For your guidance, your counsel, and your support...

Thank you!
Today’s meeting

PART I: State of the School
- Welcome, By-laws, new Council appointments
- Accolades, achievements, appointments in the School
- Faculty hiring initiative
- Progress against the goals of FY13 Plan
- ABET
- Advancement
- Closing remarks
- Feedback, Q&A

PART II: FY14 Strategic Highest Priorities, Highlights

PART III: Role of the Council
- ABET
- Advancement
ENROLLMENTS: School of Engineering

<table>
<thead>
<tr>
<th>School of Engineering</th>
<th>F06</th>
<th>F07</th>
<th>F08</th>
<th>F09</th>
<th>F10</th>
<th>F11</th>
<th>F12</th>
</tr>
</thead>
<tbody>
<tr>
<td>T/TT faculty</td>
<td>141</td>
<td>146</td>
<td>139</td>
<td>143</td>
<td>134</td>
<td>136</td>
<td>132</td>
</tr>
<tr>
<td>First-year enrollment</td>
<td>780</td>
<td>743</td>
<td>755</td>
<td>777</td>
<td>644</td>
<td>669</td>
<td>830</td>
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<td>(freshmen)</td>
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<tr>
<td>UG enrollment</td>
<td>2846</td>
<td>3042</td>
<td>3007</td>
<td>3087</td>
<td>3221</td>
<td>3077</td>
<td>3147</td>
</tr>
<tr>
<td>(a)</td>
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<tr>
<td>UG enrollment as a % of total enrollment</td>
<td>58%</td>
<td>59%</td>
<td>59%</td>
<td>58%</td>
<td>58%</td>
<td>58%</td>
<td>60%</td>
</tr>
<tr>
<td>Student (UG)/faculty (T/TT)</td>
<td>20</td>
<td>21</td>
<td>22</td>
<td>22</td>
<td>24</td>
<td>23</td>
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Key messages:

- Over the last two years, the SoE first-year enrollment has grown from 644 to 830 (an increase of nearly 30%) while the number of SoE T/TT faculty has remained more or less unchanged.
- Over the last five years, the SoE first-year enrollment has grown from 743 to 830 (an increase of 13%) while the number of SoE T/TT faculty has dropped from 146 to 132 (a decrease of about 10%).
- The SoE Fall 2012 first-year enrollment is the highest it has been dating back (at least) to 2006, while the number of SoE T/TT faculty is the lowest it has been dating back (at least) to 2006.

(a) Includes about 150-170 co-terminal students.
ENROLLMENTS: School of Engineering

The REAL issue is how these students (830 first-year and more than 3000 total UG’s) are distributed across the SoE academic departments/programs...

PROGRAMS (11):
12% of all SoE UG’s are in BME, and 22% are in MechE

DEPARTMENTS (7):
12% of all SoE UG’s are in BME, 17% are in ECSE, and 36% are in MANE

OVER-SUBSCRIBED PROGRAMS: BME, AeroE, MechE
PROGRAMS THAT ARE AT-CAPACITY: ChemE, CivE, ElecE, CSys
PROGRAMS THAT HAVE RESERVE CAPACITY: EnvE, MSE, ISE, NucE

Key messages:
• We need to create/enforce mechanisms to restrict enrollments in oversubscribed majors. Soft-messaging only takes us so far.
• ABET will indentify enrollment issues as challenges or deficiencies. It is important we show what steps we are taking to relieve the overloading.

Engineering Dean’s Advisory Council | April 2013, Troy, New York

ENROLLMENTS: Undergraduate

FY12 and FY13 Strategy

• Hold first-year enrollments in Engineering to 650
• Restrict internal transfer admissions*
• Limit external transfer admissions*
• Within four years, we can be at 2700 Engineering undergraduate students (50% of the Institute)

* Total transfers into Engineering equal to the number who leave Engineering

Engineering Dean’s Advisory Council | April 2013, Troy, New York
ENROLLMENTS: Undergraduate

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Engineering Dean's Advisory Council | April 2013, Troy, New York

ENROLLMENTS: Graduate

• We are holding steady at 500 full-time graduate students in Engineering (relatively unchanged in last five years).
• More than 80% of these are PhD students.
• We can achieve a target of 700 full-time graduate students in the next 3-5 years if:
  ✓ We increase the number of tenure-track faculty
  ✓ We grow selected Masters programs (co-term or specialized)
  ✓ We decrease the “cost to contract” of graduate students (e.g., by adopting final year registration plan)

Engineering Dean’s Advisory Council | April 2013, Troy, New York
“Faculty in the School of Engineering are deeply committed to teaching and scholarship, learning and discovery, and to inspiring the next generation of engineers, scientists, entrepreneurs, and leaders.”
School of Engineering

- **PROMOTIONS**
  
  Jie Lian, Associate Professor with tenure (MANE)
  Peter Tessier, Associate Professor with tenure (CBE)
  (plus 5 cases under consideration this Spring)

  Our promotion success ratio has improved owing to (1) the quality of our new faculty, (2) new faculty mentoring programs, and (3) transparency that has been created in the P&T process.

