THE WALKER CHEMICAL LABORATORY has housed the undergraduate chemistry program since its original completion in 1907. The building was renovated extensively in the 1990s, earning the 1996 Historical Education Building Award from the Preservation League of New York State.
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“These first nine months in graduate school have been quite a journey for me,” says Angela Seggio ’05, a graduate student in biomedical engineering who is researching the role that non-neural cells play in neurite guidance. “Ultimately,” Seggio says, “our lab’s long-term research goal is to find ways to treat people with permanent nerve damage.

“Through the one-on-one time I’ve been able to spend with Dr. Thompson in the lab, I have learned so many techniques I had only read about in my classes, and never would have guessed were applicable to biomedical engineering.

“These past two semesters she has worked hard to help me master these techniques, and start running my own experiments. I now feel that I’ve reached a milestone. I’m at the point where I realize the difference between successfully executing a technique, and understanding when and how to apply that technique to gain the information that will help propel my research.

“When you reach that roadblock when you find yourself asking, why am I doing this or what’s the point of it all, it’s comforting to know you have an adviser who’s ready to help you work through it. When I stop and think how far I’ve come in just a few months, I can only imagine what the next several years will bring.”
Mr. President, Spark a Legacy of Innovation
The nation needs a renewed national focus on science and technology

In anticipation of the annual State of the Union address in January, I sent President Bush an open letter urging him to make science and innovation a key component of his policy and budget proposals. I also had the opportunity to dine at the White House recently, where I shared with the president my thoughts on how the United States can regain its competitive edge and prepare the next generation of those who will lead in science and technology.

The letter which follows also is a call to all of us—alumni, students, parents, faculty, and friends of Rensselaer—who have a stake in the future of science and technology. I urge you to keep yourselves apprised of these issues and to lend your voices, and your perspectives, to this ongoing national dialogue.

Dear Mr. President:

Forty-five years ago, President John F. Kennedy made an extraordinary appeal to Congress that captured the nation’s imagination—one that led to Neil Armstrong stepping out of a lunar landing craft eight years later.

President Kennedy’s “man on the moon” speech is so memorable for the way it galvanized our nation, launching a space and science race. I personally owe him a great debt. I had it not been for the new spirit of discovery he engendered and for the new streams of science funding to schools all over the country, I and many in my generation of scientists might never have found our current path.

It is time for a similar galvanizing message to the American people because this nation is losing the innovation edge that Kennedy’s vision gave us. We are in the thick of what I call the “Quiet Crisis”—a crisis made not by the shock of an attack, but by the quiet convergence of economic and demographic factors. These factors expose our nation’s growing shortage of talent in the sciences and technology, and the waning commitment to, and funding for, basic research.

The “Quiet Crisis” I have spoken about for several years, as described in Thomas Friedman’s best seller The World is Flat, is already becoming “louder” as $100-per-barrel oil looms. It will be louder yet when China graduates a million engineers this year as U.S. graduation rates decline.

Mr. President, our science and technology position is a looming national crisis because it robs us of our capacity for innovation—so critical for our economic and national security. Investing in our nation’s capacity to innovate now will not only strengthen our economy, but may, by addressing global challenges such as energy security, help to allay geopolitical tensions that make for such alarming headlines today.

But even beyond this, the link between innovation and productivity is clear. Economists estimate that productivity gains fueled by innovation generated half of the growth in U.S. GDP over the last 50 years. One-third of all jobs in the United States require competency in science and technology—yet only 17 percent of our college graduates are earning degrees in technical fields. That is 10 points behind the worldwide average, and further behind China.

We are past the point of needing to document that there is a problem. I have been involved with a range of organizations that have done just that. The facts and forecasts that have emerged from these efforts moved me to urge a national conversation to generate a solution.

The much-needed national conversation is beginning to take hold. The American Association for the Advancement of Science has had the issue at the top of its agenda. It is of deep concern to business leaders, as the agendas of the Business Roundtable, Manufacturers and The Business Roundtable indicate. The National Academies report, “Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future,” has garnered national attention.

As a result of the rising crescendo, legislative policy initiatives have emerged at the local, state, and federal levels. For example, a bi-partisan group of U.S. Senators [in January] announced a plan to introduce legislation aimed at helping America maintain its leading edge in science and technology.

But we need to do more. To be fully effective, the directive must come from the highest office in the land. It is a crisis that you, Mr. President, have the power to remedy. A galvanizing call to action during your State of the Union address will unite the growing chorus of voices. Outlining a national science and technology agenda to spark new research, ignite education, and entice our youth will provide the leadership we need at this critical moment.

I suggest such an agenda must be built around meeting global energy needs to ensure our energy security. We can no longer just drill our way to energy security; we must innovate our way there. This requires innovative extractive and transportation technologies for fossile fuels, innovative conservation technologies, and innovative alternative fuel technologies.

Just as President Kennedy galvanized the nation in response to the Soviet launch of Sputnik, so too could you galvanize the nation around energy security—indeed, energy security is the “space race” of the 21st century.

It is your turn now, Mr. President. A newfound American strength in science can be your legacy.
Of Earthquakes and Explosions

I n your article “What Lies Beneath” [Winter 2005-06], the author said that New York state rarely experiences seismic activity. I am from Massena, N.Y., and I remember half the plaster falling down in the house and a chimney of a two-story house falling down.

On Sept. 4, 1944, an earthquake centered about midway between Massena, N.Y., and Cornwall, Ontario, Canada, caused an estimated $2 million damage in the two cities. The shock destroyed or damaged about 90 percent of the chimneys at Massena (intensity VIII), with similar effects at Cornwall. There was little damage due to the location of the center between Massena and Cornwall. Now the Saint Lawrence Seaway and Power Project, locks, and miles of dikes holding back Lake Saint Lawrence are located between Massena and Cornwall. An earthquake there may cause flooding of Massena and especially Cornwall if there is a break in the dams or dikes.

A little sidelight: When they blew a cofferdam with 30 tons of explosives to open the Seaway and make Lake Saint Lawrence on July 1, 1958, the shock wave was felt on the RPI campus. My roommate, Laurie Freedman, a graduate student in chemistry at the summer session, told me that the Geology Department predicted that the shock wave would follow a fault from the Saint Lawrence River Valley south through the campus.

If you didn’t know it was coming, you’d think a large truck was going by the chemistry building.

LAWRENCE NICHOLS ’58
Greenville, N.C.

Seismic Activity at Troy

A s I read the interesting article “What Lies Beneath,” it brought back memories of the “Logan Line.” In 1970 I was closely involved with the design and construction of the foundations for the Modern Classroom Facility Building at Rensselaer [Darrin Communications Center], located a short distance east of ’86 Field. During our subsurface investigation I learned about the Logan Line, a gigantic overthrust fault extending from the Albany area into Massachusetts. A geologic reference indicated that the fault occurred about 40 million years ago, when older beds of Shodack limestone shoved over younger beds of Snake Hill shale for thousands of feet.

Not a tectonic plate disruption but large enough to get my attention—especially since the fault line near the ground surface passed through the RPI campus and the northeast corner of the proposed building. The geologic reference stated that the fault had stopped moving 40 million years ago and it would not move again. I wondered how the geologist could be so sure.

I recommended to the architect/engineer that the building location be moved a short distance to put the entire building beyond the fault line. The A/E agreed and moved the building. Some time later, a Rensselaer administrator told the A/E to return the building to its original locations. The A/E agreed and moved the building back. Sometimes the practice of geotechnical engineering is similar to playing Russian roulette.

As everyone knows, seismic activity at Troy is now very small. However, 40 million years isn’t so long in geologic time. If the cause of the Logan Line is still cooking somewhere down there, perhaps the fault isn’t extinct. Just taking a nap.

TOM BELLATTY ’51
West Caldwell, N.J.

Quiet Crisis: Wrong Solution?

W ith all due respect to Dr. Jackson and her drawing attention to the “Quiet Crisis,” I believe that she is attacking the problem from the wrong end. Although a shrinking supply of technical people (scientists, engineers, programmers) is a problem, a far bigger one is the failure to retain these people once they enter the workforce. When a technical person joins almost any American company, what do they constantly hear from Day One? “We don’t value you for your technical skills. You’re just another Dilbert to us. When your salary gets too high, we’ll dump you and send your job to India or China. If you want to amount to anything and get anywhere, leave the technical track, get your MBA, and join us Art History majors in management.” Is it any wonder that technical people leave their fields in droves?

It will not help to throw money at a perceived shortage of students. The sad fact is that there is not some great pool of untapped talent out there. Very few people can think logically and rationally enough to be a success in the technical world. Does anyone remember the swarms of students in computer science programs in the late ’90s? They’re gone now. Most should never have been let near a computer.

We may be losing some students in grades K-12 by not having enough good math and science teachers, but no one should fool themselves into thinking that a huge increase in qualified math and science teachers will act as some sort of magic catalyst to produce huge numbers of qualified engineering and science students! Another concern is that pushing a huge supply of technical people onto the market will merely give management an excuse to slash salaries (supply and demand). We would do far better to concentrate on nurturing technical careers and retaining good people in their fields, rather than embarking on some crash program to spike up the supply for a short time.

PHIL PERRY ’80
Woodstock, N.Y.
THOMAS PHELAN

Rensselaer Loses a “Wise Counselor”

THE REV. THOMAS PHELAN DIED ON MARCH 31. Phelan, who devoted more than four decades of his life to Rensselaer as chaplain and dean of humanities and social sciences, most recently was the Institute Dean, Institute Historian, and Professor Emeritus.

“Dean Phelan was an extraordinary person,” said President Shirley Ann Jackson. “He was a professor, dean, historian, and wise counselor. Above all, he was a builder of community who also realized the value of understanding and documenting our rich history. The legacy he has left behind is as grand as the life he lived.”

Phelan began his long association with Rensselaer in 1959, when he was named the resident Catholic chaplain. Phelan’s legacy to Rensselaer includes building the Chapel + Cultural Center. Opened in 1968, the award-winning Chapel + Cultural Center hosts exhibitions and performances, foreign student gatherings, weddings of every denomination, and is home to Christ Sun of Justice University Parish. Phelan began his tenure as pastor of the parish in 1971, and retired as pastor in 2001.

Phelan, who was named dean of the School of Humanities and Social Sciences (H&SS) in 1972 and served in that capacity until 1994, is credited with overseeing the renovation of the Russell Sage Laboratory to bring H&SS onto the main campus, and developing a strong faculty focused on bridging the humanities and technology.

In 1983 he launched a five-year effort to revamp the H&SS Core Program, the courses required of all Rensselaer graduates. Unveiled in 1988, the new curriculum sought to “contribute to the realization of student potential as leaders in the professions and in society at large.” Dr. Ernest Boyer, president of the Carnegie Foundation for the Advancement of Teaching, called it “one of the most creative and exciting curricular reform efforts” he had seen.

