"The transitions so evident in all facets of life, learning, research, scholarship, all across our campuses, are signs of an intellectual vigor and vibrant activity. As we renew our commitment to our roots—the very premises upon which Rensselaer was founded—we are marking a transition from a storied past to a breathtaking future."—President Shirley Ann Jackson

PLAN FOR SUCCESS

Five years on, The Rensselaer Plan *continues to transform the Institute and lays the foundation for a renewed commitment to undergraduate education.*

This year marks the fifth anniversary of the launch of *The Rensselaer Plan*. A strategic blueprint for the future, the plan put Rensselaer on the road to its most significant and far-reaching transformation in more than a century, with the goal to raise the Institute to the level of a "top-tier technological research university with global reach and global impact."

The results have been wide-ranging, reaching into almost every aspect of life at the Institute. Under the plan, Rensselaer already has made its mark nationally and globally in the targeted areas of information technology, nanotechnology, and biotechnology. The Institute has recruited some of the most talented and distinguished faculty in the world. Research awards have more than doubled, from $37 million to $80 million, and the number of doctoral students has increased. Student quality and diversity is on the rise as well. More than $400 million has been poured into new construction and renovations of facilities for research, teaching, and student life. A renewed commitment to undergraduate education has sparked the recent introduction of the Undergraduate Plan, to strengthen the overall undergraduate experience at Rensselaer.

Meanwhile, the parallel transformation of Rensselaer at Hartford continues. The refocusing of the Education for Working Professionals program, which is based at Hartford and includes distance components, involves the reshaping of course offerings and the strengthening of ties to business and industry.

To support these and other initiatives, the Institute publicly launched its largest fund-raising campaign in its history, *Renaissance at Rensselaer: The Campaign for Rensselaer Polytechnic Institute*. BY JODI ACKERMAN FRANK

LONNY KALFUS





Shirley Ann Jackson came to Rensselaer in 1999 with the belief that, based on its history, the Institute had the potential to change the world.

"Rensselaer is an educational institution whose mission sits at the very heart of what has changed the world for the last 100 years. Namely, it is a university centered around science and engineering," Jackson says. "Many of the great discoveries, inventions, and innovations of the last century have completely transformed this country multiple times, and have made it the pre-eminent global leader that it is. If you look at those who have been connected to Rensselaer, they are people who have done just that in their time. That gives us a tradition to build upon."

The plan has propelled Rensselaer to prominence in critical areas, including health, safety and security, the environment, and energy security, among others. Innovation and discovery in these largely have grown from the plan's strategic research focus on one of the Institute's significant strengths, information technology, and on an area in which Rensselaer was relatively unknown until recently—biotechnology.

In her inaugural address, Jackson challenged the Rensselaer community to take the bold step of investing in biotechnology, an area that, she said, "holds out great promise and great value to humanity."

"[I]n the 21st century, genomics, combinatorics, and their marriage with information technology will impact the human condition as strongly as quantum science did in the 20th century," Jackson said in her address. "This is a field whose impact is so great, so full of promise, so well-suited to Rensselaer, that we simply must drive our stake into the ground of this new frontier."

Since then, Rensselaer has developed its own niche in biotechnology by combining research in the biological sciences with engineering and information technology. The result has been an explosion of new research, education, and technology commercialization that has fostered collaboration and innovation across all disciplines.

"*The Rensselaer Plan* has given us the focus, vision, and investment necessary to put the university back on the map with respect to groundbreaking research and leadership," says Omkaram "Om" Nalamasu, vice president for research.

From developing new methods to rapidly synthesize and screen new potential drugs to creating a living heart wall patch to treat congestive heart failure, Rensselaer faculty are increasingly being recognized for their work, attracting great interest—and funding—from government and the private sector.

The Center for Biotechnology and Interdisciplinary Studies, which opened in September 2004, lies at the heart of the plan's transformational research initiative. The 218,000-square-foot center houses faculty and researchers engaged in interdisciplinary research. Its core research facilities contain laboratories for molecular biology, analytical biochemistry, microbiology, imaging, histology, tissue and cell culture, proteomics, and scientific computing and visualization.

"This center is a cornerstone in realizing *The Rensselaer Plan*'s top priority of increasing the university's research portfolio exponentially while improving the quality of education and expanding the Institute's prominence and global impact," says the center's director, Robert Palazzo, a world-recognized cell and molecular biologist. "The building itself is the physical embodiment of Rensselaer's commitment to create an atmosphere for transformational research endeavors that will generate new models for interdisciplinary research at the university."

