

# Biomolecular Materials and Processes

Fall meeting of the Solid State Sciences Committee

October 19, 2006

Beckman Center, Irvine, CA

# Committee Membership

Arup Chakraborty

Chair, MIT

Joanna Aizenberg  
Annelise Barron  
Ken Dill  
Sharon Glotzer  
Yale Goldman  
Eli Greenbaum  
John Kao  
David Needham  
Adrian Parsegian  
Alan Rudolph  
Cyrus Safinya  
Chuck Stevens  
David Weitz

Lucent/Bell Labs  
Northwestern University  
UC San Francisco  
University of Michigan  
University of Pennsylvania  
Oak Ridge National Laboratory  
University of Wisconsin, Madison  
Duke University  
National Institutes of Health  
Adlyfe, Inc.  
UC Santa Barbara  
Salk Institute  
Harvard University

# Statement of Task

- Identify the most compelling questions and the emerging scientific opportunities at the interface between biology and condensed matter and materials research—the biomolecular domain.
- Suggest educational, programmatic, and institutional strategies to best meet the identified opportunities.
- Consider connections to national priorities including health care, security, workforce, economic and other societal needs.

# Past Reports on Biomolecular Materials

- **Role of Theory in Biological Physics and Materials, Report of an NSF-sponsored workshop, 2004**
  - Co-chaired by Michael Thorpe, Arizona State University, and Anders Carlsson, Washington University in St. Louis
- **Capturing the Full Power of Biomaterials for Military Medicine, National Research Council Workshop, 2004**
  - Chaired by James Anderson, Case Western Reserve University
- **Biomolecular Materials, Report of the BESAC workshop, 2002**
  - Co-Chaired by Mark D. Alper, LBNL, UC Berkeley, and Samuel I. Stupp, Northwestern University
- **Opportunities at the Intersection of Nanoscience, Biology and Computation, JASON, The MITRE Corporation, 2002**
  - Chaired by Ellen Williams, University of Maryland College Park
- **Biomolecular Self-Assembling Materials, National Research Council, 1996**
  - Chaired by Philip Pincus, UC Santa Barbara
- **Hierarchical Structures in Biology as a Guide for New Materials Technology, National Research Council, 1994**
  - Chaired by David Tirrell, University of Massachusetts

# BMAP Workplan

- Three committee meetings
  - 1st meeting: March 16-17, 2006
  - 2nd meeting: June 18-19, 2006
  - 3rd meeting: November 29-30, 2006
- Identifying scientific opportunities for the field
- Zeroth draft of final report prepared
- Report review in December/January
- Target release of approved prepublication draft is spring 2007

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CENTRAL THEME: LEARN BIOMOLECULAR MECHANISMS AND HARNESS UNDERSTANDING OR INSPIRATION TO CREATE MATERIALS - BIOINSPIRED?

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# BMAP Final Report

- Timely: New NSF program on Biomaterials starting in FY07
- Added value: looks at basic research conducted across all federal funding agencies
- Considering the role and contribution of probes and tools in conducting basic research in the field
- Considering the broad picture of infrastructure and human resources