

EXECUTIVE SUMMARY

The Department of Engineering Science and Mechanics (ESM) Strategic Plan for 2005-2008 presented strategies and action plans for achieving its vision and mission:

VISION

The Department of Engineering Science and Mechanics (ESM) will be an internationally distinguished department that is recognized for its globally competitive excellence in engineering and scientific accomplishments, research and educational leadership.

MISSION

To develop future state, national and international leaders of scientific and engineering endeavors, the law, medicine, business, politics and governments, who apply a solid foundation in engineering and scientific principles, to impact the well being of the global society, its environment, and future frontiers, yet to be discovered.

With a team of 29 tenure and tenure-track faculty totaling 19.8 full time equivalents [FTE], benchmarking with similar departments across the country in 2005 indicated that the ESM department's research productivity could place it among the top Engineering Science, Mechanical Engineering, Materials Science, and Electrical Engineering Departments in the nation. The ESM Department was in an excellent position for growth of the faculty, student bodies and research programs. Implementation of the plan resulted in the Engineering Science undergraduate program being ranked 5th in the nation according to the 2008 US News and World Reports rankings.

ESM determined to build on its core strengths in mechanics, materials and nanotechnology to develop new research thrusts in a) bio-nano science and engineering; b) multiscale wave-materials interactions; and c) health monitoring - *for structures, systems and people*. Partnerships with US and international institutions (universities, industry, state and federal agencies, government laboratories) and within Penn State were proposed to develop major research and educational initiatives with stable, long-term support. New curricular, educational and outreach initiatives were developed to support these areas and enhance the department's position as the Honors Program for the College of Engineering. ESM invested in the highest caliber faculty, students and staff and engaged its alumni, corporate and philanthropic partners to support their mutual development. In consultation with all constituencies, ESM laid the foundations to establish its identity as a leader in the integration of engineering and scientific approaches to derive solutions to diverse engineering problems. Through new promotional strategies, ESM began to communicate this identity to achieve its vision and establish the department as the leading Engineering Science and Mechanics Department in the nation and the global arena.

In the 2005-2008 ESM Strategic Plan, six critical issues and their associated strategic goals, highlighted on the following page, were identified with action plans for implementing each goal. Remarkable progress has been made in accomplishing, and in many cases, superseding these goals and actions. Major outcomes for each critical issue are summarized in this document.

2005-2008 CRITICAL ISSUES AND STRATEGIC GOALS

CRITICAL ISSUE 1: **RESEARCH**

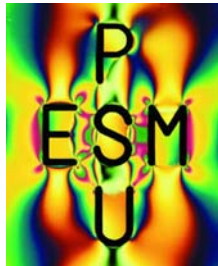
Growth of ESM's research programs will require new multidisciplinary research initiatives.



STRATEGIC GOAL 1: Develop new research initiatives that position ESM and Penn State as leaders in the international community.

CRITICAL ISSUE 3: **IDENTITY AND COMMUNICATIONS**

The Engineering Science and Mechanics fields are less well-recognized than the traditional engineering disciplines.



STRATEGIC GOAL 3: Improve the recognition of the Engineering Science and Mechanics fields by academia, the professions, industry and government through enhanced communications.

CRITICAL ISSUE 5: **DEVELOPMENT AND ALUMNI RELATIONS**

ESM's alumni, corporate and foundation relations activities and philanthropic support bases need to be strengthened.



STRATEGIC GOAL 5: Enhance our alumni, corporate and foundation relations, development and marketing activities to increase support for key ESM initiatives.

CRITICAL ISSUE 2: **EDUCATION AND OUTREACH**

New educational and outreach initiatives must be developed to support our new research areas.



STRATEGIC GOAL 2: Enhance the Engineering Science curriculum by developing innovative, nationally recognized education programs that are disseminated to the widest possible audience.

