

ENGINEERS FOR A SUSTAINABLE WORLD TRANSFORM LIVES ~ THE ART OF PERFORMANCE ~ RAA ENDOWMENT

Alumni Magazine - Spring 2013

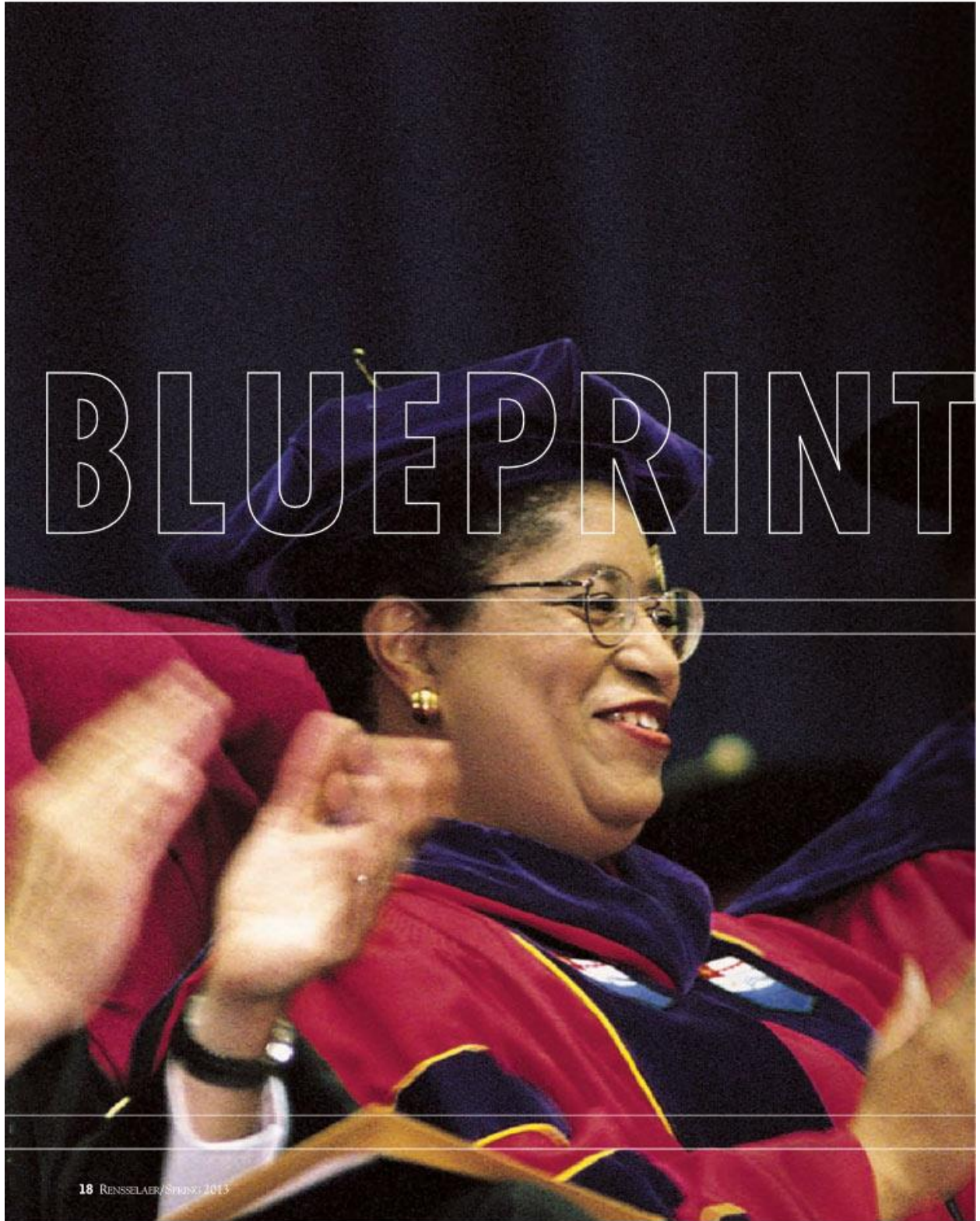
# Rensselaer

# we will

THE RENSSELAER PLAN 2024

[WWW.RPI.EDU/PLAN](http://WWW.RPI.EDU/PLAN)

# BLUEPRINT



FOR THE

# FUTURE

THE RENSSELAER PLAN 2024

BUILDS ON RENSSELAER'S  
UPWARD TRAJECTORY  
AND LOOKS AHEAD TO  
THE INSTITUTE'S 200TH  
ANNIVERSARY.

