Prologue: Issuing the Challenge

This year will mark the launch of the refreshed Rensselaer Plan, which will guide the Institute through the period culminating in our 200th anniversary in 2024. Building on the achievements and important groundwork laid by the original Rensselaer Plan, the refreshed Plan calls for us to apply our intellect and energy to developing solutions to the global challenges. In the areas of teaching and learning, research and scholarship, creativity and discovery, knowledge creation and entrepreneurship, the refreshed Rensselaer Plan challenges us to be a transformational force on the world around us. In doing so, we will collectively place Rensselaer on the world stage as a leading technological research university, with global reach and global impact.

In his first term in office, President Barack Obama issued the challenge of graduating 10,000 more American engineers per year. As he begins his second term, we are all too aware of both the urgency and complexity of stabilizing our economy, creating jobs, and solving the global challenges surrounding food, water, energy, security, and the environment. The path out of recession must and will include major commitments to our nation’s infrastructure, to climate adaptation, and energy security – all requiring engineers and engineering jobs. Engineers will lead the teams working on solutions to the global challenges. These engineers will be skilled communicators, facilitators, and lobbyists. They will understand project finance, be versed in public and private policy issues, and be sensitive to both political and cultural differences that exist across the country and around the world.

All of this suggests we must change and evolve our thinking about how we educate our students at both the undergraduate and graduate/professional levels.

1 See: “Race to the Top: Engineering a More Perfect Union” (D. Rosowsky, 2011), http://eng.rpi.edu/node/119
2 See: “Stepping up to the Grand Challenges: Engineers as Superheroes” (D. Rosowsky, 2011), http://eng.rpi.edu/node/167
3 See: “Preparing for the New Engineer” (D. Rosowsky, 2012), http://eng.rpi.edu/node/104
Responding to the Challenge

The School of Engineering at Rensselaer is one of the top engineering schools in the nation, among an elite cadre of public and private universities ranked among the top 25 undergraduate programs. Many of our graduate engineering programs also rank in the top 25, with several ranked in the top 10. We are also the oldest engineering program in the United States, with both a storied history and a long record of educational firsts and pedagogical innovations including laboratory-based instruction, the studio classroom, hands-on learning, distance education, multidisciplinary design, and requiring laptops of all incoming students. We are one of the largest US engineering programs among private universities, with more than 3,000 undergraduate engineering students and more than 1,000 engineering graduate students (at both the Troy and Hartford campuses) enrolled each year. In our 189-year history, Rensselaer has graduated more than 225,000 engineers.

The challenges described in the previous section are a rallying call. They are grand, global, and increasingly urgent. They are also enormously exciting for those of us privileged to work in higher education and at a major research university. As a highly ranked School and major producer of engineering graduates – many of whom have gone on to extraordinary careers – the School of Engineering must rise up to meet the challenges locally (managing our enrollments and ensuring we deliver on our promise to provide a world-class engineering education), nationally (preparing the next generations of engineering leaders), and globally (creating the technologies and the graduates to solve the global challenges).

The last decade has seen important advances and significant achievements by members of our Community of Scholars – the faculty, students, professional and research staff – in the School of Engineering. Our national and international visibility has grown, reflected by a rising number of recognitions, high rankings, and distinctions. We are regarded and respected for our academic programs and research activity in a number of critical fields including (but by no means limited to) materials science, energy and power, biotechnology, aerospace systems, manufacturing, and computational sciences.

Over the last decade, and indeed throughout our history, the School of Engineering has placed a high value on teaching excellence, held our faculty to high standards of teaching effectiveness, and has continued to update and evolve its teaching facilities and platforms. Still, it is fair to say that our collective focus has been first and foremost on the volume, visibility, and impact of our Research. This strategic focus was necessary to bring us to where we are today and remains a priority given the goal of transforming Rensselaer into a top technological research university. Going forward, however, we must pay the same amount of attention, demonstrate the same level of commitment, and hold ourselves accountable for achieving the same levels of success and recognition in Education as we do in Research. Together, Education and Research (each extended through Professional Service and Outreach) will form the basis of the modern research university; one cannot exist without the other, and each enhances the other.