In addition to biotechnology and information technology, Rensselaer is pushing the frontiers of knowledge in other strategic research areas, including nanotechnology and advanced materials, microelectronics, and modeling and simulation of complex systems, among others.

"Discovery and innovation are critical to solving important problems facing humanity today, and multidisciplinary inquiry at new interfaces of any number of disciplines is imperative," Nalamasu says. "For instance, we are looking at biotechnology and nanotechnology as important new toolboxes to work on crucial energy issues."

DRIVING THE RESEARCH RENAISSANCE

Expanding the research enterprise required the university to make a significant investment in a critical mass of faculty to not only create the strength needed in focal areas, but to build up related areas in engineering, the sciences, and the arts. In the past five years, 150 new faculty members have been hired, 73 of them in entirely new positions.

Several of these new faculty members are part of the plan's strategy to create "constellations" as a means to build new research programs from the ground up. Each constellation is focused on specific research programs and comprises a multidisciplinary mix of senior and junior faculty, postdocs, and graduate students.

Last year, Rensselaer completed the Future Chips Constellation, which focuses on innovations in materials and devices and in solid state and smart lighting, and extends to applications

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such as sensing, communications, biotechnology, and energy conservation. The Institute has developed seven constellations, including multiscale computation, and functional tissue engineering and regenerative medicine.

WHERE THE ARTS MEET TECHNOLOGY

As Rensselaer embarked on new areas of scientific research under the plan, it also blazed a trail at the intersection of the arts, media, and technology with the introduction of the Experimental Media and Performing Arts Center (EMPAC), a unique building and program to link the arts with leading-edge research and performance across the disciplines.

"Rensselaer combines innovation and success in research and education with an equally sophisticated and demanding cultural environment. This is what EMPAC will build upon," says EMPAC Director Johannes Goebel. "EMPAC will provide programs and a place where artists, students, and faculty from a wide spectrum of disciplines can convene, exchange, collaborate, watch, listen, think, create, and allow themselves be to challenged."

In September 2003, the university broke ground for the $141 million building that is rising on the southwestern corner of the Rensselaer campus. Construction is well under way for the 206,000-square-foot building, with the grand-opening festival planned for September 2008.

EMPAC will house a 1,200-seat concert hall and a 400-seat theater. It also will have a 3,500-square-foot black-box studio optimized for theater, dance, and visual presentations. EMPAC will incorporate acoustical properties, artistic lighting, and technologically adaptable performance spaces to support research in visualization, simulation, animation, haptics, acoustics, and more.

In the summer of 2002, Goebel joined Rensselaer to begin developing comprehensive programming for EMPAC even before construction began. Previously the director of the Institute for Music and Acoustics, which he founded at the Center for Art and Media in Karlsruhe, Germany, Goebel has brought to Rensselaer his experience as composer, producer, and mentor of intermedia art and interdisciplinary research.

A number of EMPAC performances have already taken place. In September, the midpoint between the groundbreaking and opening was marked with "EMPAC 360: On Site + Sound," an event held at sunset that included aerial dance, music, live visuals, and fireworks enjoyed by an audience of 2,000 spectators from the Troy campus and the surrounding community.

EMPAC will anchor what is becoming an arts corridor along Eighth Street on the western side of the campus. It is joined by the highly acclaimed arts department, which is housed in the newly renovated West Hall. EMPAC draws heavily from the department's leadership position in the electronic arts. The department boasts some of the university's fastest-growing programs and has attracted a highly diverse, internationally recognized faculty whose work is regularly viewed and heard around the world.

In fact, the department's iEAR (Integrated Electronics Arts at Rensselaer) graduate program that has been promoting leading-edge art for 20 years, and the successful EMAC (electronic media, arts, and communication) undergraduate program convinced Jackson that Rensselaer had the foundation and the vision to establish an experimental arts center that would be unique in the world.

OUTWARD SIGNS OF PROGRESS

When Peter Baldwin '06, president of the Rensselaer Union, was a freshman three years ago, a parking lot stretched between the Playhouse and Academy Hall on 15th Street. Baldwin also noticed the abandoned building that once housed a T-shirt shop in the midst of rundown houses and sidewalks where 15th Street meets College Avenue.

