SUCCESS

BUILDING

FORMER CHAIRMAN OF THE BOARD SAMUEL HEFFNER JR. '56 HAS LEFT AN INDELIBLE IMPRESSION ON RENSSELAER
Students prepare final projects in the Greene Building, home to Rensselaer’s School of Architecture.
On Earth Day, the campus community broke ground for a green roof on the Rensselaer Union. See page 14.

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Moving? Update your address on AlumServ, e-mail us at alum.mag@rpi.edu, or write to: Rensselaer Magazine, Strategic Communications and External Relations, Rensselaer Polytechnic Institute, Troy, NY 12180 or fax to (518) 276-3715.
IBM's Watson Takes on Jeopardy!

For three nights in February, the Curtis R. Priem Experimental Media and Performing Arts Center was filled with hundreds of people who came to witness history as IBM’s Watson computer faced off against the two all-time Jeopardy! champions. The IBM project team was led by David Ferrucci ’94 and included a number of other alumni, who joined with Rensselaer experts to discuss the technology behind Watson each night after the screening.
As part of the First-Year Experience, students participated in a program at the Darrin Fresh Water Institute.

Friends and Relations

Face-to-face social networking is an area of intense interest and investment

Social networks are finding their way into the news, into the classroom, and even into the movie theater. Rensselaer takes online relationships seriously. In fact, we recently began work on the Center for Cognition, Communication, and Culture, which will take as its focus, interactivity through virtual and augmented reality, remote learning, gaming, blended identities, and aspects of online relationships. But face-to-face social networking—bringing together our talented people to share their knowledge and understanding of different disciplines, and to work together on new ideas—is also an area of intense interest and investment within Rensselaer.

As you stroll across our campus, you will find there are many spaces that are designed to bring together people who have different talents, skills, and interests in an ad hoc manner. Most notably the atrium of the Center for Biotechnology and Interdisciplinary Studies and the public spaces of Curtis R. Priem Experimental Media and Performing Arts Center (EMPAC) attract a variety of people from our community in a way that encourages conversations that I believe will become the bases for the next generation of world-shaping ideas. In fact, EMPAC’s performance and research spaces are designed—uniquely in the world—to enable immersive human-scale interaction in the joining of the virtual and real.

Students know their classes are apt to encourage them to work on teams that—because they deal with real-world problems—draw upon people with different capabilities, and forge unexpected and valuable new social networks.

The First-Year Experience is all about building a community by providing support through resident faculty, peer help, and organized activities. This year, our sophomores are seeing their relationships continue to build as they become our first class to engage in the Sophomore Year Experience—with 100 percent of the students either living on campus or in one of our signatory Greek houses. Our retention rates are already strong, but we believe this added commitment to supporting face-to-face community within Rensselaer will pay off for our students in myriad ways as they go through the years here—certainly academically, but, as well, because they can get the help they need, and they are appreciated within a caring community.

The friendships our students make and the relationships they nurture will stay with them long after they have graduated. But even more important—and this is a priority and a value with Rensselaer—are the friendships we build provide the mechanism to “change the world.”

The relationships we build provide the mechanism to “change the world.”

One of our alumni has been a great friend to Rensselaer. He has been essential to our transformation into a university that, as I said to alumni and alumnae in the most recent State of the Institute address, has been re-imagined for the 21st century: vibrant, engaged, relevant, and leading the way.

Of course, I am talking about Mr. Samuel F. Heffner Jr. ’56. Sam served on our Board of Trustees for 33 years and as its chairman for the past 15 years. In December, he retired, leaving a record of outstanding accomplishments in building, philanthropy, and leadership. He has been my unwavering partner, as I have worked to realize all the elements of The Rensselaer Plan. Sam is both a visionary and a down-to-earth, “roll-up-your-sleeves” pragmatist who is devoted to Rensselaer and its values. He also appreciates the importance of relationships in forging a future full of possibilities and promise.

Sam’s way is personal and direct, and you can see his style reflected in the culture of our university. A handshake, a pat on the back, and breaking bread together may seem old-fashioned in a world of texting, blogging, and tweeting, but interacting face-to-face is the oldest kind of social networking. It never has gone out of style, and, at Rensselaer, it is something that is part of our investment in the next generation of leaders.

We are grateful to Sam Heffner for his leadership, his steadfastness, and his style. We are fortunate to have had him as a trustee for over 30 years, and at the helm of the Board of Trustees for 15 years.
Going Green Continues After Graduation

I just wanted to commend you on the latest alumni magazine titled “Green at Rensselaer” (Winter 2010-11) and thought I would let you know what some of your alumni are up to.

Myself (’02), Keith Macchiaver-rna ’01, Chris Normandeau ’04, and now an RPI co-op, Russell Jones, are all part of the team at Omnibuild (www.omnibuildllc.com).

We are a construction management firm based out of NYC with an eye for sustainable construction. Myself, Keith, and Chris are all LEED APs; I have a Green MBA and am also a carbon reduction manager.

We’ve consulted on LEED projects and also built them. We couldn’t be happier with what RPI is doing on campus and with the message it is sharing with the world.

BASSAM TARAZI ’02
New York, N.Y.

I am thrilled that RPI has increased their commitment to sustainability. I earned my first master’s degree at RPI in the late 1990s, in environmental management and policy, as part of the Lally School. During my second year of study, I was fortunate to interview for—and be hired as—the school’s first Green Purchasing Coordinator; the position was funded through a grant written by Dr. Steven Breyma of the Department of Science and Technology Studies. Besides working with the purchasing department, I worked with the Recycling Coordinator and the Energy and Water Conservation Coordinator (all student-held positions at the time) to attempt to reduce RPI’s environmental impact without a notable increase in costs. My biggest accomplishment was increasing the amount of recycled paper bought and used on campus, from 3 percent (before I was hired) to 38 percent (when I graduated).

All of my degrees are in the environmental field, and I am currently in the middle of my pursuit of a doctorate in energy and environmental policy at the University of Delaware. I am proud to hear that RPI continues to lead the way.

ADAM SMARGON, M.S. ’99
Newark, Del.

Changing Times!

I was stunned…no, shocked! by the double-page photo at the beginning of the magazine (“Snapshot”). Let me explain…I can remember sitting in a physics lecture class with approximately 200 students. In this class, there was one female. (I often wondered how she felt).

As Bob Dylan sang, “The times, they are a-changing…”

KURT MEYERS ’55
Rockville, Md.

Civil Engineering Impact

Reading the last issue of Rensselaer (Winter 2010-11) I felt very proud of having studied there and gotten my degrees in civil engineering (’52 and ’54). As a foreign student, perhaps I absorbed more deeply the true meaning of civil engineering—seeing its use in the development of basic human needs. In my career, I have had the opportunity of participating not only in my native country (Colombia), but later on work all over the world.

Page 12 indicates that RPI ranks 41st among the nation’s top universities, thanks apparently now to the Rensselaer Plan initiated by President Shirley Ann Jackson in 1999. The plan involves “a strategic, comprehensive strategy to transform the Institute to achieve greater prominence in the 21st century as a top-tier world-class technological research university with global reach and global impact.”

Great! However, where is “civil engineering” now, for which RPI became “a university with global reach and impact”? I had to reach the last page to feel somewhat relieved, reading the essay by the dean of RPI’s School of Engineering, Dr. David V. Rosowsky, titled “We Are All Civil Engineers.”

“We are all citizens of our community, our society, and our planet,” Dr. Rosowsky wrote. “And we rely every day on advances made by civil engineers toward improving and sustaining our quality of life.”

That is the way I remember RPI. In addition, of course, to think based on what we have learned, added to our experience, instead of memorizing.

ANTONIO PÆZ-RESTREPO ’52
Boca Raton, Fla.

