential

**Siva Bohm**, *Principal Scientist, Surface Engineering Department, Tata Steel*

**Afshin Tarat**, *Chief Scientist, Perpetuus Energy*

#### 10.10 Question & Answer Session

#### B: GRAPHITE ORE

#### 10.20 Revealing How A Unique Ore Source Has Led To A Breakthrough In The Supply Of Low Cost, Bulk Graphene Platelets For Additives Market

- Understanding how advanced methods enable graphene platelets to be liberated from raw graphite ore in a single step
- Assessing the unique properties of the ore source and determining how the ore quality enhances the ease of graphene production
- Comparing the specifications of graphene extracted from graphite ore with those produced by recent advanced synthetic routes
- Examining current progress towards graphene production via graphite ore on a mass scale and expectations for use as an additive and deliver to other markets

**Mark Thompson**, *Managing Director, Talga Resources*

#### 10.40 Question & Answer Session

#### 10.50 Morning Refreshments In The Exhibition Showcase Area

#### INTEGRATION & PROCESSING

**LEVERAGING DEFECT ENGINEERING, OPTIMISING  
SUBSTRATE CHOICES AND INTEGRATING GRAPHENE  
WITH MANUFACTURING PROCESSES TO PRACTICALLY  
BRIDGE THE GAP BETWEEN PRODUCTION AND  
COMMERCIALISATION**

#### DEFECT CHARACTERISATION

#### 11.20 Understanding The Measurement And Introduction Of Graphene Vacancy Defects For Industrialisation

- Assessing equipment and processes for the accurate measurement of the density and size of graphene defects for large scale quality control

- Examining the defects present within multi-layer graphene compared to mono-layer graphene
- Developing methods to accurately control the defect density of graphene to enable the refining of properties for applications
- Reviewing progress towards the standardisation of graphene supply and characterisation to ensure reliability of properties for commercialisation

**Andrew Pollard**, *Surface & Nanoanalysis Group, National Physical Laboratory (NPL)*

#### 11.50 Question & Answer Session

#### SUBSTRATE INTERACTIONS

#### 12.00 Benchmarking The Effects Of Substrates Upon Graphene Properties, Stability And Processability To Identify The Optimal Substrate For Each Application

- Reviewing how the choice and quality of substrate affects the properties of graphene through chemical and physical interactions
- Understanding the scalability, cost and processability implications for each substrate to identify the optimal material for industrialisation of each application
- Evaluating how environmentally induced changes such as thermal expansion, water moisture and oxidation affect graphene stability on a substrate
- Assessing the role of graphene to radically improve properties such as strength and conductivity of metals such as copper for applications such as electronics

**Antonio Paez Duenas**, *Senior Technology Consultant R&D, Repsol*

#### 12.30 Question & Answer Session

#### 12.40 Networking Lunch In The Exhibition Showcase Area

#### MANUFACTURING IMPLICATIONS

#### 1.40 Examining The Processability Of Graphene And Ease Of Integration With Existing Manufacturing Equipment To Identify The Costs, Timescales And Implementation Processes For Industrialisation

- Revealing the compatibility of existing machinery with graphene and graphene substrates and the costs and ease of integrating new processing capabilities
- Analysing the ability of graphene to withstand mechanical and aesthetic processes such as hole drilling, cutting and spray coating
- Reviewing methods and equipment for the uniform distribution of graphene within composites and components to provide consistent quality in applications
- Assessing instrumentation capable of inspecting graphene in a raw state and within a composite or integrated component as part of rigorous quality control
- Understanding the role and implications of new material standards and qualifications required to manufacture graphene based components

**Mark Davis**, *Chief Science Officer, Solan PV*

#### 2.20 Question & Answer Session

#### BIOMEDICAL

#### A: CANCER TUMORS

#### 2.30 Applying Graphene's Unique Properties In Nanomedicine Applications For Fighting Cancer Tumors

- Quality: Assessing the properties and requirements of currently produced graphene nanoparticles, for its use in the human body as mediators of tumor ablation.
- Quantity: Reviewing the scalability of graphene required in order to justify the business case for large scale biomedical applications
- Integration Requirements: Assessing the health and safety concerns of graphene interactions with human cells and implications for viability of use in medical applications
- Outlining the potential of graphene products within the biomedical industry beyond its use as a tumor hyperthermia agent.

