

ASEE Engineering Research Council Annual Forum

Bioengineering and Environmental Systems (BES)

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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

<u>Key Feature</u>	<u>Example (s)</u>
(1) Built on Cutting Edge Science	Post-Genomic QSB
(2) Leadership of Multi-Agency Cooperation	MEWG
(3) Global Perspective	WTEC (e.g., biosensing study)
(4) Diverse, Young PIs	CAREER, PECASE

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

Nanotechnology

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

BES

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 Inactivation of Bacterial Spores”

(Gurol, San Diego State U.)

BES and Homeland Security

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)

BES and Homeland Security

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)

BES and Homeland Security

***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**