**A**T HER INAUGURAL ADDRESS on September 24, 1999, with the world on the cusp of a new millennium, President Shirley Ann Jackson proposed a bold initiative: a “new Rensselaer Plan” that would revitalize the revolutionary pedagogy founded by Amos Eaton in 1824—what he called The Rensselaerean Plan—and catapult Rensselaer into the 21st century and into a new status as a top-tier world-class technological research university with global reach and global impact. BY ROBIN EILEEN BERNSTEIN



"WE WANT TO BE A TRANSFORMATIVE FORCE IN THOSE AREAS THAT MAKE A DIFFERENCE FOR THE WORLD, MAKE A DIFFERENCE FOR OUR STUDENTS, AND MAKE FOR A GREAT UNIVERSITY."

PRESIDENT SHIRLEY ANN JACKSON

President Jackson put forth five questions that day, the answers to which would crystallize the foundation for *The Rensselaer Plan*. She challenged the Rensselaer community to define the university's intellectual core, its existing and potential leadership in key disciplines, the critical areas in which Rensselaer needed to stake an identity, and which endeavors should be transformed or discarded.

"Two stakes were put in the ground back then," says President Jackson today. One was to create a compelling student experience, and the other was to ramp up research, particularly in new fields such as biotechnology and information technology. Thus began the transformation of Rensselaer into a fully realized university guided by rigorous educational imperatives and innovative new research centers, anchored by leading-edge interdisciplinary platforms and degrees, and energized by a growing holistic and global student experience.

Now, with the bicentennial of Rensselaer less than 12 years away, the Institute has unveiled a refreshed and updated blueprint for the future called *The Rensselaer Plan 2024*, which builds on this upward trajectory to ensure that Rensselaer continues and enhances its 21st-century prominence. It renews the university's commitment to the six-part strategic focus of the original plan, and underscores the distinguishing strengths of the Institute in interdisciplinary inquiry and research, interactive learning, and entrepreneurship.

#### FROM "TRANSFORMING" TO "TRANSFORMATIVE"

**The original plan** transformed Rensselaer. Annual research funding tripled to \$100 million, as five new signature research thrusts were established. The professoriate now includes 34 new named chairs, including 24 Constellation professors and 275 new faculty hires. The original plan laid the foundation for the successful \$1.4 billion *Renaissance at Rensselaer* fundraising campaign. It is no wonder there has been a threefold surge in undergraduate admission applications, and that graduate applications are at their highest levels ever. Consequently, admission to Rensselaer is more selective than ever. Perhaps most visible has been the physical transformation of the Troy campus, with new and enhanced platforms, facilities, and infrastructure to the tune of \$725 million, all of which serve to vastly invigorate education, research, and student life. "We have accomplished a lot," says President Jackson. "There is a lot of new energy."

The difference now is that the

refreshed *Rensselaer Plan* shifts gears. It is no longer about *transforming* Rensselaer as much as it is about establishing Rensselaer as a truly *transformative* force. President Jackson is quick to explain that this does not mean that the Institute will not continue to change. "It will, and we intend for it to," she says. But it is time for Rensselaer to build upon what already has been accomplished and, increasingly, to reach beyond its borders with significant and lasting worldwide influence. This means becoming a university that is transformative in the lives of its students, in its pedagogy, and in the global impact of its research. As President Jackson says, "We want to be a transformative force in those areas that make a difference for the world, make a difference for our students, and make for a great university."

#### A FOCUS ON STUDENT LIFE

**Being a transformative university** begins with its students. The focus at Rensselaer today remains on discovery, invention, and innovation, while



supporting all aspects of student growth and development.

