

'Bioinspired Nanotechnologies for Smarter Products'

- *Showcasing a spectrum of applications for a wide range of industries* -
20th – 21st March 2007, Society of Chemical Industry, London

This visually exciting conference will explore a range of structures and materials exhibited by animals and plants with applications across many industry sectors, including medicine, textiles, aerospace and automotive industries and defence. Presentations from international leaders in the field will focus on how nanotechnology is enabling nature to be emulated in the quest for better products.

Day 1 Tuesday 20th March 2007

09.15-10.00 Registration and Refreshments

10.00-10.10 **Welcome and Introduction to the Conference,**
Ottilia Saxl, CEO Institute of Nanotechnology

10.10-10.40 **Keynote Speech: 'Biomimetic Synthesis and Self-assembly of Functional Nanomaterials'**
Professor Steve Mann, University of Bristol

10.45-11.15 **'Lotus-Effect: Biomimetic Superhydrophobic Surfaces and their Application'**
✔ Multifunctional aspects of biological surfaces.
✔ Innovative self cleaning applications and products.
✔ How to stay dry under water?
Boris Striffler, University of Bonn

11.20-11.50 **'Fire and Explosions in Nature – some biomimetic possibilities'**
✔ A general overview of fire and explosion in nature
✔ Specific examples :
 a. Knobcone pine
 b. Scotch broom
✔ Biomimetic applications
Professor Andy McIntosh, University of Leeds

11.55-12.25 **'Insects did it first: Biomimetic mushroom-shaped fibrillar adhesive microstructure'**
✔ Biological adhesive and frictional systems.
✔ Microstructured polymer surfaces with enhanced adhesion.
Dr Stanislav N. Gorb, Max Planck Institute for Metals Research

12.30-13.25 Lunch

13.30-14.00 **'Charge transfer in biological systems to control structure and dynamics in nanostructured materials'**
Dr Paul Barker, University of Cambridge

14.05-14.35 **‘Photonic structures in butterfly scales’**

- ❖ How iridescence in butterflies arises from remarkable structures in the wing scales.
- ❖ How black in butterflies is produced in structures which are so thin and light.
- ❖ How white in butterflies is produced in structures which are so thin and light.
- ❖ A remarkable directed fluorescence structure in a butterfly.

Professor Roy Sambles, Exeter University

14.40-15.10 **Title t.b.c**

Professor Donal Bradley, Imperial College of Science Technology and Medicine

15.15-15.45 **‘Structural coloration does not necessarily imply a fancy, iridescent or metallic, appearance’**

- ❖ Iridescence and how to avoid it
- ❖ Short-range order and long-range disorder in photonic structures
- ❖ Cryptic structural color in a butterfly : *Cyanoprys remus*
- ❖ Broken iridescence on weevil’s scales : *Pachyrrhynchus congestus pavonius*

Professor Jean-Pol Vigneron, BioPhot project, University of Namur

16.10-16.15 Close of day 1

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Day 2 Wednesday 21st March 2007

09.30 - 10.00 Refreshments

10.00 - 10.05 Welcome to Day 2

10.05-10.35 **'Information and structure as the routes of nanotechnology'**

- ✔ We have compared Technology and Biology using the Russian system 'TRIZ'.
- ✔ Where Technology manipulates Energy to solve problems, Biology manipulates Information, which is energy-neutral.
- ✔ Information resides in all biological structures, from molecule to ecosystem.

Professor Julian Vincent, University of Bath

10.40-11.10 **'New nanocomposites inspired by the plant cell wall'**

Professor Lars Berghlund, Royal Institute of Technology (KTH) in Stockholm

11.15- 11.45 Coffee Break

11.50 – 12.20 **'Scanning arthropod diversity for biomimetic solutions'**

- ✔ Arthropods - adhesive and non-adhesive structures
- ✔ Using AFM and SEM techniques.

Andrew Martin, University of Applied Sciences Bremen Dept for Biomimetics

12.25 – 12.55 **'Plant Stems as Role Models for Structurally Optimized Biomimetic Composite Profiles with Gradient Structure'**

- ✔ Plant stems e.g. *Arundo donax* and *Equisetum hyemale* can render biomimetic solutions for innovative technical textiles, e.g. composites
- ✔ The plant stems have high specific stiffness / tenacity and oscillation damping and serve as role models to develop light-weight, high damping, composite profiles and benign fracture behaviour.
- ✔ The new developed composite profiles, produced by the cost-effective pultrusion process, can be used in many different applications.

Dr Markus Milwich, ITV Dekendorf

13.00- 13.55 Lunch

14.00-14.30 **'Biomimetics of Photonic Nanostructures'**

- ✔ The variety of optical reflectors and antireflectors in nature.
- ✔ How these may provide novel designs and functions to be copied by industry.
- ✔ How these can be made in industry and how animals themselves make them.

Professor Andrew Parker, The Natural History Museum

14.35 - 15.05 **‘Mechanically Functional Amyloid Fibrils in Natural Adhesives as a Target for Biomimicry’**

- ❖ The nanoscale mechanical response of adhesives from several attached organisms will be presented.
- ❖ We have discovered evidence of functional amyloid in natural adhesives with a beneficial mechanical role for imparting toughness to the adhesive.
- ❖ These amyloid structures may constitute a generic mechanism for mechanical strength in a wide range of natural materials.

Anika Mostaert, Trinity College Dublin

15.10-15.40 **‘Biomimetics: where has it come from and where is it going?’**

- ❖ Growth of biomimetics
- ❖ Commercialiseable outputs
- ❖ Networks and knowledge transfer

Dr Richard Bonser, Centre for Biomimetics, The University of Reading

15.45 – 16.00 Close of conference