The Rensselaer Plan: 2012-2024

The External Environment

Rensselaer Academic Enterprise
Greater prominence in the 21st century as a top-tier world-class technological research university with global reach and global impact.
The Rensselaer Plan: 2012-2024

- Represents a renewed and expansive commitment to the future
- A greater emphasis on people and programs
- Seeks to position Rensselaer as a significant transformative force – addressing global challenges
Six Strategic Goals

1. Enhance national and international leadership in innovative learning and teaching
2. Dramatically expand the RESEARCH ENTERPRISE
3. Increase our focus on INNOVATION AND ENTREPRENEURSHIP
4. Achieve true intellectual, geographic, gender, and ethnic DIVERSITY among our students, faculty, and staff
5. Revitalize our diverse COMMUNITIES
6. Redesign and invigorate ENABLING ACTIVITIES
Our Immediate Focus
The Rensselaer Plan: 2012-2024

“... creating a Rensselaer that enables our faculty to make world changing discoveries, innovations, and significant contributions to creativity, public policy, entrepreneurial endeavors.”

- Offer a complete student experience – CLASS
- Emphasize pedagogical innovation, introducing new learning paradigms
- Extend our impact on humanity through broad forward-looking research initiatives
Complete Student Experience

- CLASS – a robust student experience
- Transform the residential and experiential environments of our students, both undergraduates AND graduates
  - Creating a residentially-based living/learning
  - Focus on a broad range of programs that go beyond academics and emphasize social, physical and professional development
  - Programming to help students along various stages of the academic continuum
- Build identity and affinity among students – from earliest contact with Rensselaer through their alumni years
Pedagogical Innovation

• Expand research initiatives in pedagogical innovation
• New opportunities
  • Immersive environments
  • Collaborative online education
  • Enhancing education for our residentially based students
  • A distributed Rensselaer
### Broad Signature Thrusts

<table>
<thead>
<tr>
<th>SIGNATURE THRUSTS</th>
<th>NANO</th>
<th>ENERGY</th>
<th>COMP/IT</th>
<th>BIOTECH</th>
<th>MEDIA</th>
</tr>
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<tbody>
<tr>
<td>GLOabal CHALLENGES</td>
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<td></td>
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<tr>
<td>Energy, water, food</td>
<td>★</td>
<td>★</td>
<td>★</td>
<td>★</td>
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<tr>
<td>Infrastructure, sustainability, resiliency</td>
<td>★</td>
<td>★</td>
<td>★</td>
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<tr>
<td>Global markets</td>
<td></td>
<td>★</td>
<td></td>
<td>★</td>
<td>★</td>
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<tr>
<td>Cognition, communication, &amp; culture</td>
<td></td>
<td>★</td>
<td></td>
<td>★</td>
<td>★</td>
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<tr>
<td>Science, technology, &amp; society</td>
<td>★</td>
<td>★</td>
<td>★</td>
<td>★</td>
<td>★</td>
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<tr>
<td>Disease &amp; disease mitigation</td>
<td>★</td>
<td>★</td>
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<tr>
<td>Beyond silicon / advanced materials</td>
<td>★</td>
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<tr>
<td>Advanced manufacturing</td>
<td>★</td>
<td>★</td>
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<td>★</td>
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<tr>
<td>Data / networks / HPC</td>
<td>★</td>
<td>★</td>
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</table>
Faculty and Students

• T&TT Faculty growth
  • $342^{(2012)}$ to $500^{(2024)}$

• Long term student enrollments
  • Undergraduate – 5000
  • Graduate – 2500 including 1600 Ph. D.