Fortunately, the original *Rensselaer Plan* was a game-changing driving force in expanding the award-winning First-Year Experience into student education-centered CLASS (Clustered Learning, Advocacy, and Support for Students). CLASS is not just an initiative, but a new way of life at Rensselaer. CLASS intentionally blurs the line between academic and student life, fostering a stronger sense of community across the student experience. Learning now takes place throughout the Institute, and networks for support, intellectual growth, and personal development exist throughout a student's time at Rensselaer.

The Rensselaer that some alumni and alumnae may recall has been transformed, says Tim Sams, vice president for student life. CLASS develops an already highly capable student body, while building affinity among students, and between students and the Institute. *The Rensselaer Plan 2024* will strengthen the student experience with co-curricular programs that marry rigorous intellectual challenges with a holistic, supportive student environment.

By focusing on all students, regardless of their residential location, CLASS offers students a road map to encourage personal and intellectual growth, and inspires them to act with intent and focus, Sams says. Rensselaer's 200-plus student clubs and

organizations support CLASS in its six target areas—personal, professional, leadership, and cultural development, as well as good citizenship within both the campus community and neighboring communities, including a new competition this semester, sponsored by the Office of Student Life and spearheaded by Cary Hall's Design and Arts Housing floor, challenging students to create a CLASS brand identity and logo.

CLASS is not just for undergraduates. The graduate population is growing and is an increasingly important part of university life. With the new Rensselaer Graduate Housing at City Station, graduate students are reaping the benefits of clustered living. CLASS programs offer graduate students assistance with their unique needs, such as balancing the demands of school and family, or support with dissertations and research—including, for example, the importance of academic integrity, or turning innovative research into commercial enterprises.

CLASS, by definition, is proactive, according to Sams, and seeks to tap into Rensselaer students' desire to succeed. Pathways is a new program in which staff from the Office of Student Life reach out to students in such well-traveled places as the Rensselaer Union, Jazzman's Café, and the library. Student Life staff field questions from students in any area of need, and introduce resources and opportunities. These serendipitous encounters make

the campus feel more intimate and connected.

### CREATING AN INNOVATIVE PEDAGOGY

**Rensselaer has always been known** for pioneering groundbreaking approaches to teaching, such as the studio classroom and team-based learning in the 1990s. It was, after all, the recipient in 1996 of the "triple crown" of higher education awards: the Hesburgh, Boeing, and Pew Charitable Trust awards for innovations in undergraduate education. *The Rensselaer Plan 2024* commits the Institute to amplifying its acclaimed innovative pedagogy by creating the next revolution in teaching and learning.

"Rensselaer was always a leader in the hands-on studio or flipped classroom, versus relying solely on didactic or lecture-style learning. Now we are moving toward an even more interactive approach," says Provost Prabhat Hajela.

One such new development is the mixed reality classroom, which builds upon the already nationally recognized strength of Rensselaer in Games and Simulation Arts and Sciences (GSAS). It may seem like the stuff of the *Star Trek* generation, but an eight-week pilot program, fondly known as the Mandarin Project—which uses gamification as a teaching/learning tool—has launched Rensselaer to—as that show's tagline states—"boldly go where no man has

gone before." Indeed, it was former *Star Trek* writer Lee Sheldon, now co-director of Rensselaer's GSAS program and author of *The Multiplayer Classroom: Designing Coursework as a Game*, who helped create the pilot, called "Mandarin Language and Culture: The Lost Manuscript." The goal for students was to learn Mandarin Chinese through the interactivity and immersion of a game, but it is the underlying pedagogy that holds vast potential and, in true Rensselaer fashion, is breaking a new path.

Now that approach will be extended

these innovations with Rensselaer's high performance computing resources, the university is poised to create the next revolution in teaching and learning.

"This is the future of learning, and it will become part of what we do over the next decade," says Hajela. "Today we're focusing on language and culture, but this has implications across our entire curriculum."

Likewise, the updated *Rensselaer Plan* calls for emphasizing cyber-enabled learning that uses the Institute's mobile computing platforms, allowing faculty to connect with today's "24/7"

more, search more, and prove more.

"Can you search on the Web for data that validates what I just told you?" is a question Hajela sees professors posing more frequently to students and, if there's a lack of agreement, asking students to pinpoint the problem. This, of course, is a world apart from how alumni and alumnae were taught in a pre-Internet era without resources to efficiently dig for data. "New digital tools open their minds to question more," says Hajela.