In 2005 the Institute honored his efforts by creating the Thomas Phelan Endowed Chair in the Humanities and Social Sciences. The chair was created to recognize an outstanding scholar who has contributed significantly to the study and understanding of the relationship of material culture to the history and development of society. Langdon Winner, professor of science and technology studies, was appointed to the Phelan Chair in July 2005.

Phelan’s contributions to the community outside of Rensselaer also are numerous. He was the founding president of the Hudson-Mohawk Industrial Gateway, a nonprofit organization dedicated to fostering pride in the local communities that played a major role in the Industrial Revolution. He also served as chairman of WMHT Educational Telecommunications, chair of the Architecture and Building Commission of the Roman Catholic Diocese of Albany, president of the Catholic Art Association, and leader or member of a host of other organizations.

He wrote extensively, on historical theology, American material culture, and higher education. He is perhaps best known for his writings on the American Industrial Revolution, using the Troy area as a model for understanding the implications of industrialization in U.S. history.

Phelan’s work through the years earned him numerous honors. He was elected a fellow of the Society for the Arts, Religion and Contemporary Culture in 1972. He was awarded the Albany League of Arts Award for Distinguished Contributions to the Arts, the Albert Fox Demers Medal for distinguished service to Rensselaer in 1986, the first Community Service Award from the Hudson-Mohawk Consortium of Colleges and Universities in 1987, and the Academic Citizens Laureate Award from the State University of New York Foundation at Albany in 1988.

As Rensselaer Trustee Neal Barton ’58 has said, “Few among us, in the history of this school, have so powerfully demonstrated what it means to love and to serve with all your heart, and with all your soul, and with all your mind, and with all your strength.”

Thomas Phelan (as seen in a photograph from the early ’90s), wrote extensively on historical theology, American material culture, and higher education.
Deanna Thompson, assistant professor of biomedical engineering at Rensselaer, has received one of six New York State Office of Science, Technology, and Academic Research (NYSTAR) James D. Watson Investigator Program Awards. The $200,000 grant will support Thompson’s research, which focuses on the repair mechanisms of the nervous system.

The NYSTAR support will allow Thompson’s laboratory to investigate the roles Schwann cells play in the successful repair and guidance of nerve networks. This work could one day provide insight into new treatment strategies to help those who are paralyzed due to nerve injuries.

When an injury to a neuron occurs, the growing part of the neuron must navigate past the damaged site to its target to regain function. “Unfortunately, the cell often becomes misguided due to the trauma, the formation of scar tissue, and other reasons,” Thompson says.

Located in the peripheral nervous system (PNS), which connects the central nervous system (spinal cord and brain) to other parts of the body, Schwann cells provide insulation and other support to neurons. Their presence allows many neurons in the PNS to repair themselves. Unlike the PNS, the neurons in the central nervous system lack the ability to mend themselves, in part because they lack the support of Schwann cells.

“Despite advances in surgical techniques, the outlook for a full functional recovery following nerve injury remains dismal,” says Thompson. “Our research seeks to discover the ways in which injured nerves can be repaired.”

Thompson’s long-term research goal is to use Schwann cells to develop a novel scaffold that will aid in nerve regeneration in both the peripheral and the central nervous system.

The James D. Watson Investigator initiative is part of the $22.5 million Generating Employment through New York State Science (Gen*NY*sis) program.

Thompson joined Rensselaer in September 2004, from the Center for Engineering in Medicine at the Harvard Medical School. She is part of an influx of new faculty in the past few years who are expanding Rensselaer’s research scope with their expertise in cellular, biochemical, and biophysical approaches to the life sciences.
A TEAM OF RESEARCHERS HAS DEVELOPED a new process to make “nano skins” for a variety of applications, from electronic paper to sensors for detecting chemical and biological agents. The materials combine the strength and conductivity of carbon nanotubes with the flexibility of traditional polymers.

“Researchers have long been interested in making composites of nanotubes and polymers, but it can be difficult to engineer the interfaces between the two materials,” says Pulickel Ajayan, the Henry Burlage Professor of Materials Science and Engineering at Rensselaer. “We have found a way to get arrays of nanotubes into a soft polymer matrix without disturbing the shape, size, or alignment of the nanotubes.”

Typically, nanotube arrays don’t maintain their shape when transferred because they are held together by weak forces. The team has developed a new procedure that allows them to grow an array of nanotubes on a separate platform and then fill the array with a soft polymer. When the polymer hardens, it is essentially peeled back from the platform, leaving a flexible skin with organized arrays of nanotubes embedded throughout.

The skins can be bent, flexed, and rolled up, all while maintaining their ability to conduct electricity, which makes them ideal materials for electronic paper and other flexible electronics, according to Ajayan.

“The general concept—growing nanotubes on a stiff platform in various organizations, and then transferring them to a flexible platform without losing this organization—could have many other applications, all the way from adhesive structures and Velcro-like materials to nanotube interconnects for electronics,” says Swastik Kar, a postdoctoral researcher in materials science and engineering at Rensselaer and lead author of the paper.

The researchers also envision using the process to build miniature pressure sensors and gas detectors. “There are a lot of possibilities if you have an easy way to transfer the nanotubes to any platform, and that is what we have developed,” Ajayan says.

Several other Rensselaer researchers also collaborated on the project, along with colleagues from New Mexico State University.

IN MARCH, RENSSELAER PRESIDENT SHIRLEY ANN Jackson and New York Senate Majority Leader Joseph Bruno joined biotechnology researchers and business leaders at the Center for Biotechnology and Interdisciplinary Studies to unveil a powerful new tool—a nuclear magnetic resonance (NMR) spectrometer—that aids in research on the cause and treatment of disease.

“The addition of cutting-edge NMR technology is an important investment as we continue to build the infrastructure in this world-class research facility,” said President Jackson.

“This state-of-the-art equipment is already attracting new researchers to Rensselaer who are working at the forefront of discovery in basic and applied health research.”

“The Capital Region, particularly RPI, is a 21st-century leader in cutting-edge biotechnology and life sciences research, and today’s announcement certainly bolsters that reputation,” said Bruno. “The new nuclear magnetic resonance equipment will dramatically improve the ability of doctors and researchers to better understand and treat diseases that affect the lives of thousands of people, giving us yet another tool in the battle to cure them once and for all.”

The NMR spectrometer is a superconducting magnet that uses strong magnetic fields to provide detailed information on the 3-D structure of biological molecules. This information can assist researchers who are seeking to better understand proteins that cause disease and seeking new therapies to treat disease. Researchers are now using the high-field magnet to study health problems such as Alzheimer’s disease and to develop new methods for using NMR technology.

The new Bruker Biospin 800 MHz is currently the most sensitive and powerful NMR spectrometer in upstate New York. It joins a 600 MHz unit obtained last year for Rensselaer’s developing NMR facility.
Trading Floor Training

Eight graduate and undergraduate students from Rensselaer’s Lally School of Management and Technology tested their skills in trading, financial analysis, and econometric modeling while participating in the third annual Rotman International Trading Competition at the University of Toronto’s Rotman School of Management on Feb. 24-25.

The competition—which drew 152 participants from 36 schools throughout Canada, the United States, and Europe—challenged students to apply their trading knowledge in real-time simulations and a realistic environment.

“The trading floor competition is a wonderful illustration of experiential learning at its best,” says David Gautschi, dean of the Lally School. “Our faculty leader, Professor Stephanie Rauterkus, has worked with the students to help them understand the intricacies of how trades are really made under the pressures of a real trading floor.”

A total of 38 teams participated in the competition, including MIT’s Sloan School of Management, Carnegie Mellon University, University of London, and Duke University, among others.

“In the classroom, we explain theories and teach students to use technology to solve practical problems. This type of competition gives [them] an opportunity to test what they’re learning in a new environment against students from other institutions,” says Rauterkus, clinical assistant professor in the Lally School. “This practical experience, competing with their peers, better prepares them to compete in the marketplace.”

Preparing Global Citizens

With the Undergraduate Plan, Rensselaer is turning renewed attention to the undergraduate students it educates to lead tomorrow’s global workforce. Key to the plan are initiatives to expand their understanding of the world community they will inhabit.

Douglas Henck ’74 has a global perspective that today’s Rensselaer students would do well to emulate. Well-prepared for an actuarial career after earning his undergraduate degree in mathematics, Henck joined the new international department of the Aetna insurance company in 1981, spending the next several years traveling the world helping to set up new ventures. He later joined Sun Life Financial, becoming the president of the company’s Asian operations and retiring from that position in August 2005. During his tenure he oversaw the building of a substantive regional headquarters in Hong Kong, the opening and growth of a successful life insurance joint venture in India, and the opening and expansion of a joint venture in mainland China.

Moving his family to Hong Kong in 1987, Henck says, “put cultural differences in our daily lives.” One of the first lessons they learned, and one he thinks Rensselaer could try on campus, is “to learn what is ‘American’ about our own personality.”

“There are many elements of our personality—how we react to certain things, for example—that are distinctly American,” Henck says. “Once you are sensitized to this key point, you open your mind to learning how other cultures react differently, and your own reaction to other cultures takes on a new light.”

Henck says that his children reaped the benefit of attending an international school with classmates from diverse countries and cultures, and of visiting many countries on trips. “The results are clear: our children are ‘citizens of the world,’ comfortable traveling or living almost anywhere.”

The Hencks’ next step will add even further to their cultural experience. They are moving to Haifa, Israel, where they will volunteer at the Bahai World Center. In addition to contributions of time over the years, the Hencks signaled their support of The Rensselaer Plan and the Renaissance at Rensselaer campaign through their commitment to establish the Suzanne and Douglas C. Henck ’74 Unrestricted Endowment.

Henck approves of The Rensselaer Plan’s emphasis on “global reach and global impact,” and he applauds the intention to expand exchange programs and other connections with international academic institutions.

“The most useful scientists and engineers in the world of business are those who can ‘bridge disciplines,’” Henck says. “Engineers with a sense of the consumer or marketplace, and scientists who can communicate effectively, are great assets.”
Research Roundup

Studying Proteins Under Pressure

The National Science Foundation has awarded Angel Garcia, senior constellation chaired professor in bio-computation and bioinformatics, a five-year, $947,000 grant to study how proteins behave under pressure. The research, which involves creating molecular simulations of protein behavior through computations on the folding and unfolding of specific proteins, seeks to address gaps in scientific knowledge regarding the role of water pressure in protein structure and function that could aid in the understanding and treatment of disease.

State Funds River Research

New York State Governor George Pataki announced plans to include $25 million in the 2006-07 Executive Budget for the construction of a Center for Advanced Environmental Technology at the Rivers and Estuaries Center on the Hudson in Beacon, N.Y. Arthur Sanderson, professor of electrical, computer, and systems engineering at Rensselaer, is chair of the science advisory committee for the Rivers and Estuaries Center. The funding will foster research along the length of the Hudson River and Estuary, and will support the development of emerging technologies such as robotics, distributed sensors, and information technology for networks. These advancements will be critical to the future of environmental research and monitoring. Rensselaer and its Darrin Fresh Water Institute are at the forefront of research on distributed sensor networks that enable real-time environmental monitoring of the Hudson River and other rivers, lakes, and waterways.