School of Engineering

- **NEW FACULTY (joined us this Spring)**
  
  Vidhya Chakrapani, Assistant Professor (CBE)
  Ge Wang, Professor, Clark & Crossan Endowed Chair (BME)
  Meng Wang, Assistant Professor (ECSE)
  Yuri Gorby, Assoc. Professor, Blitman Career Development Chair (CEE)

- **NEW FACULTY (started in Fall 2012)**
  
  Ying Chen, Assistant Professor (MSE)
  Juergen Hahn, Professor (BME)
  Mariah Hahn, Associate Professor (BME)
  Farhan Gandhi, Professor (MANE)
  Jason Hicken, Assistant Professor (MANE)
  Zahra Sotoudeh, Assistant Professor (MANE)
CHAIRER PROFESSORSHIP

FARHAN GANDHI
ROTORCRAFT EXPERT JOINS RENSSELAER AS THE ROSALIND AND JOHN J. REDFERN ’33 PROFESSOR OF ENGINEERING

CHAIRED PROFESSORSHIP

YURI GORBY
GEOMICROBIOLOGY EXPERT JOINS RENSSELAER AS HOWARD N. BLITMAN ’50 P.E. CAREER DEVELOPMENT PROFESSOR IN ENGINEERING
School of Engineering

- **RENSSELAER AWARDS**

SoE awards to be presented at the Faculty Awards Dinner, to be held at Pat’s Barn, on April 22nd.

Council members are welcome to attend as my guests!

We continue to garner a significant percentage of the Institute-level awards for teaching, research, mentoring, and both early-career and career-long achievement.

School of Engineering

- **YOUNG INVESTIGATOR AWARDS (2013, to-date)**

  Liping Huang (MSE), NSF CAREER
  Sandipan Mishra (MANE), NSF CAREER
  Thomas Sharkey (ISE), NSF CAREER
  Leo Wan (BME), NSF CAREER
  Riccardo Bevilacqua (MANE), ONR YIA and AFOSR YIA (2012)
School of Engineering

RESEARCH EXPENDITURES >$1M in FY12

- Ravindra Kane (CBE)
- Jonathan Dordick (CBE)
- Tarek Abdoun (CEE)
- Partha Dutta (ECSE)
- John Wen (ECSE)
- Robert Karlicek (ECSE)
- Jian Sun (ECSE)
- Richard Siegel (MSE)
- Michael Amitay (MANE)
- Suvranu De (MANE)
- Mark Shephard (MANE)
- Yaron Danon (MANE)

TOTAL: 12 SoE Faculty

FACULTY: School of Engineering

"The School of Engineering has some of the most academically talented students in the nation. They are as impressive as they are committed to making an impact on their profession and on our world. Faculty in the School of Engineering are deeply committed to teaching and scholarship, learning and discovery, and to inspiring the next generation of engineers, scientists, entrepreneurs, and leaders."
School of Engineering Faculty Productivity

- In the last three years, the average research expenditures per faculty member in SoE has increased from $360K to $391K.

- In this same period, the median research expenditures increased, the number of faculty with more than $1M in annual research expenditures increased, and the number of grant-inactive faculty decreased.

AAU peer/aspirant benchmark: ~$300K/faculty
RESEARCH: Major NSF Centers in Engineering

• NSF Power Electronics ERC (led by Virginia Tech)
• NSF CenSSIS ERC (led by Northeastern)
• NSF Smart Lighting ERC (led by Rensselaer)
• NSF Smart Grid ERC (led by UT-Knoxville)
• NSF NEES Earthquake Center (led by Rensselaer)
• NSF Nano-Science Engineering Center (led by Rensselaer)
• NSF Nano-Bio ERC (finalist, we were very close)

... These are just in the last 10 years!

