

**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**

**17th International Symposium on Applications of Ferroelectrics**

24-27 February 2008  
Santa Fe, New Mexico

[Details](#)

**Smart Coatings 2008**

27-29 February 2008  
Orlando, Florida

[Details](#)

**Technical Textiles - a view of the future Performance Fabrics and Interactive Clothing**

6 March 2008,  
Manchester Conference Centre,  
UK

[Details](#)

**SPIE Smart Structures and Materials & Nondestructive Evaluation and Health Monitoring**

9 - 13 March 2008,  
Exhibition Dates:  
11 - 12 March 2008  
San Diego, California, USA

[Details](#)

**RFID Journal LIVE 2008**

16-18 April 2008  
The Venetian, Las Vegas

[Details](#)

**Focus on Radio Frequency Identification (RFID)**

**High-End boutique makes RFID its new standard**

At the Industry Standard clothing boutique, which opened September 2007 in Columbus, Ohio, RFID is fashion-forward. Patrons ready to make purchases place clothing on a countertop, and in about a second, the point-of-sale (POS) system reads each garment's tag, creates a list of goods and calculates the total cost. However, the technology is not only being used to make the checkout process quick and easy. It also enables the store's customers, who tend to be young and tech-savvy, to use the Internet and cell phones to confer with friends about which garments to buy. An RFID reader antenna scans the Electronic Product Code (EPC) of each item placed on a wall hook in the dressing room. A touch-screen monitor then displays a photo and item description. [Details](#)



**Maternity apparel maker to deploy smart displays in stores**

Retailer 'Tomorrow's Mother' sells its garments in maternity departments it leases at 384 stores across the United States and Canada.

The stores often fail to provide the company with sales and inventory data in a timely manner, resulting in out-of-stocks. To obtain real-time inventory data, the retailer decided to test an RFID-enabled smart-shelf system developed and supplied by Seonic. [Details](#)

**Metro sees progress with its frozen-foods pilot**

The retailer is using RFID-enabled forklifts at a distribution centre in Hamm, Germany, to track tagged pallets of frozen food and the locations where they are stored. [Details](#)

**Food and livestock tagging expected to see bumper gains**

The sector is expected to be the dominant RFID market by 2017, when sales of RFID tags for food and livestock are slated to reach \$2.66 billion. [Details](#)

**Elektrobit unveils UHF RFID suite**

The EB Identification Network consists of RFID interrogators, controllers and software to help companies more easily implement, tune and manage networks of RFID readers, thereby reducing interference and congestion. [Details](#)

**Recognizing excellence in RFID**

The second-annual RFID Journal Awards will serve to spotlight the best uses of RFID, as well as the best new product. [Details](#)

**RFID news roundup**

VDC forecasts 25 percent smart card market growth; CipherLab debuts 9400 industrial mobile computer; Tego announces initial funding; TI, NXP announce new passport chips; SAP awards certificates to Datamax, Blue Vector. [Details](#)

**STRUCTURES NEWS**

**Space technology powers insulin watch pump**

Piezo electric technology produces sufficient electricity to power a novel wristwatch type insulin pump for people with type 1 diabetes. [Details](#)



**Jet engine bearings monitored using wireless sensors**

Researchers at Purdue University are developing Wireless Micro Electromechanical Systems (MEMS) sensors that are being used in a harsh jet engine environment to detect when critical bearings are close to failing to help prevent breakdowns. [Details](#)

## Structural Health Monitoring Seminar

7 May 2008

National Physical Laboratory,  
UK

[Details](#)

## 3rd International Conference

Smart Materials, structures and systems

8-13 June 2008

Acireale, Sicily, Italy

[Details](#)

## 4th European Workshop on Structural Health Monitoring

2-4 July 2008

Krakow, Poland

[Details](#)

## The 4th International Conference on Technological Advances of Thin Films and Surface Coatings (ThinFilms2008)

13-16 July 2008

Singapore

[Details](#)

## Smart Sensing for Structural Health Monitoring (S3HM)

22-27 September 2008

Udine, Italy

[Details](#)

## In situ monitoring of monumental surfaces

27-29 October 2008

Florence

[Details](#)

## Books

### Engineering Analysis of Smart Material Systems

by Donald J Leo

Research and Markets has announced the addition of Engineering Analysis of Smart Material Systems to their offering.