I am 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 reaffirm the School’s commitment to education, and (2) to re-establish the School as an innovator, exemplar, and leader in engineering pedagogy broadly defined. This includes leadership in curricula, learning environments (classrooms and laboratories, as well as digitally augmented environments), modes of delivery, and hybrid instructional models. We will provide a platform for sharing ideas and best practices, exploring new educational modalities, and celebrating our innovations and accomplishments.
Specific Initiatives and Commitments

The following initiatives, taken together, demonstrate commitment at the School-level to promoting and celebrating pedagogy, effectiveness, and innovation in engineering education. In addition to the six measures described below, each academic department, program, and center in the School of Engineering is expected to identify efforts they will undertake in 2013 toward the goals of Celebrating our Role in Engineering Education.

1. **We will** dedicate resources to pedagogical innovation, hosting visits by national leaders in engineering education, enhancing and extending our instructional facilities, and investing in new technologies for instructional delivery. Through careful and strategic repurposing of limited non-salary funds, leveraging funding for centers having specific requirements related to educational programming and instructional delivery, and continued fundraising in support of our educational programs, the Dean will direct resources toward these activities in 2013.

2. **We will** support faculty engagement in research and scholarship related to engineering pedagogy and educational innovation. Specifically, the Dean’s office will: (1) provide travel and conference registration support for faculty to present papers at ASEE and other education-focused conferences, (2) cover any production and publication costs associated with competitively reviewed papers in education-focused journals, and (3) provide support for undergraduate research assistants working on projects related to engineering education, pedagogy, and instructional innovation that will lead to conference and journal publications in related fields.

3. **We will** convene (and support) a group of interested faculty, staff, and students from across the School of Engineering to envision the “classroom of the future” – to meet rapidly changing instructional technologies, accommodate hybrid modes of instructional delivery and of learning, and provide increased opportunities for hands-on and immersive laboratory experiences. The findings and recommendations of this group will form the basis for discussions with the President, the Vice President for Administration, and others about creating such classrooms through strategic investments and renovation of existing space (including underutilized space in current engineering buildings and elsewhere on campus).

4. **We will** create a new School-wide award for excellence in assessment and continual improvement. This new award, which complements existing awards for educational innovation and excellence in classroom instruction, will be presented annually at the School of Engineering Faculty Awards Dinner.

5. **We will** celebrate and promote pedagogical innovation, in its many forms, by School of Engineering faculty and instructional staff.

   a. Working closely with the School’s communications staff, we will prepare news releases, web and social media content, and outreach and advancement print pieces that represent our accomplishments, individually and collectively, in the area of engineering education, pedagogical innovation, and outreach.

   b. We will use the 2013 issue of the School’s highly successful and broadly distributed *Engineering Magazine* to highlight our activities related to Engineering Education and Outreach. The Dean will dedicate the next issue of our magazine to these themes and all future issues (having other themes) will include features related to educational innovation.
Throughout 2013, the communications staff will work closely with our department heads, center directors, and faculty to develop features to be included in both print and electronic versions of this forthcoming issue of the magazine.

6. **We will** continually assess our undergraduate and graduate curricula in each of our engineering programs. Department Heads will undertake a two-year review of their curricula and make changes deemed appropriate. The School will concurrently undertake a two-year review of the first-year curriculum in Engineering, making changes deemed appropriate to ensure a first-year that is broadly informing of: (1) the different fields of engineering, (2) the importance of breadth in preparing for an engineering career, and (3) pre-professional tracks that include graduate education; and that will provide flexibility to freshmen and sophomores as they select their major field of study.

**Summary**

Reaffirming this commitment to engineering education and re-establishing the School as a leader in engineering pedagogy will require a commitment from each of us. We must collectively agree to the importance, timeliness, and relevance of such a bold statement made by the School of Engineering.

I recognize there may be those who do not share this broad vision of a leading technological research university – one that leads, through innovation and impact, in both education and research. My belief is that our collective efforts in the coming years, and the excitement and energies that result, must and will engage *every member* of the School of Engineering faculty and staff, our students, and many of our alumni and alumnae. Success in education and pedagogy, in parallel and in conjunction with continued achievements in research and scholarship, is essential to our remaining among the very best engineering programs, to remaining viable and relevant, and to continuing to distinguish our School and thereby the Institute.

Thank you for your support and your steadfast commitment to excellence in all that we do.

D. Rosowsky, Dean of Engineering
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