CRITICAL ISSUE 4: **RECRUITMENT, RETENTION, PLACEMENT**

Economic and global factors create an uncertain climate for recruitment and retention of faculty and students.



STRATEGIC GOAL 4: Develop new strategies to recruit and retain faculty, students and staff and enhance placement of ESM students.

CRITICAL ISSUE 6: **ADMINISTRATION AND ORGANIZATION**

Streamlined organization and effective administration can be realized through continuous quality improvement.



STRATEGIC GOAL 6: Implement new administrative and organizational practices in accordance with ESM's strategic plan.

ACCOMPLISHMENTS FROM THE 2005-2008 STRATEGIC PLAN

In this section, the 2005-2008 Strategic Goals for each critical issue are presented. As strategic initiatives evolved, new initiatives emerged during the plan period for several critical issues. This document discusses outcomes for the original and evolving critical issues. The 2005-2008 accomplishments provide a strong foundation for the ESM 2009-2013 Strategic Plan.

1. RESEARCH

Strategic Goal 1:

Develop New Research Initiatives that Position ESM and Penn State as Leaders in the International Community

For the period 2005-2008, the ESM Department's priorities were to develop three new university-wide research initiatives in:

- Bio-nano Science and Engineering;
- The Center for Multiscale Wave-Materials Interactions (CMWMI); and
- Health Monitoring - *for Structures, Systems and People*.

ESM also proposed to continue strong leadership and development of:

- The National Nanofabrication Infrastructure Network (NNIN); and
- The Center for Innovative Sintered Products (CISP).

OUTCOMES

The **Bio-Nano Science and Engineering** initiative attracted an exceptional group of faculty and led to multiple new collaborations with the Materials Research Institute, College of Medicine and Huck Institutes for the Life Sciences. Dr. Melik Demirel, a specialist in computational modeling of proteins, nanostructured polymer thin films and optical thin films, was hired as the Pearce Assistant Professor in 2003, and received a 2005 **Humboldt Fellowship** and a **2007 ONR Young Investigator Award**. Dr. Jian Xu, hired in 2003, brought expertise in bioelectronics, biophotonics, and nano-opto-electro-mechanical systems. In 2005, Dr. Tony Huang was hired as the James Henderson Assistant Professor of Engineering Science and Mechanics, and brought new expertise in artificial and biomimetic molecular machines.

New collaborations were established with the Department of Neurosurgery in 2005. These led to the appointment of Dr. Steven Schiff, pediatric neurosurgeon, Fellow of the American College of Surgeons and Fellow of the American Physical Society as Brush Chair Professor of Engineering in the Department of Engineering Science and Mechanics, and as Professor of Neurosurgery with clinical privileges in the College of Medicine. His colleague, Dr. Bruce Gluckman, was appointed Associate Professor of Engineering Science and Neurosurgery in 2006. A new **Center for Neural Engineering** (CNE) led by Dr. Schiff in collaboration with the Departments of Neurosurgery and Engineering Science, Colleges of Engineering and Medicine, and the Huck Institutes for the Life Sciences was established in 2007. The Keystone Innovation Zone provided an award of \$250,000 to promote new industrial research collaborations with the

Center. CNE is leading the integration of neurosciences, neurosurgery and neural engineering, and has provided unprecedented opportunities for collaboration among neurosurgeons, neuroscientists, engineers, scientists, psychologists, and health and human development professionals at Penn State and in the global community. The Center will move to Penn State's new Millennium Building in 2010. In 2007, Dr. Corina Drapaca, an applied mathematician with expertise in the modeling of brain disease dynamics, was hired as Assistant Professor of Engineering Science and member of CNE, to develop new models for interpreting magnetic resonance images (MRI), and predicting the evolution of hydrocephalus (swelling of the brain) and brain trauma. More details can be found at www.esm.psu.edu/cne