An innovative pedagogy applies as well to Rensselaer graduate students and

Within the coming decade students will reap the rewards of increased campus and global connectivity, and better access to big data—resulting in more collaborative partnerships across disciplines and across Rensselaer's five schools to tackle global problems, much like a think tank.

into a more complete augmented reality experience by creating a virtual reality where students and sentient synthetic AI (artificially intelligent) characters interact. "Ultimately it helps you think on your feet and solve problems," Hajela says. "Our students learned a full semester's worth of Mandarin in just eight weeks."

The intent is that the promise heralded by the success of the Mandarin Project will be nurtured to full fruition at the new Rensselaer Emergent Reality Lab, an advanced virtual reality space currently under construction in the Rensselaer Technology Park. Together with the flexible immersive multimedia platform of the Curtis R. Priem Experimental Media and Performing Arts Center, the Emergent Reality Lab will enable classes designed as games, where students are engaged in an interactive, digitally enhanced, immersive learning environment more ambitious than any to date. Linking

plugged-in students in new ways. Gen Y and Gen Z students—that is, those currently at Rensselaer and those who will be admitted over the next decade—gravitate toward these tools. "They expect mobile and social networks, and global connectivity," says Hajela.

Within the coming decade students will reap the rewards of increased campus and global connectivity, and better access to big data—resulting in more collaborative partnerships across disciplines and across Rensselaer's five schools to tackle global problems, much like a think tank.

Professors will create new paradigms for learning—fueled by the improved Semantic Web search capabilities developed by the Tetherless World Constellation, by combining growing access to a treasure trove of online data with the critical inquiry and debate of the Socratic method.

Ultimately, the updated plan is about expecting students to question

helps them to apply their knowledge toward solving global challenges, while more constructively focusing on professional development. "It's about asking what skills they need to become leaders," says Hajela. The goal for all of our students is to create well-rounded, engaged, mature thinkers and innovators who are intellectually agile, and possess the multicultural sophistication to become transformative forces across the globe.

*The Rensselaer Plan 2024* is about giving students more opportunities for research and entrepreneurship, intellectual diversity and creativity. "If we are to be a transformative global force, we must prepare students to be innovative problem-solvers and make them lifelong learners who are productive upon graduation," says Hajela. "We teach them the joys of discovery."

## RESEARCH TO SOLVE GLOBAL CHALLENGES

Perhaps the most significant transformation at Rensselaer in the past decade has been the creation of a research portfolio of the size, quality, and prominence to position the university to impact key global challenges. In the next decade, *The Rensselaer Plan 2024* will link the Institute's strengths in five signature research thrusts to challenges facing the world at large, and empower Rensselaer to be a transformative force in solving them.

Thus, the newly refreshed *Rensselaer Plan* identifies a broad matrix of interconnected global challenges. These include mitigating disease, developing new sources of renewable energy, providing clean water and food, applying new technologies to manage an explosion of data, creating advanced materials that impact energy and health, and establishing a sustainable and resilient infrastructure.

Thanks to investments in research platforms developed under the original *Rensselaer Plan*, such as EMPAC, the Computational Center for Nanotechnology Innovations, and the Center for Biotechnology and Interdisciplinary Studies, the Institute is uniquely equipped to address global challenges by virtue of its five signature research thrusts:

- Nanotechnology and Advanced Materials
- Energy, Environment, and Smart Systems
- Computational Science and Engineering/IT
- Biotechnology and the Life Sciences
- Media, Arts, Science, and Technology

