

**Wednesday 01.12.04**

08.30-09.10 REGISTRATION & REFRESHMENTS

09.15-09.25 **MORNING CHAIR: Welcome and Opening Remarks**  
*Ottilia Saxl, CEO, Institute of Nanotechnology*

09.30-09.50 **KEYNOTE SPEAKER: "Fashion and Technology in 2020"**

- Embedded computing within textiles, i.e. 'Smart' Fabrics;
- Clothes that give read-out of body processes and 'talk to you';
- Biological applications to textiles to prevent cleaning, ironing etc;
- Issue of living in a virtual world, and how that will impact on how we see ourselves in the flesh;
- How we dress in real-space and time.

*Baroness Susan Greenfield, The Royal Institution of Great Britain*

09.55-10.15 **"The Importance of New Technology to the Survival and Regeneration of the UK's Textile Industry"**

- High-added value textiles can be delivered by novel functionality originating from new materials, fabrication processes and products;
- This review paper will demonstrate how innovative products based on new technology are contributing to a regeneration of the UK's textile industry;
- Case studies from safety clothing, sportswear, wound dressing and fashion clothing will be presented.

*Dr Malcolm Wilkinson, Managing Director, Technology For Industry Ltd*

10.20-10.40 **"Nanotechnology: An Opportunity for the European Textile Industry?"**

- What is Nanotechnology? An introduction...
- How industry can benefit and transform into new business opportunities
- Developments available now and in the pipeline
- Major players and examples of work

*Del Stark, Business Development Manager, Institute of Nanotechnology*

10.45-11.05 REFRESHMENTS

11.10-11.30 **"Title TBC"**

- New and emerging textile technologies;
- Drivers of the future technical textiles industry.

*Professor Carl Lawrence, Director of Technical Textiles Research, The University of Leeds*

11.35-11.55 **"Nanocoatings for High Functionality Textiles"**

- Over the years, several methods have been developed to coat textile surfaces for functional applications such as liquid repellency, electrical conductivity, anti-bacterial behaviour, printability, dye uptake, etc;
- Success has primarily been achieved by using high temperature methods, solvents, or strong acid / base media techniques, some of which are becoming increasingly unacceptable due to environmental and safety concerns;
- An alternative approach is to employ plasma processing. This entails exposing the textile to an electrical discharge in the presence of a reactive gas in order to deposit a coating several nanometres thick;
- There are many potential benefits including minimal waste, rapid treatment times, and control of surface functionality. A range of examples employing this technology will be described.

*Dr Jas Pal Badyal, Surface Innovations*

12.00-12.20 **"Plasma Enhancement of Entire Garments for Oil and Water Repellency"**

- Examining technology resulting from an MoD funded project to provide total liquid protection for military warfare suits, utilizing a gas phase deposition process, known as pulsed plasma polymerization, to impart the properties to the entire garment;
- Scale-up to 2000 litres (size of a telephone box) is currently achievable;
- Equipment and processing is a platform technology that will allow many other surface effects to be achieved such as increased wicking and fire retardancy.

*Dr Stephen Coulson, Technical Director, P2i Ltd*

12.25-12.45 **"Self-cleaning of Textiles Coated by TiO<sub>2</sub>: Their use in Clothing, Hospital and Aircraft Industries"**

- This talk will focus on the self-cleaning properties of the TiO<sub>2</sub> added on to surfaces, against: wine, coffee, grease and make-up;
- We have evaluated the self-cleaning effect by methods developed in our laboratory, showing the commercial benefits and the cost of these treatments

*Dr John Kiwi, Scientific Assistant, Ecole Polytechnique Federal De Lausanne*

- 12.45-13.40 LUNCH
- 13.45-14.05 **AFTERNOON CHAIR: "Title TBC"**  
TBC
- 14.10-14.30 **"New EU Call For Textile Projects"**
  - Overview of nanotechnology and nanosciences in the 6th Framework Programme
  - European strategy for nanotechnology
  - Next calls in the 6th Framework Programme*Prof. Dr. Antoaneta Folea, Professor, DG Research, European Commission*
- 14.35-14.55 **"Interactive 'Scentsory Design' for Health and Well-being"**
  - Presenting a vision of the future for textiles, in particular intelligent clothes and smart fabrics that offer a platform for wellbeing and health (drug delivery) working within the realm of nanotechnology and body sensors
  - Discussion topics include:
    - Re-cabbling Fashion
    - Scentient Beings
    - The molecule is the message
    - The 'colodour' emotional membrane
    - 'New data senses'*Dr Jenny Tillotson, Senior Research Fellow, Central Saint Martins*
- 15.00-15.20 **"Purista Fabrics - Fresher for Longer"**
  - Bacteria growing on fibres generate odour;
  - Bacterial numbers relate to odour strength;
  - Bacterial growth can be controlled by antimicrobial agents;
  - Prevention of odour generation improves freshness;
  - Communication with the Purista cobrand.*Dr John Payne, Arch Chemicals Inc.*
- 15.25-15.45 REFRESHMENTS
- 15.50-16.10 **"Natures First Smart Fibre"**
  - Wools chemical and physical properties;
  - Wools NATURAL benefits;
  - Nanotechnology in Woollen Textiles;
  - The Future of Wool.*Malcolm Campbell, Commercial Director, The Woolmark Company*
- 16.15-16.35 **"Use of Nano-silver in Creating Hygenic Textiles"**