• Long term student-faculty ratios
  • Undergraduate – 9:1
  • Overall – 13:1
Continued emphasis on admissions selectivity – target an undergraduate student body of 5000

Broaden geographic base of schools from which we recruit – nationally and internationally

Seek diversity in its broadest and richest sense, including ethnic, gender, intellectual and cultural breadth in our students.
Resident Undergraduate Education

- Emphasis on greater intellectual diversity
  - Degree programs in Architecture, Lally, and HASS that incorporate the rich scientific and technological strengths of the Institute
  - New programs in science and technology
    - Focus on the humanistic, artistic, and social dimensions
### Graduate Education - Admissions

<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
<th>Domestic</th>
<th>Women</th>
<th>URM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications</td>
<td>4457 (+13%)</td>
<td>1351 (+14%)</td>
<td>1355 (+16%)</td>
<td>230 (+34%)</td>
</tr>
<tr>
<td>Accepts</td>
<td>1254 (+12%)</td>
<td>684 (+34%)</td>
<td>445 (+14%)</td>
<td>65 (+25%)</td>
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<tr>
<td>Confirms</td>
<td>528 (+14%)</td>
<td>299 (+9%)</td>
<td>175 (+12%)</td>
<td>31 (+10%)</td>
</tr>
</tbody>
</table>

- **Selectivity gains since 2000**
  - (+12%) overall and (+29%) for US students
Resident Graduate Education

- Focus on new Ph.D. programs - Web Science, Economics.
- New degree programs in Lally – MS programs in Business Analytics and in Supply-Chain Management
  - Links to expertise in Economics, Mathematics and ISE
- Continuing support for graduate student recruitment
  - Strategies to improve recruitment in Lally (MS and MBA), SoA (MArch), and HASS (MFA)
- Efforts to assist students pursue competitive graduate fellowships.
- Enhance support for comprehensive professional development of graduate students
Faculty Recruitment
Faculty Recruitment

- Driven by instructional needs and the research agenda
- Reduce student-faculty ratios
  - Steady 14:1 overall ratio as intermediate goal
  - Long-term target of 7500 students and 500 T&TT faculty (student faculty ratio of 13:1 is the long-term target)
- Priority areas
  - Recruitment for T&TT and Constellation positions
  - Transition gap-funded adjunct lines to lecturer/POP positions
  - Adjunct involvement focused on special areas or contingency needs
Faculty Instructional Activity

Credit Hours Taught Per Instructional Faculty FTE
Faculty Instructional Activity

Total Credit Hours Taught Per School – FY 2013
Ratio of PhD Degrees Awarded to Total T&TT Faculty
Rensselaer and Peer Institutions (Peers exclude Medicine and Law Degrees)

Source: IPEDS Peer Analysis System
# Faculty Hiring Plan (FY ’13)

**Positions filled for FY’14 start or rolling to FY’14**

<table>
<thead>
<tr>
<th>SoE</th>
<th>SoS</th>
<th>SoA</th>
<th>Lally</th>
<th>HASS</th>
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<tbody>
<tr>
<td><strong>Endowed Chairs</strong></td>
<td></td>
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<tr>
<td>Horton Hood</td>
<td>D. Darrin</td>
<td>M. Darrin</td>
<td></td>
<td>Bozzone</td>
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<td></td>
<td>Ricketts</td>
<td>Rayleigh</td>
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<td>C. Wellington</td>
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<td></td>
<td>D’Ambra</td>
<td>Hamilton</td>
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<td><strong>VP/Deans/Department Heads/Center Directors</strong></td>
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<tr>
<td>MDIS *</td>
<td>Baruch</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td>Arts Com &amp; Med</td>
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<td>COGS STS</td>
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<tr>
<td><strong>Tenured/Tenure-Track</strong></td>
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<tr>
<td>CBE - 2</td>
<td>ECSE</td>
<td>Environment</td>
<td></td>
<td>Entr/Strat</td>
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<tr>
<td>MSE</td>
<td>ISE</td>
<td>CSCI - 2</td>
<td></td>
<td>Econ Imrs Intel - 3</td>
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<tr>
<td>MSE</td>
<td>MANE</td>
<td></td>
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</tr>
<tr>
<td>ISE</td>
<td>CEE - 2</td>
<td></td>
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<tr>
<td><strong>Totals</strong></td>
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<td></td>
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<tr>
<td>11</td>
<td>10</td>
<td></td>
<td>3</td>
<td>8</td>
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<tr>
<td><strong>Constellations – 6</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Biocatalysis and Metabolic Engineering – 1</td>
<td>TERM– 4</td>
<td>Computational Biology – 1</td>
<td></td>
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</tr>
</tbody>
</table>