In the “One Last Thing” essay by Dr. Rosowsky, he states that “Ralph Peck ’34 is considered by many to be the founder of the field in soil mechanics, now known as geotechnical engineering.”

Anyone who believes this should keep a sharp eye out for bolts of lightning heading their way from wherever Karl Terzaghi resides these days.

Dr. Peck was an outstanding world-class engineer, who made many very important contributions to soil mechanics and geotechnical engineering, but he was not the founder or father of soil mechanics.

Dr. Karl Terzaghi was Dr. Peck’s mentor (and boss, early in his career) and is recognized as the “founder and/or father of soil mechanics.”

TOM BELLATTY ’51
West Caldwell, N.J.

Early Days of AI

It was nice to see the panel discussions involving RPI graduates of the 1980s and ’90s who were key members of the IBM Watson Jeopardy! Team (see page 2). But I am moved to point out that there was much earlier
involvement by at least a couple of other RPI alums.

In the early 1960s, computers were largely viewed as purely number-crunching machines; but a group at the fledgling MIT Artificial Intelligence Laboratory believed that those machines could also be made to “understand” symbols, concepts, and even natural language. If you ask the Watson team to identify the earliest research that demonstrated the feasibility of getting computers to respond in a meaningful way to English questions, I would expect them to cite the 1964 MIT Ph.D. theses by Daniel Bobrow ’57 on natural language question-answering, and by me (Bertram Raphael) on semantic knowledge representation. Danny and I were roommates at RPI for four years, and received our B.S. degrees in physics in 1957, before becoming fascinated by digital computers and the possibilities of artificial intelligence.

BERT RAPHAEL ’57
Los Altos Hills, Calif.

Life-Saving Research

Thank you so much for sending the copy of the alumni magazine. It was so great reading what Lou Shornick ’39 wrote about my dad, Howard Kastan ’39 (“Class Notes”).

It was also interesting reading about the research being done at Rensselaer’s Biotechnology Center to come up with a solution to defeat MRSA, “New Coating Safely Kills MRSA.” My daughter was seriously ill with MRSA last October after a C-section. She is fine now, and my baby grandson is fine, but there were a couple of very frightening days in the hospital wondering if she would overcome the infection. This research could save lives.

I took note of your overwhelmingly snowy winter. The kids from Hawaii attending Rensselaer must have been in shock. My husband, a pediatrician here in Hawaii, has had a few kids in his practice go on to attend college there.

BETH ANDERSON
Kailua, Hawaii

Recalling the War Years

The winter edition articles about the Curtiss-Wright Cadettes brought back a few memories (“Mail”). I was originally in the Class of ’45, an Aero. Yes, there were two women in the Class of ’46 that preceded the Cadettes; Sandy Cluett in architecture, of the Cluett shirt-making family, and Lois Graham in mechanical engineering, who was “Pop” Graham’s daughter.

I think Sandy’s nickname came from Sanford Cluett, Class of 1898, who invented a pre-shrinking process for shirt material named “Sanforize” after him.

Lois Graham’s activity in mechanical engineering was quite prominent and I think she became head of the ME Dept. at one of the big universities. “Pop” Graham was football coach before “Duke” Nelson and, among other things, taught a hygiene course that was required of all entering freshmen.

William Otis Hotchkiss was president and is rumored to have organized the Army Specialized Training Program as a temporary brigadier general. In the meantime, the Army was encouraging us to volunteer for the Enlisted Reserve Corps and they would let us finish before calling us up. A group of us signed up in the Rensselaer Union Building in October 1942.

The Army didn’t wait long enough but called us up in June 1943. Infantry basic training, two terms of ASTP before the program folded up, and then many of us ended up in the 103rd Infantry Division on a troop transport heading for Southern France. Talk about small worlds—the tug boat that pulled us into Marseilles was named the “Emma Willard” (September 1944).

We fought our way up the Rhone Valley into the Vosges Mountains. On a particularly rough day I remember helping to carry Frank Postiepak’s body down from a ridge. We earned Combat Infantryman’s Badges for that campaign and Frank a posthumous Purple Heart in lieu of a BAE. He was a good friend and fellow aero classmate.

On a happier note, I see in the same issue that RPI ranked 41st in the U.S. News & World Report “Best National Universities” and even better in two other categories.

John Petrus ’45
West Hartford, Conn.

I was a Curtiss-Wright Cadette (that company paid for our scholarships to RPI). My roommates and I, 10 of us, (you poor kids in suites!) lived in a room in Thompson House downtown, and climbed those (million?) steps every weekday and Saturdays to the school. There were five bunk beds in our room, and two desks, so we mostly studied with our books spread out on the floor. Our professors were good and treated us like we knew something, and some of us did, as several of the girls had bachelor’s degrees in mathematics. We had classes in electricity, metallurgy (interesting), aerodynamics, strength in materials (Timoshenko, my favorite subject), drafting (my worst subject), mathematics. On snow days a bus took us up to classes.

There were civilian and military male students. Some were officers in the Navy who had survived the bombing of the USS Arizona by the Japanese. My best friend, named Rosebud, was from Louisiana and I was from Virginia. I think we were the only Southerners.

I think of my time at RPI as a happy time because of the great campus life of study and fun, and a sad time because lurking in the back of my mind (and I think of others, too) was the constant awareness of war. Afterward I went to Duke University and got a B.S. in electrical engineering. This wonderful training prepared me for many technician-type jobs (I did not have to be a secretary) as at that time the engineering jobs were for the returning veterans. Later I became an editor, and rewritter, of engineering reports.

Muriel Williams ’43
Naples, Fla.

We’d love to hear from you! To provide space as many letters as possible, we often must edit them for length. Address correspondence to: Rensselaer Magazine, Strategic Communications and External Relations, Rensselaer Polytechnic Institute, Troy, NY 12180; e-mail to alum.mag@rpi.edu; or call (518) 276-6531.

According to The Polytechnic, President William Hotchkiss was an assistant director of the Army Special Corps and served as a brigadier general.
Student Nathaniel Quillin has friends in high places. Some of those friends helped pilot space shuttle Discovery when it was launched into orbit Feb. 23.

Quillin, a sophomore dual majoring in computer science and computer and systems engineering, spent two semesters and two summers at NASA’s Johnson Space Center (JSC) outside Houston. He is a member of the research team that developed the first human-like robot to be sent to space. The robot, called Robonaut 2, or R2, was launched into orbit aboard Discovery and has become a permanent resident of the International Space Station.

At JSC, Quillin wrote the computer code used to help debug R2’s hardware. Additionally, Quillin helped write code for the graphical user interface that NASA researchers use to control R2. This control software creates 3-D visualizations that allow researchers to see how R2 will carry out their commands, prior to sending the actual commands for the robot to execute.

“It’s pretty cool, and pretty scary, to know code that I wrote is going to be used in space,” says Quillin, a native of League City, Texas. “I can’t wait to see some actual video footage sent down from the space station, and see R2 installed and moving around in space.”

Quillin said he’s been able to directly apply many of the principles he’s learning in class, particularly Introduction to Engineering Analysis and memory management techniques from computer science courses, to his work on Robonaut 2.
New Robotics Lab Explores Human Thought

In a new Cognitive Robotics Lab, students at Rensselaer are exploring how human thought outwits brute force computing in the real world. The lab’s 20 programmable robots allow students to test the performance of computer models that mimic human thought.

“The real world has a lot of inconsistency that humans handle almost without noticing—for example, we walk on uneven terrain, we see in shifting light,” says Vladislav Daniel Veksler, who is currently teaching Cognitive Robotics. “With robots, we can see the problems humans face when navigating their environment.”

Cognitive Robotics marries the study of cognitive science—how the brain represents and transforms information—with the challenges of a physical environment. Advances in cognitive robotics transfer to artificial intelligence, which seeks to develop more efficient computer systems patterned on the versatility of human thought.