RESEARCH: New SoE Centers

• Center for Modeling, Simulation, and Imaging in Medicine (CeMSIM), launched 2010), Directed by Suvranu De, engaging about 10 Rensselaer faculty and researchers at other universities, including Harvard Medical School and Tufts Medical School

  In 2011, CenSIMM received more than $5M in new NIH awards

• Center for Flow Physics and Control (CeFPaC, launched 2011), Directed by Miki Amitay, engaging about 15 Rensselaer faculty and with considerable industrial support from Boeing, Pratt-Whitney, and others

  Significant increase in interest by Boeing (new research, exchanges) and major expansion into Watervliet facility
RESEARCH: Future center plans

In preparation or under review:

- DOE Computational Science Center (Assad Oberai, multiple faculty from SoE and SoS) – selected for site visit (Feb.), awaiting decision

- Volvo Foundation Center for Sustainable Freight Systems (Jose Holguin-Veras, multiple faculty from SoE and HASS) – awarded

Under consideration (pre-planning):

- NSF Nano/Graphene Center (Nikhil Koratkar, multiple faculty from SoE and SoS)
- Transformational Materials/Materials Genome
- Advanced Manufacturing

RESEARCH: Key points

- More than 80% of the Engineering faculty are “research active”

- Average annual research expenditures vectoring towards $400K per faculty member

- Engineering faculty research generates between $8M and $9M of overhead for the Institute each year

- Annual research expenditures per faculty, PhD graduates per faculty, and peer-reviewed journal publications per faculty ALL are at or above the average of our AAU aspirant peer set

- 12 Engineering faculty had research expenditures in excess of $1M in FY12
SoE Focal Areas
1. Transformation Materials
2. Human Health and Livability

SoE Faculty Searches

We will be carrying over 2-4 FY13 searches into FY14, by design. We will launch 3-5 NEW searches in FY14. We will continue to search for 2-3 Constellation Chairs in FY14.

Assuming current projections hold for departures and retirements (hard to predict), and assuming we fill 8 of these 12 potential positions in FY14, our T/TT faculty size will have grown from 130 to 150 in the last four years.

Four years ago, we were averaging 8 faculty departures annually. In 2009, this number reached a high of 12. By 2012, this number had dropped to 3. We have one more “bubble” of retirements to occur, but when?
SoE Faculty Searches

Key messages:

• We are doing GREAT at filling these critical positions with outstanding new faculty.

• We are operating in a timely way, ensuring we take the appropriate time to develop an applicant pool that is high quality and diverse.

• Six of the last twelve faculty hired in the SoE are women.

• The SoE continues its record of attracting outstanding faculty, moving quickly to fill positions, and working efficiently and effectively with the various Institute offices to recruit and hire new faculty. We endeavor, as with all things, to serve as the model at the Institute.

• The SoE is grateful to the President, Cabinet, and Board for their continued support of our faculty renewal.
Leadership succession planning

Center Directors
Department Heads
Deans

SNAPSHOTS
A look at where we are - and where we are going

“The School of Engineering has some of the most academically talented students in the nation. They are as impressive as they are committed to making an impact on their profession and on our world.”

“Rensselaer Engineering”

Engineering Dean’s Advisory Council | April 2013, Troy, New York
Rankings and Other Indicators

- SoE ranked **#23** (Best Undergraduate Engineering Programs, Fall 2012), **#38** (Best Graduate Engineering Programs, Spring 2013) by USN&WR
- 6 of 11 SoE graduate engineering programs were ranked in the Top 25 (Spring 2013) by USN&WR, 9 are in the Top 30, many are in the Top 10 among privates
- SoE ranked **#4** (World’s Best Engineering Schools, Fall 2012) by Business Insider
- Ranked in Top-5 (Wall Street’s Top Technology Schools, Fall 2012) by Wall Street & Technology
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- Research expenditures crossed the $50M level last year
- Annual research expenditures per faculty crossed $390K
- 6 of the last 12 faculty hired in SoE have been women
- 20 SWE scholarships (2012-13), highest of any university

"The engineering programs at Rensselaer are held in very high esteem among the academic and scientific communities. We have long been recognized for the quality of our academic programs, the unique experiences we afford our students, and the ability of our graduates to make significant contributions early in their careers. This latest ranking provides clear evidence of the value placed on our world-class engineering programs by the companies that hire our graduates."

—David V. Rosowsky, Ph.D., P.E., FASCE, Dean of Engineering
SoE Performance Plan

Fall 2009

Fall 2010

Fall 2011

Engineering Dean’s Advisory Council | April 2013, Troy, New York
Connecting to the refreshed Rensselaer Plan (2013)

“The School of Engineering – its faculty, staff, students, and alumn/ae – stand firmly behind the goals of the Rensselaer Plan. This support is the result of consistent and strategic outreach and engagement by the Dean and the leadership of the School. The entire School of Engineering is invested in and committed to the Rensselaer Plan.