* MDIS Director could be in SoE or SoS
A Balanced Student Distribution
Undergraduate Education

• Distribution of incoming freshmen
  • Target enrollments in five schools
    - Focus on new academic programs
  • Attention to oversubscribed programs

• School of Engineering
  • Three oversubscribed programs (S/F ratios are unacceptable)
    - Attractive concentrations in other SoE programs
    - Common first year – declaration of major in 2nd year?
    - Defining standards for inter-department transfers
Notes: Does not include 213 undeclared students. Departmental counts are based upon the number of students majoring in each department.
Note: Does not include 26 undeclared students. Departmental counts are based upon the number of students majoring in each department. ITWS students not included due to interdisciplinary nature of major. Does not include 60 IT grad students, 5 multidisciplinary grad students, or 1 IT.
Student Enrollment, Fall 2012 – Lally, HASS, and Architecture

Note: Does not include 26 undeclared students. Departmental counts are based upon the number of students majoring in each department. 1 undeclared HASS UG student not included. 134 GSAS students not included.
The External Environment

What else should we be looking at?
Cost of Higher Education

• Between 1150 and 1450, the number of universities worldwide doubled every 100 years
  • At that rate, by the year 2000, there would have been 2000 universities
  • There were in fact 20,000+ universities by 2000

• Cost of books was the primary limiting factor
  • Arrival of the printing press in the 1450 removed that limitation 5x growth from 12th to 15th century; 200x growth from 15th to 18th century

• Today, the cost of instructors/instruction is the primary limiting factor
Cost Disease is More Virulent in Sectors Requiring Highly Educated Workforce
Cost of Higher Education

Efficiency in higher education
Increase student-faculty ratio?

Efficiency without sacrificing quality is much harder – ability to provide intelligent, high bandwidth feedback and assessment
Cost of Higher Education

- What is happening with MOOCs – “success” of experimental courses
  - Video-on-demand
  - Widespread connectivity
  - Automated assessment/feedback
  - Social media
  - Semi-synchronous delivery
  - Crowd sourcing
  - Acknowledgement of completion

Highly scalable
Feedback mechanisms
Use of New Technologies

- Supplementing existing courses
  - Enhance quality
  - Improve efficiency
  - At Rensselaer or elsewhere
- Free-standing courses
  - With certification?
- Components of degree programs
  - At Rensselaer or elsewhere
- Full degree-granting programs

Discussions with Stanford Provost
John Etchemendy
University selects and certifies the faculty for students and vice versa.
Role of the Academic Institution

Discussions with Stanford Provost John Etchemendy

Faculty ➔ Online University ➔ Students

Unsustainable in long term
Our Approach

• Development of platform for content delivery – open source tools
  - Automated feedback and online tutors
  - Innovative assessment tools

• Develop and deploy tools for searching, validating, and using web content - the new library
  • Use new platform and tools for
    - Our residentially based students
    - Working professionals
    - Alumni/ae around the world
Other Areas of Focus
Faculty Development

- Develop systematic processes and guidelines to ensure diversity in Rensselaer faculty ranks
- Develop and implement standard guidelines for annual faculty performance review
- Benchmark existing tenure and promotion policies at peer and aspirant institutions
  - Propose revisions that support faculty success and retention
- Revise the faculty handbook to align with current practices and procedures
Assessment

• Must secure full compliance on assessment of learning outcomes
  - Middle States
    – PRR submitted as required
    – Full review due in 2015-2016
  - ABET – visit in 2013, AACSB – next study in 2014-15, NAAB – full review conducted in 2010

• Higher Education Re-authorization Act
  - Regulatory mandates
  - Emphasis on accountability
  - Outcomes assessment
Program Reviews

• Establish process for subjecting all academic programs to a rigorous peer review
  - Department level reviews, be conducted in cycles of 5-10 years
• Work with the Deans of Science and HASS to develop a timeline for review of undergraduate and graduate programs
  • Begin with internal self-assessment to be done by each department.
Questions