Harnessing the Power of the Sun

Rensselaer researchers have received a $300,000, three-year grant from the National Science Foundation (NSF) to develop a thin-film active building envelope (ABE), a solar-powered heating and cooling system that could potentially render traditional air conditioning and heating equipment obsolete. Made up of photovoltaic cells that collect and convert sunlight into electricity and thermoelectric heat-pumps that emit hot or cool temperatures based on the direction of the electric current, the ABE system could be applied like a glaze to a building’s walls and windows, giving them the ability to regulate interior temperatures.

ARCHITECTURE

Celebrating History Through Art

Since January, a poster hanging in subway stations and bus terminals across New York City has been reminding commuters of the city’s rich history of bus transportation.

Rensselaer Clinical Assistant Professor of Architecture Michael Oatman was commissioned by the Metropolitan Transit Authority (MTA) to create the poster in celebration of the Bus Centennial—one hundred years of motorized bus service in New York City.

Oatman enlisted the help of his Falling Anvil Studios, architecture students that he’s selected to work with on various art projects that have been displayed and exhibited nationally. According to Oatman, the students are “involved in all aspects of the projects, from conceptualization to the making of stuff.”

Best known for his collage work, Oatman drew on that experience for the MTA poster, which he titled “Busman’s Holiday.” Using photos from the MTA archives, he worked to create a poster representative of a gallery wall, featuring framed archive photos.

Oatman photographed Rensselaer architecture students Erin Cusker, Matthew Fickett, and Jenna Beltram (along with Cramer Silkworth) to create the silhouettes in the foreground of the poster. The silhouettes not only appear to be viewing the photographs, but they are also queuing in line to step through the wall and board a historic bus.

“I wanted to create a ‘mini-museum’ in one picture, and to bring the archives—which were squirreled away as archives oftentimes are—out to the people,” says Oatman. “I wanted to show them the rich history of this place.”

The MTA printed more than 5,000 “Busman’s Holiday” posters, which are still being posted in stations and terminals throughout New York City.

ARCHITECTURE ON THE MOVE

Rensselaer Clinical Assistant Professor of Architecture Michael Oatman used Rensselaer students to help create the MTA Bus Centennial poster.
dents, seven faculty members who relocated from Rensselaer to Connecticut (including Warren Stoker ’33, who served as director and later dean), and adjunct professors from local industry.

While it believed strongly in serving the individual student, the Hartford Graduate Center was committed to serving the business community as well. As a result, an additional campus was founded in Groton, Conn., to respond to the educational demands of Electric Boat, a subsidiary of General Dynamics.

In December 1996, trustees of both Rensselaer and the Hartford Graduate Center voted to transfer Hartford’s assets into a corporation controlled by Rensselaer. Under the new arrangement, Hartford had its own board of trustees, named by the Rensselaer president while the former Hartford board and new appointees assumed an advisory role.

In 1997, to celebrate the newly restored connection to Rensselaer, the Hartford Graduate Center was given its current name—Rensselaer at Hartford.

“We are proud to be celebrating 50 years of continued excellence in educating the working professional,” says John Minasian, vice president and dean of Rensselaer at Hartford.

“Rensselaer at Hartford has a strong foundation on which to build a future Center for Technology Leadership, a learning laboratory dedicated to shaping our next world leaders based on an intellectual core of innovation, business sustainability, global enterprise management, and systems engineering leadership.”

Researchers at Rensselaer and the University of North Carolina at Chapel Hill have discovered an alternative way to produce heparin, a drug commonly used to stop or prevent blood from clotting. The findings could enable the current supply of the drug—now extracted from animal organ tissue—to be replaced or supplemented by the synthetic version. The new process also can be applied as a tool for drug discovery, according to the researchers.

Heparin is a complex carbohydrate used to stop or prevent blood from clotting during medical procedures and treatments such as kidney dialysis, heart bypass surgery, stent implantation, and indwelling catheters, among others. The annual worldwide sales of heparin are estimated at $3 billion.

“We have synthetically prepared heparin in quantities large enough for use in human medical treatments by engineering recently discovered heparin biosynthetic enzymes,” says Robert Linhardt, the Ann and John H. Broadbent Jr. ’59 Senior Constellation Professor of Biocatalysis and Metabolic Engineering. “These discoveries will enable us to effectively replace a variable raw material with a synthetic material and have the same therapeutic result.”

Researchers at MIT first prepared a synthetic heparin, but, in amounts of less than 1 microgram, it was insufficient to treat humans, says Linhardt. One human dose of heparin is approximately 100 milligrams.

Rensselaer and UNC-Chapel Hill researchers successfully synthesized hundreds of milligrams of heparin by developing a large-scale process involving engineered enzymes and co-factor recycling. The new, scalable process can be applied to synthesize other heparin-based structures that regulate cell growth and may have applications in wound healing or cancer treatment.
Making Hoops History

In a home game against Hobart on Feb. 10, 2006, Rensselaer men’s basketball star Tom Schneider accomplished a feat only a handful of Red Hawks before him have achieved. In front of fans, friends, and family members who drove from his hometown in New Hampshire to watch, Schneider became the 12th player in Rensselaer history to score 1,000 career points.

Needing to score only eight points versus Hobart to reach the 1,000 mark, Schneider put up a game-high 27 points, leading Rensselaer to a 75-69 victory over the Statesmen. He finished the game with 1,019 career points.

“I’m proud of the accomplishment,” Schneider says, “but I never went into a game thinking it was my chance to score the 1,000 points—my team always came first.”

Schneider wasn’t always Rensselaer’s star scorer. He began his college basketball career quietly, often as an essential backup player behind more experienced teammates. Last summer, Head Coach Mike Griffin mailed Schneider a box score from a game he’d played during his own college career at Columbia, in which he put up 22 points and 20 rebounds.

“At the bottom [of the box score] it said, ‘Tom, you’re the guy this year we need averaging 20 and 12,’” Schneider recalled during an interview with THE POLYTECHNIC.

The letter motivated Schneider to return to Troy and train hard. During what should’ve been a summer vacation, he played basketball daily, and spent three days a week lifting weights and running three-mile circuits.

His hard work paid off on the court. Schneider became the team’s main offensive threat this season, and was named the Liberty League Player of the Year. He finished his college basketball career with a total of 1,099 points and 808 rebounds, and is the ninth highest career scorer in Rensselaer history.

DINING ON THE GROUND FLOOR OF THE Rensselaer Union is an entirely new experience thanks to extensive renovations made to the Rathskeller, which were unveiled in a grand-opening ceremony on Feb. 13.

The revamped Rathskeller offers hungry students, faculty, and staff a new variety of food items, increased areas for laptop use, and a colorful atmosphere conducive for working individually and in groups, or for relaxing and socializing with colleagues.

“The students wanted a radical change in the ambience of the Rathskeller. [They needed] a place that was more laid-back to suit their needs,” says John Fusco, resident district manager for Sodexo, Rensselaer’s hospitality provider. “The new space serves as a place for students to work or gather and socialize in a comfortable environment.”

Students’ input was taken into consideration during every phase of the project, even down to selecting the room’s furniture and color schemes, according to Fusco.

The $475,000 renovation includes new tables and chairs to accommodate groups of four to eight individuals, bar-style seating, and an open sitting area with sofas and easy chairs. Additional outlets and Ethernet ports allow for increased wired and wireless Internet access, and aesthetic upgrades such as new tiles, lighting, carpeting, and a raspberry-painted ceiling complete the Rathskeller’s makeover.

An improved menu features original and new fare choices with combo-style offerings for beverages or side items, and bimonthly specials. A variety of hot and cold sub sandwiches, globally inspired hearty wraps, grilled food items, and pizza, stromboli, and calzones can be found at four food stations.

“I remember sitting on the business operations committee, researching and discussing possible layouts and designs for the Rathskeller,” says Peter Baldwin, president of the Rensselaer Union. “Three years later, the space has been transformed. The new seating, lighting, and furniture in the Rathskeller extend the dining experience far beyond the confines of food.”

The Rathskeller renovation is among a series of recent upgrades and improvements to Rensselaer’s campus dining experience. Changes include the addition of a new coffeehouse, expanded offerings at campus retail eateries, and specialized menus and dishes in the dining halls.
Prabhat Hajela: Elevating the Undergraduate Experience

Prabhat Hajela has spent his entire career aiming high. Trained as an aeronautical, aerospace, and mechanical engineer, he’s spent time in Washington, working with Congress to develop public policy on aerospace issues like the commercialization of space travel. He’s also conducted research at U.S. Air Force labs and at two NASA centers. As vice provost and dean of undergraduate education at Rensselaer, Hajela has set his sights on giving undergraduate students the tools needed to reach for the stars.

“Rensselaer will be defined by its level of exciting undergraduate education and by the undergraduate experience,” says Hajela. Sitting in his office in the Walker Laboratory, Hajela’s enthusiasm for the Undergraduate Plan—the next major initiative of The Rensselaer Plan—is contagious.

Calling for a renewed focus on the overall undergraduate experience, the initiative seeks to raise the level of academics, research, and international study opportunities available to undergraduate students, while boosting the student life experience.

“What makes a university great are its new discoveries,” says Hajela, who is working toward the initiative’s five-year goal of tripling the number of undergraduate students actively involved in research activities with faculty and graduate students. “Our undergraduate students are remarkable, and it’s important for us to engage them in the research and discovery process early. We should be getting them interested in independent inquiry now.”

Hajela, who also has worked with government officials in Washington to regulate Internet privacy and the control of unsolicited e-mail, conducts research focused on the analysis and optimization of structural and multidisciplinary systems through the development of innovative computational techniques. He has published extensively in the area of design methods that derive from the evolution process or mimic the behavior of a biological immune system.

In order to foster strong relationships between students and faculty, Hajela is working to develop living and learning communities for undergraduate students who share common intellectual interests. He hopes this will provide them with the opportunity to develop close mentoring relationships and lasting contacts with faculty, staff, and graduate students in their field.

Working to expand undergraduate academic programs in each of the five schools on campus, Hajela says he is committed to increasing the number of courses that are taught in Rensselaer’s innovative studio format, and he encourages the development of new programs for undergraduate students.

“The Foundations of Engineering program, the Product Design & Innovation program, and the Games and Simulation Arts and Sciences major are prime examples of new, exciting course offerings. Programs like these point to a new vibrancy in undergraduate education, and to the changing face of Rensselaer,” says Hajela.

In the future Hajela would like to create an Honors College at Rensselaer—a special approach to recognize and reward undergraduate students for their academic and research accomplishments. Students admitted to the Honors College would have the opportunity to participate in a multidisciplinary seminar series, develop a thesis derived from their individual research, and earn diplomas marked with a special distinction.

The new opportunities on the horizon for Rensselaer’s undergraduate students are steps toward achieving Hajela’s overarching goal, “to revitalize and reposition undergraduate education.”

