Rensselaer ENGINEERING

Dean’s Town Hall Meeting

October 5, 2011

David Rosowsky, Ph.D., P.E., F.ASCE
Dean, School of Engineering
Rensselaer ENGINEERING

ACCOLADES

Sharing Good News – Celebrating Achievements
PROMOTIONS

- Assad Oberai, Professor, MANE
- Michael (Miki) Amitay, Professor, MANE
- Jian Sun, Professor, ECSE
- Birsen Yazici, Professor, ECSE
- Daniel Gall, Professor, MSE
- Diana Borca-Tasciuc, Associate Professor, MANE
- Deanna Thompson, Associate Professor, BME
- Mona Hella, Associate Professor, ECSE
- Leila Parsa, Associate Professor, ECSE
- Wai Kin (Victor) Chan, Associate Professor, ISE
RENSSELAER AWARDS

- Joe Chow, Jerome Fishbach Faculty Travel Award
- Eric Ledet, Class of 1951 Outstanding Teaching Award
- Bimal Malaviya, David M. Darrin ’40 Counseling Award
- Tom Willemain, Rensselaer Alumni Association Teaching Award
NEW FACULTY

• Johnson Samuel, Assistant Professor, MANE
• Onkar Sahni, Assistant Professor, MANE
• Xiaokun (Cara) Wang, Assistant Professor, CEE
• Chris Letchford, Professor and Department Head, CEE
• Qun (Leo) Wan, Assistant Professor, BME
• Mattheos Koffas, Career Development Constellation Professor in Biocatalysis and Metabolic Engineering, Associate Professor, CBE

CHAIRED PROFESSORSHIPS

• Jose Holguin-Veras, William Howard Hart Professor
• Georges Belfort, Institute Professor
YOUNG INVESTIGATOR AWARDS

- Jeff Ban (CEE), NSF CAREER
- Daniel Lewis (MSE), NSF CAREER
- Cynthia Collins (CBE), NSF CAREER

RESEARCH EXPENDITURES GREATER THAN $1M (FY11)

- Bob Karlicek, Ken Connor, John Wen, Partha Dutta, Jian Sun (ECSE)
- Richard Siegel (MSE)
- Michael Amitay, Suvranu De, Mark Shephard, Yaron Danon (MANE)
- Tarek Abdoun (CEE)
- John Dordick, Ravi Kane, Robert Linhardt (CBE)
SNAPSHOTS

A look at where we are - and where we are going
SoE Enrollment - Undergraduate

In Fall 2004, we had about 2700 undergraduate engineering students.

This Fall (2011), we have about 3000 undergraduate engineering. This was the result of some very large first-year intakes over the last five years into SoE*.

Maintaining first-year engineering intake at about 650, while also limiting transfer admissions, will bring the total engineering undergraduate enrollment to about 2700-2800 in two years.

This represents about 50% of the Institute (assuming 5500 undergraduates). Getting to 40% will require further reduction.

* 730 in F’05, 780 in F’06, 750 in F’07, 760 in F’08, 780 in F’09, 650 in F’10, 670 in F’11
Since Fall 2004, graduate enrollment in engineering on the Troy campus has been steady at about 500 full-time students. This does not include co-terminal (BS/MS) students (about 150 currently).

In Fall 2004, 80% of the SoE graduate students were PhD students. This percentage has steadily increased to more than 90% today (Fall 2011).

Our ratio of PhD graduates to faculty in SoE (0.6) is already at the top of the range of our peer/aspirant group.
SoE Faculty

We currently have about 135 T/TT faculty in the SoE.

Last Spring, we received approval to commence searches for 10 new faculty in SoE and a new department head (MANE).

We had 7 faculty retirements this year (high) along with 4 faculty departures for other universities (normal).

