

2010
MRS



SPRING
MEETING
San Francisco, CA • April 5-9

CALL FOR PAPERS

Abstract Deadline: November 2, 2009

REMINDER:

In fairness to all potential authors,
late abstracts will not be accepted.

www.mrs.org/spring2010

MRS Symposium QQ: Biological Materials and Structures in Physiologically Extreme Conditions and Disease

The goal of this symposium is to bring together researchers who work at the interface of materials science and biology, with a focus on biological materials under extreme physical, chemical, as well as physiological conditions and human disease. The symposium will focus on the integration of advanced experimental, computational, and theoretical methods, utilized to assess structure-process-property relations and to monitor and predict mechanisms associated with failure of protein materials and structures composed of them. A core focus will be the study of materials phenomena that play a crucial role in disease etiology, progression, and treatment, covering multiple scales, from nano to macro.

The study of biological materials under extreme conditions includes changes in forces, pressures, pH, chemical environments, etc., and how these materials fail to provide the designed biological functions under these conditions. The symposium will specifically involve studies of materials failure in the context of genetic diseases such as osteogenesis imperfecta (brittle bone disease), rapid-aging disease (progeria), as well as other medical disorders such as Alzheimer's, infectious disease (e.g., malaria), as well as cancer. The study of failure mechanisms and the role of materials in disease represents a new topic that opens up novel avenues for future materials research with broad impact in the life sciences, bio/nanomedicine and beyond.

Topics to be addressed include (but are not limited to):

- Deformation and failure of biological tissues and structures (e.g., bone, tendon, skin, organs, cells, and protein networks)
- Physiological and pathological cellular and tissue failure phenomena, including tissue-engineered components
- Cell and molecular mechanics, bionanomechanics, and nanobioscience of disease
- Molecular foundation of disease in the context of materials factors
- Impact, trauma and injury, and healing
- Materials phenomena in genetic and infectious disease, as well as cancer
- Materials phenomena in amyloid diseases (Alzheimer's, Parkinson's, type 2 diabetes mellitus, etc.)
- Imaging and visualization of assembly/aggregation, deformation, and failure mechanisms
- Novel disease diagnosis and treatment methods; nanomedicine
- Multiscale modeling and simulation, and integration with multiscale experiments

Invited speakers include:

Kris Dahl (Carnegie Mellon Univ.), **Dennis Discher** (Univ. of Pennsylvania), **Peter Fratzl** (Max-Planck-Institute for Colloids and Interfaces, Germany), **Ehud Gazit** (Tel Aviv Univ., Israel), **Himadri Gupta** (Queen Mary, University of London, United Kingdom), **Harald Herrmann** (German Cancer Research Ctr., Univ. of Heidelberg, Germany), **Roger Kamm** (Massachusetts Inst. of Technology), **Josef Käs** (Univ. of Leipzig, Germany), **Laurent Kreplak** (Dalhousie Univ., Canada), **Jan Lammerding** (Harvard Medical School), **Marc A. Meyers** (Univ. of California-San Diego), **Anant K. Paravastu** (Florida State Univ.), **William Lu** (Hong Kong Univ., China), **Robert Ritchie** (Univ. of California-Berkeley), **Geert Schmid-Schonbein** (Univ. of California-San Diego), **Michael Sheetz** (Columbia Univ.), **Subra Suresh** (Massachusetts Inst. of Technology), **Taher Saif** (Univ. of Illinois, Urbana-Champaign), **David Taylor** (Trinity College, Ireland), **Viola Vogel** (ETH Zurich, Switzerland).

Symposium Organizers

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