In Fall 2012, the faculty and staff in the School of Engineering fully engaged in the important refresh process for the Rensselaer Plan.”

Alignment with Institute Highest Priority Initiatives

“The School of Engineering strategic focal areas (themes) are FULLY ALIGNED with the Institute Strategic Thrusts as presented in the Rensselaer Plan.”
FY14 Performance Plan Key Initiatives - 1

1. Undergraduate engineering education
   a. Common first year model
   b. Introduction to Engineering course
   c. Pedagogical innovation
   d. Evolution of the classroom/studio/laboratory

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. Final-year registration policy

FY14 Performance Plan Key Initiatives - 2

3. Faculty
   a. Second year of strategic ("cluster") hiring initiative*
   b. Recruiting for diversity (Compact, Part A)
   c. Lecturer/Professor of Practice tracks, Research faculty

4. Research
   a. Focus on large center proposals
   b. Renew initiatives with (new) VPR on faculty support, cost-sharing, center support

5. Programs
   a. MILL
   b. Diversity and Outreach
   c. Archer Center for Student Leadership Development
   d. Undergraduate Advising

* SoE faculty expansion initiative launched in Fall 2011. Four strategic clusters: energy systems, infrastructure, materials and manufacturing, bio-engineering
FY14 Performance Plan Key Initiatives - 3

6. Advancement
   a. Constituent model Year 1 assessment and Year 2 goal setting
   b. Framing priorities for the School and Departments
   c. Alumni 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. We are in a period of faculty growth (not just renewal)
   e. ROI consistently ranked among the best, graduates highly recruited

Engineering Dean’s Advisory Council | April 2013, Troy, New York

Engineering Student Services Center
(to launch this Summer)

Engineering Student Services Center
(to launch this Summer)

Dean’s Advisory Council Meeting | April 2012, RPI
ABET is a nonprofit, non-governmental organization that accredits college and university programs in the disciplines of applied science, computing, engineering, and engineering technology. ABET accredits over 3,100 programs at more than 660 colleges and universities in 23 countries. ABET provides specialized, programmatic accreditation that evaluates an individual program of study, rather than evaluating an institution as a whole.

ABET accreditation, which is voluntary and achieved through a peer review process, provides assurance that a college or university program meets the quality standards established by the profession for which the program prepares its students.
Rensselaer Engineering Magazine

Engineering education, pedagogy, and K-12 outreach

Human health, livability, and global quality of life

FALL 2013
(2500 mailed)
print only

FALL 2014
(target 5000)
print+online

FALL 2015
(target 10,000)
+social media

SCHOOL OF ENGINEERING

- Initiatives
  Better World/Engineering
SCHOOL OF ENGINEERING

- **Initiatives**
  Better World/Engineering
  Future Faculty Programs

Engineering Pilot Course (2nd year)

- [Image of brochure titled "GRAND CHALLENGES FOR ENGINEERING"]
- [Image of brochure titled "CITIZEN Engineer"]
SCHOOL OF ENGINEERING

- **Initiatives**
  - Better World // Engineering
  - Future Faculty Programs
  - Engineering Pilot Course
  - Focus on Students

**Better World // Engineering**

Vienna Yee ‘14

I joined the Rensselaer Chapter of the Society of Hispanic Professional Engineers (SHPE) when I was a freshman—now they are like an extended family. This year I’ll be serving as Vice President and Education Coordinator for the SHPE Outreach Weekend. A program where we give inner-city high-school students a chance to see their future in engineering.

Engineering Dean’s Advisory Council | April 2013, Troy, New York
SCHOOL OF ENGINEERING

- **Initiatives**
  Better World//Engineering
  Future Faculty Programs
  Engineering Pilot Course
  Focus on Students
  SoE Research Report (2011)

SCHOOL OF ENGINEERING

- **Initiatives**
  Better World//Engineering
  Future Faculty Programs
  Engineering Pilot Course
  Focus on Students
  SoE Research Report
  SoE Annual Magazine
2012 Distinguished Visitors

