Introduction to the Department of Materials Science and Engineering

Raj Bordia
Professor and Chair

Outline

I. Department Introduction and Status Report

II. Program Strengths (feedback from students)

III. Benchmarking of the Department with peer MS&E Departments and the College

IV. Areas of Research and Research Support

V. Key Accomplishments in the Last Few Years

VI. Expertise of Relevance to the FAA Center

I. Department Introduction

History

- Oldest department in the College of Engineering
- Degrees in Mining Engr., Ceramic Engr., Metallurgical Engr. and Materials Science and Engr.

Current Vision

- Student centered, broad based, interdisciplinary department

Strategic Focus

- Be the focal point of materials education, research and facilities
- Strength from collaborations with others working on materials
- Build in the areas of Universities and local strengths (electronics, aerospace, biotechnology, photonics, nanotechnology)
- Diverse student body
- Flexible curriculum, experiential learning, UG student involvement in research
- Mentoring at all levels

I. Department Status Report (02-03)

UG Program

- 77 students (17 underrepresented minorities, 19 women)
- 38 BS degrees

Graduate Program

- 60 students (7 underrepresented minorities, 19 women, 21 international)
- 20 Graduate degrees (10 MS; 10 Ph.D.)

Program Funding

- Total funding approx. $ 7 Million
- State funding approx. $ 1.8 Million
- Other funding approx. $ 5.2 Million

Staff and Faculty Positions

- 10 tenure track; 4 research; 20 research associates; 4 visiting scientists
- 4.5 administrative and 4 technical staff positions

II. Program Strengths: Student Feedback

UG Program

- Department size, atmosphere and involvement of students
- Flexible senior year, strong junior year curriculum, hands-on-experience; good variety of courses, balance between science and engineering.
- Research involvement, working with graduate students, willingness of faculty to discuss and engage in research.
- Advising and computing resources

Graduate Program

- Interdisciplinary
- Student mentoring and support
- Strong focus on broad training (for industry, academia and national labs)
- Small size and personal interactions with other students, faculty and staff
- Opportunities to teach
- Responsive department, student involvement in the department.

III. Benchmarking of the Department (02-03)

With respect to College of Engineering

- We are about 4.1 % of the College in terms of our faculty size and State budget
- Credit hours about 5 % of College; research awards and expenses about 4 % of the College

ASEE data on 35 Materials Science and Engineering Departments in US (including top 10 graduate and UG Programs).

- Number 1 in terms of BS degrees/faculty
- Number 8 in terms of MS/faculty
- Number 6 in terms of Ph.D./faculty
- Number 12 in terms of Research funding/faculty

IV. Research Areas

Biomimetics and Biomaterials
- Learning from nature to design materials and materials for biotechnology

Ceramics
- High temperature, energy technologies, environmental technologies

Composites
- Aerospace, automotive, sporting goods

Electronic and Optical Materials
- Current and next generation of telecommunications and computing

Engineering Education
- Internationalization of engineering education, hands-on learning

