Announcements

- NSF CAREER Awards:
  - Bing Wang, CSE
  - Ugur Pasaogullari, ME
- Humboldt Research Award
  - Bahram Javidi, ECE
- Outstanding Staff Award
  - Sandi Lizee
UConn SoE

- UConn’s Strength: Faculty
- Research expenditures ($125K/year)
- Scholarly output (3 articles/year)
- 25 NSF CAREER and YI Awardees
- 50% Society Fellows
- 18 Chief Editorships
- 3 Chair Professorships
- 4 Named Professorships
- 3 UConn BOT Professorships

Where Do We Stand?

Graph showing trends in BS Degrees, PhD Degrees, and Faculty from 1997 to 2007.
Where Do We Stand?

**Journal Articles**

<table>
<thead>
<tr>
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<td>180</td>
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<td>220</td>
<td>250</td>
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Where Do We Stand?

**Research Expenditures**

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<td>$35,000,000</td>
<td>$30,000,000</td>
<td>$25,000,000</td>
<td>$20,000,000</td>
<td>$15,000,000</td>
<td>$10,000,000</td>
<td>$5,000,000</td>
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### Comparisons With Peers

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<th>USNWR Peer Eval</th>
<th>Institution</th>
<th>Faculty</th>
<th>SAT</th>
<th>UG/Fac</th>
<th>BS/Fac</th>
<th>MS/Fac</th>
<th>PhD/Fac</th>
<th>Res Exp/Fac</th>
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<td>19</td>
<td>3.4</td>
<td>UC-Santa Barbara</td>
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<td>2.07</td>
<td>1.00</td>
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<td>37</td>
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<td>Virginia</td>
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<td>UMass</td>
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<td>1150-1330</td>
<td>11.3</td>
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<td>61</td>
<td>2.9</td>
<td>Iowa</td>
<td>83</td>
<td>1190-1390</td>
<td>15.7</td>
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<td>$416K</td>
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<td>66</td>
<td>2.7</td>
<td>Tennessee</td>
<td>160</td>
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<td>11.1</td>
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<tr>
<td>70</td>
<td>2.7</td>
<td>Connecticut</td>
<td>105</td>
<td>1180-1320</td>
<td>16.7</td>
<td>2.98</td>
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<td>0.50</td>
<td>$125K</td>
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<tr>
<td><strong>Average</strong></td>
<td></td>
<td></td>
<td>120</td>
<td>14.3</td>
<td>2.78</td>
<td>1.18</td>
<td>0.51</td>
<td>$350K</td>
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### School of Engineering Rankings

<table>
<thead>
<tr>
<th>Overall Rank</th>
<th>Peer Evaluation (25%)</th>
<th>Recruiter Evaluation (15%)</th>
<th>GRE Quan Score (6.75%)</th>
<th>Accept Rate (3.25%)</th>
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</thead>
<tbody>
<tr>
<td>UConn</td>
<td>70 (2.7) 62 (2.9) 72</td>
<td>59</td>
<td>36</td>
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<table>
<thead>
<tr>
<th>NAE Members (7.5%)</th>
<th>Total Res. Exp (15%)</th>
<th>Res. Exp/Faculty (10%)</th>
<th>PhD Degrees (6.25%)</th>
<th>PhD/Faculty (7.5%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UConn</td>
<td>64</td>
<td>67</td>
<td>66</td>
<td>52</td>
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<table>
<thead>
<tr>
<th>Biomed</th>
<th>Chem</th>
<th>Civil</th>
<th>Environmental</th>
<th>ECE</th>
<th>Mats</th>
<th>ME</th>
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<tr>
<td>USNWR</td>
<td>N/A</td>
<td>65</td>
<td>37</td>
<td>73</td>
<td>46</td>
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<tr>
<td>NRC</td>
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<td>51</td>
<td>N/A</td>
<td>79</td>
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### Departmental Activities

