E-NEWSLETTER
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APRIL 2007

SMART.mat

Smart Materials, Surfaces and Structures Network

SPONSORSHIP

Would you like to sponsor a 2nd Year BA Textile design student?
Companies interested in sponsoring students by providing technical yarns or materials please contact Dr Sharon Baurley.
Tel: 0207 514 7050
s.baurley@csm.arts.ac.uk
The project commences
18 April 2007

CONFERENCE DATES

Society for adhesion and adhesives – Structural validation and health monitoring of adhesive joints
19 April 2007
London, UK
Details

Emerging trends in Nano Structures & Nano Photonics
30 April 2007
Glasgow, Scotland
Details

Surface Treatment of Titanium for the Designer & Engineer
2 May 2007
National Metalforming Centre
West Bromwich, UK
Details

Smart Fabrics 2007
7-9 May 2007 (New Conference Dates!)
Washington Marriott,
Washington DC
Details

SMART.IDEAS Award winners.

Smart.mat has now made the first grants from its Smart.ideas programme.
The successful applications each receive up to £5,000 towards the cost of an early stage investigation of an application for a smart material or technology.
There was a very wide spread of applications within the awards made this time including an umbrella frame that will correct itself if it blows inside out, a power harvesting device that fits on a vehicle wheel to power a tyre condition monitoring system and a wearable device that automatically dispenses an atomised burst of fragrance, insect repellent or even pharmaceutical when triggered by some external stimulus.

Smart.mat has further funds to support Smart.ideas Awards for details see below.

SMART.idea AWARDS

Objective: SMART.idea awards have been launched to support the objectives of the SMART.mat network by helping Members to improve their industrial performance through the increased use of SMART-based technology.
Awards of up to £5000 are available to fund problem solving, proof-of-concept, technology demonstration and other development activities on behalf of SMART.mat members/companies. Any company applying for a SMART.idea Award (the "problem holder") has to collaborate with a solution/research provider. The award itself will be made to the solution provider, and will be paid once the Member company/problem holder has approved the final report.
Application for the awards is simple and a rapid decision can be given.
For guidelines and an application form please visit www.smartmat.org.uk

COME AND MEET THE SMART.MAT TEAM AT:

Materials KTN Annual Meeting
Making a Difference with Materials

Tuesday 24th April, 2007 Central Hall Westminster, London
Smart.mat will be actively involved in this Materials KTN event including a session on Smart Packaging as well as on Structural Health Monitoring, using smart technologies. There will also be a SMART clinic where you will be able to talk to members of the team regarding any ideas you may have and how SMART.mat can help you.
Places are going rapidly so if you wish to attend please visit the Materials KTN website www.materialsktn.net for programme details and registration. We look forward to seeing you on the 24th.

Please note: all web links included in this e-newsletter are correct at time of distribution. E&OE.

3rd International Symposium "Nanostructured and Functional Polymer-Based Materials and Composites"
13-15 May 2007
Corfu, Greece
Details

World Forum on Smart Materials and Smart Structures Technology
22 – 27 May 2007
Chongqing & Nanjing, China
Details

Smart interior surfaces and materials
23-24 May 2007
Frankfurt, Germany
Details

Adaptronic Congress 2007
23-24 May 2007
Gottingen, Germany
Details

Fourth International Conference on Condition Monitoring
11-14 June 2007
Harrogate, UK
Details

International Conference on Smart Materials and Nanotechnology in Engineering
1-4 July 2007
Harbin, PR China
Details

Sensors & their Applications XIV
11-13 September 2007
Liverpool John Moores University, Liverpool, UK
Details

Electro-active Materials
20 September 2007
Cranfield Management Development Centre, Cranfield, UK
Details

EuroSSC 2007, the 2nd European Conference on Smart Sensing and Context
23-25 October 07
Windermere, Lake District National Park, UK
Details

STRUCTURES NEWS

Adverts that sense when you are watching
Electronic advertising boards could soon sense how you react to them and change their display to grab your attention, researchers say. ***Details***