Bram Van Heuveln, clinical assistant professor of cognitive science, says cognitive scientists have developed a suite of elements—perception/action, planning, reasoning, memory, decision-making—that are believed to constitute human thought. When properly modeled and connected, those elements are capable of solving complex problems without the raw power required by precise mathematical computations.

“Suppose we wanted to build a robot to catch fly balls in an outfield. There are two approaches: one uses a lot of calculations—Newton’s law, mechanics, trigonometry, calculus—to get the robot to be in the right spot at the right time,” says Van Heuveln. “But that’s not the way humans do it. We just keep moving toward the ball. It’s a very simple solution that doesn’t involve a lot of computation but it gets the job done.”

The lab is equipped with five “Create” robots—essentially a Roomba robotic vacuum cleaner paired with a laptop; three hand-eye systems; one Chiara (which looks like a large metal crab); and 10 LEGO robots paired with the Sony Handy Board robotic controller.

A few unassuming drops of liquid locked in a very precise game of “follow the leader” could one day be found in mobile phone cameras, medical imaging equipment, implantable drug delivery devices, and even implantable eye lenses. Engineering researchers, led by Amir Hirsa, have developed liquid pistons from precisely controlled oscillating motion of two ferrofluid droplets.

The liquid pistons are highly tunable and scalable, and—because they lack any solid moving parts—suffer no wear and tear. The pulsating motion of the droplets, which are saturated with metal nanoparticles, can be used to pump small volumes of liquid, or function as a liquid lens.

“It is possible to make mechanical pumps that are small enough for use in lab-on-a-chip applications, but it’s a very complex, expensive proposition,” says Hirsa, professor of mechanical, aerospace, and nuclear engineering. “Our electromagnetic liquid pistons present a new strategy for tackling the challenge of microscale liquid pumping. We have also shown how these pistons are well-suited for chip-level, fast-acting adaptive liquid lenses.”

Hirsa’s team developed a liquid piston that is comprised of two ferrofluid droplets situated on a substrate about the size of a piece of chewing gum. The substrate has two holes in it, each hosting one of the droplets. The entire device is housed in a chamber filled with water.

Pulses from an electromagnet provoke one of the ferrofluid droplets, the driver, to vibrate back and forth. This vibration, in turn, prompts a combination of magnetic, capillary, and inertial forces that cause the second droplet to vibrate in an inverted pattern. The two droplets create a piston, resonating back and forth with great speed and a spring-like force.

In this way, the droplets become a liquid resonator, capable of moving the surrounding liquid back and forth from one chamber to another. Similarly, the liquid piston can also function as a pump. The shift in volume, as a droplet moves, can displace from the chamber an equal volume of the surrounding liquid. Hirsa says he can envision the liquid piston integrated into an implantable device that very accurately releases tiny timed doses of drugs into the body of a patient.

This study was supported with funding from the Defense Advanced Research Projects Agency.
CIVIL ENGINEERING

Rensselaer Named National Historic Civil Engineering Landmark

For launching the first civil engineering degree program in the United States 175 years ago, the American Society of Civil Engineers (ASCE) has named Rensselaer a National Historic Civil Engineering Landmark.

ASCE President Kathy Caldwell presented the award to President Shirley Ann Jackson during an event commemorating the 175th anniversary of civil engineering at the university. Since Rensselaer granted the nation’s first civil engineering degree in 1835, its civil engineering graduates have gone on to make global contributions to essential infrastructure, from the Brooklyn Bridge and Panama Canal to the railways of Japan and Latin America.

“We are tremendously proud of the civil engineering heritage at Rensselaer, the success of our many civil engineering graduates over the last 175 years, and their contributions to the history of our nation in building the strength, security, and mobility we enjoy today,” Jackson said. “The designation of Rensselaer as a National Historic Civil Engineering Landmark is an important validation of our civil engineering roots and culture of innovation, and it provides significant motivation for our students, faculty, and graduates to continue leaving their mark on the world.”

“We are tremendously proud of the civil engineering heritage at Rensselaer, the success of our many civil engineering graduates over the last 175 years, and their contributions to the history of our nation.”

For more than 40 years, ASCE has recognized civil engineering achievements that have played a unique role in the development of the United States and the world,” Caldwell said. “We are pleased to recognize the work Rensselaer Polytechnic Institute has done leading the way in developing civil engineering in this country.”

Caldwell presented a special plaque that reads: “Rensselaer was founded in 1824 by Stephen Van Rensselaer and Amos Eaton. In 1835, under President Eliphalet Nott, it was the first college in the United States to award the degree of Civil Engineer.”

The civil engineering festivities, which took place as part of Reunion and Homecoming weekend, looked back at the world-changing innovations of the Institute’s civil engineering graduates and faculty, and looked forward to the challenges awaiting today’s civil engineering students.

MECHANICAL ENGINEERING

Students Take First Place at Design Competition

For the second year in a row, a pair of students took first place at the annual Student Manufacturing Design Competition held by the American Society of Mechanical Engineers (ASME).

Mechanical engineering doctoral students Casey Hoffman and Jaron Kuppers won top honors in the national competition last month for their innovative Specialized Elastomeric Tooling (SET) process. The SET process offers a new method for curing advanced composites, which are highly customizable materials used in a range of critically important applications, from aircraft to windmill blades to biomedical devices. The new process is significantly less expensive and requires 500 to 1,000 times less energy than the conventional curing method used around the globe.

The competition, held in mid-October at the 2010 ASME International Manufacturing Science and Engineering Conference in Erie, Pa., was established in 1995 and is among the leading national manufacturing and design competitions for undergraduate and graduate students. Hoffman and Kuppers presented at the event, and were accompanied by faculty project sponsor Daniel Walczyk, associate professor in the Department of Mechanical, Aerospace, and Nuclear Engineering.

“It’s a large international conference, with students from many other top engineering programs entering the competition, so it’s really exciting to have won first place,” says Hoffman, who invented the SET process accompanied by faculty project sponsor Daniel Walczyk, associate professor in the Department of Mechanical, Aerospace, and Nuclear Engineering.

“If it’s a large international conference, with students from many other top engineering programs entering the competition, so it’s really exciting to have won first place,” says Hoffman, who invented the SET process and was also a finalist in the 2010 Lemelson-MIT Rensselaer Student Prize Competition.

The potential of advanced composites, despite their strength and versatility, is limited because the materials are difficult and expensive to produce. The patent-pending SET process put forth by Hoffman and Kuppers replaces the need for autoclaves—energy-intensive machines that cost hundreds of thousands of dollars—in composites manufacturing.

The process involves curing a composite laminate by pressing the material between heated, rubber-lined molds. Heating occurs quickly because the composite is in direct contact with the tool. The shape of the rubber mold half is derived computationally using 3-D computer modeling and simulations.

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CHEMICAL AND BIOLOGICAL ENGINEERING

Delivering Drugs to the Brain

Research into methods of delivering drugs to the brain has attracted the support of the Alzheimer’s Foundation. The research of Pankaj Karande, an assistant professor of chemical and biological engineering, promises novel means of treating some of the most complex brain illnesses, including Alzheimer’s disease, Parkinson’s disease, traumatic brain injury, and brain cancer. Karande’s research has already attracted the interest of the Goldhirsh Foundation and now has garnered an additional $80,000 in research funding from the Alzheimer’s Foundation.

Karande’s research seeks to open the natural and protective barriers that exist in the brain to allow the targeted delivery of drugs into the brain. Such drug delivery systems could limit side effects currently experienced by patients being treated for brain illness, increase the effectiveness of current drug treatments, lead to the development of new drugs, and even allow drugs that previously failed in clinical trials to be reconsidered with the new delivery methods.

“You can have the best and most promising of drugs, but if it doesn’t go where it is needed, then it won’t be effective,” Karande says. “There are a lot of new discoveries within the area of drug development, even related to treatment of Alzheimer’s. There is not a drug discovery problem; drug delivery is really the challenge.”