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<tr>
<th></th>
<th>CEE</th>
<th>CMBE</th>
<th>CSE</th>
<th>ECE</th>
<th>ME</th>
<th>BME</th>
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<tbody>
<tr>
<td>Faculty</td>
<td>22</td>
<td>21</td>
<td>20</td>
<td>23</td>
<td>19</td>
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<tr>
<td>UG Students</td>
<td>255</td>
<td>208</td>
<td>240</td>
<td>201</td>
<td>355</td>
<td>218</td>
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<td>Graduate Students</td>
<td>66</td>
<td>97</td>
<td>91</td>
<td>108</td>
<td>77</td>
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<tr>
<td>BS Degrees</td>
<td>44</td>
<td>30</td>
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<td>46</td>
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<td>MS Degrees</td>
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<td>14</td>
<td>7</td>
<td>13</td>
<td>14</td>
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<tr>
<td>PhD Degrees</td>
<td>11</td>
<td>13</td>
<td>6</td>
<td>8</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Research Expenditures</td>
<td>$1,588K</td>
<td>$2,131K</td>
<td>$2,143K</td>
<td>$3,707K</td>
<td>$2,588K</td>
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### Undergraduate Programs

<table>
<thead>
<tr>
<th></th>
<th>AY 2002/2003</th>
<th>Ret. Rate</th>
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<tbody>
<tr>
<td>New Freshmen</td>
<td>312</td>
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<tr>
<td>Promotions</td>
<td></td>
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<tr>
<td>Fresh-&gt;Soph</td>
<td>235</td>
<td>75.3%</td>
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<tr>
<td>Soph-&gt;Junior</td>
<td>192</td>
<td>61.5%</td>
</tr>
<tr>
<td>Junior-&gt;Senior</td>
<td>165</td>
<td>52.9%</td>
</tr>
<tr>
<td>Graduation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AY 2005/06</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>AY 2006/07</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>AY 2007/08</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>141</td>
<td>45.2%</td>
</tr>
<tr>
<td>Graduation Rate</td>
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<td>45.2%</td>
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</table>

- Need to evaluate and update our curriculum at all levels
Retention and Graduation

<table>
<thead>
<tr>
<th>Sem/year</th>
<th>BME</th>
<th>CMBE</th>
<th>CEE</th>
<th>CSE</th>
<th>ECE</th>
<th>ME</th>
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<tbody>
<tr>
<td></td>
<td># St</td>
<td>% Prom</td>
<td># St</td>
<td>% Prom</td>
<td># St</td>
<td>% Prom</td>
</tr>
<tr>
<td>AY 2002/2003</td>
<td>40</td>
<td>21%</td>
<td>31</td>
<td>73%</td>
<td>24</td>
<td>52%</td>
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<tr>
<td>Fresh to Soph</td>
<td>32</td>
<td>80%</td>
<td>18</td>
<td>86%</td>
<td>21</td>
<td>68%</td>
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<td>Soph to Junior</td>
<td>29</td>
<td>91%</td>
<td>15</td>
<td>83%</td>
<td>20</td>
<td>95%</td>
</tr>
<tr>
<td>Junior to Senior</td>
<td>28</td>
<td>97%</td>
<td>14</td>
<td>93%</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>AY 2005/06</td>
<td>22</td>
<td>8%</td>
<td>10</td>
<td>15%</td>
<td>4</td>
<td>8%</td>
</tr>
<tr>
<td>AY 2006/07</td>
<td>5</td>
<td>5%</td>
<td>6</td>
<td>8%</td>
<td>8</td>
<td>25%</td>
</tr>
<tr>
<td>AY 2007/08</td>
<td>3</td>
<td>1%</td>
<td>3</td>
<td>3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>13%</td>
<td>16</td>
<td>26%</td>
<td>13</td>
<td>36%</td>
</tr>
<tr>
<td>Grad Rate</td>
<td>68%</td>
<td>62%</td>
<td>52%</td>
<td>36%</td>
<td>54%</td>
<td>69%</td>
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</tbody>
</table>

Recruitment

- Jan_26_06
- Jan_29_07
- Jan_29_08
Outreach Activities

Of those college freshmen who intend to major in science or engineering, the share expressing interest in majoring in computer sciences or engineering has declined in recent years.

