Biomolecular Materials and Processes

Board on Physics and Astronomy
November 4, 2006
Beckman Center, Irvine, CA
# Committee Membership

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
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<tbody>
<tr>
<td>Arup Chakraborty</td>
<td>Chair, MIT</td>
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<td>Joanna Aizenberg</td>
<td>Lucent/Bell Labs</td>
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<td>Eli Greenbaum</td>
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<td>David Needham</td>
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<td>Chuck Stevens</td>
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<td>David Weitz</td>
<td>Harvard University</td>
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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

  - 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
  - Chaired by David Tirrell, University of Massachusetts
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**TIMELY – E.G., NEW NSF PROGRAM IN 2007**

**REPORT ON RESEARCH AT THE INTERFACE OF PHYSICAL AND LIFE SCIENCES**
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 January
• Target release of approved prepublication draft is spring 2007
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.

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

- Suggest educational, programmatic, and institutional strategies to best meet the identified opportunities.

  EMPHASIZES BASIC RESEARCH, VARIOUS FEDERAL AGENCIES, ROLE OF PROBES AND TOOLS, HUMAN RESOURCES, MULTIDISCIPLINARY TRAINING, BROAD INFRASTRUCTURE NEEDS

- Consider connections to national priorities including health care, security, workforce, economic and other societal needs.

  IMPORTANCE TO NATIONAL ECONOMIC COMPETITIVENESS