The problem in delivering drugs to the brain is that the brain is exceptionally good at barring entry to foreign substances. The main obstacle to entry is the so-called blood-brain barrier. Blood vessels within the brain are lined with “Velcro-like” cells that interlock tightly, allowing little to pass through to the brain.

Karande’s hypothesis is that the key to opening these pathways into the brain can be found within the natural world. He will use the new research funding to investigate how certain natural pathogens cross the blood-brain barrier.

Karande hopes to develop small molecules that act as “chemical wedges,” which “sit” on the Velcro junction points within the brain’s blood vessels to briefly prevent them from closing and gently allow drugs to move through the system.

COMPUTER SCIENCE

Rensselaer Grads Played Vital Role in Watson’s Success

For three nights in February, Rensselaer professors and scientists, and lead developers of the IBM Watson computer, joined an enthusiastic audience of students and visitors to watch as Watson faced off against the two all-time Jeopardy! champions on the large high-definition screen in the EMPAC Concert Hall.

Several of the scientists behind the development of Watson are Rensselaer graduates. David Ferrucci ’94, the IBM lead scientist on the project, earned his Ph.D. at Rensselaer. Chris Welty ’85 (who earned all three of his degrees at Rensselaer) is a member of the IBM Watson algorithms team and a former director of Rensselaer’s computer science laboratory. Welty participated in all three viewing events and shared behind-the-scenes stories with the audience. He was joined by Adam Lally ’98, another IBM software engineer on the Watson project.

All three events included panel discussions before the show aired, followed by Q&A. Welty and a number of Rensselaer experts discussed the Watson technology and its importance in the development of benefits ranging from medicine to science to computing.

Welty was a member of the IBM Watson team that was involved in “teaching” Watson language, including how to process and respond to it. They utilized ontologies—a common vocabulary of basic concepts and relationships among them, which is used by computer scientists to encode meanings in a language that computers can understand.

According to IBM, “Jeopardy! The IBM Challenge” poses a specific question with very real business implications: “Can a system be designed that applies advanced data management and analytics to natural language in order to uncover a single, reliable insight—in a fraction of a second?”

James Hendler, the senior constellation professor of the Tetherless World Research Constellation at Rensselaer, told the Associated Press: “A human working with Watson can get a better answer. Using what humans are good at and what Watson is good at, together we can build systems that solve problems that neither of us can solve alone.”

To learn more about IBM and Watson, and to view archived footage of the events, go to http://watson.rpi.edu.
Two Rensselaer alumni have become the ninth and 10th graduates to earn national medals. Steven Sasson ’72 and Marcian “Ted” Hoff Jr. ’58 were each selected to receive a National Medal of Technology and Innovation. According to an announcement from the White House and the Department of Commerce, they were honored for their accomplishments as follows:

“Steven Sasson for the invention of the digital camera, which has revolutionized the way images are captured, stored, and shared, thereby creating new opportunities for commerce, education, and improved worldwide communication. In 1974, Sasson was asked to investigate the imaging properties of charge-coupled devices (CCDs) to create an image sensor for a film-free camera. The result of Sasson’s work was a device that weighed 8.6 pounds and was the size of a small toaster. Today, digital cameras are all around us, many as close as our mobile phones. In 2008, 73 percent of Americans owned a digital camera and 34 million digital cameras were sold in the United States, generating $7 billion in revenue.”

“Marcian ‘Ted’ Hoff Jr., along with Stanley Mazor and Federico Faggin, for the conception, design, development, and application of the first microcomputer. The subsequent commercial acceptance of this universal building block enabled a multitude of novel digital electronic systems. For example, traffic lights controlled by microcomputers provide smart and inexpensive traffic flow. Microwave ovens, dishwashers, and countless small appliances and electronics contain microcomputers that control and provide a usable human interface. Today’s automobile uses several microcomputers to give us smart brakes, better engine ignition, and automatic systems for speed control and navigation (GPS).”

“The achievements of the men and women who are onstage today stand as a testament to the ingenuity, to their zeal for discovery, and to the willingness to give of themselves and to sacrifice in order to expand the reach of human understanding,” said President Barack Obama at the awards ceremony Nov. 18. “One of the most important ways in which we can restore science to its rightful place is by celebrating the contributions of men and women like all of you. Because that’s how we’ll excite a new generation to follow in your footsteps. That’s how we can spark the imagination of a young person who just might change the world.”
New App Allows Easy Access to Data

Government agencies around the world make billions of bits of raw data available to the public each day, but this data is often in difficult formats or so widely spread around the Web, it is virtually unusable to the public and to scientists who seek to use this valuable information in their research.

Computer scientists within the Tetherless World Research Constellation have developed an application to help solve the problem. A collaboration with scientific publisher Elsevier, the application uses the U.S. government data warehouse, Data.gov, to provide scientists with easy and direct access to government data sets relevant to their research.

The work is the latest example of the renowned Web Science research group’s efforts to enhance hundreds of thousands of raw government datasets available on the Data.gov website with advanced Semantic Web technology. Their work is bringing scientists and the public usable, relevant, searchable, and easily replicable datasets on topics from climate change to public safety to the federal deficit.

The new application, called US Government Dataset Search, lives on Elsevier’s SciVerse websites. SciVerse provides the global scientific research community with searchable access to the world’s largest source of peer-reviewed scientific content. Such access is a vital component of the modern scientific process as scientists develop new discoveries by building off the findings of previous peer-reviewed publications.

“There is a growing movement to make data and content more open and accessible on the Web,” says Senior Constellation Professor James Hendler. “Elsevier’s tool-based systems show a new way for publishers to join this movement without sacrificing copyrights. It should serve as a starting place to be emulated by others around the world.”

ENTREPRENEURSHIP

New Business Incubation Program Launched This Spring

Building on decades of successful efforts to nurture new businesses and bring ideas from classrooms and labs to the marketplace, Rensselaer has launched a distributed incubation program to help young businesses grow and succeed. The Emerging Ventures Ecosystem (EVE) will help to accelerate the growth of new businesses and boost the transfer of scientific and technological breakthroughs from the laboratory and classroom to the marketplace, for social and economic impact.

In this reshaped model, EVE will link Rensselaer’s institutional resources and alumni expertise with community strengths, in a multifaceted partnership that will benefit members of the campus and local community as they pursue their entrepreneurial dreams.

EVE builds on more than 30 years of the Institute’s previous incubator program, the nation’s first such program wholly sponsored and operated by a university. The new incubation program will utilize an innovative distributed incubation model, maintaining a central office in the Rice Building on River Street in Troy, and working with each company to find an ideal matchup of space to enterprise in Troy and the surrounding area. EVE will be overseen by Richard Frederick, an experienced entrepreneur and a faculty member in the Lally School of Management and Technology.

At the launch event in February, U.S. Congressman Paul Tonko said, “I congratulate Dr. Jackson and RPI as they announce the Emerging Ventures Ecosystem and I applaud these efforts that will launch new technology companies and create jobs in the Capital Region and beyond.”
COMPUTER-AIDED DESIGN AND ANALYSIS enables architects to generate limitless options for consideration. But the history of innovation in architecture—hampered by the need for painstaking calculations—has provided few guidelines for judging the relative merit of that bounty.

“With modern-day computation we can do thousands of design iterations, but we don’t necessarily know how to evaluate them,” says Lonn Combs, clinical associate professor of architecture.

Combs is the winner of the 2011 Rome Prize, awarded by the American Academy in Rome, a recognition that includes a fellowship to explore the architectural resources of Italy, Europe, and the Academy. The Rome Prize is awarded annually to approximately 30 individuals who represent the highest standard of excellence in the arts and humanities.