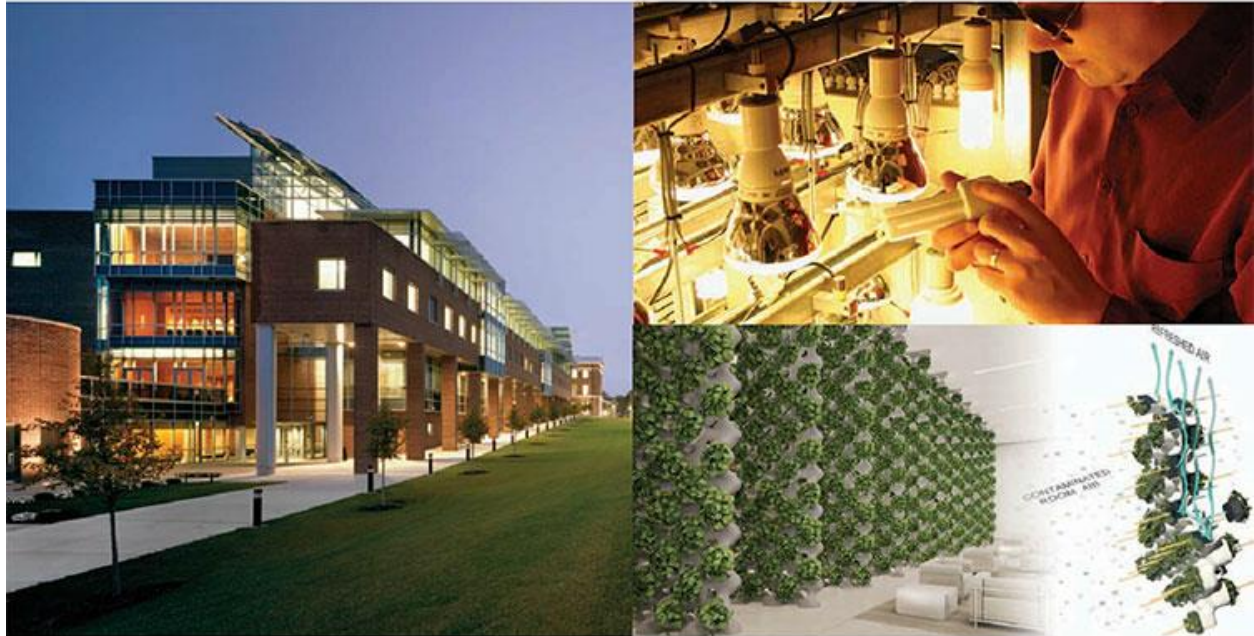
"We are in a position of strength," says Jonathan Dordick, vice president for research. "Our research has applications in a great number of arenas including, for example, human health, business analytics, advanced materials, artificial intelligence, cybersecurity, supply chain management, and climate

change." Under *The Rensselaer Plan 2024*, the Institute will zero in on scientifically rich topics such as these and others, all of which impact global challenges.

Roughly speaking, research in the coming decade will fall under two broad interdisciplinary umbrellas. "Beyond the Internet: Digital Meets Reality" will explore data and information in the context of engineering natural and man-made networks, cyberinfrastructure and cybersecurity, the social sciences and art, data analytics, innovation, and the basic sciences. "Infrastructural Resilience, Sustainability, and Stewardship" will look at building a sustainable future by developing affordable health-care technologies, transformative materials, new energy solutions, smart logistics, and resilient infrastructure.

Consider disease mitigation. "How do we take unstructured big data and generate useful information that we can apply to solve problems?" asks





Dordick. "How do we take treatment and outcomes data spanning two decades to determine optimum treatments and outcomes at the lowest cost to the patient?"

One answer, which Rensselaer is uniquely equipped to handle, is to utilize health-care analytics to help the pharmaceutical industry bring new drugs in the pipeline to market more efficiently. Drug repurposing is one technique that researchers are using to decrease drug development costs and boost approval rates. "The vast majority of molecules fail," says Dordick. "But we have an opportunity to perhaps bring some back to life." By probing massive databases Rensselaer can determine, for example, if patients given drug X for disease Y were cured of side effect Z. In this way, a potential new drug formerly assigned to the clinical trial scrap heap might find viable new uses.

This is not driven by advances in biology but by how we deal with these massive amounts of data, according to Dordick. "In a sense it means weeding through material to find the buried treasure. Five or 10 years ago we called it data-mining," he says. "But back

then we were limited by preconceived notions of what to look for. Now we are much more efficient at finding data and making connections."

Rensselaer is already in the lead. "Medical schools and health-care organizations come to us to turn their data into something meaningful," says Dordick. "They need our expertise in supercomputing, data and web science, and our ability to link that to the life sciences. We don't have a medical school, but we are driving how they function."