As a consequence of the bio-nano initiative, ESM faculty began developing new research programs in biomedicine. Dr. Shaw received a Grace Woodward award for collaboration with the College of Medicine to develop bioresorbable stents. Dr. Demirel received a Clinical Translational Science Award to develop "*Hand-held Medical Diagnostics*". Dr. Tittmann developed scanning acoustic microscopy of biological tissue and measured mechanical properties of cells using the ultrasonic atomic force microscope invented in his laboratory. Dr. Urquidi-Macdonald developed new programs in bioinformatics with the National Institutes of Health. Partnerships with the College of Medicine in neurosurgery (Dr. Robert Harbaugh), cancer (Dr. Judith Bond) and hand/foot surgery (Dr. Sanjiv Naidu), among others, were established. Significant growth of engineering science research at the interface of medicine and the life sciences is anticipated in future years.

A **Center for Multiscale Wave-Materials Interactions** was established with support from the College of Engineering, Applied Research Laboratory (ARL), Materials Research Institute, and Electro-Optics Center in 2005. Two new laboratories were developed, and following construction delays, installed with equipment in 2007. The laboratories are equipped with high power CO₂ (500 W) and Nd-YAG (3 kW) lasers, a LASAG Nd-YAG laser, UV frequency tripled Nd-YLF laser, and a Lambda Physik LPX 220i Excimer Laser configured to operate with KrF at 248 nm. ARL provided access to a PRC 2 kW CW until a 5 kW CO₂ laser was purchased in 2008. **Defense University Research Instrumentation Proposals (DURIP)** were successful in 2006 for a 6 kW Nd-YAG laser, now located in ARL, in 2007 for a Coherent Inc. LIBRA-S-1K-110VAC femtosecond system with 100 fs pulses at 1mJ/pulse, 1 kHz-repetition rate, and an optical parameter amplifier (OPA) for wavelength tunability, and in 2008 for a 12 kW ytterbium-doped fiber laser. New grants on laser sustained plasma interactions with materials and on photonics research have been received from ONR and ARO, respectively.

The **Health Monitoring – for Structures, Systems and People** initiative was highly successful. Led by Dr. Cliff Lissenden, in partnership with the Aerospace, Civil and Environmental, and Mechanical and Nuclear Engineering Departments, and the Applied Research Laboratory, ESM successfully competed for a Ben Franklin Technology Development Grant and established the **Ben Franklin Center of Excellence in Structural Health Monitoring** in 2007. This Center has attracted support from major corporations (e.g. Alcoa, FBS, GE, Intelligent Automation, Sikorsky, Siemens) and agencies including AFRL, AFOSR, ONR, ARO and NAVAIR. Several contracts have been awarded and the Center is poised for further growth. More details can be found at www.esm.psu.edu/shm.

The Health monitoring initiative was strongly linked to new directions in mechanics and medical research. To advance these areas, Dr. Sulin Zhang, an expert in **multiscale computational methods** across different length and time scales, cellular and biomechanics, and the mechanics of nanostructured materials, nano-scale contact, and the nano-bio interface, was appointed as Assistant Professor in the Fall semester 2007.

ESM research, educational and outreach programs in the **National Nanotechnology Infrastructure Network** grew significantly, resulting in the establishment of the **Center for Nanotechnology Education and Utilization (CNEU)**, directed by Dr. Stephen Fonash, in 2005. Operation of the nanofabrication facility was transitioned to the Materials Research Institute to service the University-wide community. New research in nanowire and nanoribbon “grow-in-place” synthesis was developed using chemical and electrochemical nanofabrication techniques. Major initiatives in nanotechnology education are described in Section 2: Education and Outreach.

The **Center for Innovative Sintered Products (CISP)** added new faculty associates and increased its collaboration with the Applied Research Laboratory following the departure of Dr. German in 2005. Dr. Donald Heaney was appointed Director of CISP in 2007 and continues to develop new industrial affiliations and research directions in collaboration with the CISP Advisory Board and Associate Director, Dr. Ivi Smid. CISP’s research activities have stabilized at approximately \$500,000 per year, with significant potential for future growth in refractory and hard materials technologies.