Andrew Jackson, NAE
Sir Harry Kroto, NAS
Nobel Prize Winner
Chris Hendrickson, NAE
Linda Abriola, NAE
Ahsan Kareem, NAE
Gordana Vunjak-Novakovic, NAE
Michael Corradini, NAE
Monica Olivera de la Cruz, NAE
Bruce Rittman, NAE
Kenneth Stokoe, NAE
Gerald Fuller, NAE
Chris Macosko, NAE
Zhigang Suo, NAE
Keith Johnston, NAE
K. Dane Wittrup, NAE
Frank Bates, NAE
Tresa Pollock, NAE
Frans Spaepen, NAE
"I’m calling for 2013 to be a year for Celebrating our Role in Engineering Education in the School of Engineering. The goals for this calendar year will be (1) to affirm the School’s commitment to education, and (2) to re-establish the School as an innovator, exemplar, and leader in engineering pedagogy broadly defined."

“We will provide a platform for sharing ideas and best practices, exploring new educational modalities, and celebrating our innovations and accomplishments.”
School of Engineering
Advanced Manufacturing: Government relations, Federal interest
Manufacturing Network
School of Engineering
Design, Service Learning, International Outreach

School of Engineering
Design, Service Learning, International Outreach
School of Engineering (EOC)
Engineering Ambassadors Program: Community K-12 Outreach, Building the STEM Pipeline

Advancement

- In our second year under the new constituent-based advancement model
- SoE Senior Advancement Officer, Richard Graw
- Plus front-line DO’s and staff (IA)
- Corporate and Foundation Relations
- School priorities = Institute priorities
- Council role
SoE Fundraising Priorities

- FACULTY EXCELLENCE FUNDS (startup packages)
- STUDENT SUPPORT (scholarships and fellowships)
- FACULTY ENDOWED CHAIRS
- SUPPORT FOR CO-CURRICULAR ACTIVITIES (student chapters and teams, social entrepreneurship, service learning projects, travel, global experiences)
- PROGRAM SUPPORT (departments, centers, labs)
- DEPARTMENT EXCELLENCE FUNDS

Dean's Travel

- Individual and small group visits
- Hosted dinners
- RAA chapter visits
- Accepted student events
- Corporate leadership
- Alumni groups within large companies
- Agency and Laboratory leadership
- Alumni receptions at technical conferences

Boston, MA
New York, NY
Cleveland, OH
Chicago, IL
Fairfax, VA
Baltimore, MD
Washington, DC
Philadelphia, PA
Houston, TX
Austin, TX
Dallas, TX
Houston, TX
San Antonio, TX
Los Angeles, CA
San Francisco, CA
Denver, CO
Seattle, WA
School of Engineering
Douglas Mercer '77 Laboratory for Student Exploration and Innovation
SoE-based fundraising. 
Year 1 outcome (example)

Nine projects were selected for funding under the first year of this new grant program, made possible by our Alumni.

Project reports due this summer.

Celebration document will be prepared to share with donors and use to promote future support for this program.

“Amazing people doing amazing things.”

Washington Updates

- Sequestration, agency appropriations, impacts
- Immigration Reform (Dream Act, green card)
- Battle over “Good Science”
- Higher Education Opportunity Act, including—
  - Consumer Information (e.g., sticker sheets showing real cost, information on ROI)
  - Regulation of MOOC’s, financial aid
- Gates Foundation grants to redefine financial aid models
  - Beyond access
  - Retention, progression, and completion

“Higher education has a public trust issue right now.”
DAVIES MEDAL – April 22

2012 Davies Medal for Engineering Achievement
Hugo S. Ferguson ’56
Launching this Spring…

ENG TALK
little lectures on big ideas from rensselaer engineers

Launched in early 2012…

NEW CENTER
ENGINEERING EDUCATIONAL OUTREACH CENTER
Exciting programs, inspiring the next generation to study science, technology, engineering, and math (STEM)

RENSSELAER SCHOOL OF ENGINEERING
My biggest challenges

1. Enabling target enrollments in SoE
2. Rate of faculty hiring
3. Faculty retention
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. Faculty growth in strategic areas (although competition is picking up markedly)

4. School-based development activities
PORTFOLIO-SPECIFIC HIGHEST PRIORITIES

• Faculty hiring

• Controls on undergraduate enrollments

• Retention of outstanding faculty

• Staff

SoE THEMATIC MESSAGING

• Transformation Materials and Manufacturing (TMM)

• Human Health and Livability (HHL)

• Engineering at the core of the Institute, central to its expansion forward, upward, and outward

• Engineering is made more attractive, more robust, and ultimately more relevant by having significant strengths in the other four Schools
Discussion, Q&A

Rensselaer Engineering