ERC Meeting and Engineering Ed and Centers

March 16, 2010

Allen L. Soyster
Brief History and Present Facts

• EEC Division formed in 1992
• 50 ERCs (since 1984)
• Four Foci
  ✓ Centers (65% funding)
  ✓ Human Resources (10%)
  ✓ Engineering Education (10%)
  ✓ (Stipend – GRF, IGERT, K-12, Brige)(15%)

• 138 million (Request for 2011)
1. Enhance the K-12 Pipeline and its Diversity;  
   * 10% of all matriculates study engineering.

2. Promote the Success of the Undergraduate Learning Experience;  
   * 3 of 4 students complete BS in engineering.

3. Improve the Pathway to Graduate Engineering Programs for US and Permanent Residents;  
   * 5000 PhDs granted to domestic students.

4. Build a Culture of Discovery and Innovation in Engineering through Multi-Disciplinary Centers;  
   * 1000 Center-related students graduate annually
EEC Opportunities

A) Education

B) Human Resources

C) Centers
<table>
<thead>
<tr>
<th>Program/Date</th>
<th>Subject</th>
<th>Funding</th>
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</thead>
<tbody>
<tr>
<td>1) IEECI</td>
<td>a) G.I. Bill</td>
<td>4-6 million</td>
</tr>
<tr>
<td>(March 31, 2010)</td>
<td>b) Valley of Death</td>
<td></td>
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<td>2) Nano Under Education</td>
<td>Nanotechnology for Undergraduates</td>
<td>2 Million</td>
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<tr>
<td>(May 7, 2010)</td>
<td></td>
<td></td>
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<tr>
<td>3) IEECI</td>
<td>How People Learn</td>
<td>4-6 million</td>
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<tr>
<td>(Jan, 2011)</td>
<td></td>
<td></td>
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<tr>
<td>4) IEECI</td>
<td>(Stay Tuned)</td>
<td>4-6 million</td>
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<td>(March, 2011)</td>
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Engineering Education (1340)

(1) Converted to Program Announcement in 2007
   (Require tenured, senior Engineering Professor on Team)

(2) Proposals received (Awards)
   ✓ 2007 – 84 (13)
   ✓ 2008 – 116 (40)
   ✓ 2009 – 216 (46)
   ✓ 2010 – (March 31, 2010)

(3) 2010 – (Exploratory topics)
   ✓ Valley of Death/Translation
   ✓ Innovations for GI Pathway

(4) 2011 – (New Announcement in September 2010-topics ?)
Building a collaborative community of scholars and practitioners

How do we bridge the divide?

Engineering education researchers

Engineering education practitioners
STUDENT PIPELINE

K-12

School Board Advisory

University

Industry Advisory Board

Industry
Global Experience – Purdue Pilot

• International Research and Education in Engineering (IREE)

• 50 students /(30 graduate 20 undergraduate) Summer 2010

• Shanghai research assignments

• Two week training prior to travel
  ✓ 20 Purdue
  ✓ 20 Shanghai
  ✓ 10 Internet
## Human Resources

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<tr>
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<tr>
<td>1) REU (August 25, 2010)</td>
<td>Research Experience for Undergraduate</td>
<td>4 Million (New)</td>
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<tr>
<td>2) RET (November 15, 2010)</td>
<td>Research Experience for teachers</td>
<td>1-2 million (New)</td>
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Engineering REU Site Statistics

- 38 sites funded in (FY 2009); $13.67M
- 100 active sites; impacting ~1,200 undergraduate students per year
- 34 states
- 63 institutions
RET in Engineering Site Statistics

- 61 sites funded (FY 2002-2009); $25.4M
- 29 active sites
  - ~400 teachers per year; impacting ~80,000 students
  - 24 states
  - 29 institutions; majority large universities
- ENG supports ~60% of all NSF RETs
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<td>1) ERC/Spring 2011</td>
<td>Open (Energy Infrastructure)</td>
<td>40 million/Center</td>
</tr>
<tr>
<td>2) NSECs/?</td>
<td>(under review)</td>
<td>(under review)</td>
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</table>
ERC – SBIF Partnerships (2010)

- ERC (Supplement) with Active SBIR
- SBIR (Supplement) with Active ERC
- 2010 Budget – 12 million for Innovation
RECENT EEC Workshops

(1) Power Engineering and Education
(2) PhD Education – Industry
(3) PhD Education – University Presidents
(4) GK-12 and Engineering
(5) International Research in Engineering and Education Planning (Newport Declaration)
(6) Healthcare and Engineering***
(7) K-12 and SAT/ACT Opportunity***
(8) Engineering Design
(9) Grand Challenges
(10) Women in Engineering Leadership
(11) Post-Docs in Industry
(12) Systems Dynamics in Forecasting Engineering Manpower needs
(13) Planning for the GI Bill
(14) SBIR/ERC Grantees
(15) International Research Education Meeting for PIs
(16) Eng Ed Department Heads/Deans
Engineering PhDs
(Some facts from CGS)

• 5 year Completion rate - (Domestic) 25%
  (2008 Council of Graduate Schools Template)
  a) require an MS?
  b) continuous enrollment?

• Cohort---students entering a doctoral program in a given year)

• Percent United States Citizens 31%
Overall EEC Metric for Market Penetration

Of all the 360 ABET accredited Engineering Schools,* how many did not submit a proposal to EEC in 2008 or 2009

22

* (85 or more graduates)
Post-Doc and Industry (2009)

• 40 Engineering Post Docs to Industry

• ASEE Clearinghouse

• 50K + 25k + benefits

• Future (?)