Smart thin membrane takes on properties of guest molecules
A new nanostructured membrane has been developed that is compatible with molecules; both organic and inorganic. The membrane takes on the properties of the guest molecules which are widely dispersed throughout. There is the potential to create protective clothing permeable to water. ***Details***

New nano-tech gel inspired by sea urchins and venus fly trap
Silicon columns that straighten on contact with water and go limp when they dry could be used to develop microscopic plumbing systems or water repellent clothing. ***Details***

Plastic nanospheres to hunt out cancer
Nanospheres could help take the sting out of chemotherapy by delivering anticancer drugs more effectively and safely, say Australian researchers. ***Details***

Caterpillars inspire robots
Inspiration is to be taken from the caterpillars to produce a robot with bodies, electronic components and wiring that are pliable. Such flexible robots could do everything from explore inside a person's body to help doctors make a medical diagnosis. ***Details***

Smart bladder pacemaker' moves a step closer
Patients with neurological diseases or spinal chord injuries may soon benefit from a 'smart bladder pacemaker', which taps into the spinal chord, targeting the urinary control nerves, allowing the bladder to empty when full, and to increase capacity. ***Details***

Worlds first 'Smart' robotic Micro-drill used in surgery
A smart micro drill is being used to prevent penetration of the membrane in the inner ear during cochlear implants. It does not have to be programmed or made to work from a computer operated by a human. It is smart. It just knows where to go and what to do. This has never happened in medicine before. ***Details***

Potential 'Smart' therapies for breast and ovarian cancer
Smart molecules are being developed to block the protein called podocalyxin, which has been found to cause breast cancer. ***Details***

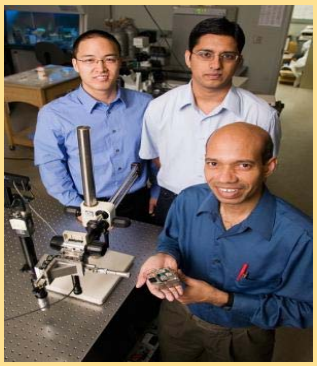
Increased functionality of composite materials could be achieved
Theoretical notion of "stable" composite materials has been dispelled – this could lead to increased functionality of composite materials. ***Details***

Smart Motion Platform
Smart Motion platform keeps itself level in rough seas. It could be used to keep the platform level for maintenance crew accessing off shore wind turbines and other offshore structures in rough weather. ***Details***

Self healing house
A house is being built to withstand earthquakes with intelligent walls that monitor vibration and self heal. Nano polymer particles are to be used that will turn into a liquid when subjected to pressure, flow into cracks and repair the structure. ***Details***

Smart Fluid reacts to UV light
A photorheological fluid has been developed that changes from a gel to a liquid after exposure to UV light. ***Details***

Artificial hand with sensitive fingers
An artificial hand has been built with piezoelectric, temperature and vibration sensors in its fingers that enable fragile objects to be held without crushing. Pressure sensors in each fingertip connect to a control system that maintains the hands grip. ***Details***



Memory metals discovered
Some bent films of metal (of the right microstructure) will return to their original shape with the application of heat. Increased temperature speeds up the response. ***Details***

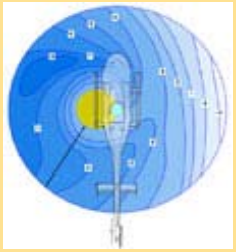
Linear arrays of nanotubes offer potential for high performance electronics
Researchers have developed a method of arranging nanotubes in linear arrays on to plastic and other substrates. Charges move in what is effectively a thin-film semiconductor material. ***Details***

Nano scissors
A Molecular scale pair of scissors have been developed that open and shut in response to light. The tiny scissors are the first example of a molecular machine capable of mechanically manipulating molecules by using light, the scientists say. ***Details***

Optimisation of smart material manufacture
Optimising manufacturing smart materials requires significant control over various parameters need to be optimised, including sample size, interfacial diffusion, the physical environment, and mass transfer properties. ***Details***