As part of his fellowship, Combs will study the work of Pier Luigi Nervi, a 20th-century Italian architect famed for his innovative application of reinforced concrete as the principal building material in fluid, nearly organic structures. Combs is interested in how the work of Nervi and his contemporaries might have varied had they had access to modern computing tools, and what lessons contemporary architects can learn from their choices.

“The work in general tended toward a kind of mathematical and physical perfection, a universal truth, and I think what the computer allows is for a much broader range of imperfection being considered as possibly valid.”

“It could be described like the story in architecture of symmetry versus asymmetry on some level, one being a representation of a universal truth and the other being symbolically cast aside as inadequate,” Combs says. “Once you have the ability to run through all of these options, one may be able to discover efficient options that would be better in certain applications.”

Combs is the co-founder of Easton + Combs, a New York City-based design firm. He received his post-professional degree at Columbia University and his first professional degree in architecture from the University of Kentucky. He joined Rensselaer in 2010.

Combs will begin his fellowship in January 2012, following a semester as professor in the School of Architecture Rome Program. The fellowship will run from January through August 2012. The results of his work will be part of a 2012 installation at the American Academy of Rome. Combs will be publishing his research and designs in the United States in the fall of 2012.
Making a Difference

Rensselaer Union Holds Green Roof “Groundmaking”

On Earth Day, the campus community came together for a “Green Roof Groundmaking” celebration at the Rensselaer Union. A green roof is a plant-based multipurpose roofing choice capable of rainwater filtration and collection, thermal energy improvements, cleaner and cooler ambient air, and general public enjoyment.

The Union’s green roof features a multicolor array of sedum plants, as well as sensors that will compare temperature between a standard roof and a green roof. A long-standing tradition at Rensselaer, the class gift symbolizes a type of philanthropy that exhibits pride, loyalty, and devotion to the Institute.

The idea to create a “green roof” on the Union bookstore has been germinating for some time on campus. The idea finally came to fruition when members of the Class of 2010 presented their class gift symbolizing a type of philanthropy that exhibits pride, loyalty, and devotion to the Institute.

“Three years ago, an RPI student came up with the idea for a green roof on the Union Bookstore,” says former Grand Marshal Benjamin Hunt, who has served as a champion for the project. “When the Student Sustainability Task Force partnered with the Class of 2010 to make this project a class gift, things really picked up. This is an inspiring partnership between students, alumni, faculty, staff, and parents, the Institute, and President Jackson.”

At the time of the “groundmaking,” 285 individuals had donated funds to support the project, surpassing its goal of $55,000. Within this group, 249 members of the class—representing 22 percent—donated to the project, a record participation level.

Following remarks, 100 student volunteers planted 18,000 green plant plugs.

“The green roof embodies, in a very tangible way, the sustainability movement that has taken root here at RPI in recent years,” says Laban Coblenz, chief of staff and associate vice president for policy and planning. “It will be a tool for education and research. It will be a centrally located ‘advertisement’ to attract new students to the various student eco-clubs. And because the green roof itself is a project conceived by students, led by students, and funded largely by voluntary contributions, it is truly a community effort.”

On Earth Day, student volunteers planted 18,000 green plant plugs made up of a multicolor array of sedum plants. The green roof is located on top of the Rensselaer Union bookstore.

Research Roundup

New Center for Modeling, Simulation and Imaging in Medicine

A new Center for Modeling, Simulation and Imaging in Medicine (CeMSIM) within the School of Engineering will develop advanced modeling, simulation, and imaging technology for health care. The center is directed by Suvranu De, associate professor in the Department of Mechanical, Aerospace, and Nuclear Engineering at Rensselaer, with a joint appointment in the Department of Biomedical Engineering. “With CeMSIM, we are leveraging the skills of a major technological university to make significant advancements in critical areas of health care that directly translate into benefits for patients,” De said. Center partners include Harvard Medical School and Tufts University.

New Center for Data Science Research

A new Data Science Research Center joins top researchers from throughout Rensselaer as well as corporate and academic collaborators in developing new and better ways to store, protect, share, and gain knowledge from scientific data. “The goal of this center is to attack difficult problems ranging from attacking a cancerous tumor to climate change,” said Bulent Yener, the center director and professor of computer science. “We live in a data-intensive world where advances in high-throughput computing and sensors allow us to collect amounts of data never thought possible every second. The center seeks to extract and preserve knowledge from this complex data.”

Rethinking Renewables: A New Approach to Energy Storage for Wind and Solar

Researchers are leading a new $2 million study to overcome a key bottleneck in the proliferation of large-scale wind and solar power generation. Funded by a $2 million grant from the U.S. National Science Foundation, the four-year study aims to develop novel ceramic materials for use in nanostructured capacitors, an alternative to batteries. The capacitors could be used to store energy generated by wind turbines and solar panels. With an extremely high power density and the ability to quickly charge and discharge, these nanoengineered capacitors could be a game-changer impacting a wide range of applications, from energy production to electronics to national defense.
A recent Research Scholar Grant from the American Cancer Society acknowledges the potential of researcher Lee Ligon’s work on breast cancer. Ligon is investigating interactions between cells as breast cancer spreads within the body.

“We’re trying to figure out how cancerous and non-cancerous cells communicate with each other, how they bind to each other, and what the consequences of those interactions are,” says Ligon, assistant professor of biology.

The Research Scholar Grant from the American Cancer Society, awarded to younger researchers, includes a four-year $720,000 award to support this research.

More than 90 percent of all cancers, Ligon said, originate in epithelial cells—cells that form barriers between the inside and outside of the body, like skin cells, or the cells that line the intestines, or milk ducts in the breasts. Because epithelial cells form a barrier between the inside and outside of the body, they must renew themselves more frequently than many other kinds of cells—like muscle or nerve cells. That presents more opportunity for abnormal cell division and cancer.

Most breast cancers originate in the epithelial cells that line milk ducts. In the early stages of the disease, the epithelial cells begin to grow abnormally, but are still confined within the lining of the milk ducts. At that point, the cancerous growth can still be excised with a surgeon’s knife.

But with continued growth, the cancerous cells break through the barrier between the lining and the surrounding tissue—the stroma—at which point they come into contact with a different type of cell called fibroblasts. Now the cancer is progressing into the body. Unchecked, it will reach the bloodstream, at which point it becomes far more difficult to treat.

Ligon studies cadherins, proteins that cause cells to adhere to one another, allowing cells to form organs and other structures. Different cadherins are expressed by different cells, each for its proper function, and it has been thought that only cells expressing the same cadherins would stick together.

But in her earlier research, Ligon found that different cancerous cells do adhere to one another, despite expressing different cadherins. “Everyone thought they wouldn’t stick together, but when we introduce mildly invasive cancerous epithelial cells to normal fibroblasts, a certain percentage stick together,” Ligon says.

The finding, and Ligon’s continued research into interactions between cancerous and non-cancerous cells, may offer insights on how to control the spread of cancer from its point of origin.
Several members of Rensselaer’s Phi Sigma Kappa fraternity are planning to move into a distinctive and historic new home. In March, the fraternity officially took ownership of the former St. Francis DeSales Church and Rectory on Congress Street in Troy. The fraternity, which currently consists of 19 student members and more than 600 alumni, finalized the purchase of the buildings from the Roman Catholic Diocese of Albany after the sale was approved by the City of Troy Zoning and Planning Boards last fall.

The buildings are owned and managed by the Phi Sigma Kappa Alumni Association of Troy, which is responsible for providing safe, affordable, quality housing to its student members. According to the association’s president, Paul Marano ’87, a few students planned to move into the buildings this spring to address any maintenance or security issues and help oversee modifications approved by the site plan that supports shared use of the church building with the community.

“We are very excited about the move,” says Justin Adibi, chapter president and a junior majoring in biomedical engineering. “We are looking forward to meeting our new neighbors and making positive contributions to the quality of life for all who live and work in the Congress Street/Mount Ida neighborhood.”