“Rensselaer is up there in terms of top college choices for very bright young students,” says Hajela. “I want prospective students to look at all of the unique opportunities we offer undergraduate students, and get excited. I want them to have a ‘Wow, I could do that at Rensselaer’ moment.”
ALHUSSEIN ABOUZEID, assistant professor of electrical, computer, and systems engineering, has been awarded a Faculty Early Career Development Award from the National Science Foundation (NSF). Abouezid will use the projected five-year, $400,000 grant to investigate dynamic wireless networks with applications in environmental sensing, disaster response, and connecting homes within a community.

GERALD FRIEDMAN, professor emeritus of earth and environmental sciences, was awarded the 2005 Legendary Geoscientist Award by the American Geological Institute and the 2005 Mary C. Rabbit Award of the American Geological Institute, the American Geological Institute, the organization dedicated to advancing the science of earth and environmental sciences. Friedman is best known for his work in carbonate rocks and is also accomplished in coastal geology and water geochemistry.

OMKARAM “OM” NALAMSU, vice president for research, has been honored with the Pride of India Gold award. Presented by the NRI Institute, the award recognizes nonresident Indians (NRIs) for outstanding achievements in their fields and for contributions toward the economic development of India and the country of their adoption.

LINDA LAYNE, the Alma and H. Erwin Hale ’30 Professor of Humanities and Social Sciences, has won a Gracie Allen Award for her TV series, Motherhood Lost: Conversations. Presented by American Women in Radio & Television—a national organization dedicated to advancing the impact of women in the electronic media—the Gracie Awards strive to encourage the realistic and faceted portrayal of women in entertainment, commercials, news, features, and other programs.

ROBERT BLOCK, director of the Gaertner Linear Accelerator Laboratory and professor emeritus of nuclear engineering, has been awarded the Seaborg Medal by the American Nuclear Society. The award recognizes an individual who has made outstanding scientific or engineering research contributions to the development of peaceful uses of nuclear energy.

WILLIAM EDELSTEIN, visiting scientist at Rensselaer, has been named the winner of the 2005-2006 American Institute of Physics Industrial Applications in Physics Prize. Edelstein was chosen “for his pioneering developments leading to commercialization of high-resolution magnetic resonance imaging (MRI) for medical applications.”

JOE CHOW, professor of electrical, computer, and systems engineering, has been appointed associate dean of engineering for research and graduate programs. In his new role, Chow will be actively involved in prioritizing the school’s resources to support research and new initiatives, linking teaching and research more closely by integrating research into the curriculum.

BRUCE WATSON, Institute Professor of Earth and Environmental Sciences, has been appointed scientific editor for Elements, an international magazine covering mineralogy, geochemistry, and petrology research and news. He will be the chief editor for the October and December 2006 issues of the publication.

MICHAEL HANNA, associate professor of biology, has been appointed associate dean for academic advising, assessment, and special programs at Rensselaer. He will also serve as the director of the Institute’s Advising and Learning Assistance Center. Hanna will work with Rensselaer’s five schools, the Joint Student/Faculty Senate Committee on Advising, and various campus constituents to further develop advising and mentoring approaches to aid undergraduate students. He will also work with the Office of Undergraduate Education in key areas and initiatives defined in the Undergraduate Plan.

ROBERT CHERNOW, professor of language, literature, and communication, has been named associate fellow of the Society for Technical Communication (STC). The rank of associate fellow is conferred upon a senior member of STC who has attained distinction in the field of technical communication. Krull will receive this award at the STC convention in Las Vegas, Nev., in May.

HEIDI NEWBERG, associate professor of physics, applied physics, and astronomy, received the Martin and Beate Block Winter Fund Award at the Aspen Center Winter Conference “Particle Physics at the Verge of Discovery” Feb. 12-18, 2006.

ACHILLE MESSAC, professor of mechanical, aerospace, and nuclear engineering, has been appointed the featured area editor for “Mechanical Engineering” for the Springer journal Optimization and Engineering. Messac has served on the editorial board of this journal since 1999.

JOHN KOLLER, professor of philosophy, was named editor of The American Philosophical NewsLetter for Asian and Asian-American philosophers. He was also recently named to the list of Leading Philosophers of the World, published by the World Philosophy Congress.
When he came to Rensselaer, Muhammad Ihsan Mohd Nasir ’06 simply took for granted that there would be a Muslim presence. While the number of Muslims has not risen substantially, they are more likely to be undergraduates and more integrated into campus life than Muslim students of a decade ago.
These are students of faith at Rensselaer, for whom worship and study at a technological university are complementary pursuits. Reflecting a national trend, the Institute’s religious population is larger, more active, and more diverse than it was even a decade ago.

The students approach observance with the intensity they bring to the study of engineering or architecture. They build hours of worship, community service, and organizational work into their already busy academic and activities schedules as they explore the relationship between the subjects they study and their faith traditions.

“The world is telling you that science and faith don’t go together, that God couldn’t have done all of that,” says Kristen Clark ’09, a physics major from Michigan who heads outreach for the Rensselaer Newman Catholic Fellowship. “Part of what is great about RPI is that you can learn that these things go together. It’s a struggle. Science can’t explain everything.”

Five chaplains counsel students and work with about nine student-led religious organizations that are active at any time. The chaplains are not Rensselaer employees and, like the religion clubs they serve, receive no Institute funds. But they do include students in their ministries and maintain an office on campus, and pages on the Rensselaer Web site.

The groups and their eclectic programs tell the story of both tradition and change on campus. Participation among Catholics and Protestants, for example, who have composed Rensselaer’s traditional student base for decades, is strong, and some students believe is growing. Interdenominational organizations are also active, among them the Rensselaer Christian Association, an affiliate of a national Evangelical network.

The Korean Christian Fellowship, Muslim Students Association, Hindu Students Association, and Indian Christian Fellowship speak to Rensselaer’s growing religious and ethnic diversity, involving students from the U.S. and abroad. In fact, at least 19 faiths are represented in the current freshman class. | BY JANE GOTTLIEB
A

s the student body
has broadened, the
number of campus clubs
overall has jumped to 160—
and counting. Like all groups,
the religious organizations are
prone to fluctuations in membership. Hillel, the
Jewish organization, has seen its numbers lag
recently, and Rensselaer’s Brothers and Sisters
in Christ is inactive right now. But in the range
of faiths and their visibility on campus some
advisers perceive something deeper than demo-

graphics.

“Since the mid-1990s we’ve had a resur-
gence of interest, more students staying with
their religious heritage,” says the Rev. Ed Kac-
erguis, Rensselaer’s coordinator of religious
affairs and one of two Catholic chaplains. “And
I’d argue it’s a contradiction in terms: our stu-
dents are bright, articulate, intellectual, and
innovators, but socially they tend to be very con-
servative. Our kids were very quiet. Now they are
more open about worship, more comfortable
exploring it. They’re a little more public.”

In fact, the people who gather as Catholics,
Baptists, or Hindus are as active as those who
gather as chess players or computer game enthu-
siasts.

Recently, for example, the Newman Catholic
Fellowship had an overflow crowd for its forum
on the ethics of cloning. More than 150 stu-
dents attended a Mardi Gras party preceding
Ash Wednesday services—an eye-opener for
Asian Catholics who had never before donned
masks or had beads tossed at them. African-
American students joined members of local
churches in the Rensselaer Union for a Gospel
Expo celebrated in prayer, music, and poetry.
Christian groups convened the first-ever Praise
Night. Rensselaer Hillel’s calendar included
Passover seders and an evening of matzoh ball-
making. The Muslim Students Association held
a community basketball event.

Regular gatherings on campus abound. The
Rensselaer Christian Association holds prayer
meetings three times a week at 5 p.m. For the
Korean Christians, it’s 8 p.m. Wednesdays. On
Sunday afternoons, the Protestant chaplain
holds informal discussions on the Bible.

“The Sunday meetings are a breath of fresh
air,” says Jenny Burton, a lifelong Congrega-
tionalist who is a fourth-year architecture stu-
dent. “RPI is obviously really intense. I get
stressed. The discussion is a real grounding
thing. It reminds me that there is more to life
than my work.”

Periodically, the Robison Pool closes to the
community so Muslim women can swim with-
out breaking religious rules requiring them to
cover their bodies. At noon each Friday, 100 or
more Muslim students and local residents, wear-
ing everything from the loose-fitting traditional
garb to jeans, stream into the basement of the
Alumni Sports & Recreation Center for Jumush
services, signifying Sabbath. And five times
every day Muslims find space to pray—though
privacy is not always possible.

“While I’m praying people have whole con-
versations with me. They say ‘Rami, why aren’t
you talking?’” laughs Rami Santrisi ’06, former
president of the Muslim organization.

Surge in Spiritualism

It was not always this way at secular colleges
and universities. Once, students were expected to
study hard and meet their own religious and
spiritual needs.

“It used to be that your religious beliefs were
private—except for Mass on Sunday mornings,”
says Rick Hart ’70, director of the Union. “Now
we try to create an environment where they can
feel comfortable exploring their faith. I’ve rea-

ly seen interest grow in the last five years. These
students see the larger picture.”

During the 1960s and 1970s many young
Americans had traded in their parents’ prac-
tices for political activism or study of Eastern
philosophies, says Thomas Beaudoin, assistant
professor of Christian theology at Santa Clara
University. For the next few decades, he says,
talk of God was largely absent from the intel-
lectual discourse.

“In the 1950s you were required to partici-
pat in chapel worship and religious education
on campus, and then after that there wasn’t any
requirement and it gradually fell away,” says the
Rev. Beth Illingsworth, Rensselaer’s Protestant
chaplain. “I’m a Presbyterian. I went to Lafayette
College, a Presbyterian college, but you wouldn’t
have known it in the 1980s. We had a tradi-
tional worship service and nobody came.”

By the 21st century the dormant spiritual life
in higher education was waking up. A two-year
study published by the Association of Ameri-
can Colleges and Universities reported that
Evangelical groups, which had built their base
slowly, blossomed. For example, from 1995 to
2000, the study found, Campus Crusade for
Christ doubled to 39,000 members.

Just as significant, the report found there is a
renewed interest at non-denominational
school. In 1998, 800 people attended a con-
ference Wellesley College held on religious
diversity. By then, religious studies courses pro-
liferated, along with multi-faith chapels recog-
nizing the increasingly diverse student bodies.

(The Rensselaer Newman Foundation opened
its Chapel + Cultural Center in 1968 to pro-
vide worship space for Catholics. Today, stu-
dents of all faiths use the C+CC for quiet
reflection and cultural programs.)

Soon, presidential politics made “faith-based
initiatives” a buzzword. The debate on evolu-
tion vs. creationism was back. The Sept. 11,
2001, terrorist attacks found many Americans
seeking answers outside their day-to-day lives.

“There is also a growing trend of students who
say ‘I’m spiritual but not religious,’” says the Rev.
Wayne Clark, a Methodist minister and presi-
dent of the National Association of College and
University Chaplains. “At our national confer-
ence our conversation confirmed that, yes, there
is an increase in spirituality across the board.
It is a concept colleges need to address.”