The Department attracted two **Multidisciplinary University Research Initiatives (MURI - \$5,000,000/5 years)**, “*Unconventional Dielectric Materials and Structures of Ultra-High Performance Pulsed Power Capacitors*” (ONR, 2005-2010) led by Professor Michael Lanagan, and “*Growth, Characterization and Modeling of Monolithic Silicon Microbolometer Materials for Uncooled Infrared Detectors: Overview and VOx deposition*” (ARO, 2006-2011), led by Professor Mark Horn. Professor Sulin Zhang, appointed in Fall 2007, brought an **NSF CAREER Award** “*Multiscale Modeling of Nanoparticle-Cell Interactions*” with him to Penn State.

A University-wide proposal to the National Science Foundation (NSF) to support **diversity initiatives**, “*ADVANCE: Institutional Transformation - to promote the recruitment, retention and advancement of women faculty in science and engineering*” was unsuccessful but will be resubmitted when a future proposal call is announced. Professor Barbara Bogue received NSF support for a program “*Assessing Women in Engineering*” to determine the factors that influence women’s choice of engineering as a field of study and their decisions to continue or leave the field. **NSF Presidential Awards for Excellence in Science, Mathematics and Engineering Mentoring (PAESMEM)** were made to Professors Barbara Bogue and Judith Todd in 2005 and 2007, respectively.

Technology Transfer

Dr. Stephen Fonash founded NanoHorizons Inc., an emerging leader in applied nanoscale materials and solutions, in 2002. NanoHorizons Inc. produces SmartSilver(TM) additives, which are used in fiber, fabric and biomedical applications. In August 2006, Dr. Fonash co-founded

Solarity, LLC, to develop solar cell technology and manufacture photovoltaic cells. He serves as Chief Technology Officer of Solarity, LLC. Dr. Joseph Rose serves as President of FBS, Inc. and has spun out ultrasonic guided wave technologies. Dr. Donald Heaney serves as President of Advanced Powder Products, Inc. a manufacturing company specializing in powdered material products.

2. EDUCATION AND OUTREACH

Strategic Goal 2: Enhance the Engineering Science Curriculum by Developing Innovative, Nationally Recognized Education Programs that are Disseminated to the Widest Possible Audience

OUTCOMES

The Engineering Science undergraduate curriculum was accredited by the Accreditation Board for Engineering and Technology (ABET) in May 2003. A new **Engineering Science undergraduate curriculum** was approved in Spring 2006, with credit hours reduced from 137 to 131. Foundational biology electives were included, a **pre-med** Engineering Science curriculum was introduced, and pathways, requiring one additional semester, for dual majors with electrical, mechanical, and civil engineering were identified. A new **minor in nanotechnology** with six new/revised courses was introduced in the spring semester 2006. To date, one student has graduated with the minor, four students are registered to graduate, and twenty two students are enrolled in the required courses. The mechanics minor continued to grow with 70 students from ME, AERSP, AE, CEE, NUCE and ESM currently enrolled.

The ABET professional components were integrated and assessed in the curriculum, particularly through a new seminar series in the Senior Research and Design Project, E SC 410H and 411H. In response to the 2002 ABET visit, undergraduate portfolios were developed to include selected materials related to the ABET professional components (e.g. ethics, leadership, teamwork, sustainability, economics, etc.) and to include an annual reflective statement on each student's personal and professional development. The portfolios and undergraduate honors theses were assessed by faculty committees. An **integrated undergraduate-graduate** program, allowing students to complete B.Sc. and M.Sc. degrees in five years, was introduced in Spring 2006.

