ASEE Engineering Research Council
Annual Forum

Bioengineering and Environmental Systems
(BES)

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National Science Foundation
Bioengineering and Environmental Systems (BES)

BES MISSION

Support Research, Innovation, and Education in Bioengineering & Environmental Engineering
Bioengineering and Environmental Systems (BES)

BES has 3 “disciplinary” clusters, each funded at around 1/3 of BES’s total of about $50 million/year:

- Biochemical Engineering
- Biomedical Engineering
- Environmental Engineering
Bioengineering and Environmental Systems (BES)

BES PRIORITY AREAS

(1) Metabolic Engineering  (with BIO, MPS, MEWG)
(2) Post-Genomic QSB     (with ENG, MPS, BIO, CISE)
(3) Nanobiotech          (with NNI)
(4) MUSES                (with ENG, BE)
(5) Biophotonics         (with DARPA, NIH)
(6) Sensors              (with ENG)
### KEY FEATURES of BES Priority Areas

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<th>Key Feature</th>
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<td>(1) Built on Cutting Edge Science</td>
<td>Post-Genomic QSB</td>
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<td>(2) Leadership of Multi-Agency Cooperation</td>
<td>MEWG</td>
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<td>(3) Global Perspective</td>
<td>WTEC (e.g., biosensing study)</td>
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<td>(4) Diverse, Young PIs</td>
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PECASE
Presidential Early Career Awards

BES PECASE awardees:

• Two every year, each of past several years
• All except one are from under-represented groups
CAREER
Faculty Early Career Development Program

• Supports career development of junior faculty
• Provides in a single program the support of both research and education
• Each year, BES devotes a very significant portion of its budget to CAREER awards
Nanotechnology and BES

Nanotechnology is being allocated an increasing portion of BES’s annual budget:

- 2000: $1.89 million
- 2001: $3.75 million
- 2002: $6.67 million
- 2003: $8.00 million
- 2004: $10.02 million
- 2005: $12.63 million
Nanobiotechnology is defined as the study and control of structure-function in biological systems and processes at the nanoscale.

Two of the grand challenges in Nanoscale Science and Engineering in which BES/ENG has strong interest are:

» Advanced healthcare, therapeutics and diagnostics and

» Nanoscale processes for environmental improvement
BES and MUSES

**MUSES** = **Materials Use:**

*Science, Engineering & Society.*

Part of the NSF-wide priority,

“**Biocomplexity in the Environment (BE)**”
BES and MUSES

_MUSES calls for interdisciplinary proposals that cover both:_

**Technological issues** (such as environmentally benign process redesign and manufacturing, and)

**Behavioral factors** (such as economic and other social forces that affect consumption and adoption of new technologies and materials).
BES and MUSES

2005+ Interdisciplinary Group
Research and Education
Grants (up to $2 million over 5 years)
+
Planning Grants
(up to $100K over up to 2 years)
BES and MUSES

Find out more at the BE website on NSF’s homepage at:

www.nsf.gov
Homeland Security:

- April 16, 2002 Dear Colleague Letter: Sensor SGERs (CHE, DMR, CTS, BES)
- Solicitation on Sensors and Sensor Networks
- Worldwide WTEC Study on Biosensing just published
- Other funding opportunities
BES and Homeland Security

Example SGER grants resulting from April 2002 Dear Colleague Letter:

“Detection of Bioterrorism-Linked Microbial Pathogens Using Surface Acoustic Wave Liquid Sensors”

(Mauricio da Cunha and Paul Millard, U. of Maine; co-funded by BES and ECS)
BES and Homeland Security

Example SGER grants resulting from April 2002 Dear Colleague Letter:

“Application of Gaseous Ozone for Inactivivation of Bacterial Spores”

(Gurol, San Diego State U.)
Example SGER grants resulting from April 2002 Dear Colleague Letter:

“Antibody-Conjugated Nanoparticle Films as Spectroscopic Sensors of Chemical Agents”

(Wei, Purdue U.)
BES and Homeland Security

Example SGER grants resulting from April 2002 Dear Colleague Letter:

“Biosensing in the Gas Phase: A New Approach Based on Imprinted Nanoparticles of a Linear Polymer”

(Tepper, VCU)
Example SGER grants resulting from April 2002 Dear Colleague Letter:

“Evaluation of the Effects of Physical and Geochemical Heterogeneity on Virus Transport in Aquifers”

(Welty, Drexel U., and Ryan, U. of Colorado-Boulder)
Follow-up grant to SGER-

From Sensors and Sensor Networks solicitation:

“Detecting Microbial Pathogens with Novel Surface Acoustic Wave Devices in Liquid Environments”

(Mauricio da Cunha and Paul Millard, University of Maine; $512K over 3 years)
BES and Homeland Security

3rd Solicitation on Sensors and Sensor Networks:

- $20+ million in FY 2005
- Includes Homeland Security
- Deadline: March 3, 2005
- www.nsf.gov
BES and Homeland Security

Worldwide WTEC Study on Biosensing (with ENG, NIH, ARO, USDA, NASA):

- Has an emphasis on biosensing for Homeland Security
- Chaired by Jerry Schultz (coauthor of 1999 IOM/NRC study on Chemical and Biological Terrorism)
- Includes site visits to US, Japan and Europe
- [http://www.wtec.org/biosensing/]
BES and Homeland Security

Other BES Funding Opportunities for Homeland Security Research:

- Unsolicited proposals (various deadlines)
- Biophotonics proposals (by Feb. 1 each year)
- SGERs (any time; discuss with a PO first)
BES

- Biochemical Engineering
- Biomedical Engineering
- Environmental Engineering