

**FUNDING
OPPORTUNITIES**

FP7 is the short name for the Seventh Framework Programme for Research and Technological Development. This is the EU's main instrument for funding research in Europe and it will run from 2007-2013. FP7 is also designed to respond to Europe's employment needs, competitiveness and quality of life [Details](#)

**CONFERENCE
DATES**

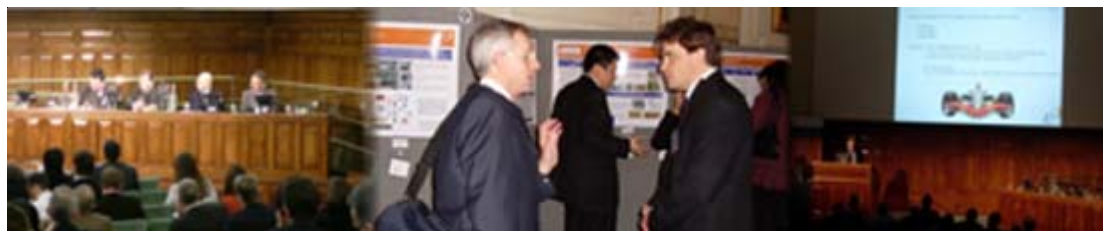
Trends in Nanoscience 2009
28 February - 4 March 2009
Kloster Irsee, Germany
[Details](#)

Ecobuild
03 - 05 March 2009
Earls Court
London, UK
[Details](#)

UK Young Scientists and Engineers Fair 2009
04 - 06 Mar 2009,
Queen Elizabeth II Conference Centre, London, UK
[Details](#)

SMART.mat Annual Meeting
17 March 2009

The programme will include a review of SMART.mat's achievements over the past three years as well as a look towards the future of the network within the next phase of activities of the Materials KTN. National Motorcycle Museum Birmingham, UK
[Details](#)



LTN EVENT TACKLES THE LATEST ADVANCES IN 'SMART' MATERIALS

A major networking event on breakthroughs in 'smart' materials technology was held on 21 January, attracting speakers from a wide range of industry and academic perspectives.

Advances in 'smart' materials addressed breakthroughs in structural and composite materials, high throughput screening, materials discovery, smart coatings, surfaces and nano-materials, during a day-long event based around 50 displays of the latest innovation.

LTN (London Technology Network) hold monthly networking events on a wide range of sectors, attracting the very best speakers to raise challenges and share knowledge. Previous events have covered topics such as wearable technologies, and polymers & plastics.

A not-for-profit, government funded initiative, LTN assists companies across not just London, but the Greater South-East of England, to access the best research from universities across the regions. With 7,000 research contacts, and links to European technology and research, LTN's free matchmaking service is the innovation sector's best-kept secret.

Highlights from the speaker sessions included Matthew Easton and Steve Ogin of McLaren Racing and the University of Surrey respectively discussing the physical forces experienced by structures in Formula 1 cars (particularly when cornering) and how cutting edge materials and strain monitoring techniques were being used to develop future designs.

Marcel Buckley of Airbus gave an in depth account of how future product designs would likely feature high proportions of composites and that the ability to adapt existing manufacturing equipment to work reliably with cutting edge technology was a challenge that innovators should consider.

Jawwad Darr of University College London outlined an ambitious new project which would see large volumes of uniform nanoparticles synthesised to order in much reduced time periods. In a first of its kind, the new Rapid Automated Materials Synthesis Instrument also uses hydrothermal processes eliminating the need for toxic organic solvents and additives.

Derek Illsley of Sun Chemical Functional Coatings gave a refreshing update on gas barrier coatings for packaging materials focussing on potential advances in the area and where they were likely to come from. Choosing the right protective film whilst maintaining flexibility and the environmental benefits of such packaging were also important points raised.

The latest innovations from the university sector were on display throughout the day, sourced via LTN's Business Fellow network. Business Fellows are top-level scientists and heads of department, approached and trained by LTN to improve their engagement with industry.

A core network of Business Fellows at 38 universities means LTN has privileged access to the latest research, with links to UCL, Imperial College London, Queen Mary, University of London, the University of Cambridge, Oxford University and many more.

To find out more about LTN's upcoming events, or to benefit from their other services, contact Tim at t.benzie@LTNetwork.org.