Observers see a number of reasons for the
revival. Among them is the late 20th-century
emphasis on self-discovery. Students are often
aware of the ways in which family patterns and
problems have had an impact on their lives. And
their parents might be the very people who
shook things up in the 1960s and 1970s.

“This is a generation that is very used to deal-
ing with psychology and looking inward,” says the Rev.
Illingsworth. “What you end up with are a great many people who are interested in
spiritual questions. They approach Christiani-
ty in a very different way.” What’s more, they
are less apt to reject their parents’ advice.

Professor Beaudoin, who studies the inter-
play between secular and religious life, says that
baby boomers are generally friendlier and less
authoritarian toward their children than their
own parents were. “I see it all over the country.
Parents have tremendous access to their chil-
dren,” says Beaudoin. “There’s the technology—cell phones and e-mail bring them
constantly together. And, college is so expen-
sive. When parents pay $40,000 a year for col-
lege they have bought access.”

Students interviewed for this article consist-
tently referred to their mothers and fathers as
close friends they are in frequent touch with.
They say they were not anxious to abandon the
rituals they practiced at home.

“I guess I just expect a Muslim community
wherever I go,” says Muhammad Ihsan Mold
Nasir ’06, an information technology major who
is, like a growing number of Muslims on cam-
pus, American. He was born in Illinois and
raised both in the U.S. and in Malaysia.

When he came to Rensselaer, Nasir said he

MARK MCCARTY

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“The world is telling you that science and faith don’t go together, that God couldn’t have done all of that,” says Kristen Clark ’09, a member of Rensselaer’s Newman Catholic Fellowship. “Part of what is great about RPI is that you can learn that these things go together. Science can’t explain everything.”
Senior Boris Dvinsky ’06 knew that the Jewish community at Rensselaer was not large. But in Troy, he can walk to shul and spend long hours at the rabbi’s house for discussions over meals. “They had kosher food available here and a place to go on Shabbat,” he says. “I wanted a place where I’d feel accepted.”
simply took for granted that there would be a Muslim presence. While the number of Muslims has not risen substantially, they are more likely than in the past to be undergraduates and more integrated into campus life than Muslim students of even a decade ago. Nasir, who is active in the Muslim Student Association, said the school environment has always been welcoming. At the same time, the campus provides an environment in which the students feel free to question one another in their spiritual lives. It is not unusual, he said, to hear “what’s that on your head?”

Finding a Home at Rensselaer

Imam Djafer Sebkhaoui ’86, the Muslim chaplain, came to Rensselaer from Algeria as a graduate student in psychology. He remained in the region and eventually helped open Al-Hidayah, the first mosque in Troy. Imam Sebkhaoui, too, sees change in the composition of the Muslim community.

“In the 1980s more of the Muslims were foreign students. They probably did more among themselves,” he says. “Now they are much more apparent because they are undergraduates who grew up here, much like the rest of the groups. They interact easily with the rest of the school.”

Having friends and roommates of other faiths has proved to be an important part of the Rensselaer experience. “I knew I’d end up in a room with a person who never saw a Muslim person before,” says Ferheen Shaikh, who also reads about the Muslim group and met with members before coming to Rensselaer. “They are like my family,” she says.

Religious groups, like Rensselaer cultural organizations, bring together people of the same heritage. Muhammed Mohd Rafie Mohamad ’06, who is from Malaysia, is grateful for the support he gets on campus. More than once, he has experienced a less than welcoming reaction off campus. Recently, airport security took him into the security area. This is not unusual, he said, to hear, “what’s that on your head?”

Boris Dvinsky, a senior, doubts that the Saturday Commencement will disrupt worship for many people. Technically, as an Orthodox Jew he could attend without breaking Sabbath laws because Commencement is not a work commitment. But, regrettably, Dvinsky will probably not receive his diploma alongside his classmates, because he cannot attend without breaking Sabbath laws. While he is happy to consider religious groups, like Rensselaer cultural organizations, holding Commencement on Saturday was not intended as a slight, he could understand Rabbi Wineman’s reaction. The day was chosen to make travel more convenient for parents, but such decisions have other ramifications.

“I’m not surprised to hear that people are saying what they’re saying,” says Durgans, who has no role in scheduling Commencement. “The beauty of the diversity issue is the complexity. We have to find ways to work through it. Sometimes in that process you do the best you can, and it requires some give on the part of diversity.”

Joe Reynolds ’06, who has been a leader in the Rensselaer Christian Association, has occasionally felt uncomfortable around peers whom he fears will assume he is out to convert them. Even so, like many other students he also welcomes their questions.

“If I’m reading my Bible in public I’ve had someone ask, ‘Why do you read it at all the time? Can’t you read it once and know it?’” says Reynolds, a chemical engineering major. “I was able to explain that a lot of the Bible you can pull out and talk about in groups and individually. We should be able to talk about these things. We’re in college. We did not come here to be spoon-fed.”
As calls for energy independence increase, Rensselaer alumni explore innovative solutions.

THE FUTURE OF ENERGY

WITH RISING OIL AND GAS PRICES making front-page news and stretching the budgets of many Americans, and as evidence for global warming mounts, a national debate on the future of energy has been ignited in the United States, re-energizing the search for viable alternatives and “green” solutions.

In his State of the Union address at the end of January, President Bush called for cleaner, cheaper, and more reliable alternative energy sources, saying that “America is addicted to oil,” and that the best way to break this addiction is through technology.

Steve Percy ’68, former chairman and CEO of BP America, agrees.

“Coming up with new technologies will be key to the acceptability and access of new energy sources,” says Percy, who also served as the head of Phillips Petroleum’s Refining, Marketing and Transportation Company. “A lot of people would say that technology is part of the problem, and I would say that it’s got to be the solution. It’s about how we can continue to improve our living standards with less environmental impact.”

And, no energy source alone will be able to solve all our energy needs, Percy and other energy experts say. “There’s no silver bullet. We’re going to need help just about everywhere we can find it,” he says.

Percy is one of a number of Rensselaer alumni who have been at the forefront of energy innovation, developing and promoting new technologies and research, shaping policy, and establishing successful businesses in the renewable energy market.

At the same time, Rensselaer has re-energized its research commitment to energy security, hiring faculty and administrators who are visionaries at the top of their fields and establishing new centers and programs.

by Jodi Ackerman Frank
In the past 35 to 40 years, worldwide energy consumption has nearly doubled, driven by population growth, rising living standards, invention of energy-dependent technologies, and consumerism. Electricity use has nearly tripled. If these trends continue, global energy consumption will double again by mid-century.
Compounding the threat of global warming are the **RISING CONCERNS OF WORLD ENERGY SHORTAGES** fueled by growing demand, **AN INCREASINGLY VOLATILE POLITICAL WORLD**, the succession of hurricanes in the Gulf of Mexico in 2005 that knocked out oil production for months, and evidence of a global depletion of petroleum resources.

**A CHANGE IN THE WEATHER** It is 2010. The world is experiencing an increasingly volatile climate with disastrous consequences. While temperatures in Africa and Asia exceed 90 degrees for days at a time, blistering cold weather plagues much of Europe, North America, and Canada. Violent hurricanes are commonplace in Central America and the Caribbean. Drought persists in agricultural regions in Europe and in eastern North America.

The abrupt climate changes take their toll as famine, disease, and weather-related disasters destabilize the geopolitical environment, eventually leading to armed conflict over food, clean water, and energy supplies.

A far-fetched scenario? Perhaps. But Peter Schwartz ’68 points out that recent scientific findings on global warming and its effects on climate change suggest that the world could be on the cusp of such a cataclysmic event.

“There is an urgent need to make a huge change [in our energy strategy],” says Schwartz, an internationally renowned futurist and business strategist who formerly headed scenario planning at Royal Dutch/Shell Group.

Schwartz was co-author of the Pentagon-sponsored report released in late 2003 that posited this scenario. Built on the research of leading climate experts, the report revitalized the global warming debate in Congress.

“The findings raised the sense of urgency of the climate-change issue. Our research, sponsored by the Pew Center on Climate Change, concluded that the main leverage is in reducing fossil-fuel burning, especially coal,” Schwartz says.

Compounding the threat of global warming are the rising concerns of world energy shortages fueled by growing demand, an increasingly volatile political world, the succession of hurricanes in the Gulf of Mexico in 2005 that knocked out oil production for months, and evidence of a global depletion of petroleum resources. Some energy experts suggest that traditional oil production will reach its peak within the next two decades and then plummet in an irreversible decline.

“I think the [oil production] system is starting to show that there is going to be a resource crunch sometime in the next 15 or 20 years,” says Percy.

Economic prosperity depends upon energy. Power is essential to producing food and a variety of everyday products, and to running automobiles, mass transit systems, homes, industries, offices, hospitals, stores, and the many other building blocks of a vibrant economy. In general, fossil fuels—coal, oil, and natural gas—provide more than 85 percent of all the energy consumed in the United States, according to the Department of Energy (DOE). But oil is really the lifeblood of America’s economy, supplying more than 40 percent of the U.S. total energy demands and nearly 100 percent of fuel for transportation.

Still, Percy says we’re not in an oil crisis just yet. “Obviously, the world economies have been able to absorb the much higher prices and seem to be growing fine,” he says.

Percy also shares Schwartz’s sense of urgency in addressing global warming by cutting the use of fossil fuels, which release heat-trapping carbon dioxide and other pollutants. Percy, who co-chaired the Climate Change Task Force under President Bill Clinton’s Council on Sustainable Development, was an author in a recently published United Nations report on the state of the world’s ecosystems. The report, called the Millennium Ecosystem Assessment, involved nearly 1,500 scientists worldwide.

“It was really about assessing the state of the planet. The bottom line was that the global ecosystems are under tremendous pressure and as the world economy continues to expand—as we hope it does because there are so many impoverished people—that stress will grow and that stress is both a threat and an opportunity for business,” he says. “The threat is obviously of potential regulation or making it difficult to obtain raw materials. But on the other hand, those who have new technology to help solve some of these problems will have great opportunity.”

**THE POWER OF WIND** Although renewable energy sources are a tiny fraction of the world’s power supply, providing about 2 percent of the primary energy used, they are increasingly becoming an important solution to clean and affordable energy. Wind, in particular, has become the world’s fastest-growing power source, according to DOE. General Electric, which bought bankrupt Enron’s wind assets in 2002, expects to sell $8 billion worth of wind turbines in 2006 and 2007 globally.

“We’re sold out,” says Victor Abate ’86, vice president for renewables at GE. “We’re going to ship more than 2,100 wind turbines this year alone.”

Today’s highly efficient industrial-grade wind turbines are a far cry from the old-fashioned windmills that once pumped water for farms. Some farms use the big industrial-grade wind turbines that Abate talks about. Each turbine has a generator the size of a mobile home that sits on top of a tower, which typically reaches 240 feet high. The generator is driven by a set of three blades that spans 100 meters in diameter, the length of a football field. Built mostly on farmland, coastal areas, and in the ocean, each turbine produces from 1.5 megawatts up to 3.6 megawatts of energy, enough to power about 2,000 homes.