Once settled, the fraternity will attend local neighborhood association meetings as well as other local community group meetings as a way to develop a relationship with the community and their neighbors. “We are excited about the projects and programs we are planning for the neighborhood as well as working with groups who have an interest in using our community space,” says Jim Frosell, the fraternity’s student community relations chairman and a senior majoring in mechanical engineering.

“I am pleased to see a vacant building being reused for both student housing and the betterment of the surrounding community,” says Troy Councilman Ken Zalewski, who represents the area in which the church is located. “I am certain that Phi Sigma Kappa will make a positive impact on the neighborhood, and I look forward to working with fraternity leadership in order to keep them involved and active in the neighborhood.”

The fraternity is planning to have an open house, after the completion of their site plan renovations, sometime in the fall.

Engineers for the Rensselaer Solar Racing Team rolled out their innovative car, Photon, on March 30 on the ‘86 Field. The team took Photon to race against other all-electric student-built vehicles in the 2011 Shell Eco-Marathon.

In Texas, they raced the car as an all-electric vehicle, undergoing different endurance and performance tests. A key metric they were judged on is Photon’s km/kWh—kilometers per kilowatt hour, the all-electric vehicle equivalent of mpg or km/L for gas vehicles.

Photon was originally a novel kit car that the team converted into an all-electric vehicle. Following the Eco-Marathon competition, they’ll work to convert Photon into a solar-powered car. The goal is to race Photon as a solar vehicle in the North American Solar Challenge and the cross-Australia World Solar Challenge, and the team is in the process of raising funds to make that happen.
MATTHEW OEHLSCLAEGER, associate professor of mechanical, aerospace, and nuclear engineering, was honored by the White House with the Presidential Early Career Award for Scientists and Engineers (PECASE). The award is the highest honor bestowed by the United States government on science and engineering professionals in the early stages of their independent research careers. The PECASE award recognizes Oehlschlaeger’s U.S. Air Force-funded research on the combustion chemistry of aviation fuels.

FRANCINE BERMAN, the vice president for research, has been named a fellow of the Institute of Electrical and Electronics Engineers (IEEE). Widely recognized as a pioneer in the effort to build a stronger digital infrastructure in the United States, Berman has been named a technology leader by Newsweek and Business Week. In elevating her to a fellow, the IEEE cited her leadership in the areas of high-performance and grid computing.

JAMES JIAN-QIANG LU, associate professor of electrical, computer, and systems engineering, has been named a fellow of the Institute of Electrical and Electronics Engineers (IEEE). In elevating him to a fellow, the IEEE cited Lu’s contributions to three-dimensional integrated circuit technology. Lu is known as a pioneer and technical leader in 3-D computer chip integration, and has been working to design the processes and architecture that could one day be the platform for 3-D chips. Lu also has been recognized for his innovative research and technical achievements toward the design and realization of 3-D integrated computer chips with the William D. Ashman Achievement Award for 2010 from the International Microelectronics and Packaging Society.

DANIEL WALCZYK, associate professor of mechanical, aerospace, and nuclear engineering, has been named a fellow of the American Society of Mechanical Engineers (ASME). The ASME applauded Walczyk for his “significant contributions to the fields of rapid tooling, manufacturing processes, and biomedical device design.” Walczyk’s research focuses on the development of rapid tooling and manufacturing processes, and ranges from reducing the time it takes to manufacture membrane electrode assemblies used in fuel cells, to forming and curing of thermoset composite parts.

JOSE HOLGUÍN-VERAS, a transportation engineering expert, has been named the William Howard Hart Professor. A professor in the Department of Civil and Environmental Engineering, Holguín-Veras is also director of the Institute’s Center for Infrastructure, Transportation, and the Environment. Holguín-Veras is known as a global leader in the areas of freight demand modeling, transportation economics, and humanitarian logistics.

JONATHAN DORDICK, the Howard P. Isermann ’42 Professor of Chemical and Biological Engineering and director of the Center for Biotechnology and Interdisciplinary Studies, and LEONARD INTERRANTE, professor emeritus of chemistry, have been named 2010 fellows of the American Chemical Society (ACS). Both were recognized by the ACS for their “outstanding achievements in and contributions to the science, the profession, and service to the society.” Dordick’s research interests are in the areas of biocatalysis, bioengineering, and nanobiotechnology. Interrante’s research encompasses a wide range of subjects in materials chemistry.

CHRIS LETCHFORD, a global leader in wind engineering and aerodynamics, has joined Rensselaer as a professor and head of the Department of Civil and Environmental Engineering. Letchford joins Rensselaer from the University of Tasmania, Australia, where he served as professor and head of the School of Engineering. He also served as professor, senior associate dean, and associate director of the Wind Science and Engineering Research Center from 1999-2007 at Texas Tech University.

GEORGES BELFORT, who was named Institute Professor in February, has been recognized for his fundamental and applied research of separations processes in biochemical engineering with the 2011 Alan S. Michaels Award in the Recovery of Biological Products from the American Chemical Society Biotechnology Division.

LEE SHELDON has joined Rensselaer as associate professor and co-director of the Games & Simulation Research Constellation. Sheldon, a former Hollywood screenwriter and producer, has more than 200 credits in popular television to his name, including Star Trek: Next Generation, Charlie’s Angels, and Cagney & Lacey. Sheldon began designing video games in the 1970s and made the leap to the video game industry in 1995. To date, he has written and designed more than 20 commercial video games and massively multiplayer online games.

VINCENT MEUNIER, a computational physicist, has joined Rensselaer as the Gail and Jeffrey L. Kodosky ’70 Constellation Professor of Physics, Information Technology, and Entrepreneurship. Meunier’s research uses computation to examine the atomic-level detail of materials. Meunier, who joined the Institute in August, is the first to hold this constellation position at Rensselaer.

TAREK ABDOUN ’97, the Judith and Thomas Iovino ’73 Professor in Civil Engineering, has been named associate dean for research and graduate studies in the School of Engineering. Abdoun is known internationally for his work in geotechnical earthquake engineering. His primary research interests include centrifuge modeling, soil-structure interaction, soil remediation, field advanced sensing, and data visualization.

JOANNE SYLVIA LUCIANO has joined Rensselaer as research associate professor in the Tethered World Research Constellation. Luciano’s research uses computational modeling and the World Wide Web to improve health care and advance medical discovery. Luciano is an experienced technology consultant to major hospitals, and biotechnology and pharmaceutical companies. In addition to nearly 30 years as a consultant, Luciano held a joint appointment with Harvard Medical School and Massachusetts General Hospital for nine years, where she served as a lecturer and research scientist using computational modeling to study human disease.
As founder and principal of the Maryland-based Heffner & Weber Companies, Samuel F. Heffner Jr. ’56 is credited with jump-starting development around Baltimore/Washington International Airport and transforming the surrounding landscape. Over the past 46 years, Heffner & Weber has designed, developed, constructed, or renovated more than 10 million square feet of commercial space, including retail and entertainment complexes, office buildings, hotels, restaurants, industrial and manufacturing facilities, and “green” projects. Yet some of Heffner’s most towering achievements can be found more than 300 miles away, at a place where his firm has not built a single structure—his alma mater.

BY ELISA GALLARO

Heffner recently retired after 33 years on the Rensselaer Polytechnic Institute Board of Trustees, including 15 as chairman. He leaves behind a reinvigorated institution, home to leading-edge facilities, top-notch faculty and students, groundbreaking research, and a university president who has attracted worldwide attention for her development of, and accomplishments under, The Rensselaer Plan.