Thus, assuming no more losses over the coming year, we are “holding ground” in terms of faculty size.
# FY12 Faculty Searches (11)*

## Endowed Chairs
- Hood Chair (MANE-Nuclear)
- Redfern Chair (MANE-Aero)
- Blitman Career Devel. Chair (CEE)
- Horton Chair (MSE)
- Clark and Crossan Chair (BME)

*plus vacant Constellation Chairs*

## Additional Positions
- Asst. Professor (MANE-Aero)
- Asst. Professor (MSE)
- Asst. Professor (CBE)
- Asst. Professor (BME)
- Assoc./Full Professor (BME)
- Department Head/Full Prof. (MANE)
Enrollment management and faculty growth:
toward right-sizing the SoE and improving our program rankings

<table>
<thead>
<tr>
<th></th>
<th>F’2006</th>
<th>F’2011</th>
<th>Goal 1 (50%)</th>
<th>Interm.</th>
<th>Goal 2 (40%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T/TT faculty</td>
<td>146</td>
<td>135</td>
<td>160</td>
<td>160</td>
<td>175</td>
</tr>
<tr>
<td>UG students*</td>
<td>3042</td>
<td>3000</td>
<td>2750</td>
<td>2200</td>
<td>2200</td>
</tr>
<tr>
<td>G students*</td>
<td>505</td>
<td>502</td>
<td>600</td>
<td>650</td>
<td>700</td>
</tr>
<tr>
<td>UG/faculty ratio</td>
<td>20.8</td>
<td>22.5</td>
<td>17.2</td>
<td>13.8</td>
<td>12.6</td>
</tr>
</tbody>
</table>

* Excludes co-terminal BS/MS students (~150 as of F’11)

AAU Peer/Aspirant Benchmarks:
- UG/faculty ratio (range: 6:1 – 12:1)
- UG/G ratio (range: 1:1 – 4:1)
Faculty growth

To meet the President’s call to grow the T/TT faculty to 400 in the next three years, the following commitment is requested for the next three years:

FY13 (for positions to start Fall 2012) 15 faculty positions
Assuming we hire 11 approved in FY12, 8 departures in FY12, and 8 departures in FY13, this brings SoE T/TT faculty total to 146

FY14 (for positions to start Fall 2013) 20 faculty positions
Assuming 8 departures, this brings SoE T/TT faculty total to 158

FY15 (for positions to start Fall 2014) 20 faculty positions
Assuming 8 departures, this brings SoE T/TT faculty total to 170 (GOAL)

NET GAIN: 34 SoE T/TT positions
The President and Board want to grow as quickly as possible to 400 T/TT faculty on the Troy campus.

Positions (salaries) exist in the budget, but startup funds continue to be extremely limited. So…

1. Mini-campaign (Rensselaer and SoE) to raise Faculty Excellence Funds (read: startup) to enable rapid expansion, i.e. over a 2-3 year period.

2. We are not likely to be approved for the large number of positions we will be requesting.
What might we expect in FY13?

- On-going FY12 searches approved in Spring 2011
- Constellation Chair searches by SoE
- FY13 searches with low/modest startup needs
- FY13 searches with larger startup needs
What could we see in FY13?

- On-going FY12 searches approved in Spring 2011
- Constellation Chair searches by SoE
- Research faculty (e.g., Research Asst. Professor)
- Targeted Professors of Practice
SoE Faculty Productivity

The average research expenditures per faculty member in SoE has held steady at about $300K over the last two years.

However in this two year period, the median research expenditures has increased, the number of faculty with more than $1M in research expenditures increased, and the number of grant-inactive faculty decreased.