“The world wants this,” Abate says. “For every wind turbine you install, you offset natural gas, oil, and coal. There are no carbon emissions. Wind energy is clean.”

The global installed base for wind is expanding at a rate of about 17 percent a year, according to Abate, and rapid worldwide growth is projected to continue as more countries turn to wind.

In the U.S., some 28 states now have wind farms that feed electricity into the local grid. Many of these states have incorporated renewable portfolio standards (RPS), which require a certain amount of electricity to come from
Although renewable energy sources are a tiny fraction of the world’s power supply, providing about 2 percent of the primary energy used, they are increasingly becoming an important solution to clean and affordable energy. While coal usage has decreased marginally, consumption of every other major energy source has increased markedly.
“We look for the benefits of living on a day-to-day basis. We look for comfort, good health, physical security. We look for a stable society, and we want all that science and technology can give us. To do all that, society takes a risk. If you’re not a society that’s willing to stick its neck out and try new things, you’re not going to progress. Nuclear power represents a living example of that.” Chauncey Starr ’32
In general, fossil fuels—coal, oil, natural gas—provide more than 85 percent of all the energy consumed in the United States. But OIL IS REALLY THE LIFEblood OF AMERICA’S ECONOMY, supplying more than 40 percent of the U.S. total energy demands and NEARLY 100 PERCENT OF FUEL FOR TRANSPORTATION.

renewable sources. New York’s RPS calls for 24 percent of the state’s electricity to come from renewable sources by 2013. In Arizona, that figure is 15 percent by 2025, and in California it’s 20 percent by 2010.

“If you look at the RPSs in place today, they’re driving about 22 gigawatts of renewable investment over the next several years. Each gigawatt is about $1 billion worth of business,” says Abate. “That’s driving a lot of these wind farms, and a lot of investment in renewables in general.”

S OAK UP THE SUN Solar power also is sparking new hope as a reliable green energy source. This year, it is expected to be a $9 billion industry, according to Dan Shugar ’86.

Shugar has turned the sun’s rays into a commercially viable energy source, with his company, PowerLight, a designer, manufacturer, and installer of large-scale solar electric systems, based in Berkeley, Calif.

Shugar is a Californian whose day-to-day life is all about soaking up the rays. He drives an electric car, powered exclusively by the sun. When he gets to work, he’ll plug it into his company’s commercial building, which also is solar-powered.

“By midmorning, my car will be fully charged,” Shugar says on a recent morning as he made the 25-mile trip from home to work. “I have 46,000 miles on this car and I haven’t put a drop of gas in this thing. That’s cool, don’t you think?”

For the last five years, PowerLight has been ranked as one of the fastest-growing private corporations in the country by Inc. magazine. As a result, PowerLight recently was listed in the Inc. 500 Hall of Fame, a distinction shared with companies such as Microsoft and Oracle.

In 2004, Shugar’s company completed the world’s largest solar power system in Germany. Ground-mounted solar panels cover an area the size of 45 football fields, providing power to three nearby towns. PowerLight also specializes in installing solar panels on flat commercial rooftops. The company has expanded into the residential market, providing integrated solar solutions for homebuilders.

The cost to buy and install solar panels is a tenth of the price it was 25 years ago. And, with new thin films and other technologies, the panels provide twice as much energy as they did a decade ago, from 10 percent to 20 percent efficiency.

“That doesn’t sound like a lot, but let me give you some context. The gasoline in your car operates at only about 15 percent efficiency,” Shugar says.

At this point, solar generation doesn’t eliminate the need for the power utility and probably won’t be the top energy source to replace oil anytime soon, Shugar says.

But, it is sure to bring much-needed relief to the overworked electric grid to prevent rolling blackouts like those experienced in southern California during the warmest times of year when farmers are drawing extra power to irrigate their fields and utility customers are cranking air conditioners, constraining already-overloaded lines.

With its compatibility with the electric grid and its modularity—you can put a few panels on a rooftop or add thousands to service whole communities—solar power generation is an ideal source of distributed energy, which is essentially supplementing electricity to a main power district.

Solar panels can be placed alongside power line transformers, where the sun-generated energy can be fed into the grid. The electricity from the same panels on your roof can also supply power to the local grid.

Shugar has been a leader in promoting the concept of net metering, which allows customers to sell excess energy back to the utility company at retail value.

Shugar’s integral role in pushing net metering requirements in some states, including California, has spurred a boom in consumer investment in solar and other renewable energy sources.

A WASTE-FULL APPROACH Bio- mass—plant matter and byproducts including crops, wood waste, and animal manure—is another promising renewable energy source. The gasoline supplement ethanol, derived from corn, is probably the most familiar biofuel.

Many more biomass technologies are on the verge of being developed that turn everything from rice to aquatic plants into energy. One endless source of power that researchers have had their eye on is literally dumped down the toilet everyday.

Bruce Logan ’79, the Kappe Professor of Environmental Engineering at Penn State University, is leading a research team that has developed a microbial fuel cell that uses bacteria to break down organic matter in sewage to generate electricity. The process cleans up wastewater at the same time.

Logan is working to make the device commercially available within the next three to five years. The immediate application is to use the fuel cells in conjunction with wastewater treatment plants to offset the costs of running the facilities. But, wastewater alone will not solve the energy crisis, Logan says.

“It is hoped that, as these technologies evolve, they will become useful techniques for producing energy from a variety of organic matter sources,” he says.

Hydrogen, the most abundant element in the universe, also has its promoters as the next great energy revolution. But the gas must be extracted using other energy sources. Currently, hydrogen is commercially produced primarily from fossil fuels, a situation that will have to change, says Logan, for it to be a truly green and sustainable energy source.

Logan has found a way to use bacteria to extract hydrogen from wastes. The hydrogen can then be used in conventional fuel cells to make electricity.

By modifying the microbial fuel cells so that
ECO
ECONOMIC PROSPERITY depends upon energy. POWER IS ESSENTIAL to producing food and a variety of everyday products, and to running automobiles, mass transit systems, homes, industries, offices, hospitals, stores, and the many other BUILDING BLOCKS OF A VIBRANT ECONOMY.

deal with issues of nuclear waste," says Jackson, former chairman of the Nuclear Regulatory Commission. Some American companies are planning for this nuclear future. "Several U.S. utility companies already are identifying potential new plant sites and testing new federal licensing processes for advanced-design nuclear power plants. The industry anticipates building 12 to 15 new nuclear plants by 2015," she adds.

they do not use oxygen, his team has developed the first process that enables bacteria to coax four times as much hydrogen directly out of biomass than can be generated by fermentation alone. To allow the bacteria to extract the extra hydrogen, Logan assists the microorganisms with a power boost, which is a fraction of the voltage needed to electrolyze water in producing hydropower.

Logan has won a number of awards for his research. Recently, he was named a winner of the Popular Mechanics 2005 Breakthrough Award.

NC
NUCLEAR—A VIABLE OPTION With accidents at Three-Mile Island and Chernobyl a part of recent history, nuclear power remains controversial, but with global awareness of the dangers of fossil fuels, enthusiasm for nuclear fission as an abundant, emission-free power source is reviving.

"Around the world nuclear power has been steadily growing," says Chauncey Starr ’32, the Rensselaer Alumni Hall of Fame member who introduced the world to nuclear power for peaceful purposes. After working on the Manhattan Project, Starr founded the first nuclear power companies in the U.S., France, and Germany. In 1990, he received the National Medal of Technology from President George Bush for his contributions to nuclear power, including his seminal work in risk analysis.

Nuclear fission is the second largest source of electricity in the U.S., supplying about 20 percent of the nation’s electric use each year. In other countries, that number is much higher. For example, nuclear provides more than 75 percent of the electricity in France. In addition, China, Japan, and other countries are building new reactors.

In particular, there is renewed interest in “recycling” the spent fuel in which the recovered plutonium and uranium can be used to generate more energy. When fuel assemblies are removed from the reactor for the first time, this “spent fuel” contains over 95 percent of its original energy potential.

“When we talk about nuclear power being good for thousands of years, it’s because it takes very little of the original uranium to produce a huge amount of energy, if it’s recycled,” Starr says.

Over the years, accidents, waste storage, and concerns of weapon proliferation have kept nuclear power from playing a greater role. But, Starr notes, great strides have been made in developing more efficient reactor designs as well as improved regulations for both plant safety and to prevent weapons proliferation.

As far as where to dispose of the radioactive waste, Starr says storing it deep underground is a safe solution, adding that the amount of waste is a small fraction of what is produced by fossil fuels and that the radioactive activity eventually becomes negligible.

“If condensed into a pill, the ashes that would be left of the nuclear power it takes to service a single individual in his or her lifetime in our society would represent two aspirins. So, you’re dealing with an extremely small amount of waste,” he says.

Nuclear energy is one of the most viable options for clean energy, says Starr, who wrote a landmark paper in 1969 on how to weigh the risks and social benefits of various technologies.

“We look for the benefits of living on a day-to-day basis. We look for comfort, good health, physical security. We look for a stable society, and we want all that science and technology can give us,” he says. “To do all that, society takes a risk. If you’re not a society that’s willing to stick its neck out and try new things, you’re not going to progress. Nuclear power represents a living example of that.”

Rensselaer President Shirley Ann Jackson also believes nuclear power is having a resurgence. “This is being achieved through safer and more economical performance of nuclear power plants, and by technological innovations in new designs—which address safety and profitability concerns, and which are targeted to

CLEAN COAL Out of all the fossil fuels, coal can be the dirtiest. It also is the cheapest and the most plentiful. The U.S. alone has enough coal to last more than 200 years at today’s level of energy use, according to DOE.

"Those of us who can figure out how to burn coal with minimal pollution will be part of the ‘energy-environment economic’ solution,” says Robert Hanfling ’59, a clean-coal proponent and an energy policy expert who has served under three U.S. presidents.

The Brooklyn native remembers what it was like living in the midst of dirty and inefficient power plants 50 years ago. “You’ve heard the commercial, ‘ring around the collar?’ Well, when I was growing up in the ’40s and ’50s, if you wore a white shirt, by the time you came home you had ring around the collar,” Hanfling recalls.

“The incinerators and the furnaces in apartment buildings were burning coal or burning trash, and the soot was all over the place.”

Hanfling is much more optimistic about coal power these days. He heads KFx Inc., a company in Denver, Colo., that has developed a way to process coal into a cleaner, more energy efficient product called “K-Fuel.”

“It is the unleaded gasoline equivalent for the coal-fired industry,” Hanfling says.

The process uses temperature and pressure to reduce the water content of low-grade coal and lignite, thereby increasing the energy content in Powder River Basin coal by about 30 percent. In removing the water, Hanfling adds, the process also reduces the mercury content by 70 percent and upon combustion reduces sulfur and nitrogen oxide emissions by 30 percent.