Magnetic Materials
- Data storage, medical diagnostics

Metals and Alloys
- Aerospace, automotive, biomedical

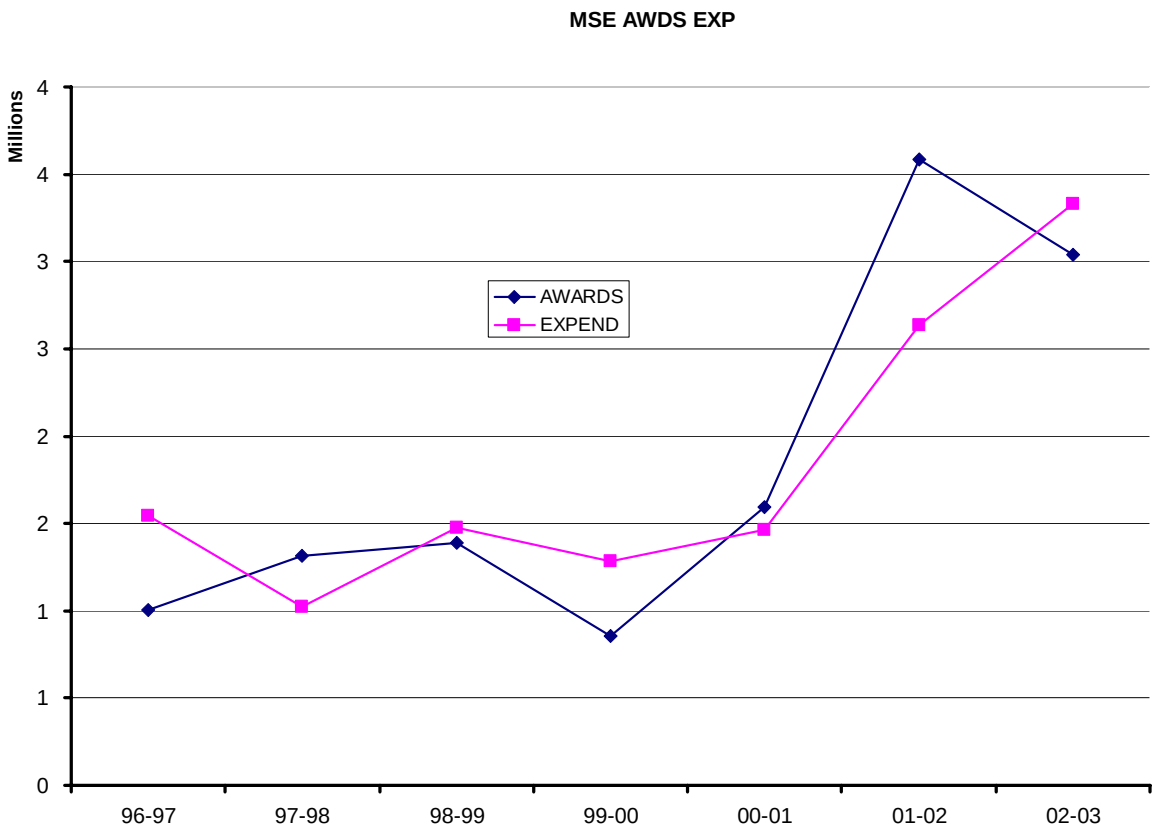
Polymers
- Molecular electronics, photonics

Surface Science
- Electronics, catalysis, energy efficiency and conversion

Collaborations with A&A, BioE, ChemE, C&EE, Chemistry, EE, ME, Physics, School of Medicine (five departments)

Participation and leadership in interdisciplinary programs and centers: Nanotechnology, Photonics, and UWEB

IV. Research Support



Rapid increase in research in the last three years

V. Key Accomplishments in the past five years

Single Degree

- Merged two BS degrees (in Ceramic and Metallurgical Engr.) into a single BS in Materials Science and Engr.
- Awarded first BS degrees in Materials Science and Engineering

Recruitment of New faculty Members

- Three new faculty members in photonics, biomaterials and magnetic materials

Research and Graduate Program

- Strong well funded research programs in exciting new areas
- 100 % of full time graduate students have support (including MS students)
- Students very competitive for scholarships and fellowships (e.g. NSF Graduate, Nanotech, JIN)
- 100 % of the UG students participate in research
- Strong programs in engineering education, photonics, nanotechnology, composites

Resources and Facilities

- Electron Microscopy Center has been established as a Multi-user facility
- Excellent facilities for materials processing, analysis and testing

VI. Expertise of Relevance to the FAA Center

Research

- Bonded Joints Processing
- Structural Substantiation
- Advanced Material Forms and Processes
- Nanotechnology for Composite Structures

Education and Outreach

- Broad based materials education
- Graduate and UG courses on Composites
- K-12 teacher training in Materials Technology
- Close collaboration with Edmonds Community College

Key participants: Bordia, Das, Flinn and Ohuchi