**Mercedes Vila Juarez**, *Principal Investigator, Nanotechnology Research Division, Universidade de Aveiro*

#### B: CELL-CULTURE

#### 2.50 Understanding The Interactions Between Graphene And Cells To Revolutionise Tissue Engineering Methods

- Exploring the potential for graphene as a scaffold for cell-culture and tissue engineering
- Novel strategies for interfacing biological membranes such as cell-membranes with graphene
- Reviewing expected timelines for overcoming remaining challenges for graphene commercialisation for the

biomedical industry

**Aravind Vijayaraghavan**, *School Of Materials, The University Of Manchester*

#### 3.10 Shared Question & Answer Session

#### 3.20 Afternoon Refreshments In The Exhibition Showcase Area

#### ENERGY STORAGE

#### 3.50 Determining The Potential Of Graphene's Conductivity To Enable The Engineering Of Supercapacitors And Batteries Beyond the Capability Of The Lithium Generation

- Quality: Understanding the specifications required, such as conductivity, for use of graphene in energy storage applications
- Quantity: Benchmarking the consistency, shape and size of mass produced graphene films currently in production compared with quantities required
- Integration Requirements: Outlining methods for the integration of graphene within energy storage devices without hindering the conductive nature of the material
- Comparing the energy density and power density of current generation energy storage products compared to existing and potential graphene based alternatives
- Assessing the potential charging and discharging rates of graphene batteries and capacitors to identify the most viable end use applications

**Paolo Bondavalli**, *Head of Nanomaterial Group, Thales Group*

#### 4.20 Question & Answer Session

**REGULATIONS & CERTIFICATION  
IDENTIFYING THE HAZARDS AND EVALUATING  
MITIGATION METHODS FOR THE USE OF  
GRAPHENE THROUGHOUT THE PRODUCTION AND  
MANUFACTURING PROCESSES**

#### HEALTH & SAFETY

#### 4.30 Overcoming And Identifying Hazards Of Graphene Contact With Cell Membranes And Identifying Methods For Reducing Exposure To Improve Safety And Facilitate Scale Up

- Assessing the risks of graphene on the health of staff and consumers through interactions with cell membranes and upon the wider environment
- Understanding how the health and safety considerations change due to environmental conditions, use of substrates or incorporation within a device
- Reviewing mitigation methods during production and processing through the control of direct exposure with cells
- Revealing the role of regulations and industry wide guidelines and their implications upon the costs and ease of production and industrialisation of graphene
- Considering the role of the insurance industry in transferring informational risk and ensuring lack of understanding does not hinder graphene commercialisation

**Craig Poland**, *Research Scientist, Institute of Occupational Medicine*

#### 5.00 Question & Answer Session

**BEYOND GRAPHENE  
DETERMINING THE ROLE OF OTHER 2D MATERIALS IN  
COMPLEMENTING AND COMPETING WITH GRAPHENE  
FOR COMMERCIALISATION**

#### OTHER 2D MATERIALS

#### 5.10 Analysing The Role Of Other 2D Materials Alongside Or As A Replacement Of Graphene To Optimise Material Selection For Each Application

- Understanding the properties and potential applications of 2D materials such as molybdenum disulphide and hexagonal boron nitride compared to graphene
- Reviewing the role of 2D insulators as substrate layers between graphene to maximise its conductive properties in electronic applications
- Highlighting the scalability, quality and processability of 2D materials to understand their business case compared to traditional 3D materials
- Examining the applications of 2D materials aside from those related to graphene and the roadmap towards commercialisation

**York Haemisch**, *Senior Director Corporate Technologies, Phillips*

#### 5.40 Question & Answer Session

#### 5.50 Chair's Closing Remarks

#### 6.00 End Of Congress



# Sponsorship Opportunities

**Graphene Supply, Application & Commercialisation 2014** offers a unique platform for highly relevant graphene producers and industry suppliers to outline their technology advances and unveil routes to commercialisation for end users across the globe.

## Achieving Your Business And Marketing Objectives At The Summit

### DEMONSTRATE THOUGHT LEADERSHIP

The scalable supply of reliable, high quality graphene is the greatest barrier facing large scale commercialisation. You may be pioneering these advances, but do your customers know what differentiates you from your competitors? Use targeted, editorially reviewed keynote presentations and case studies to demonstrate thought leadership to your target audience.

### RAISE BRAND AWARENESS AND INCREASE YOUR PROFILE

Any solutions selected by developers of graphene applications must be subjected to careful comparative cost-benefit analysis. Of course Vice Presidents, Directors and Managers take into account profile, credibility and market leadership when selecting suppliers to support their investment plans. Your organisation must be at the forefront when these decisions are made. Cement your leadership position with targeted branding and profiling campaigns directed at the major leaders of the graphene industry.