The company plans to construct facilities with a total capacity of 50 million tons per year of K-Fuel product within the next five years.
Energy Initiatives at Rensselaer

In the past 35 to 40 years, worldwide energy consumption has nearly doubled, driven by population growth, rising living standards, invention of energy-dependent technologies, and consumerism. While coal usage has decreased marginally, consumption of every other major energy source has increased markedly. Electricity use has nearly tripled. If these trends continue, global energy consumption will double again by mid-century.

“As the global demand for energy increases, it is crucial that we develop alternative and renewable energy sources,” says Omkaram “Om” Nalamasu, vice president for research. “Rensselaer’s combination of research, education, and entrepreneurship provides novel opportunities to move new energy technologies from the lab to the market.” Here’s a look at what Rensselaer is doing:

Center for Future Energy Systems

This $20 million research center, in partnership with Cornell University and Brookhaven National Laboratory, seeks to meet the energy challenges of the 21st century by focusing on innovation in and commercialization of energy conservation and renewable energy systems.

Center for Fuel Cell and Hydrogen Research

Rensselaer’s Center for Fuel Cell and Hydrogen Research focuses on fuel cell development, hydrogen generation and storage, electrochemistry, solid state and polymer science, and the application of nano-materials in fuel cell and hydrogen research.

Fuel Cell Research Education

Rensselaer has initiated a $4.8 million novel interdisciplinary program to train doctoral students in fuel cell science and engineering. The program is supported by a $3.2 million, first-of-its-kind fuel cell research education grant from the National Science Foundation combined with a $1.6 million investment by Rensselaer.

Center for Power Electronics Systems

Established in August 1998, the Center for Power Electronics Systems is one of the nation’s relatively few National Science Foundation Engineering Research Centers. Its vision is to provide the nation with the capabilities to become a world leader in power electronics.

Future Chips Constellation

The Future Chips Constellation focuses on innovations in materials and devices, in solid-state and smart lighting, and will extend to applications such as sensing, communications, and biotechnology.

New York State Center for Polymer Synthesis

Researchers are designing new polymers that could revolutionize or create entirely new industries. The future implications of this research are limitless, from achieving plug-in power for fuel cells, to biomedical applications that could help diagnose and treat many diseases.

Lighting Research Center

Rensselaer’s Lighting Research Center (LRC) is the leading university-based research center devoted to lighting. The center programs cover a range of activities including both laboratory testing of lighting products and real-world demonstration and evaluation of lighting products and designs. The LRC conducts research into energy efficiency, new products and technologies, lighting design, and human factors issues.
Dressed in a cotton helmet, worn leather boots, and an oversized pair of goggles, John B. “Jack” Newkirk ’41 departed from the Rensselaer campus one hot summer day, headed on a trip across the country to see both the New York and the San Francisco World’s Fairs. He rode a worn and temperamental Harley-Davidson and carried no more than a few army blankets, a State Farm road atlas, and $45 in cash. Little did he know they were all the tools he’d need to start a family—and a Rensselaer-related—legacy.
The year was 1939. Early that spring semester, Jack, a 19-year-old sophomore metallurgical engineering student, bought a battered 1930 Harley VL Big Twin for $40 from Eustace Hetzel ’39, then president of the Rensselaer Student Union. With a decade’s worth of mileage, the bike required major attention before it would be ready for the open road. The Harley’s first stop: the Ricketts Laboratory.

The bike was in need of serious metal repair. When the welding was finished, Jack stuck a 4-inch decal of the RPI surveyor’s logo on the bike’s gas tank to show his appreciation for the use of Rensselaer’s welding tools (and to cover up a large dent that he couldn’t pound out). He called the bike the “Raspberry”—not for its red color, but for the sputtering sound it made when it ran.

Swerving up and down Burdett Avenue, Jack learned to ride the newly renovated Raspberry; as his confidence behind the handlebars grew, so too did his craving for the open road and wide horizons.

The possibility of seeing two World’s Fairs in one summer was just the adventure Jack had been looking for. To jump-start the economy after the Great Depression, President Franklin Roosevelt called for two World’s Fairs, one in Flushing Meadows, N.Y., and one on Treasure Island in San Francisco. Jack was convinced that the Raspberry was up to the task of taking him to both.

“I’ve often asked myself why I wanted to make that trip,” Jack says from his home in Evergreen, Colo. At 85, he’s energetic as he talks about the cross-country trip he took 67 years ago. “Just the lure of adventure for a 19-year-old with the two World’s Fairs as an excuse, I guess. It’s still a wonder to me that my Dad [Burt Newkirk, who was a professor of aeronautical engineering at Rensselaer] let me go.”

Leaving from the Rensselaer campus, Jack easily made it to “The World of Tomorrow” at the New York fair, where he saw a display of new-fangled inventions, including the world’s first microwave oven, computer, and photocopier. As crowds of fairgoers gathered to see President Roosevelt’s image being transmitted on the world’s first television, Jack was already heading for the Raspberry. The fair was exciting, but miles of open road lay before him. Pointing his bike west he waved goodbye to the World of Tomorrow.

Squeezing every penny out of the $45 his parents lent him for the trip, Jack bought 15-cent meals for himself and 50-cent meals for the Raspberry. At night he slept in fields or under trees. During the day he bathed in rivers and streams. As he made his way to San Francisco, he stopped and spoke with passersby who were always fascinated to hear stories of his excursion.

In mid-July he reached the Golden Gate Inter-national Exhibition and enjoyed just one day at the site in San Francisco, celebrating Treasure Island—the world’s first man-made island.

That summer Jack traveled 10,371 miles over the course of 51 days. The Raspberry, which shuddered violently while in operation, broke down every day of the trip but four. Even when the Raspberry was running, the bike leaked oil, bolts and wires loosened and fell out of the machine’s body, and the Raspberry shook nearly out of control at speeds higher than 43 miles per hour.

By September 1939 Jack was back in New York, and he returned to Rensselaer with a summer vacation story that couldn’t be matched.

“When I got back it was still summer and it didn’t register to me that I did anything out of the ordinary [by taking this trip], I was just happy to have made it back unharmed,” Jack says. “But when I got back to RPI, I was elated to tell people that I had pulled the trip off—I was full of stories, and boring people with the details of my trip.”

In 1941 Jack received a bachelor’s degree in metallurgical engineering. As America entered World War II, he placed close attention to the adventures of John “Scarsdale Jack” Newkirk ’36, a cousin who also attended Rensselaer.

Scarsdale Jack graduated from Rensselaer with an aeronautical engineering degree in 1936, and later resigned a Navy commission to serve as squadron leader for the American Volunteer Group’s “Flying Tigers.” When he was 28 his plane was gunned down during combat. The Jack Newkirk AAS branch of Rensselaer’s Air Force ROTC detachment is named in his honor.

Shortly after Scarsdale’s death, Jack Newkirk also joined the Navy. By that time motorcycles had become favorable means of transportation since resources like gasoline and rubber were scarce, and Jack was able to sell the irritable Raspberry for $125. Turning the profit into a plane ticket, Jack headed back to San Francisco where he reported for duty.

By 1946, after three years of service in the South Pacific, Jack was relieved of his military duties, and five years later he married his wife, Carolyn.

In 1965, Jack became chair of the physical metallurgy department at the University of Denver in Colorado. He and Carolyn raised four children in Colorado, and occasionally Jack shared stories of his cross-country trip with them.

Regardless of how many times he’d heard the stories, Jack’s second oldest son, John Newkirk ’83, found them entirely fascinating. Like his father, John also attended Rensselaer. In 1983, after receiving a degree in electrical,
computer, and systems engineering, he returned home to Colorado, founded a thriving computer systems engineering business, and started a family with his wife, Melissa.

The passing of one of his father’s fellow World War II veterans in 2004 sparked a realization in the younger Newkirk that his father, who was now 84, was growing older and would someday be gone.

John was eager to connect with his father as a friend and as a mentor. He decided there was only one way to get to do this: They would recreate the cross-country trip of 1939, riding together on a Harley.

Jack says he felt “flattered that [John] would take enough interest in what I did to want to recreate the trip. I was happy to ride on the back of his bike.”

Once his father agreed to the trip, John started a year of intense preparation for the trip, intending to make his journey as authentic as possible. He bought a 1939 State Farm road atlas he found on eBay and used it to map out a modern-day replica of Jack’s route.

Since a restored 1930 Harley VL was more expensive than a new motorcycle and would probably be unreliable, John purchased a 2003 100th Anniversary Edition black and silver Harley-Davidson Road King Classic motorcycle, which he dubbed the “Blackberry.”

He feared for his father’s safety riding solo for such a long distance, so the pair agreed that Jack would meet his son on the road and would ride on the back of John’s bike for a third of the trip.

On the morning of July 12, 2005, John departed for day one of the long-anticipated trip. Consistent with his father’s journey, John stayed on two-lane highways whenever possible—there was no interstate highway system when his father made the original trip—and kept his speed at 43 miles per hour, the point at which his father’s Raspberry became dangerously unsteady.

Arriving first in San Francisco, John found no trace of Treasure Island’s former glory. The site of the 1939 fair had little left to offer beyond a collection of military buildings from World War II. Following his dad’s route in reverse, he headed toward the heartland.

In August Jack met John in Montana and the two headed for Sturgis, S.D. Although he was crossing the territory for a second time, Jack found the land transformed and unrecognizable.

“I didn’t remember anything, really. Everything had changed,” says Jack. “The last time I went through [Sturgis] it was just a crossroads. There was a small bike rally happening but I drove right by unknowingly. This time there were nearly 600,000 bikers gathered in the city.”

Stopping at a Sturgis motorcycle museum, the pair stumbled upon a restored 1930 Harley VL—a bike identical to the one Jack rode in 1939. While John went to ask if he could take its picture, a crowd of bikers gathered around Jack, prodding him for details about his trip.

According to John his dad got “instant respect and was treated like royalty by all the bikers who crossed [their] path.”

After 1,200 miles together, Jack flew back to Colorado, leaving John to complete the remaining two-thirds of the trip on his own.

John arrived at the site of the 1939 World’s Fair in Flushing Meadows on Sept. 15. The place was desolate and dirty, and John was shocked at what he’d traveled so far to see.

“The place was abandoned,” John says. “Relics from the 1964 fair were rusted and overgrown; papers blew around in the wind. There were no people. There was only me.

“I felt a strong sense of sadness, wondering what happened to this place,” John says. “Was this the World of Tomorrow my father’s generation had been promised?”"}

John began to recall what he’d seen across the country.

“By this time Katrina had hit and all along my trip I saw folks helping fellow Americans. There was pride and patriotism evident from California to New York, and I saw extreme freedom. Suddenly my sadness turned to fierce pride and I felt great respect for my father’s generation who provided me with the freedom to take this trip.”

John is currently writing a book, titled The Old Man and the Harley, which recounts his father’s solo trip across the country in 1939, comparing it to his own journey during the summer of 2005. It is tentatively scheduled for release on June 18 (Father’s Day).