NSF Statistics for CT 2005

- Need to become institution of choice in CT and region

<table>
<thead>
<tr>
<th></th>
<th>Quartile</th>
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</thead>
<tbody>
<tr>
<td>Engineers as Share of Work Force (WF)</td>
<td>1st Quartile</td>
</tr>
<tr>
<td>BS Degrees Confirmed in S/E for 18-24 year olds</td>
<td>4th Quartile</td>
</tr>
<tr>
<td>Cost of Undergraduate Education</td>
<td>1st Quartile</td>
</tr>
<tr>
<td>Cost of UG Education/Disposable Income</td>
<td>3rd Quartile</td>
</tr>
<tr>
<td>S/E Doctorate Holders as a Share of WF</td>
<td>1st Quartile</td>
</tr>
<tr>
<td>S/E Doctorates Confirmed as a Share of WF</td>
<td>3rd Quartile</td>
</tr>
<tr>
<td>Academic Research/Gross Domestic Prod</td>
<td>3rd Quartile</td>
</tr>
</tbody>
</table>
UG Programs

- Increase quality
  - SAT
- Val/Sal Yield
- Increase enrollment
  - Active recruitment
  - Engage applicants
- Increase retention
  - Engagement
- Increase graduation
  - Modern curriculum
  - Internships
  - Research
- Align teaching for outcome:
  - Engineering as a profession
  - Engineering as an education
- BS/PhD Programs
  - Integrated research & education training
- Develop 2+2 programs with HBCU/MSI

UG Curriculum

- Evaluate and introduce innovations in curriculum
  - Creativity
  - Entrepreneurship
  - Interactive learning
- Develop exciting concentrations/certificate programs in each department
  - Promotes inter-disciplinary philosophy in our students
- Professional engagement of our students
  - Industry internships
  - Research internships
### Undergraduate Engagement

- **Research Experiences:**
  - Intellectual development of students
  - External fellowships applications
  - Attract bright high school students

- **Internships and Co-Ops:**
  - Timely advice from employers regarding student performance in real-world environment
  - Increased access to business, industry and government
  - WACE Survey: students with industrial experience in college are more likely to be promoted

### Research

- FY 07 research expenditures: $13M
- Research expenditure per faculty: $125K

<table>
<thead>
<tr>
<th></th>
<th>CEE</th>
<th>CMBE</th>
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<th>ECE</th>
<th>ME</th>
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</thead>
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<td>Faculty</td>
<td>22</td>
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<td>20</td>
<td>23</td>
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<td>38</td>
<td>89</td>
<td>39</td>
<td>63</td>
<td>71</td>
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<tr>
<td>Conf. Proceed</td>
<td>51</td>
<td>30</td>
<td>69</td>
<td>142</td>
<td>60</td>
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<tr>
<td>Research Exp.</td>
<td>$1,588K</td>
<td>$2,131K</td>
<td>$2,143K</td>
<td>$3,707K</td>
<td>$2,588K</td>
</tr>
<tr>
<td>Active Grants</td>
<td>58</td>
<td>48</td>
<td>40</td>
<td>60</td>
<td>64</td>
</tr>
<tr>
<td>Prop Submission</td>
<td>41 (15)</td>
<td>80 (20)</td>
<td>57 (17)</td>
<td>82 (23)</td>
<td>80 (19)</td>
</tr>
<tr>
<td>Value</td>
<td>$8.3M</td>
<td>$23.4M</td>
<td>$20.3M</td>
<td>$23.7M</td>
<td>$29.8M</td>
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<td>New Awards</td>
<td>28</td>
<td>30</td>
<td>22</td>
<td>64</td>
<td>23</td>
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New Awards

Goals: Research Funding

- Encouragement of Center/Team efforts
- Collaborations across all units
- Collaborations with UCHC
- Adjusting to research dynamics
- Near-term goal: $200,000 faculty/yr
- Five-year goal: $350,000 faculty/yr
- Identification of the “right” audience

Science: NSF, NIH, DoE  Applications: NIST, NASA, DoD

Dreams: DARPA  Development: Industry
Opportunities in Research

ENG only represents 13% of NSF budget

Total Federal Distribution ($000)

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Total Distribution</th>
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<tr>
<td>Mathematics</td>
<td>1,021,789</td>
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<td>Soc Sciences</td>
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<tr>
<td>Environmental Sciences</td>
<td>634,017</td>
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<tr>
<td>Engineering</td>
<td>522,345</td>
</tr>
<tr>
<td>Other Sciences</td>
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</tr>
<tr>
<td>Phys Sciences</td>
<td>322,345</td>
</tr>
<tr>
<td>Biol. Sciences</td>
<td>1,216,740</td>
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<tr>
<td>Psychology</td>
<td>1,070,140</td>
</tr>
<tr>
<td>Med Sciences</td>
<td>486,004</td>
</tr>
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</table>

Source: NSF

Research Collaborations

Percent of Single PI vs. Multiple Investigator Awards

[Graph showing the percentage of single versus multiple investigator awards for different disciplines over time]
Dean’s Research Advisory Comm