This presentation will explore the wide spectrum antimicrobial properties of nano-silver, including their antibacterial, antifungal, and anti-candidas properties, within the following environments:

  - Medical (dressing for burns & scald and wounds, gels for spots and acnes, sticky plasters, endo-tubes - catheters, airways);
  - Personal hygiene applications (female personal hygiene, incontinence, baby nappies);
  - Personal and medical apparels (vest & pants, operating theatre gowns, nurses uniforms, bed linens, curtains, bath & hand towels);
  - Food packaging materials (bags, wraps, boxes & containers);
  - Environmental applications (water filter, air filter, pint and antifouling).*Robert Kwan, JR Nanotech Ltd*
- 16.40-17.00 **Closing Remarks from the Chair**  
*Institute of Nanotechnology*

## Thursday 02.12.04

08.30-08.55 Registration & Refreshments

09.00-09.20

### **MORNING CHAIR: "The Concept of SMART Textiles at the Design/Technology Interface"**

- Defining the SMART concept
- Describing its importance and particularly emphasizing the contribution of both design and technology
- A critique of current research and insight to Prof. Stylios' own work in two areas of SMART: shape changing textiles and wireless data communicating textiles
- Current progress and applications

*Professor George Stylios, Director, Research Institute for Flexible Materials, Heriot-Watt University*

09.25-09.45

### **KEYNOTE SPEAKER: "Wearable Electronics – Keeping in Touch 2020"**

- People will be surrounded by a digital bubble;
- Devices worn in or on the person or in clothing or accessories will be able to communicate freely in this bubble;
- People's bubbles will interact with those of other people and with the digital environment;
- Many devices will be worn in or on the skin, and many others as part of clothing or jewellery;
- Body adornment will make use of new technology such as digital tattoos, video display fabrics, smart accessories etc;
- People will have multiple appearances, depending on who is looking at them. These will be tailored using technologies such as digital mirrors.

*Dr Ian Pearson, Futurologist, BT Exact*

09.50-10.10

### **"Wearable Health Care System: New Frontier on E-Textile"**

- A new concept in health care, aimed at providing continuous remote monitoring of patient vital signs, is now emerging. This paradigm shift is both socially driven - the rising cost of assistance, the need to improve early illness detection and medical intervention - and technologically driven. In particular, the advances in sensor technology, as well as in communication technology and treatment of data, constitute the basis on which this new generation of health care systems can consolidate;
- In these systems conductive and piezoresistive materials in form of fiber and yarn are used to realize clothes where knitted fabric sensors and electrodes are distributed and connected to an electronic portable unit, these systems are able to detect, acquire and transmit physiological signals. The simultaneous recording of vital signs allows parameters extrapolation and inter-signal elaboration that contribute to produce alert messages and personalized synoptic tables of patient's health.

*Katja Wolter, MesseFrankfurt (EU-Project WEALTHY)*

10.15-10.35

### **"Soft Solutions Enabled"**

- One of the latest technologies attempting to bridge the gap between man and everyday objects he tries to interact with is referred to as 'smart' or 'intelligent' fabrics;
- Eleksen is on the forefront of research, development and licensing of soft sensing and switching solutions that enable these innovative product developments;
- Eleksen will present how they overcame the technical implementation challenges and how they sourced capable manufacturing partners for their innovation, they will explain you about their core technology, ElekTex™, and give you an overview of their product portfolio and concept possibilities.

*Dr Nigel Gilhespy, Eleksen*

10.40-11.05

REFRESHMENTS

11.10-11.30

### **"Smart Textiles: Integrated Microelectronics for Large-area Sensor and Display Systems"**

- In this talk an enabling technique for the integration of microelectronics in large-area textiles is presented, which detects the physical shape of the smart textiles and forms routing paths for data transmission, automatically circumventing defective or missing regions;
- This concept allows the smart textiles to be produced in reel-to-reel processes, to be cut in arbitrary shapes, and to be implemented in systems at low installation costs;
- The possible applications are manifold, from alarm systems to emergency way guidance, flexible displays or monitoring systems for textile reinforced concrete.