- A. Hebb and T. Benzie

Innovations in Textiles 2009:

Smart, Nano and Technical Textiles for Medical, Industrial and Clothing Applications
18 - 19 March 2009
The Royal College of Physicians
London, UK
[Details](#)

5th International Materials Symposium

Materials 2009

5 - 8 April 2009
Alameda Campus, Technical University of Lisbon
Portugal
[Details](#)

Materials Research Society Spring Meeting 2009

13 - 17 April 2009
San Francisco Marriott
California
[Details](#)

Materials KTN Annual Event

23 Apr 2009
Church House Conference Centre,
London, UK
[Details](#)

Techtextil and Avantex Symposium 2009

16 - 18 June 2009
Congress Centre, Messe Frankfurt
[Details](#)

The 2nd International Conference on Self-healing Materials

28 June - 1 July 2009
Westin Chicago River North,
Chicago
Illinois USA
[Details](#)

ICCM17

17th International Conference on Composite Materials
27 - 31 July 2009
Edinburgh International Conference Centre
Edinburgh, UK
[Details](#)

11th ISAM 2009

The 11th International Symposium on Advanced Materials
8 - 12 August 2009
Islamabad, Pakistan
[Details](#)

Ten sci-fi devices that could soon be in your hands

The New Scientist has compiled a list of the top ten gadgets which could become reality by 2039. These gadgets could change our lives more than the internet, cellphones and the ipod. A number of the items have featured in previous issues of the SMART.mat Newsletter. [Details](#) [Details](#)

Cloaking research advances

Researchers are one step closer to creating cloaking technology that could make objects appear invisible. Metamaterials can be used to form cloaking structures that can bend electromagnetic waves, such as light, around an object. Although entering the realms of fantasy, on a more basic level, this also means that static impeding mobile communications signals can 'disappear' and create clearer signals. [Details](#) [Details](#) [Details](#)

Palm unveils smartphone at show

The touchscreen handset runs a web-centric operating system that aims to help people organise and manage their many online contacts and identities. The device is seen as a competitor to rival smartphones such as the iPhone, BlackBerry, N97 and G1. Palm showed off the **Pre** at a news conference in Las Vegas. [Details](#)



Smart mobile can turn on heating

Nokia has announced it is developing a smart home platform, Nokia Home Control Centre. The platform is opening a new era for networked home services and solutions. Nokia's Home Control Centre will be the basis for next generation security, smart home solutions and household energy management systems. The platform is open allowing third parties to integrate their own smart home solutions and services; its core consumer value is the plug and play experience across all solution areas with high security levels built in. All solutions based on the platform can be used through a smart phone or PC locally or remotely. [Details](#) [Details](#)

Grasping nanospirals promise new smart materials

A team at Harvard have found a way to make nanospirals self assemble, by starting with an array of epoxy-resin bristles immersed in a mixture of ethanol and water then taken out to dry. As the liquid evaporates its surface tension draws the bristles together forming mini towers, as the liquid continues to evaporate the bristles intertwine, making the towers twist. [Details](#)

Self-powered devices?

Imagine a self-powering cell phone that never needs to be charged because it converts sound waves produced by the user into the energy it needs to keep running. Prof Tahir Cagin and his partners have found that a certain type of piezoelectric material can convert energy at a 100 percent increase when manufactured at around 21 nanometers in thickness. This is a significant discovery for the power harvesting field, a field that aims to develop self powered devices that don't require replaceable power supplies, such as batteries. [Details](#)

Smart fabrics that monitor health

In a new study researchers in the US and China are reporting progress toward a simple, low cost method to make 'smart fabrics'. They point out that the current electronic textiles are too bulky, rigid and complex for practical use. The researchers also show that the new e-fibres are capable of detecting diseases and monitoring heart rates. [Details](#) [Details](#) [Details](#)

New 'smart' materials for the brain

Scientists have shown that carbon nanotubes may be the ideal smart brain material. The research results show that unlike metal electrodes the nanotubes can create shortcuts between the distal and proximal compartments of the neuron, resulting in neuronal excitability and are a promising step forward in the search to find ways to bypass faulty brain wiring. Carbon nano-electrodes could be used to replace metal parts in clinical applications such as deep brain stimulation for the treatment of Parkinson's disease or severe depression. [Details](#)

Smart lighting: New LED drops the "droop"

Researchers have developed and demonstrated a new type of light emitting diode (LED) with significantly improved lighting performance and energy efficiency. The new polarization-matched LED, developed in collaboration with Samsung Electro-Mechanics, exhibits an 18 percent increase in light output and a 22 percent increase in wall-plug efficiency, which essentially measures the amount of electricity the LED converts into light. [Details](#)