"As far as I was concerned, the south side of campus ended at the Armory. College Avenue seemed to be anything but a part of the college," says Baldwin, who is completing a dual major in mechanical engineering and economics.

The north side of campus didn't fare much better. "When I was a freshman, I can remember visiting my friends' dorms that still appeared to be like Army barracks. The entire landscape of Freshman Hill left much to be desired," Baldwin says. "But, that was then and the Rensselaer of today is not what it was three years ago."

Today, the intersection Baldwin remembers as a no-man's land is a new gateway to the south side of the campus, with new walkways and lighting. The extensively renovated Academy Hall now serves as a student service center. The Institute also transformed an empty T-shirt shop into a lively coffeehouse, Java + +, where students can get a cappuccino, eat organic, and take advantage of wireless Internet access. In fact, the Troy campus is replete with new and renovated cafes in the Darrin Communications Center, the Folsom Library, and other locations, with future plans for expanded dining options in the Union.

Indeed, under *The Rensselaer Plan*, a whole new physical campus has sprung up with new and renovated facilities serving all aspects of the university community.



In addition to construction of the Center for Biotechnology and Interdisciplinary Studies and EMPAC, Rensselaer has invested millions of dollars in new and renovated freshman residence halls that are becoming places of living and learning. Barton Hall, completed in 2000, was the first new residence hall built on campus since 1977. The investment extends to improved housing for graduate students as well, including the renovation of abandoned buildings along Peoples Avenue and other areas near campus.

THE BEST IS YET TO COME

"What we have accomplished at Rensselaer in the past five years is remarkable," Jackson says. "While *The Rensselaer Plan* is a document of which we all can be proud, it is the people of Rensselaer who have made the promise of it a reality. What is more, our success is gaining for Rensselaer a national reputation as a model for academic transformation."

And, "as the song says, 'the best is yet to come,' " she adds.

The next major initiative is the Undergraduate Plan, which will build on *The Rensselaer Plan*'s commitment to develop a world-class undergraduate experience. The Institute's growing faculty, expanding facilities, and model programs are attracting ever more outstanding students. Average freshman SAT scores have increased 60 points in recent years. The undergraduate program has received the highest ranking in years from *U.S.News & World Report*—43rd, up from 46th last year.

"If we are to continue to attract the very best and brightest, we must focus on elevating our programs and expanding opportunities for our undergraduate students," says Prabhat Hajela, vice provost and dean of undergraduate education.

With this in mind, Rensselaer is developing one of its most ambitious initiatives for the immediate future: the Undergraduate Plan.

The initiative will build upon Rensselaer's innovative experiential approaches to education. Living and learning communities, which provide opportunities for groups of students who share common academic interests, are among programs being developed under the umbrella of the plan.

The plan calls for more opportunities for undergraduates to participate in research with faculty and graduate students. It sets a goal for research participation to nearly triple in the next five years, with up to 80 percent of students actively taking part in research activities.

"Our undergraduate programs must go hand-in-hand with what is being done at the graduate level because the most contemporary, forward-looking education one can expect happens when teaching is informed by research," says Hajela, who is working across all portfolios to expand undergraduate academic programs. "Such expanded research efforts will also encourage entrepreneurship and contribute to building mentoring relationships between faculty and students."

Another goal of the Undergraduate Plan is to provide an international experience for every undergraduate student. In preparing students to be good global citizens, comfortable in a multicultural environment, Rensselaer will provide enhanced and new opportunities for students to study abroad at universities around the world. In addition, the plan will increase offerings in international co-op and internship experiences and summer overseas semesters led by Rensselaer faculty.

Strengthening the student-advisement system is another focus. To support this effort, a new position has been created for an associate dean for academic advising, assessment, and special programs in the Office of Undergraduate Education.

The Undergraduate Plan will build upon Student Life's well-established First-Year Experience (FYE) program and services. FYE, now in its fourth year, welcomes new students with a full schedule of orientation events, parent and family programs, and social, cultural, and educational activities.

"We want to help students become part of this community, discover their interests and their passions, and form friendships and social connections with their peers, from the moment they first step onto campus," says Eddie Ade Knowles, vice president for student life.