The book provides a pedagogical approach that emphasizes the physical processes of active materials and the design and control of engineering systems

[Details](#)

## SHM company says it can extend life of F-111

The Australian government's decision to retire the F-111 fighter jet due to structural concerns is being questioned by a Structural Health Monitoring (SHM) company in Perth, which says that SHM could prolong the service life of the aircraft. [Details](#)

## Glow in the dark clothing

The William Lee Innovation Centre (WLIC) is developing an electroluminescent yarn which emits light when an electric current is passed through it. The yarns could be incorporated into clothing to make cyclists, joggers and pedestrians more visible. [Details](#)

## Designing new piezoelectric materials

A new type of piezoelectric polymer material has been developed which could be piezoelectrically stable at 150°C, significantly higher than the polyvinylidene difluoride (PVDF) polymers which are only stable to 90°C. [Details](#)

## Structural gel changes colour

Researchers at MIT have developed a new structured gel that changes colour rapidly in response to a variety of stimuli, including pressure, temperature, humidity and salt concentration. [Details](#)

## Power harvesting wireless bridge monitoring sensors

Researchers at Clarkson University have developed a power harvesting device that uses the vibrations of passing traffic to power wireless bridge monitoring sensors. [Details](#)

## Acoustic emission detection system

A single channel continuous sensor has been developed that has the potential to detect and locate early crack growth in structures, thereby providing timely information to prevent catastrophic failures. [Details](#)

## Smart dust used to measure flow and currents

Marble sized smart dust probes have been developed to measure temperature and to send data back wirelessly. The probes float under water, enabling them to be carried along by underwater currents. [Details](#)

## New self-healing method for self-repair composites

A new self-healing system has been developed which doesn't require a catalyst. 150 micron chlorobenzene microcapsules are dispersed in the resin matrix, which rupture when a crack propagates through it. The structural integrity is regained as the solvent finds unreacted epoxy monomers which cause polymerisation to occur. [Details](#)

## "Smart" optical microchips could be used for remote sensing

Microchips are being explored to see if utilising light instead of electricity could provide greater performance. New theory suggests that chips could feature tiny machines with moving parts powered and controlled by the very light they manipulate. [Details](#)

## New European Piezo Institute kicks off

The Piezo Institute highlights European collaboration between universities and industry. It is funded by the EU Multifunctional INtegrated Devices (MIND) Network to provide expertise and resources on piezoelectric devices and materials. There are various types of membership, and you can sign up to a Newsletter. [Details](#)

## Smart Gloves could be your personal trainer

A glove has been developed with embedded sensors to record movement and repetitions to aid exercise. The device could lead to a new style of personal trainer, providing real time feedback on performance. [Details](#)

## Georgia institute develops shape-memory polymers for biomedical applications

Light, heat or chemical stimuli alter the shape of shape-memory polymers. These are being developed for medical applications such as opening up blocked arteries. [Details](#)

## Magnetic Shape Memory Foam

Porous nickel-manganese-gallium alloy is being used to alter its shape under a magnetic field. The light weight, high strain material has great potential for many applications including space applications and automobiles. [Details](#)

## Smart tyre warns of problems

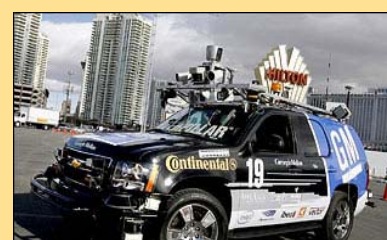
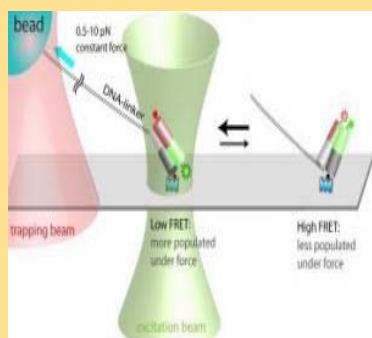
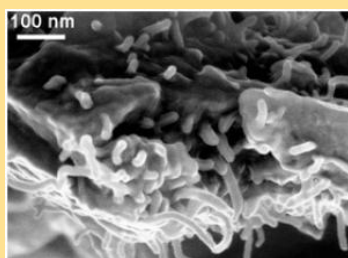
Using the whole tyre as a sensor has enabled a system to be developed that can detect manufacturing defects, imbalance and degradation, as well as low pressure that is detectable using existing methods. [Details](#)



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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](#)