The establishment of the **Center for Nanotechnology Education and Utilization (CNEU, 2005)**, directed by Dr. Stephen Fonash, led to significant growth of nanotechnology research, education and outreach. CNEU is the home of the Pennsylvania **Nanofabrication Manufacturing Technology (NMT) Partnership** and its **NSF-sponsored regional Advanced Technology Education (ATE) Center**. The NMT Capstone Semester of six courses is taught to:

- Undergraduates at 23 institutions offering nanotechnology two-year Associate Degrees. Among these institutions are community colleges in Pennsylvania, the Pennsylvania College of Technology, and several Penn State Commonwealth College Campuses;
- Students in the Pennsylvania State System of Higher Education (PSSHE) schools that are:
 - a) developing concentrations in nanofabrication manufacturing technology (NMT) within existing four-year programs in applied physics, physics, chemistry, biology, and industrial technology. These schools include California University of PA, Indiana

University of PA, Lock Haven University, Mansfield University, Millersville University, and Shippensburg University; and

- b) creating a minor in nanotechnology incorporating the NMT Capstone Semester, for example, Clarion University of PA.

Since its inception in 1998, the NMT program has received \$14,825,000 in state funding, 453 students have completed the capstone semester, 18 hands-on Educators Workshops have been presented to 399 attendees and 71 Nanotech (chip) Camps have been presented to 1154 attendees. NSF has supported an ATE Regional Center for Nanofabrication Manufacturing Education with \$4,424,449 from 2001-2008. In 2008, CNEU was awarded the **NSF National Center for Nanotechnology Applications and Career Knowledge**.

CNEU's Educational Scholarship serves as a model nationally and internationally and is in high demand, as demonstrated by the following snapshot. Between September and December 2007, the Center received 253 visitors representing 18 organizations. Offsite and remote access presentations impacted an additional 1626 individuals at 35 locations. The offsite outreach included meetings/presentations/exhibitions at the Two Year College Chemistry Consortium at Bergen Community College in Paramus NJ, the NSF ATE Principle Investigators Conference in Washington DC, the State of Pennsylvania WIB, the Society of Hispanic Professional Engineers Annual Conference in Philadelphia PA, the PDE Integrated Learning Conference in University Park, and the Materials Research Society Education Outreach Showcase in Boston, MA. More information about CNEU can be found at www.cneu.psu.edu.

The **ESM graduate program** was reviewed and a new candidacy examination structure developed to include tracks in bio-nanotechnology and neural engineering. A **Post-Baccalaureate certificate in Laser Materials Processing** with five new courses was introduced in Spring 2006. An MD-PhD (Engineering Science) degree is under development as a model for other departments in the College of Engineering. An **informal graduate education seminar** was introduced to enhance written, oral and graphical communication skills and prepare students for the professoriate. The seminar was so successful in increasing students' abilities to pass the communications requirement that selected elements were transferred to the regular graduate seminar. The seminar also increased the number of students enrolled in the **Graduate Teaching Certificate**, which is excellent preparation for the professoriate, school teaching and on-the-job educational programs.

Annual **short courses** on Corrosion and Sintered Materials were presented by Dr. Barbara Shaw (ESM) and Dr. Donald Heaney (CISP), respectively. ESM faculty members deliver numerous short courses and tutorials to industries and universities around the world.

3. IDENTITY AND COMMUNICATIONS

Strategic Goal 3: Improve the Recognition of the Engineering Science and Mechanics Fields by Academia, the Professions, Industry and Government through Enhanced Communication

The Engineering Science undergraduate major positioned itself as a Multidisciplinary Honors program that addresses problems across the engineering, physical, life, social and medical sciences, and creates solutions that promote the wellbeing of society. The breadth and depth of the program prepares students for leadership positions in all sectors of the economy. New

marketing strategies included a first web redesign in 2005 with “*What’s New*”- news of student, faculty, and staff accomplishments, a second redesign currently in progress, a video produced by our undergraduates (Penn State’s first podcast), development of non-technical abstracts for communicating research to the public, new materials for industry, and supporting faculty to make presentations at strategic partner schools. US News and World Reports began ranking Engineering Science programs in 2005. Penn State Engineering Science was ranked 9th in 2006 and 5th in the nation in 2008.