### MEET AND NETWORK WITH DECISION MAKERS

Thought leadership, branding and profiling are converted into contracts through extensive face-to-face relationship building. As a dedicated event to graphene commercialisation, this intimate forum enables you to meet specific job titles in one place at one time, giving you the best possible chance of influencing key decision makers.

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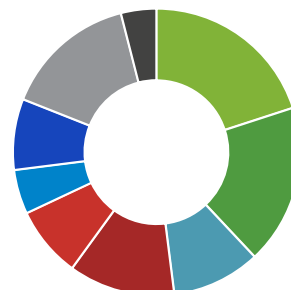
**Andy Barrett**

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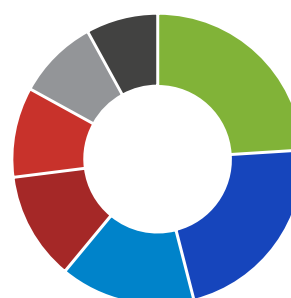
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## Who Will You Meet:

### Attendees Organisation Type:



### Attendees Organisation Type:



## This Year, Join Us At The Birthplace Of Graphene, Manchester!

Manchester is an international hub for scientific research, history and culture. During your visit you could:

- Arrange business meetings with a plethora of graphene companies headquartered in the city
- Visit the Museum of Science & Industry, or the Imperial War Museum
- Indulge in culture, from the Lowry to Chinatown, to Old Trafford Stadium to the Etihad Stadium



# Yes ✓

I would like to register the delegate(s) below for the 2 day conference  
*Graphene Supply, Application & Commercialisation 2014*

## Details PLEASE USE CAPITALS - PHOTOCOPY FOR MULTIPLE DELEGATES

### Delegate 1

☐ Mr ☐ Dr ☐ Miss ☐ Ms ☐ Mrs ☐ Other:

Name

Position

Organisation

Email

### Delegate 2

☐ Mr ☐ Dr ☐ Miss ☐ Ms ☐ Mrs ☐ Other:

Name

Position

Organisation

Email

Telephone

Address For Invoice Purposes

Zip/Postal Code

Country

**WE HAVE GROUP DISCOUNTS**

You can involve your whole organisation or team

## Delegate Rates GUESTS ARE RESPONSIBLE FOR THEIR OWN TRAVEL AND ACCOMMODATION ARRANGEMENTS

	Super Early Booking Discount	Early Booking Discount	Standard Rate
	Book And Pay By Friday 21 <sup>st</sup> March 2014	Book And Pay By Friday 25 <sup>th</sup> April 2014	From 18 <sup>th</sup> April 2014
<b>2 Day Conference Pass</b>	<del>£899 GBP (+VAT)</del> <b>SAVING £200</b>	<del>£999 GBP (+VAT)</del> <b>SAVING £100</b>	<b>£1.099 GBP (+VAT)</b>

## Payment PLEASE TICK APPROPRIATE BOXES AND COMPLETE DETAILS

Payment must be received in full prior to the event.

☐ **Option 1. CREDIT CARD** Please charge my ☐ VISA ☐ AMERICAN EXPRESS ☐ MASTERCARD

Amount £ GBP

Expiry date

Card number

Security Code / CVV (required)

Name on card

Signature of card holder

☐ **Option 2. INVOICE** An invoice containing payment instructions will be sent electronically upon receipt of the completed registration form.

### Terms & Conditions

Cancellations received 30 days prior to the event taking place will be eligible for a refund less £75 administration fee, after that point no refund can be made. Cancellations must be made in writing, if you are unable to attend you may nominate a colleague to attend in your place at no additional cost.

London Business Conferences Limited reserves the right to alter or cancel the speakers or program.

Receipt of this booking form, inclusive or exclusive of payment constitutes formal agreement to attend and acceptance of the terms and conditions stated.

All outstanding fees must be paid within our standard payment period of 7 days. Any outstanding invoices will remain valid should cancellation of attendance be received outside of the aforementioned cancellation period.

\*If you are claiming the early booking discount this

may not be used in conjunction with other discounts advertised elsewhere. All discount codes and offers must be claimed at the time of registration.

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### How To Finalise Your Registration

Now that your details are completed please send your registration form to our Customer Service Team using one of the following options:

**Option 1. Email: [info@london-business-conferences.co.uk](mailto:info@london-business-conferences.co.uk)**

**Option 2. Fax: + 44 (0) 20 7247 9905**

### Enquiries And More Information

Should you have any enquiries or if you would like to request more information contact our friendly **Customer Service Team** on + 44 (0) 800 098 8489 or visit the conference website at [www.graphene-applications-2014.com](http://www.graphene-applications-2014.com)