

GENERAL THEME

The interaction of materials and biological systems is emerging as a new frontier in Materials Science and Engineering. The Biology-Materials connection is a fertile field of research with limitless possibilities. The components of biological systems are biological materials whereas biomaterials are synthetic materials developed for and used in the body.

The structure and properties of biological materials have an unmatched breadth and complexity. The structure-property relationships in these materials are only starting to be established at the present time. Present themes toward developing novel biomaterials with unique tailored properties and improved biocompatibility are yielding exciting concepts. Biomimetics is a newly emerging interdisciplinary field in which lessons learned from biology have the basis for novel material concepts. This new field of biomimetics investigates biological structures, establishing relationships between properties and structures in order to develop methods of processing and microstructural design for new materials. It is going one to new materials concepts, including multifunctional and hierarchically-structured materials, and new materials synthesis/processing approaches.

Many properties of biological materials are far beyond those that can be achieved in synthetic materials with present technologies. Biological organisms produce complex composites that are hierarchically organized in terms of composition and microstructure, containing both inorganic and organic components in complicated mixtures. These usually organo-inorganic materials are synthesized at ambient temperature and atmospheric conditions. The unique name and microstructures in biological composites and the resulting properties have been, until recently, unknown to Materials Scientists, but are now beginning to stimulate creativity in the development of future synthetic materials.

The symposium will encompass the following themes:

- Biological materials
- Biomaterials (Biomimetics)
- Biomimetics

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ABSTRACTS DUE
07/15/2004



SYMPOSIUM ON BIOLOGICAL MATERIALS SCIENCE

**2005 TMS Annual Meeting
& Exhibition**

**February 13-17, 2005
San Francisco, CA**

SPONSORS

• ESI/PMI and SMD divisions of TMS

• Mechanical Behavior of Materials (TMS/ASM) and Biomaterials (TMS) Committees

PROPOSED SESSIONS

Session 1: Biological Materials

Session 2: Biomimetic Materials

Session 3: Biomaterials for Implants

Session 4: Implant Biomaterials

Session 5: Biomaterials for Drug Delivery

Session 6: The Biomaterial-Tissue Interface

Session 7: Functional Biomaterials and Devices

PRELIMINARY LIST OF INVITED SPEAKERS

Note: We will have a good mix of well established Materials Scientists with high TMS visibility and researchers in more specialized areas. We will try to have 2-4 invited talks per session, totaling 18-24 talks. We foresee 30-40 contributed talks.

* E. Ayl, Max-Planck, Stuttgart, Germany (Insect Evolutionary)

• Eric Baer or Anne Wilson, Case Western (Laminated or Spiral Systems)

• Angela Belcher, MIT

• Paul Calvert, U. of Massachusetts (Rapid Prototyping to Mimic Biocomposites)

• John Curry, Univ. of York, UK (Metals)

• Tom Daniel, Univ. of Washington (Locomotion in Insects)

• Jim Hartman, UC Irvine (Optical Materials)

• A. G. Evans, UC Santa Barbara (Layered Structures)

• William Gerberich, Univ. of Wisconsin (Thin Films)

• John Gosline, Univ. of British Columbia (Silks)

• L. Hench, Imperial College (Bioglass)

• Arthur Huser - UWRI (Mollusk, Cross-Lamellar Shells)

• Karpata Kark, North Dakota State University (Insect - Finite Element Modeling)

• E. LaRo, Los Alamos National Lab (Computational Aspects)

• S. Mann, U. Bristol, UK (Biomimetic/Insects)

• G. Mayer, Univ. of Washington (Amorphous Silicon)

• B. Morse, UC Santa Barbara (Biology-Materials Connection)

• Chris Orton, Lawrence Livermore National Lab (Protein Mediated Nucleation and Growth)

• Henry Park, Clemson (Titanium Alloys for Biological Applications)

• Robert Ritchie, UC Berkeley (Mechanical Properties of Hard Biomaterials: Bone and Teeth)

• M. Sarikaya, Univ. of Washington (Biomimetics: The GFP Approach)

• Malcolm Stodd, USC (Dental Treatments)

• Robert Suresh, MIT (Mechanical Properties of Cells)

• A.P. Thomson, Lawrence Berkeley Lab (Teeth)

• Julian Vincent, Univ. of Bath, UK (General Introduction)

• Jennifer West, Rice (Biomimetics)

• G. Whitesides, Harvard (Self-assembly)

PROCEEDINGS

We are hopeful that Materials Science and Engineering C will publish proceedings as a separate volume.