In fact, Heffner views the decision to hire President Shirley Ann Jackson as one of his singular successes as board chairman. He calls it “a stroke of genius,” matched only by the fact that “we kept her. Once people saw what she could do, she could have gone anywhere,” he says. “But she didn’t, and that’s a tribute to Rensselaer.” It’s also no coincidence that Heffner waited for Jackson to accept the board’s invitation to serve another 10 years before announcing his retirement. “Once she accepted,” he says, “I knew I’d done everything I could.”

The admiration is mutual. During a December 2010 tribute to Heffner, Jackson described him as a visionary, doer, reliable supporter, mentor, and friend. “From the beginning, I sensed that I had met a special person,” Jackson said. “And indeed I had. I have been privileged ever since to know and work with Sam.”

STUDENT, CADET, AND BROTHER

Heffner is the first to admit that today’s campus—with its Center for Biotechnology and Interdisciplinary Studies, Computational Center for Nanotechnology Innovations, Curtis R. Priem Experimental Media and Performing Arts Center, and East Campus Athletic Village—is a far cry from the one he knew as a Rensselaer student in the 1950s. Back then, his days revolved around classes, Air Force ROTC, and Delta Kappa Epsilon (DEKE), the fraternity where he would meet fellow trustee John Broadbent Jr. ’59.

Heffner came to Rensselaer from rural Bradford, Pa., with plans to major in aeronautical engineering. As a high school senior, he decided to apply to two schools: Massachusetts Institute of Technology (MIT) and Cornell University. His guidance counselor encouraged him to add a third, “a school I’d never heard of,” Heffner says. He was accepted and received scholarship offers from all three universities, including $100 from MIT and $200 from Cornell. Rensselaer offered $300, nearly half the $700 tuition, “and here I came,” Heffner says. After one semester as an aeronautical engineering major, he switched to architecture, a better fit for a young man who spent summers and spring breaks working in construction. During freshman year, Heffner lived on
“RENSSELAER GAVE ME A GREAT EDUCATION AND A SENSE OF CONFIDENCE—THE ABILITY TO MEET AND WORK WITH PEOPLE, KNOWING THAT I'D NEVER HAVE TO TAKE A BACKSEAT TO ANYONE, IN ANY SITUATION.”
A CALL TO RETURN

After graduating from Rensselaer’s five-year architecture program, Heffner fulfilled his ROTC commitment with a stint in Alaska. He then returned to civilian life, drawing on the skills he had learned at Rensselaer to co-found Dickinson-Heffner, the predecessor of today’s Heffner & Weber Companies. Although he was keenly aware of the connection between his Rensselaer education and his commercial success, Heffner was not actively involved with his alma mater. “I was focused on other things,” he says, including raising a family and building a business. Then, in 1974, he received a late-night phone call from a student asking Heffner to support Rensselaer’s annual campaign. “It was about 10 p.m. and I thought, ‘Any kid who’s willing to do this at 10 at night has got to be all right,’” Heffner says. “So I gave $100.” He made a similar gift the following year and, not long afterward, received an invitation to visit the campus. It would be the first of countless trips by a man who, during 33 years on the board, would not miss a single meeting. A skilled pilot, Heffner would literally chart and fly his own course back to Rensselaer.

By 1977 Heffner was on the board. A year later, he was asked by then-President George Low ’48 to chair a task force to study the feasibility of establishing a technology park on 1,200 acres that Rensselaer owned in nearby North Greenbush. Today the park is one of the oldest university-affiliated tech parks in the country. Even more important, it is an economic engine, home to more than 70 tenants and more than 2,400 employees. It also is one of Heffner’s proudest achievements at Rensselaer. But back in 1978, the proposal involved more than its share of risk.

“I can remember clearly that we were pursuing this effort in a sea of skepticism,” says Michael Wacholder, who served on the task force and has been director of the Tech Park since 1986. “What I’ve learned since then is that, with a good vision, hard work, and a talented team, you can accomplish anything.”

“I could cite story after story of Sam flying up here to attend a meeting, review projects, and talk strategy on how to approach and close deals. Here was this incredibly busy guy, building his own projects and consumed with his own business, yet unselfishly donating enormous amounts of time to us.”

MICHAEL WACHOLDER, DIRECTOR, RENSSELAER TECHNOLOGY PARK

the Quadrangle, in Hunt III. Sophomore and subsequent years, he lived in the DEKE house. Broadbent remembers coming to the house as a young pledge and meeting Heffner and the other fraternity brothers.

“The pledges had to memorize every brother’s name, where he was from, and what his major was, so I got to know a bit about Sam,” Broadbent says, recalling that Heffner was student commander of the Air Force ROTC and a senior board member of Rensselaer Engineer, a quarterly student publication. Heffner also served on the editorial staff of the student humor magazine, Bachelor, and on the Soiree Committee. “He was a committed student who, even back then, had shown his ability to be an effective leader,” Broadbent says. “Those were clear signs that he was going to have a very successful career.”

The two men lost touch for a while, but reconnected and cemented their friendship while serving on the Board of Trustees. Broadbent, co-founder of Arrow International, joined the board in 1995, the year Heffner was elected chairman. At the December 2010 tribute, Broadbent and fellow DEKE Peter Goetz ’56 informed Heffner that his fraternity brothers had made substantial contributions to the Samuel F. Heffner Jr. Endowed Scholarship, which has been established in his honor. Later, Broadbent spoke of Heffner’s leadership and extraordinary dedication to Rensselaer.

“There are so many things we could point to,” Broadbent says, “but the relationship he had with Dr. Jackson—and the effectiveness of that relationship—is really Sam’s most important legacy at Rensselaer.

“Look at what’s happened here,” he adds. “So much of what Dr. Jackson has been able to accomplish has been because of the strength of the relationship she had with Sam. Their legacies are connected.”
Fundraiser and Philanthropist

Heffner’s energy, generosity, and appreciation for Rensselaer made him an ideal choice to play a key role in major fundraising efforts. “My Rensselaer degree made me what I am,” he says. “Rensselaer gave me a great education and a sense of confidence—the ability to meet and work with people, knowing that I’d never have to take a backseat to anyone, in any situation.” Heffner was convinced that other alumni felt the same way; it was just a matter of asking them for support. In 1978, along with Charles Rybolt ’34, Heffner co-chaired a campaign to raise what was considered “real money at the time.” The two men crisscrossed the country, meeting with alumni and asking their help in reaching the $38 million campaign goal. By 1981, when the campaign ended, they had raised $52 million.

The more Heffner met with alumni, the more he realized they needed a stronger connection to their alma mater. Other universities had alumni houses; why not Rensselaer? He envisioned a building where generations of alumni and alumnae could gather, network among themselves and with Rensselaer students, and become more involved with the Institute. Heffner called together a carefully selected group of alumni to conceive, design, construct, and help finance the $3.2 million building. To boost the fundraising effort, Heffner made a sizable leadership gift. Construction began in March 1988. The award-winning Samuel F. Heffner Jr. ’56 Alumni House opened 14 months later, on May 18, 1989. In September of that year, Heffner’s fundraising abilities were tapped again, this time by then-President Roland Schmitt, who asked Heffner to chair the $200 million New Century Campaign. The Institute’s most ambitious effort to date, the campaign ended in 1993 after raising $207 million from more than 32,000 alumni and alumnae, corporations, foundations, and other friends of Rensselaer.

FROM THE BEGINNING, I SENSED THAT I HAD MET A SPECIAL PERSON. AND INDEED I HAD. I HAVE BEEN PRIVILEGED EVER SINCE TO KNOW AND WORK WITH SAM.” PRESIDENT SHIRLEY ANN JACKSON
HEFFNER LEAVES BEHIND A REINVIGORATED INSTITUTION, HOME TO LEADING-EDGE FACILITIES, TOP-NOTCH FACULTY AND STUDENTS, AND GROUNDBREAKING RESEARCH PERFORMED IN SUCH VENUES AS THE PIONEERING CENTER FOR BIOTECHNOLOGY AND INTERDISCIPLINARY STUDIES.
Despite this success, the 1990s were not kind to Rensselaer. It was the start of the Internet age, and the nation’s oldest technological university should have been at the forefront. Instead, Rensselaer seemed content to mark time, enabling others to surge ahead. Elsewhere, research funding was booming; at Rensselaer, grants remained stagnant. The once-proud institution was losing its way—and its standing as a hub of innovation.