Nearly 70 years later, Jack’s trip across the country on a cantankerous motorcycle has become a lasting family legacy. John says he’s considering recreating the trip in 2039, 100 years after his father’s original journey, and hopes his two daughters will accompany him.

Inheritance is defined as a valued possession passed down in a family through succeeding generations. The Newkirk family inheritance is not a single possession any of them can hold in their hands. It’s an experience. It’s 10,371 miles.

Jack and John are returning to Rensselaer in June for Reunion 2006—this will be Jack’s 65th. No word yet on whether they’ll travel by motorcycle.


**Alumni Web Site Revamped**

**AFTER A YEAR-LONG COLLABORATION BETWEEN**
the Office of Alumni Relations and the marketing and communications committee of the Rensselaer Alumni Association (RAA), Rensselaer’s alumni Web site—www.alumni.rpi.edu—has debuted a new look. Visitors to the site will find that the ease of site navigation has been significantly improved, the content has been upgraded, and the look and feel now match the main Rensselaer site.

“Everything alumni would want to know about Rensselaer is here,” says Jeff Schanz, director of alumni relations. “The latest news about research and things happening on campus; quick links to everything from sports schedules to products and services; upcoming events; and lots of ways to connect with Rensselaer and with their fellow alumni are all found on this site.”

Members of the RAA committee, led by Nancy Schultz, EMBA ’98, provided direction on what would work best from an alumni perspective. Their straw model for the site was the foundation upon which the new structure was built.

“The success of this project was the result of collaboration between the members of the RAA and members of the Rensselaer staff,” says Schultz. “Together we were able to fine-tune messages, create a clear structure to deliver the messages, and provide a means for continuing input and improvement to the site.”

The result of this teamwork is a site with a cleaner look, more exciting graphics, and better organized and more useful content.

Visit the site at www.alumni.rpi.edu for information on career services, alumni news and events, Reunion and class information, volunteer involvement opportunities, and a link to the alumni Web community, @RPInet.rpi.edu. Exclusively for Rensselaer alumni, the site provides a searchable alumni database, online event registration, and E-mail for Life. Access that site by clicking on the icon at the top right-hand corner of the alumni page. Use the ID number printed on the mailing label of this issue of Rensselaer to sign in.

“We hope alumni who want to stay connected with their alma mater will make the new alumni site their home page,” says Schanz. If you have suggestions on how to improve the new site, contact the alumni office at alumni@rpi.edu or (518) 276-6205.

**DO YOU HAVE A SUCCESS STORY TO SHARE?** Write to alumni@rpi.edu and tell us about it!
APRIL
25 "Rensselaer on the Road," Detroit, Mich. Engineering Dean Alan Cramb will discuss highlights of the ongoing Renaissance at Rensselaer with Detroit-area alumni. The evening will include a cocktail and hors d’oeuvres reception and will end with dessert and networking. General Motors Heritage Center, Sterling Heights, Mich. Contact Susan Haight at haighs@rpi.edu or (518) 276-6042.

MAY
9 Boston Venture Forum. Whether you are an investor seeking new deals or an alum looking for business contacts, come to the World Trade Center West in Boston for an evening of networking and presentations from early-stage and emerging-growth companies from RPI’s Incubator Center. Visit arpinet.rpi.edu/events for details and to register.

10 “Rensselaer on the Road,” Atlanta, Ga. Lally School Dean David Gautschi will discuss highlights of the ongoing Renaissance at Rensselaer with Atlanta-area alumni. The evening will include a cocktail and hors d’oeuvres reception and will end with dessert and networking. The Buckhead Club, Atlanta, Ga. Contact Susan Haight at haighs@rpi.edu or (518) 276-6042.

19 ROTC Commissioning Ceremony. Contact (518) 276-8011.

JUNE
7 Solid-State Lighting Short Course. Alumni returning for Reunion are invited to enroll in this two-day course, taught by E. Fred Schubert, the Wellfleet Senior Constellation Professor, Future Chips, at Rensselaer. The course presents the history, operating principles, fabrication process, and applications of light-emitting diodes (LEDs) with particular emphasis on solid-state lighting applications. For overview, cost, and other details, contact Laurie Gillespie-Allen at gillel@rpi.edu or (518) 276-6431. www.rpi.edu/academics/summer

8 Reunion. For class years ending in 1 or 6, June 8-11. Come back to the Troy campus to see all that’s happening! www.alumni.rpi.edu/involved/reunion

JULY
13 Freshman Student Orientation. Incoming freshmen will have the opportunity to learn more about life at Rensselaer. www.fye.rpi.edu

AUGUST
20 Navigating Rensselaer & Beyond. Weeklong program for all first-year students, including freshmen, transfers, and graduate students, to help with the transition to Rensselaer. Additional activities include a welcome barbecue, Freshman Convocation, and offerings from clubs and departments across campus. www.fye.rpi.edu

OCTOBER
13 FallFest. It’s going to be a busy weekend on the Troy campus Oct. 13-15! Homecoming, Family Weekend, the RAA Board meeting, a Legacy reception, a gathering of music alumni, and the 75th anniversary of the Phi Iota Alpha fraternity are rolled into one exciting weekend. For more information, contact Peter Pedone at pedonp@rpi.edu or (518) 276-6061.

Alumni MusicFest. Former members of Rensselaer’s music groups are invited back for FallFest weekend. Contact Howard Henze ’69 at bchhenze@bellsouth.net or Peter Pedone at pedonp@rpi.edu with your name, class year, and the music group(s) you participated in. You will receive an invitation when details are finalized.

75th Anniversary of Phi Iota Alpha Fraternity. As part of FallFest weekend, Phi Iota Alpha will celebrate 75 years at Rensselaer. For details, contact Hansel Baez ’06 at baezh2@rpi.edu or Victor Marrero at marrev@rpi.edu. www.phiota.net
Over the last couple of years, I have had the opportunity to experience something that I am sure very few students do during their tenure here at RPI. No, I am not talking about staying up until 7 a.m. finishing The Poly; I am talking about doing research on the history of RPI in the archives room of the Folsom Library.

Now, I know that many people on this campus cringe at the thought of reading anything that could be described as “history,” but the archives offer a lot of fascinating material dating back to 1824 from many different areas of the Institute. There are old school publications, histories of student and faculty governments, planning documents and memos, histories of various clubs, and many other things extending back decades.

These materials show the evolution of the campus throughout the years—the changes that have been made or the things that have stayed the same. It can be pretty funny, too. I remember sitting and laughing at the documents from the mid-1980s predicting that due to out-of-control tuition hikes, the cost of a year’s education at RPI might actually top $14,000 by 2000. One of the most hilarious items I found was a line in a School of Architecture planning document from 1968 pointing out that “consistent student unhappiness” is one of the greatest traditions at RPI.

One of the major things I have learned in my trips to the archives is that for decades the Institute has been fond of generating master plans. The current Rensselaer Plan, for example, is reminiscent of George Low’s 1977 Rensselaer 2000, which had drawn inspiration from Benjamin Franklin Greene’s 1855 The Rensselaer Polytechnic Institute, and all reference Amos Eaton’s 1824 The Rensselaer Plan.

Consider these objectives: A larger faculty, more research money, more students from around the country and the world, better relationships with the City of Troy, new athletics facilities, and an emphasis on communications and the performing arts. What do all these have in common? Many would say that these are all parts of The Rensselaer Plan. Some would be surprised to learn, though, that this list of goals is taken from Rensselaer 2000.

Richard Folsom’s 1968 Goals for Rensselaer is yet another example. The plan called for more research, more humanities and “liberal learning,” more student life buildings for athletics and performing arts, more interdisciplinary programs, and more links with the community—goals echoed in The Rensselaer Plan. One of the essays used in planning the Goals calls for supporting “several areas which are not at all scientific or technological,” explaining that, “We have been an excellent engineering school, but we haven’t been a very good university.”

John Hawley ’70, in a 1968 editorial in The Poly, wrote that RPI required sudden, quick, and drastic change, some of these very changes, in order to succeed in the future. If it did not embrace these changes, he wrote, then we might as well rename the school to something more fitting: the Rensselaer University of Technology—good old RUT. This is something that could very well appear in the pages of The Poly today, as debate continues over the direction of the school under the new plan.

Almost all of this, and more, is open to anyone looking to read through it out of idle curiosity or for research purposes. One day while I was in the archives, a fraternity brother was trying to find out what had happened to some relic from his house that had disappeared in the mid-1980s. The archivists were able to help him track down some documentation on it within a few minutes. While he was not able to figure out exactly what had happened, he found a lot more information that he did not have when he walked in.

This is exactly like what my experience has been with the archives. The staff members are some of the most helpful people on campus, and they are really dedicated to helping you find the answers to whatever questions you have.

I often encourage my fellow students to find out more about the history of RPI through the resources available in the archives. In many cases, it’s the only opportunity they’ll have to learn more about this rich and, often, entertaining history—an opportunity not to be missed.

Alumni, professors emeriti, and others who have been associated with RPI’s history also can help to preserve as much information as possible. I have noticed that RPI has an extremely short institutional memory, but the Institute has one of the longest and most storied university histories in the country—or even the world. Efforts should be made toward educating the new generation, and re-educating the older ones, of the parts of our history that extend past the Alumni Hall of Fame or the display case in the Jonsson Engineering Center.

More displays—or even a real museum—on campus would bring this past alive. Alumni can also take the time to drop by their old clubs and departments to tell current students about their RPI experiences. If everyone tells a part of their stories, then the campus—and the students of tomorrow—will gain a lot.

Andrew Tibbetts ’06 is the news editor and the former editor-in-chief of The Polytechnic. He is a computer science, and computer and systems engineering major.
More than ever, the world needs leaders who know how to communicate, to seek answers beyond traditional academic boundaries, and to understand the social and ethical consequences of their work. Rensselaer rises to the challenge by providing a breadth of experiences that encompass everything from attractive housing to a rich mix of extracurricular and athletic opportunities.

▶ Experimental Media and Performing Arts Center—Scheduled to open in 2008, EMPAC sits at the nexus of the arts, science, technology, and culture, offering both students and faculty a broader, richer view of the world and its possibilities.

▶ Athletic Programs and Facilities—Rensselaer will upgrade playing fields and build new facilities, including a new gym, pool, and indoor track in the new East Campus Athletic Village. Our student athletes deserve the best arena in which to excel.

▶ Student Life Programs—In everything from recreation and residence halls to coffeehouses and clubs, Rensselaer is committed to student success by creating a culture where students interact in the larger university community.

Join us on this remarkable journey. Call (518) 276-2566 to visit the campus and see for yourself, or visit us online at rpi.edu/campaign to learn more about Renaissance at Rensselaer: The Campaign for Rensselaer Polytechnic Institute.
One university is fostering photonics research, LED breakthroughs, and "smart lighting" to change the way we light the world. Saving energy. Broadening our focus. Shining a bright light on discovery. At Rensselaer.