The Department embarked on an ambitious program of recognition of its faculty staff and students. Since 2002, ESM faculty members received two endowed Chairs, two endowed Assistant Professorships, three Distinguished Professorships, and were elected as 13 Fellows in nine professional societies and a Jefferson Fellow at the US Department of State. This brought the department’s 2008 total to six endowed Chaired Professors, two endowed Assistant Professorships, two Distinguished Professorships, 26 Fellows in 13 professional organizations, and one Jefferson Fellow. Graduate students Vivek Verma and Yuebing Zhang won the Haythornthwaite Prize from the American Academy of Mechanics in 2006 and 2008, respectively. This prestigious prize included a \$1,000 award and a \$9,000 grant for research. Further international recognition accrued from the Department’s hosting the 2002 and 2006 Society of Engineering Science conferences, Institute for Complex Adaptive Matter meeting (2005), the First Annual Systems Biology Workshop, and being selected to host the 2010 US National Congress on Theoretical and Applied Mechanics.

Undergraduate and Graduate Councils were formed with representatives who attended ESM faculty meetings. The undergraduate council played an important role in developing recruitment materials, including ESM’s first video. The Graduate Council launched *ESM Today* a research symposium with presentations and posters from more than 30 students in 2008.

The ESM department is highly visible in the College of Engineering magazine and in publications from Penn State’s Materials Research Institute and the College of Medicine. CNEU distributed a quarterly bulletin on nanotechnology and CISP distributed an annual newsletter to industry members. The Department has launched a new alumni newsletter, *ESM Connections*, with the guidance of our Alumni Advisory Board, formed in 2007. The newsletter was distributed to 3,500 alumni. The communications committee of the alumni advisory board is now providing professional advice on the development of “profilers”, two to four page documents designed to communicate our identity and attract target audiences of undergraduate students and their families, graduate students, and industry.

4. RECRUITMENT RETENTION AND PLACEMENT

Strategic Goal 4: Develop New Strategies to Recruit and Retain Faculty, Students and Staff and Enhance Placement of ESM Students

Faculty recruitment oriented towards our strategic initiatives of bio-nano and health monitoring was highly successful with the appointment of Professors Huang (bio-nano, 2005), Schiff and Gluckman (neural engineering, 2006), Zhang (multi-scale computational modeling, 2007) and Drapaca (neural engineering, imaging, 2007). These faculty members are attracting new students to our program.

A goal of increasing undergraduate numbers to 40 juniors and 40 seniors was established in 2006. This would bring the four-year total number of students in our program to ~120. For the last five years, our graduation rate has averaged 25 students with an average GPA of 3.60. In Spring 2008, there were 29 seniors and 29 juniors in the Engineering Science major, and the sophomore pool indicated significant potential growth for Fall 2008. In Fall 2008, the goal was met with 39 juniors and 42 seniors in the program. Active recruitment strategies are under development to sustain these numbers.

A strategic program of recruitment from targeted schools, particularly State College High School is in progress. To attract graduate students, ESM signed Memoranda of Agreement with Pennsylvania universities (Lock Haven, Lebanon Valley College, Millersville, Edinboro) and Rose Hulman Institute of Technology (Indiana), Southeastern Louisiana University, as well as international universities (Salerno – Italy, Tianjin – China, Taibah University - Saudi Arabia). Our integrated undergraduate-graduate (IUG) program was so successful that it could become oversubscribed. Higher admission standards may have to be considered in the future.

An active program to increase recognition of Engineering Science at Penn State by industry was undertaken. Publicity materials were prepared and distributed at career fairs and Penn State's industry showcase. The alumni advisory board, many of whom are former recruiters for industry, has taken an active role in distributing materials at the career fair. They guided the development of a new "profiler" to show case Engineering Science strengths to an industrial audience. The profiler was distributed at the Fall 2008 career fair enhancing significantly the recognition of our major.