AAU peer/aspirant benchmark: ~$300K/faculty
Focus on large research centers

CenSSIS (NSF ERC, Year 10)
Smart Lighting (NSF ERC, Year 4)
CURENT (Ultra-wideband smart grid NSF ERC, Year 1)
Dam and Levee Safety (NIST, Year 2)
Earthquake/Geotechnical Centrifuge (NSF NEES, Year 4+)
Nano-Bio (NSF ERC, submitted, 3+1)
Sustainable Urban Freight Systems (Volvo, submitted)
Computational Science Center (DOE, proposal stage)

Two new SoE centers established in last two years:
  CenSIMM (>5M in new NIH funding in first year)
  CeFPaC (targets: Boeing, Pratt Whitney, GE)
Rensselaer Signature Thrust Areas
(from the Rensselaer Plan, ~2000)
Rensselaer Signature Thrust Areas
(from the Rensselaer Plan)

School of Engineering Strategic Focal Areas
(SoE FY13 Performance Plan, Fall 2012)

Transformational Materials and Manufacturing (TMM)

Human Health and Livability (HHL)
SoE Performance Plan

Fall 2009

Fall 2010

Fall 2011
1. Undergraduate engineering education
   a. Introduction to Engineering pilot course
   b. Pedagogical innovation
   c. Evolution of the classroom/studio/laboratory
   d. New degree programs and pairings with SoA, SoS, Lally

2. Graduate Education
   a. Selected co-terminal MS program expansion
   b. Blue-chip PhD recruiting (pre-acceptance visits, fellowships, value-added programs for faculty preparation)
   c. Streamlining graduate admissions, graduate student policies
   d. Bedford Program with SoA
   e. New degree pairings with Lally
3. Faculty
   a. Strategic hiring initiative: advertisements appearing late-Fall
   b. Recruiting for diversity (Compact, Part A)

4. Research
   a. Large center proposals
   b. Increase/replace eliminated faculty support (Institute-level)
   c. Implement system for center support (VPR)

5. Programs
   a. BRIDGE Program
   b. Archer Center for Student Leadership Development
   c. SL and SE initiatives (Ambassadors, Better World, and beyond)
6. **Advancement**
   a. Constituent Model Year 1 goal setting
   b. Frame and promote Dean’s priorities
   c. Target alumni/group engagement

7. **Thematic Messaging**
   a. Transformation Materials and Manufacturing (TMM)
   b. Human Health and Livability (HHL)
   c. Engineering at the core of the Institute, central to its expansion upward, forward, and outward
   d. Faculty recruitment has continued throughout the economic crisis
   e. ROI consistently ranked among the best, graduates highly recruited
2010/2011 USN&WR Rankings of Engineering Programs at Rensselaer
Top-25 rankings among all universities, public and private, are highlighted. Note that these all correspond to top-10 rankings among privates only. (NR = not ranked by USN&WR in 2010/11)

<table>
<thead>
<tr>
<th>Program</th>
<th>Undergraduate</th>
<th>Graduate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All universities</td>
<td>Private only</td>
</tr>
<tr>
<td>Overall (School of Engineering)</td>
<td>27</td>
<td>13</td>
</tr>
<tr>
<td>Aerospace Engineering</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Biomedical Engineering</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Computer Engineering</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>14</td>
<td>TBD</td>
</tr>
<tr>
<td>Environmental Engineering</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Industrial Engineering</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Materials Engineering</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Nuclear Engineering</td>
<td>NR</td>
<td>NR</td>
</tr>
</tbody>
</table>
Other quality indicators

- Selectivity
- Student/faculty ratios
- Class sizes (e.g., below 20, above 50)
- Student retention and graduation rates
- Percent UG students going on for graduate study
- Faculty research expenditures
- PhD’s graduated (per faculty) per year
- Placement of PhD graduates in academic positions
- Members of the National Academy of Engineering
- Peer-reviewed journal publications (per faculty) per year
- Journal paper citations (per faculty) per year
- National and international awards and recognitions
Rensselaer Engineering Magazine

FALL 2010

SUMMER 2011

BETTER WORLD//ENGINEERING

Rensselaer's community of scholars guides future engineers to design a better world.
Initiatives
Better World // Engineering

- **Smart Lighting Engineering Research Center**
  - The Smart Lighting Engineering Research Center (SERC) was founded in 2009 by RPI as one of the first Generation 3.0 projects.