## Project on multifunctional textiles is underway – POLYTECT

The development of multifunctional technical textiles is being undertaken under a European SME partnership programme, aimed at the retrofitting of masonry and earthworks. This site provides information on the project of which some documents will be made public. [Details](#)

## Smart Insulin release system

Biomedical engineers demonstrate feasibility of "smart particle system" that delivers insulin when a spike in blood sugar levels is detected. [Details](#)

## Carbon nanotubes could provide structural health monitoring and self repair capability

The inclusion of carbon nanotubes in composite structures could provide feedback on the health of a structure by measuring changes in electrical resistance and determining the damage location. Localised heating via an electrical charge could then melt an embedded healing resin that would impregnate the crack. [Details](#)

## Pressure sensitive nanotubes

3mm long carbon nanotubes that were repeatedly squeezed, exhibited a linear relationship between applied force and electrical resistance, showing potential for pressure sensors [Details](#)

## Anthrax toxin detected by carbon nanotubes

Attaching peptides to Carbon nanotubes enables them to select anthrax proteins amongst a mixture of other proteins. The Anthrax protein can then be destroyed by exposing the mixture to light. This technique could lead to the development of antibacterial films and possibly a means of detecting and destroying tumours. [Details](#)

## Biodegradable nanoparticles used to target tumours

A new type of biodegradable nanoparticles has been developed that could be used to deliver anti-cancer drugs to target tumours. [Details](#)

## Detection of nano-scale motion of biomolecules

A new hybrid technique has been applied using force and fluorescence to accurately detect the nano-scale motion of biomolecules. [Details](#)

## Novel Biosensors are being developed

Researchers at Penn State University are developing a novel technique of biosensor by tethering molecules to surfaces, which capture biomolecules. These could be tailored to detect chemical warfare agents and environmental pollutants. [Details](#)

## Magnetics control cellular signalling

Researchers have shown that magnetism can be used to control cellular level events, which could lead to new systems for the release of drugs or control heart rhythms and muscle contraction. [Details](#)

## E-paper developments

A novel type of electronic-paper has been developed by Qualcomm which can switch pixels fast enough to display high-quality video images. [Details](#)

## Special needs babies benefit from small robots

A small robot with sensors is enabling special needs babies to be mobile, allowing them to explore their surroundings independently. [Details](#)

## Mimicking the body's self repair capability in aerostructures

Cornerstone Research Group is looking at reflexive composites that detect and respond to damage, whilst informing the operator of the location and state of repair. [Details](#)

## NASA declares government tech invention of the year

A device that can act like muscle and nerves to expand and contract surfaces is the NASA Government Invention of the Year. [Details](#)

## Meet the car that drives itself

The car, called Boss was unveiled at a technology show in Las Vegas, it lets you sleep while you travel or catch up with emails. [Details](#)

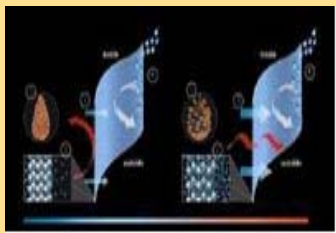
## Nanotechnology: Small but mighty

Architects and building manufacturers are slowly bringing to market new applications that allow the positive outcomes of nanotechnology to become more visible in the built environment [Details](#)

## **SURFACES NEWS**

### **New Smart boxes provide alternative to RFID labels**

RFID inlays are embedded in the cardboard that is then used to make boxes, this smart material is compatible with a variety of box-making equipment, and has been successfully tested on manufacturing lines. [Details](#)



### **When clothes think ahead climate is always right**

The c\_change membrane technology follows nature's example 'open when warm, shut when cold'. [Details](#)

### **Advanced paintjob that changes colour at the touch of a button**

With the introduction of a new technology using 'paramagnetic' paint coating, the colour of your car will no longer be set in stone. [Details](#)

### **Cyber shirt to harness your energy**

Advances in miniaturisation and flexible electronics could allow necessary wiring to create energy-generating clothing. [Details](#)



### **Smart fabrics used for ski wear**

Quiksilver Bartik Beanie utilises d3o™ technology in its head wear providing impact protection for skiers. The material consists of "intelligent molecules" that flow with the skier's movement; however they lock together when subjected to shock. [Details](#)