Self Healing Composites achieved using smaller repair capsules
Concordia researchers have improved self repair composites by reducing the size of the embedded capsules and the amount of catalyst required. ***Details***

Shape Memory Alloys and Polymers used for smart handle and air vent in car interior
Smart materials are to be utilised in car interiors, including a handle that can fold down when required and an air vent that can self adjust to improve air flow. Shape Memory Alloys and polymers are being utilised because of the ability to change shape and then return to their original state. ***Details***



Morphing blade structures provide greater fuel efficiency
Greater efficiency provided by morphing structures – wings change shape to provide greater fuel efficiency during cruise phase
Reference to helicopter blades: ***Details***
Reference to aircraft wings: ***Details***

New technology safe home for people with Dementia opens in England
Special sensors wirelessly 'talk' to devices, such as the cooker, taps and light switches, in response to the behaviour of the resident. By monitoring movement within the home, the system is able to respond to many different situations without having to contact care staff, often just using simple voice prompts, which could be recorded by family members. ***Details***

Here comes the 'Smart' Home: Fingerprint-reading locks and preprogrammed ovens rolling out
At the recent International Builder Show in Orlando, home builders saw some of the new products that continue to push the technology envelope in housing. Fingerprint-readers that activate doorway locks are among the latest developments in high-tech home security. To set them up, homeowners scan the fingerprints of family members, housekeepers and contractors. Then a swipe of your finger is all that's needed to open the door, but if the system doesn't recognize your scan, you're shut out, literally. ***Details***

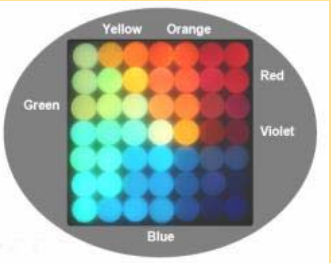
Shopping that speaks to the individual
An Indian start-up company has implemeted an RFID based system which learns customers preferences and informs them of special offers using their mobile phone. Willing participants are given an RFID device such as a key fob or card, which recognises them when they enter the store. They are then alerted to products or offers which may be of interest. ***Details***

'Smart' Wasps
Fortunately 'Smart' wasps does not mean that the uninvited guests at your next picnic are going to be more intelligent in their pursuit of your food and drinks. It means that biologists from the Zoological Society of London (ZSL) were inspired by London Transport's RFID "Touch-in, Touch-out" Oyster card and fitted tiny passive RFID tags to some tropical paper wasps in order to check which nests they visit. ***Details***

Books

Smart Materials in Architecture, Interior Architecture and Design
Axel Ritter

About this book
The book presents the development of Smart materials and also describes their use
in the contexts of architecture, design and Art.
More details



Robots blaze a trail
Two firefighters died when they were engulfed by smoke and lost their exit route while attending a blaze in London's East End in 1992. The smoke was so thick it was impossible to find them and they died when their air ran out.
Now an EU-funded project to develop swarms of palm-sized intelligent robots could help protect firefighters in dangerous, smoke-filled buildings and prevent this happening again. ***Details***

Jet engines shape up
Rolls-Royce is bringing together researchers from India and the UK in a bid to develop shape-changing alloys that could operate at high temperatures inside aircraft jet engines. ***Details***

European Groups Should not over-regulate RFID
Europe is a strong player in the development and implementation of these tags, generating large incomes. A working group has been set up of the various stakeholders to establish consensus on a the feeling towards such tags. At this stage, no new regulations to police the tags are expected. ***Details***

Structural Health monitoring of missiles
A triaxial accelerometer sensor is being used to collect vibration data to pinpoint damage in filament wound composite missile shells. ***Details***

Nano scale pressure/force sensors
Zinc-oxide nano wires that when bent produce electrical charge, these could be used for nano scale Piezoelectric pressure/force sensors. ***Details***