- **Student Engineers for a Sustainable World**
  - Engineers for a Sustainable World (ESW) is a student-run organization at Rensselaer Polytechnic Institute affiliated with Engineers for a Sustainable World (ESW).

- **Interdisciplinary Programs in Design and Innovation**
  - At Rensselaer, we provide opportunities for students to engage in innovative and interdisciplinary programs focused on sustainability and renewable energy.

**BW/E projects**
- All Projects
- Student-Led Projects
- Classroom Projects
- Research Projects

**BW/E recent posts**
- Faculty Profile: Ling Huang, Assistant Professor of Nanotechnology
- Hello World
- Solar-eletric hybrid trimobile
- Formula Hybrid SAE Team

**The Approach >> CentSIM**
- Japan: How to Send Not Too Many
- Researcher’s Perspective on the Situation in Japan
- Every Wall in a Cluster

**Engineering News**
- A Breakthrough for Electrical Automobile Batteries: January 22, 2011
- Driving Innovations in Nanoscale Materials: January 12, 2011
Initiatives
Better World/Engineering
Future Faculty Programs

Professional Development

The School of Engineering is committed to the professional development of our graduate students and post-doctoral fellows. This is evident in the mentoring provided by our faculty, the number of students who present their research at conferences each year, the publication rate by our students and post-doctoral researchers, and the number of industrial interactions available on campus. In addition to offering several career fairs each year, the Center for Career and Professional Development is available to assist with preparation of CVs and provides assistance in preparing for interviews.

In the last three years, more than 60 PhD graduates from the School of Engineering have gone on to academic positions, either tenure-track positions of post-doctoral appointments, at major universities. The School has a long record of placing our graduates in academia and is especially proud of the success our graduates have in finding academic appointments.

We encourage our students to consider careers in academia and take advantage of the programs provided by the Office of Graduate Education at Rensselaer to train “Faculty of the Future.” This includes a set of workshops on:

- Teaching
- Proposal writing
- Building an academic resume

In addition, there are courses on proposal writing offered by the Department of Industrial and Systems Engineering and the Department of Chemical and Biological Engineering, and a workshop on ethics offered by the Department of Materials Science and Engineering.

The School of Engineering at Rensselaer continues to train future faculty and researchers. Our graduates are highly recruited for positions at some of the best universities, national labs, and research centers worldwide. If you have an interest in pursuing an academic career, you should make this interest known to your advisor as soon as possible. Our faculty are committed to providing the best possible preparation for this rewarding career.

Linda Schadler, Associate Dean of Academic Affairs
David Manevitz, Dean

Wednesday, 27 July 2011
Initiatives
Better World//Engineering
Future Faculty Programs
Engineering 101 Pilot Course
Advancement

- New strategy
- New VP for Institute Advancement, Brenda Wilson-Hale, J.D.
- Constituent-based model
- New Senior Advancement Officer for SoE, Richard Graw
- SoE priorities
- Faculty role
SoE Fundraising Priorities

- FACULTY EXCELLENCE FUNDS (startup packages)
- STUDENT SUPPORT (scholarships and fellowships)
- STUDENT ACTIVITY SUPPORT (student chapters, teams, travel)
- PROGRAM SUPPORT (departments, centers, labs)
- DEPARTMENT EXCELLENCE FUNDS
Introduction and welcoming comments by…

Richard Graw
Senior Advancement Officer, SoE
CLOSING REMARKS
My biggest challenges

1. Rate of faculty hiring
2. Faculty retention
3. Enabling target enrollments in SoE
4. Staff hiring freeze
5. Reduced operating budget
Our greatest opportunities

1. Large-scale, collaborative, highly interdisciplinary and highly visible centers

2. Recapturing reputation for innovation in engineering education

3. Target faculty growth in strategic areas, at a time when the “market” is good

4. Propel the Institute upward, forward, and outward
Thank you.