- Help identify new focus areas
- Evaluate policies and practices to promote research
- Develop activities in core areas of each department that lead to int’l leadership
- Foster collaboration across departments and schools
  - Equitable distribution of credit for participation
- Need to develop foundational programs that lead to larger efforts
  - IUCRC, REU, RET, GAANN, MURI, MRSEC, ERC
Research

- Promote and sustain the value of research
- Need to develop dialogue among researchers
  - Research Day
  - Departmental Research Showcase
  - Emerging Research Mini-Symposiums
- Some focus areas:
  - Nanotechnology
  - Energy and Sustainability
  - Infrastructure
  - Data fusion & data mining
  - Biomedical engineering
  - Transportation Security

Graduate Programs

- Proactive recruitment
  - Attract domestic graduate students
  - Identify and recruit best of our own
  - Diversity in recruitment (Women and minorities)
    - GEM, Bridge to the Doctorate, AGEP
  - Diversity in international recruitment
- Develop site programs for fellowships
- Evaluate policies and practices to increase Ph.D. student recruitment and training
- Professional development for Ph.D. students
- Ph.D.s to academia
Graduate Programs

- M. Eng. Program Committee:
  - Evaluate needs of regional corporations for professional master’s program
  - Develop on-line teaching/learning for M.Eng. and M.S. programs
  - Develop certificate programs, examples:
    - Sustainable energy
    - Green engineering
    - Bioinformatics
    - Nanotechnology
    - Engineering management
    - Entrepreneurship
Int’l Program Task Force

- Explore int’l educational, training and research opportunities
- Dual degree programs
- Study-abroad opportunities with top institutions
- Global Engineering Education Exchange
- Effective global collaboration is critical for growth
  - Faculty and student exchanges (PIRE)
  - World Materials Network
- Develop recruitment programs for Int’l Students
Aligning Goals with Institution

- Develop plans to integrate activities with UConn initiatives
- Aspiration to be one of the top-ranked research universities in the country and in the world
  - School of Engineering needs to play central role
  - Each department will contribute to success
- Focused activities in research, learning, outreach, globalization, and diversity
- Themes for growth and resource:
  - Our World: The Environment
  - Our People: Health and Human Behavior
  - Our Future: Education and Workforce Dev.

Where Do We Want To Go?

- An internationally recognized research program known for its excellence in
  - Emerging research with impact
  - Source of ideas
  - Graduate student training
  - Source of Talent
  - Nationally ranked graduate program
    - Let’s first strive for the top 50
    - Let’s then strive for the top 25
  - A nationally recognized UG program with emphasis on creative learning
  - Outreach programs and distance learning
Immediate Goals

- Research
  - Increase proposal submissions
  - Promote multi-investigator proposals
  - Collaborations with UCHC
- Faculty Hirings
  - Diversity focus
  - Focus on quality
- Recruitment & Retention
  - Curriculum innovations
  - Engagement activities
  - Outreach
- Graduate Programs
  - Enhance diversity
  - Professional development
  - Distance learning

Future Growth

- Faculty:
  - 40 to 50 hirings in the next 5 years
- Facilities
  - Renovations to EII/EIII
  - New Engineering building
- Graduate Program
  - National prominence
  - Int’l Collaborations
- Undergraduate Program
  - Modern curriculum
  - Undergraduate research
  - Undergraduate internships
**Diversity**

- **Faculty**
  - 42 Full Profs, 23 Assoc. Profs, 40 Asst Profs
  - 13 Women faculty, 3 URM faculty

- **Ph.D. students**
  - 241 total students
  - 66 women (27%), 191 int’l (79%) and 9 URM (4%)

- **UG Students**
  - 14% women
  - 4% African-American
  - 4% Hispanic

**Raising Interests and Resources**

- Need to develop sense of excitement about SoE activities
- Programs that enable meaningful legacy
- Need to nurture relationships with a long-term focus
- Faculty participation is critical
- Focus:
  - Naming rights
  - Scholarships
  - Fellowships
  - Research Collaborations
Elements of Success

- Continue with the BAU approach?
  - Are we satisfied?
  - What changes do we expect of the institution?
- What changes do we expect of ourselves?
- Changes for positive benefits
- Faculty & staff are the foundations for change
- Collegiality and Sense of community
- Recognize and reward excellence
- Communication will be key

ENGINEERING
NEW FRONTIERS