*Christl Lauterbach, Infineon Technologies AG*

11.35-11.55

### **"Personal Health Monitoring Through Wearable Computing"**

- This talk will the challenges and considerations of intergrating electronics into textiles as well as the benefits
- Paul Lukowicz will discuss the considerations with respect to functionality and the users' expectations.
- The talk will also introduce a 'system architecture concept' and give examples of implemented devices and their applications.

*Dr Pavel Lukowicz, Swiss Federal Institute of Technology*

12.00-12.20

### **"Fabric-ation": Weaving Electrical Circuits"**

What happens when you weave electrical circuits on a loom, rather than etching, printing or cutting them in metal and plastic? Namely:

- How does this change the products?
- How does this change the design process?
- How does this change the company and its working practices?

*Dr Asha Peta Thompson and Dr Stan Swallow, Intelligent Textiles Ltd*

- 12.25-12.45      **"Smart Textiles in Vehicles"**
- Smart textiles can introduce new features. Two examples are discussed here – climate control based on passenger comfort, and detection of reduced attention of the driver.
- Prof. Leiva Van Langenhove, University of Ghent*
- 12.50-13.40      LUNCH
- 13.45-14.05      **AFTERNOON CHAIR: "Nanotechnology in Medical Care: A Clinician's Perspective"**
- Prof. Shervanthi Homer-Vanniasinkam, Technitex Faraday Partnership*
- 14.10-14.30      **"Advanced Fibrous Materials"**
- Professor Xiaoming Tao, Institute of Textiles and Clothing, Hong Kong*
- 14.35-14.55      **"Developments in Textile and Fibre Technology"**
- CSIRO research into enabling technologies for smart textiles;
  - Progress of 'smart' textiles from concept to practical applications will require the development of a range of new technologies. The science underlying these technologies still needs to be developed and CSIRO Textile & Fibre Technology has established a number of programs in response to this need;
  - One important program is the production and application of carbon nanotubes (CNTs). CTFT has developed a small CVD reactor to produce reasonable amounts of high quality multiwalled CNTs for experiments ranging from research into the production and quality of CNTs per se to various applications such as dispersion and blending of CNTs to produce composite fibres and films;
  - Another program is flexible electronics, which includes conducting polymers and the incorporation of sensors into textiles either directly into the fibres or by conventional textile processes such as knitting;
  - The final area of investigation is medical textiles, which for CSIRO is concerned with gaining a better understanding of what is required and developing from this new technologies.
- Ken Atkinson, CSIRO Textile and Fibre Technology*
- 15.00-15.20      REFRESHMENTS
- 15.30-15.50      **"High Performance Multifunctional Carbon Nanotube Based Fibers and Yarns"**
- Hundred-meter-long carbon nanotube composite fibers having a higher toughness than spider silk or any other natural or synthetic fiber, can now be spun;
  - These nanotube composite fibers, which are easily woven or sewn into textiles, are interesting for artificial muscles and other electronic textile applications - such as distributed sensors, electronic interconnects, electromagnetic shielding, antennas, and batteries;
  - Such applications and the origin of the attractive fiber properties will be discussed.
- Dr Alan Dalton, University of Texas, Dallas*
- 15.55-16.15      **"Smart fibres and textiles based on shape memory polymers"**
- Basic concept of shape memory polymers
  - Cyclic thermomechanical tests to quantify the shape memory effect
  - Examples for polymer shapes, showing shape memory polymers functionality
  - Shape memory fibres and textiles
  - Example for potential application.
- Dr Andreas Lendlein, GKSS Research Center*
- 16.20-16.40      **"Technical Textiles for Security & Defence"**
- The DDA's specific remit is to maximize the benefits to the UK as a whole of the large-scale public investment in defence-related scientific and engineering research and development;
  - The DDA has brokered technology insertions to ensure the future competitiveness of textiles companies; case studies will be presented on a range of projects, including the application of nano-coatings onto traditional textile materials, integration of sensors and electronics into garments and the application of nanomaterials to non-woven structures;
  - The DDA is currently providing regional connectivity and encouraging collaboration between MoD and advanced materials technology providers within the supply chain. This dialogue has allowed MoD to shape its future requirements and source leading-edge materials technology from across the UK. Examples of this approach will be discussed, to include the acquisition of flame-retardant materials, anti-microbial garments and composite aero-structures.
- Tim Brundle, Dr Danny Connaughton and Dr Theresa A K Gow, Defence Diversification Agency*
- 16.45-17.00      **Closing Remarks from the Chair and Conference Close**