A new FYE program this year is "Tuesday Night Toolbox," which offers programming and events that focus on topics of concern to new students, such as healthy living, academic support, and career development. Student Life also is focusing on strengthening student support and counseling well beyond the orientation period. For example, the early intervention program involves a new role of "class dean," named for each class after the freshman year. These deans lead a team that provides support for and outreach to the class, addressing concerns to help students stay on track.

For years, Jackson has warned that the United States faces a shortage of scientists and engineers, which could cause a decline in America's economic leadership. She calls this phenomenon the "quiet crisis."

"Unless we begin, now, to attract new groups

A renewed committment to undergraduate education has sparked the recent introduction of the Undergraduate Plan, to strengthen the overall undergraduate experience at Rensselaer.

of students, including women, underrepresented groups, and students with disabilities into science and engineering, we will not have enough scientists and engineers to maintain our national capacity for innovation and discovery, which undergirds our economy," she says.

To address this issue as an integral part of the Undergraduate Plan, the Division of Student Life is increasing diversity, the applicant pool, and national visibility for the Institute by creating internal pipeline programs, and building relationships with national pipeline programs that focus on preparing students who might not otherwise go to college.

One recently established internal pipeline program is the Rensselaer Presidential Scholars, a six-week national summer program to attract talented high-school seniors. Beginning next summer, up to 30 seniors from around the country will take a credit-bearing course in science or engineering with a research component in biotechnology, information technology, engineering, or another science.

FIELDS OF DREAMS

The Undergraduate Plan also encompasses the far-reaching expansion of athletics facilities.

"Athletics is a key element of the Undergraduate Plan, and creating new and better sports facilities for students is a high priority," Knowles says. "When you consider that more than 4,000 Rensselaer students play varsity, club, and intramural sports each year, you can see our need for the update and expansion."

Plans are being developed to build a new East Campus Athletic Village, a complex of buildings and spaces that will include a new football field with a 7,500-seat stadium, and a basketball gymnasium with seating for 2,000 that will also serve as a centralized location for all the athletics offices. Also part of the plan is to build an athletics support center that will have sports medicine and weight training facilities as well as multipurpose conference rooms, concessions, and lounges.

In addition, during the first phase of the plan the Houston Field House will be expanded to accommodate offices for women's and men's ice hockey as well as to provide room for athletics training facilities to support both programs. The first phase of this all-encompassing project is expected to begin next summer.

Later phases will include a 50-meter natatorium, a track-and-field facility with inside tennis courts, and eight outside tennis courts.

SUPPORTING THE RENAISSANCE

To support the vision of *The Rensselaer Plan*, the Institute publicly launched its largest capital campaign in its history with a goal of raising $1 billion by the end of 2008.

The campaign, titled *Renaissance at Rensselaer: The Campaign for Rensselaer Polytechnic Institute*, has raised more than $660 million to date—more than three times the amount raised in the last campaign that ended almost 10 years ago.

The campaign's nucleus phase began in 2000. Less than a year later, the university received a landmark $360 million gift from an anonymous donor. The largest unrestricted gift on record, the donation constituted a powerful endorsement of the transformational goals of the plan.

Several alumni since have made their own significant contributions, including Rensselaer alumnus and Trustee Curtis Priem '82, who pledged an unrestricted gift of $40 million to Rensselaer on the day of the public launch of the campaign in September 2004. In recognition of this gift, Rensselaer will name EMPAC in his honor. In addition, the Rensselaer Alumni Association has made its largest-ever gift commitment of $300,000 to support the expansion of athletics facilities.

THE NEW FACE OF RENSSELAER

What will the Institute look like when the goals of *The Rensselaer Plan* are achieved?

"There is no one 'look' in the future because if we are stagnant then we are not making the contributions that we intend to make," Jackson says.

Jackson intended the plan to be "evergreen"—a living document continually evolving and challenging the Institute to reach greater heights.

For example, early discussions referred to EMPAC as the "electronic media and performing arts center," but as the understanding of the center evolved, "electronic" was replaced with "experimental" to include new domains of exploration in the nexus of the arts and technology.

The Institute also has invested heavily in emerging disciplines that did not exist just a few years ago, such as terahertz science and nanoelectronics. Rensselaer faculty are pioneers in these exciting new areas of science that hold enormous potential in biomedical imaging, genetics diagnostics, and microelectronics.

"We have been opportunistic as we've gone," Jackson says. "But these things still derive from a fundamental desire to build out from strengths we have had all along."