Scrollable displays set to debut
Last year, SMART.mat reported on e-paper being used in a Sony product. Now, a flexible LED screen has been developed by Polymer Vision. The Readius device is as small as a mobile phone with a screen that unrolls to 5 inches across, it will go on sale in Italy later this year. ***Details***

SURFACES NEWS

Tooth implant 'to release drugs'
Forgetting to take medicine may be a thing of the past as researchers close in on creating an artificial tooth which automatically releases medicine. The device is small enough to fit inside two artificial molars in the jaw and will benefit patients that require doses during the night. ***Details***

Sun Roof
A government-funded project could see steel warehouse and superstore roofs painted with dye-sensitised photovoltaic coatings to turn them into power generators. ***Details***

Hiding Messages in plain sight
A technology that can 'hide' information in plain sight on printed images has begun to see the first commercial applications. Japanese firm Fujitsu is pushing a technology that can encode data into a picture that is invisible to the human eye but can be decoded by a mobile phone with a camera. ***Details***

Full spectrum glow in the dark material
Glow in the dark materials have been developed that emit across a wide band in the visible range, which could provide lighting and highly visible signs for use in emergency when no power is available. ***Details***

Smart sunglasses
A new material is being used for smart sunglasses that change shade and colour at the touch of a button, using very little power. ***Details***

Glass with self cleaning coating
A coating applied to glass prevents oil from sticking, but not water. It has the potential for anti-fogging wind shields and sunglasses. ***Details***

Nice smelling clothes
Researchers are looking to infuse the yarn in fabrics with scent to disguise unwanted odours. The scent is captured in the core of the yarn which has an outer sheaf. The scent-infused fabrics could lead to pleasant-smelling blankets and sheets, or could hide the stink of used gym clothes. ***Details***

If you do not wish to receive this newsletter in future, please reply to the email with the word 'unsubscribe' in the subject field. Alternatively, visit the Forum and click on 'My Account' and choose 'no' in the opt-in for mailing contact option.

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 Chain mail fabric
Smart micro metallic chain mail fabric with unique mechanical and electrical properties has been developed. It's ease of movement in two directions also makes it easy to drape over 3D shapes. ***Details***

Wrinkly Polymers
A wrinkly polymer could provide the potential for developing multifunctional fluidic devices for MEMS applications. ***Details***

Breathable chemical suit
Breathable suit that also provides protection against chemical warfare vapours which could be of benefit to emergency and military personnel. ***Details***

Smart labels that indicate when goods have become too cold
Timestrip has now launched the iStrip, a label which gives a clear visual display of when a package has been accidentally frozen in the supply chain. Current and future applications include vaccines, blood, paints and agro-chemicals. ***Details***

Manufacturing smart packaging
Designers and technologists are creating new smart products to be encompassed into the packaging (see Smartmat State of the Art Review) but often little thought is given to the manufacture. An article in Packaging Machinery Technology describes some of the options and modifications that might be needed by the packaging converter. ***Details***

Aircrafts electronic windows shaded using electronic controls
Raytheon Aircraft company is now offering dynamically controllable glass windows. ***Details***

A sense of security
An intelligent sensing system will use wireless technology, GPS and a suite of sensors for real-time monitoring of independent elderly people at home. ***Details***

Smart Fabrics on the Pulse and Underfoot
At the recent CEBIT technology trade fair **(http://www.cebit.de/homepage_e)** in Germany, Zephyr Technology **(http://www.zephyrtech.co.nz/)** of New Zealand unveiled two "Wireless Smart Fabric" products, the BioHarness and the ShoePod.
The integrated sensors of the BioHarness measure physiological data (temperature, breathing, heart rate etc.) while the ShoePod measures mechanical forces to show the biomechanics of the feet. Applications are expected to be military - monitoring the health and fatigue level of soldiers, medical - monitoring patient vital signs, warning of the onset of Diabetic Peripheral Neuropathy symptoms affecting a patients feet and gait, and in sports, health and physiotherapy as a training aid to optimise posture, gait and technique. ***Details***

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 partneship 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 July 2007.

Materials
Knowledge Transfer Network