Another area in which Rensselaer is blazing a new trail is in finding new sources of energy. For example, energy transmission is limited by the capacity of the power grid; higher currents mean greater efficiency, but existing materials often fall apart when exposed to them. Similarly, solar energy acquisition and storage are limited by their efficiency. "This is about developing new materials for new uses," says Dordick. "Our Center for Future Energy Systems supports this, as do our supercomputer and the Smart Lighting Energy Research Center." Rensselaer also is a leader in using new interdisciplinary approaches

to improve the efficiency, resiliency, and livability of buildings.

Dordick predicts that by 2024, Rensselaer will grow its research enterprise from \$100 million to \$250 million, and will be working on research endeavors perhaps not yet even imagined. He envisions new partnerships and the cultivation and spin-off of bigger entrepreneurial ventures, perhaps multinational companies. "It's about being transformative," he says. "Our job is to be proactive and to define how science and technology evolve and progress."

### THE PROCESS BEHIND THE PLAN

Perhaps just as important to the creation of *The Rensselaer Plan 2024* was the process of developing it. President Jackson's goal was to take stock of the current position Rensselaer holds as a major technological research university, and to position the Institute for its 200th anniversary. Last summer, she established an interdisciplinary Reassessment Leadership Committee, ReaLCom 2.0, chaired by Hajela, to



“Not too many places I know have the unique compilation of assets—human and infrastructural—that we have put together. The best is yet to come.”

PRESIDENT SHIRLEY ANN JACKSON

initiate an Institutewide discussion for updating the original *Rensselaer Plan*. She also convened a Writing Committee, consisting of Hajela, Dordick, and Sams, along with Virginia Gregg, vice president for finance and CFO; John Kolb '79, vice president for information services and technology and CIO; and William Walker, vice president for strategic communications and external relations.

Guided by the original plan and the five questions posed when developing it, ReaLCom 2.0 posted online an early draft of the new *Rensselaer Plan*, and solicited input from constituencies within the university, from student leaders to endowed professors to the faculty senate to the Pillars of Rensselaer. The committee held four open public sessions—as well as separate sessions specifically for students and alumni and alumnae—so that everyone had an opportunity to attend and offer comment in person or online. In addition, all vice presidents and deans conducted discussion sessions with their own portfolios. The Rensselaer Alumni Association played a key role in garnering alumni and alumnae input to the new *Rensselaer Plan*. The Writing

Committee then reviewed and distilled the feedback section by section with President Jackson, as the final draft plan was being developed.

Overall, the process was a very collaborative effort that considered all perspectives. President Jackson commends ReaLCom 2.0 and the Writing Committee for a magnificent job. “We had this very open process that allowed different constituencies and parts of the Rensselaer family to give their direct input,” says President Jackson. “People are invested in this plan because they had a stake in creating it. That is why the process matters.”

#### THE NEW POLYTECHNIC

The “poly” in the name Rensselaer Polytechnic Institute stands for “many.” President Jackson spoke in London earlier this year of a construct she calls “the New Polytechnic,” which she defines as a collaborative endeavor across a multiplicity of disciplines, sectors, and global regions that facilitates novel approaches to global challenges—a concept that underpins *The Rensselaer Plan 2024*.

The New Polytechnic does that by harkening back to the original meaning of the liberal arts, where the arts and social sciences interact with the natural sciences, mathematics, and engineering, an approach necessary to devise fresh solutions to today’s pressing issues. As the world becomes more digitally connected, generating a massive growing library of data, the New Polytechnic—and specifically the resources at Rensselaer Polytechnic Institute—enables new approaches to harness that power, such as tools to access and use data to address societal problems, and online tools and networks to enable people to collaborate in new cross-cultural ways.

As Rensselaer advances toward its bicentennial with the updated *Rensselaer Plan* firmly in place, President Jackson has done a little crystal-ball gazing. She envisions the Rensselaer students of 2024 benefitting from significantly more opportunities. She pictures a growing university in terms of the number of students and faculty, as well as one with greater global impact, through innovative teaching and world-class research, but also by virtue of alumni and alumnae doing great things. And she sees a Rensselaer with a much stronger financial underpinning.

“Not too many places I know have the unique compilation of assets—human and infrastructural—that we have put together,” says President Jackson. “The best is yet to come.”