### **Venus fly trap inspires**

The "snap" transition of the Venus fly trap has inspired a new polymer material covered in small holes which are also covered by a cap made of thin lenses that snaps between convex and concave in response to a trigger. This could lead to materials that can adhere and release on command, or change reflectivity. [Details](#)

### **Vibrotactile suit could improve dancing**

A Vibrotactile suit has been developed to help improve co-ordination, and to aid teachers of physical activities such as dance and golf and also to aid rehabilitation. [Details](#)

### **Coating method mimics mussels**

Functional surfaces could be developed as a result of a study which uses a surface layer of polydopamine, which sticks to practically anything. This in turn would adhere a second coating which could be functional. [Details](#)

### **Nanostructured water repellent surface developed**

A glass powder coating material has been developed that maintains a microscopic layer of air on surfaces when it is covered in water. This could lead to a cheaper method of producing 'super-hydrophobic' surfaces. [Details](#)

### **Nature inspires water repellent and anti-reflective coating**

A novel method of spin coating has been used to produce patterns on a surface to mimic moth eyes and wings of cicadas, to provide anti-reflective and water repellent surfaces respectively. [Details](#)

### **Meat protected using anti-microbial edible film**

An edible film has been developed that could be used to coat meat to prevent contamination with bacteria. The film is based on a whey protein that can be used as a carrier for antimicrobials. [Details](#)

### **Fruit and vegetable foodwrap that can kill E.Coli bacteria**

Another type of edible natural antibacterial coating has been developed made from oregano oil and apple puree which can kill the E.Coli bacteria. [Details](#)

### **Oil off a duck's back**

A novel, oil repelling material could potentially be used to replace o-rings and rubber gaskets which are susceptible to damage when submersed in fuel. [Details](#)

### **Chemically sensitive coatings could be produced on mass scale**

An inkjet printing method has been used to print thin sensor films of barium carbonate onto microchips, enabling the potential for sensitive gas detectors to be produced on a mass scale. [Details](#)

### **Switchable surface that repels also draws a liquid**

A novel non-stick material is being developed that uses "nanonails" to repel liquids, however when an electric current is applied the surface retains the liquid, sucking it between the nails. [Details](#)





### Variable tint 'Smart windows' on show in Tokyo

Hino motors Ltd has unveiled a concept motorcoach that allows occupants to control the amount of sunlight, glare and heat passing through the windows and sunroofs. [Details](#)

### Sony scented cellphones

Scents are released from a replaceable strip located near the central hinge and guaranteed to work for 3 months. [Details](#)

### Interactive LED roof tiles

These transparent roof tiles feature built in LEDs powered by a series of self contained solar-photovoltaic cells. [Details](#)

### Paint that can generate electricity

Industrial Nanotech Inc has announced it is in the development stage of a thermal insulation material that will generate electricity. [Details](#)

### High quality imaging solution for pharmaceutical boxes and labels

Datalase and Domino Amjet have worked together to enable customized information such as lot codes and bar codes to be printed on pharmaceutical packaging. [Details](#)

### Freshness check at a glance

Ciba is presenting revolutionary new OnVU time temperature indicators (TTIs), which show at a glance the freshness of perishable goods, at the Anuga trade fair. [Details](#)

### An electronic revolution

Ciba is launching a new range of printable, electrically conductive inks, which can be used to print electronic circuits. The ability to print circuit features means cost and time savings for both the design engineer and the manufacturer. [Details](#)

### New efficient bulb sees the light

A new type of super-efficient household light bulb is being developed which could spell the end of regular bulbs. The project involves making microscopic holes in the surface of LEDs to increase the level of light they give off. [Details](#)

### Reflect, a noise sensitive table

Reflect is a luminous board embedded in a table, monitoring conversations it shows a visualisation of the current state of the conversation using arrays of colour LEDs. [Details](#)

### 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](mailto:Jackie.Butterfield@iom3.org)

The following reports are available to download :

- Smart and Active Packaging to Reduce Food Waste [Download](#)
- Consumer Packaging - Opportunities for SMART Technologies [Download](#)
- State of the Art Review - Structural Health Monitoring [Download](#)
- SMART Materials, a designer's handbook [Details](#)

### 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](mailto:nicola.radford@namtec.co.uk) / [lfixter@qinetiq.com](mailto:lfixter@qinetiq.com)

SMART.mat is a DTI funded project and is part of the Materials Knowledge Transfer Network (KTN) concentrating on 'smart' technology. SMART.mat is a partnership of QinetiQ, 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 2008.