A better way to make nanotubes

The shortest segment of a carbon nanotube has been synthesized for the first time. The compound, called cycloparaphenylene, could usher in a new era of more efficient carbon nanotube production. [Details](#)

Metamaterials 2009

3rd International Congress on Advanced Electromagnetic Materials in Microwaves and Optics

30 Aug - 4 September 2009

Queen Mary University of London

UK

[Details](#)

Euromat 2009

European Congress and Exhibition on Advanced Materials and Processes

7 - 10 September 2009

Glasgow, UK

[Details](#)

2010 Materials Research Society

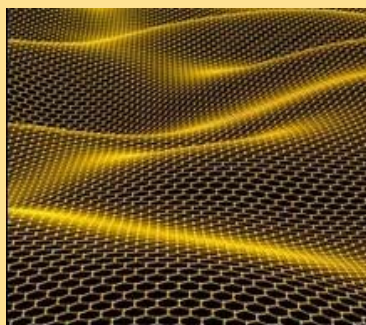
Spring Meeting

5 - 9 April 2010

San Francisco, California

CALL FOR SYMPOSIA

We would like to request your input on future symposium topics as part of the early stages of planning the technical program for the 2010 MRS Spring Meeting. We want to consider new, rapidly developing areas in Materials Science as well as topics within the traditional core area of the Spring Meeting. [Details](#)



*science photo library



Libraries to offer 'smart meters'

Library users in York are being given the chance to test out 'smart meters' to track how much electricity and gas they use. The devices record how much energy is being used in the home and gives tips on how to reduce bills. [Details](#)

Smart amoebas reveal origins of primitive intelligence

In recent years the amoeba has surprised researchers with its ability to behave in an intelligent way making the researchers think they have a memory storage device. As with human brains, the device can strengthen and store memories for some time but if the memory isn't used it gradually fades away. [Details](#)

Bio-inspired wing design to revolutionize aircraft flight

Inspired by nature a mechanical engineering professor is currently developing aircraft wing designs that imitate the amazing flight of birds by altering the planform of the wings in order to optimize the aerodynamics for a given flight stage [Details](#)

Smart kits aim to reduce thefts

Homeowners across Northamptonshire are being given smartwater devices by the police to help reduce the number of burglaries. Smartwater is a property marking system that carries a unique DNA like forensic code. Once products are coated traces can remain on the hands of anyone who has touched the items. [Details](#)

Molecular forklifts overcome obstacle to 'smart dust'

Algae is a vivid green giveaway of nutrient pollution in a lake. Scientists would love to reproduce that action in tiny particles that would turn different colours if exposed to biological weapons, food spoilage or signs of poor health in the blood. Researchers have now tapped the working parts of cells to clear a major hurdle to creating such "smart dust." The feat, which signifies a new approach to technology known as the "lab on a chip," is to be reported in the journal *Nature Nanotechnology*. Chip-based labs have been developed in recent years as portable tools to gauge the presence of bioweapons, pollution, or to conduct on-the-spot blood tests. They are essentially assays, or ways to test for different pathogens, chemicals or compounds. [Details](#)

Bendy gadget future for graphene

A remarkable material called graphene could soon be used to make flexible and transparent high-speed electronics. Graphene's incredible mechanical and electronic properties are well known, but it is difficult to make in bulk. It consists of one-atom-thick layers of carbon atoms arranged in hexagons. A report in the journal *Nature* is the third in recent efforts that have seen the production of centimetre-scale samples of graphene. The transparent samples can be fixed to any surface and bent or twisted without damaging them. When the technique is perfected, such films could be used in solar cells as well as any number of bendy, thin, transparent gadgetry, such as crystal-clear, flexible displays. [Details](#)

Smart networking

Researchers have developed a small open-source, IPv6-ready protocol stack, which could enable every device, no matter how limited by power or memory, to have an Internet Protocol address. The uIPv6 stack has the potential to impact a wide range of markets where automation is key, just as voice over IP did in telephony. 'Smart' devices powered by sensors and actuators could help transmit information over networks to locations where the information can then be analysed, correlated with other data and acted upon. But the proliferation of systems based on the idea has been restricted by the cost associated with ensuring that all the devices in such systems are interoperable. [Details](#)