It was determined that retention of students is not an issue for the Engineering Science undergraduate program. Individual academic advising plus research advising ensured that students are well informed about the program. It was found to be rare for a student, once admitted, to leave the program.

5. DEVELOPMENT AND ALUMNI RELATIONS

Strategic Goal 5: Enhance Our Alumni, Corporate and Foundation Relations and Development Activities to Increase Support for Key ESM Initiatives

The ESM Department does not have a long tradition of alumni activities and communications. To address this situation, a Centennial Celebration was held in 2006, opened by Mason Walsh, grandson of Paul B. Breneman, the founding head of the program. Approximately 300 alumni and families came for two days of reunion, department updates, and fellowship with faculty, staff and students. The event was such a success that many alumni committed to re-engage with the department. As a result, The Alumni Advisory Board, led by Michael Erdman, was formed in 2007, charged with assisting the department with its alumni relations, communications, student recruitment and placement, and corporate relations. The Communications subcommittee was very proactive in guiding the development of new publicity materials. The alumni relations committee organized the first regional "meet the department head" event in Pittsburgh, and the industry committee guided our career placement opportunities and publicized the broad range of careers pursued by our alumni.

As we engage the broad alumni community, we are developing increased opportunities for philanthropic support of our students, faculty and programs. Maureen Macaleer, Director of Major Gifts, was appointed by the College of Engineering to assist ESM, and Jason Lyons was appointed ESM Coordinator for Alumni, Development, and Advancement. A stewardship plan was developed and plans are in progress for departmental participation in Penn State's Campaign "*For the Future*".

6. ADMINISTRATION AND ORGANIZATION

Strategic Goal 6: Implement New Administrative and Organizational Practices to Support ESM's Strategic Plan

A Management Engineering study and Continuous Quality Improvement survey of ESM Information Technology (IT) needs was performed in 2005 and recommendations implemented. Satisfaction with IT service improved dramatically as indicated by responses to a follow-up survey. Voice over Internet Protocol (VOIP) telephone systems were installed in 2005 and a major upgrade of ESM servers and data storage was implemented in 2006/07. The Department Head Secretary and Book Keeping positions were upgraded. New laboratories for neural engineering, bio-nanotechnology, lasers, computation, and optics were established and instructional laboratory equipment was updated annually. Safety Protocols were updated annually.

Staff professional development plans were implemented in 2005, and promotion and award milestones established. All staff was active in professional development programs. Administrative Assistant Sue Croyle completed the Management Institute program in 2005, two staff completed Mastering Supervision (Croyle 2004, Daub 2006), four staff completed the Administrative Committee on Research (ACOR) certification (Watson 2007, Owens 2007, Daub 2008, Brooks 2008) and Kathleen Zimmerman attended the Women's Leadership Conference in 2007. Since 2003, the staff has received 24 awards: Peer Review of Exceptional Performance, which includes 8% salary increase, (Daub, Orr, 2003; Ritter, 2004; Croyle, 2003, 2005; Winkler, 2005; Ames, 2006; Zimmerman, 2007); promotion – Ritter; Materials Research Institute Administrative Staff Excellence Award – Daub (2003); Penn State Engineering Society Outstanding Staff Award – Croyle, 2007; 25 year award – Orr; **ESM Legacy Awards: Diversity and Citizenship** – Winkler (2005), Zimmerman (2006), Ritter (2007); **Management of a Project** - Kralik (2005), Bierly (2006), Daub (2007); **Creativity and Innovation** – Ames (2005), Haynal (2006), Markley (2007); **Planning and Organizational Effectiveness** – Ritter (2005); Cowan, Potter (2006); Hosterman (2007). The Engineering Science and Mechanics Department is very fortunate to have such a talented and accomplished staff.