Smart analysis

Researchers working on the EU-funded SMART-BIOMEMS project are developing a system that could enable DNA analysis to be carried out on a single, portable device. The project is creating a new microsystem – a lab on a microfluidic chip – that can be used in a diagnostic device to automatically analyse DNA samples with high accuracy. Current technology limits DNA analysis to large, expensive equipment with a high potential for human error due to the different steps involved. Researchers hope that the microanalysis system will improve efficiency as well as the detection and treatment rate. [Details](#)

Polymer coatings heal when scratched

A method of making polymer coatings that repair themselves has been devised. The technique involves encapsulating a catalyst and a healing agent in separate spheres that are less than 100 microns across, which are then dispersed within the coating material and applied to the substrate. [Details](#)

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IOM3 INSTITUTE MEMBERS

You are able to update your contact details online and set up your personal interests profile by visiting the new 'members' area [HERE](#)



Smart fabric solutions

Two European research streams are investigating new applications for smart fabrics; including helping prevent repetitive strain injury (RSI) and keeping emergency workers safe in disaster zones. The Context project developed a vest to tackle RSI, a serious work safety issue which can lead to debilitating injury. To do so, researchers used sophisticated sensors to measure muscle contraction as a predictor for long-term, low-key stress, the leading risk factor for RSI. [Details](#)

Nanoscale coatings

Scientist Bruce Cook is leading an effort to develop nanoscale coatings to boost the energy efficiency and extend the life of pump rotors and industrial cutting tools. The coating is a boron-aluminium-magnesium (BAM) ceramic alloy called AlMgB14 that he discovered about eight years ago. Cook's team is using pulsed laser deposition to deposit a thin layer of the alloy on hydraulic pump vanes and tungsten carbide cutting tools. [Details](#)

Nanofibres reduce flammability

Researchers have discovered that adding a small amount of carbon nanofibres to the polyurethane foams used in some upholstered furniture can reduce flammability by about 35 per cent when compared to foam infused with conventional fire retardants. [Details](#)

Nanotech clothing fabric 'never gets wet'

If you were to soak a raincoat underwater for two months it would be wet through at the end of the experience. But a new waterproof material would be as dry as the day it went in. The fabric, made from polyester fibres coated with millions of tiny silicone filaments, is the most water-repellent clothing-appropriate material ever created. Drops of water stay as spherical balls on top of the fabric and a sheet of the material need only be tilted by 2 degrees from horizontal for them to roll off like marbles. A jet of water bounces off the fabric without leaving a trace. The secret to this incredible water resistance is the layer of silicone nanofilaments, which are highly chemically hydrophobic. [Details](#)

Nano 'balls' can be used to manipulate the properties of glass

Researchers are investigating a new 'model material' that can adopt a series of different properties. This is possible because of miniscule balls of knotted polymers which become enlarged as the temperature drops. It has interesting potential for research into the consequences of ageing in the properties of glass, which can serve as a model for the natural process of ageing. [Details](#)

Tomorrow's world, today

Kevin Tinkham is a Technology Translator for the SMART.mat Knowledge Transfer Network who recently produced the State of the Art review entitled 'Smart Surfaces and Functional Coatings in the Modern Built Environment'. He has now been published in the Building Surveying Journal. In the first of two articles Kevin gives an overview of 'smart materials' used in the built environment, initially focusing on energy efficiency and occupier comfort. For further information email kevin.tinkham@corusgroup.com

Feed back on SOA

SMART.mat is keen to receive feedback on the State of the Art Reviews that can be found on the [website](#). Please send your comments to Jackie.Butterfield@iom3.org

Download the following reports from the SMART.mat website

- NEW Smart Surfaces and Functional Coatings in the Modern Built Environment
- NEW In-Vivo applications of SMART Materials
- Smart and Active Packaging to Reduce Food Waste
- Consumer Packaging - Opportunities for SMART Technologies
- State of the Art Review - Structural Health Monitoring
- SMART Materials, a designer's handbook

News on company products

If you or your company would like to include news on any products / programmes that are applicable to smart structures or surfaces in the SMART.mat quarterly newsletter, please provide a brief description, contact details, and website address to nicola.radford@namtec.co.uk

SMART.mat is a TSB funded project and is part of the Materials Knowledge Transfer Network (KTN) concentrating on 'smart' technology. SMART.mat is a partnership of NAMTEC and the Institute of Materials, Minerals and Mining.

[Click Here to visit the Materials KTN Website](#)

The next issue of the SMART.mat newsletter will be distributed in April 2009.



Materials

Knowledge Transfer Network