Heffner was elected chairman in 1995, at the height of these challenges. Three years later, when the Institute was in search of a new president, Heffner seized the opportunity to change course. “Sam charged the search committee and consultants to find a candidate who would take RPI to a new plateau,” Haviland says. “When Shirley Jackson came in, it was obvious right from the beginning that she would set our sights on the top and set a pace that would take us there; that she would demand an enormous amount from the campus, from the alumni, and from the board.”

That’s exactly what happened.

Jackson’s first step was to develop The Rensselaer Plan, an ambitious, comprehensive plan to position the Institute as a top-tier world-class technological research university, with global reach and global impact. The plan was approved in May 2000, and since then, under Jackson’s leadership, Rensselaer has undergone a renaissance. The Institute has invested approximately $700 million in new and renovated facilities, including the pioneering Center for Biotechnology and Interdisciplinary Studies, Computational Center for Nanotechnology Innovations, and the Curtis R. Priem Experimental Media and Performing Arts Center. Annual research awards have more than doubled, and Rensselaer researchers are leading the way in fields including energy and the environment, biotechnology and the life sciences, experimental media and the arts, nanotechnology and advanced materials, and computation and information technologies. Rensselaer’s ranking among national universities has improved to No. 41; many graduate programs also are nationally ranked. Undergraduate applications are up more than 160 percent, and the caliber of applicants has never been better. Alumni support has increased dramatically, a key factor in the success of the Institute’s record-setting successful $1.4 billion capital campaign.

Change of this magnitude is often accompanied by challenges and, even, detractors, but Heffner and Jackson stood firm. Jackson spoke of frequent 5:30 a.m. phone calls between the two. “He supported me in the toughest decisions I made,” she says, “by explaining those decisions to the trustees and garnering their support.”

Heffner’s contributions have earned him numerous accolades, including the Rensselaer Alumni Association Fellows Award and the Distinguished Service Award. The Samuel F. Heffner Patroon Scholarships are named in his honor, as is the new Samuel F. Heffner Jr. Endowed Scholarship. He also has been awarded the Alis Aquilae medal. Translated as “on the wings of eagles,” the medal recognizes donors who gave $1 million or more to the Institute’s $1.4 billion capital campaign. During the December tribute, Heffner was named Honorary Trustee and Honorary Chairman and was presented with a special trustee medallion. At this year’s Commencement, he was awarded an honorary doctorate in humane letters. “Very few alumni in the history of the Institute have given back as much, and in as many ways, as Sam has,” says Arthur Gajarsa ’62, circuit judge, U.S. Court of Appeals for the Federal Circuit; Rensselaer Board Chairman.

“VERY FEW ALUMNI IN THE HISTORY OF THE INSTITUTE HAVE GIVEN BACK AS MUCH, AND IN AS MANY WAYS, AS SAM HAS.”

ARTHUR GAJARSA ’62, CIRCUIT JUDGE, U.S. COURT OF APPEALS FOR THE FEDERAL CIRCUIT; RENSSELAER BOARD CHAIRMAN
PLOTTING THE JOURNEY TO
HOW DID WE GET HERE? ARE WE ALONE?

Scientists around the world are coming together under the umbrella of astrobiology to answer these most basic questions of existence. From cosmic dust in space to the rusty soils of Mars to the venerable laboratories of Rensselaer, clues about our origins are coming together at an amazing pace.

Leading the search are researchers within the New York Center for Astrobiology, based within the School of Science at Rensselaer. This interdisciplinary center, which is a member of the NASA Astrobiology Institute (NAI), brings together researchers from multiple fields of study at Rensselaer as well as collaborators from other institutions around the country. With almost $7 million in NASA funding, it is among the premier astrobiology groups in the world.

By Gabrielle Demarco
“THERE ARE MULTIPLE COLLABORATIONS WITHIN THE CENTER AND ACROSS DISCIPLINES THAT ALLOW US TO MAKE PROGRESS IN OUR RESEARCH THAT WOULD NOT OCCUR IF WE WERE WORKING INDEPENDENTLY.”

– DOUGLAS WHITTET, NEW YORK CENTER FOR ASTROBIOLOGY DIRECTOR

(l-r) Linda McGown, Prakash Joshi, Michael Aldersley, Douglas Whittet, Glenn Ciolek, Bruce Watson, James Ferris, and Wayne Roberge
are trying to follow the path of increasing chemical complexity all the way from very basic, simple molecules that occur in space, through the formation of our solar system to early Earth," says center director Douglas Whittet, professor of physics. "Once we understand the history of our own solar system, we can begin to evaluate how common those processes are. To show that the processes that led to life here could happen anywhere in the right conditions would give us a strong hint that life is common in the universe."

In addition to its leading role in astrobiology research, the center is also fostering the next generation of astrobiology pioneers, from middle school students through doctoral candidates. Together, students and faculty within the center are seeking to understand the origins of life on Earth and clues for life in the chaotic reaches of space.

From Interstellar Space to Our Solar System

Research within the center begins with studies of interstellar clouds, the birth sites of future solar systems. We cannot turn back the clock to observe our own solar system's birth, but we can look beyond our cosmic neighborhood to identify analogs—embryonic planetary systems similar to our own as it may have been at the time of its birth.

Whittet and postdoctoral researcher David Horne use spectroscopic data from NASA missions such as the Spitzer Space Telescope to hunt for the simplest molecular ingredients for life in deep space. The goal is to understand the development of the organic compounds required for life from the most basic building blocks.

"The interstellar medium is very rich in the elements hydrogen, carbon, oxygen and nitrogen—the key components of organic molecules," Whittet says. "But you need to follow the chemistry to determine whether it leads to prebiotic molecules or to other, less interesting products. It is at those interesting chemical branching points that we focus our search."

When carbon reacts with oxygen, the relatively inert carbon dioxide may be formed. This rigid molecule is basically a chemical endgame in the low temperatures of space, but when carbon and oxygen react with hydrogen, more complex compounds of greater relevance to biology are synthesized. What Whittet has found is that this interesting chemistry is most abundant in the vicinity of a young star.

“When we look in the vicinity of an interstellar cloud that might form a star in the future, but is currently cold, we find carbon dioxide in abundance,” Whittet says. “But we find far more interesting products, such as methyl alcohol, formaldehyde, and formic acid, in the vicinity of a star that has just been born.” The findings provide important evidence on how the earliest chemistry that leads to life got its kick start. “The implication is that the energy from the star drives chemical reactions that create complex molecules required for life,” Whittet says.

And not just any star will do. Whittet’s research is showing that stars more luminous than our Sun are ideal. “It is looking increasingly likely that our solar system formed, not in isolation, but surrounded by other stars, and they may have played a vital role in driving the chemistry toward life,” Whittet says.

Whittet’s colleague and center member Wayne Roberge, professor of physics, picks up on the journey to life where Whittet leaves off—4.6 billion years ago during the formation of our planetary system.

Roberge and co-researcher Glenn Ciolek seek to determine what happens to materials during the chaotic conditions that build a new solar system around a young star. They find evidence that preplanetary materials, including the prebiotic molecules seen by Whittet, were subjected to intense heat that modified their structure and composition before they were incorporated into or delivered to Earth. Roberge’s research strongly supports the theory that shock waves are the source of the heat that modified much of this interstellar material.

On Earth, shock waves are commonly associated with supersonic aircraft and explosions. In space, shock waves occur during the birth of a star. Roberge uses supercomputer simulations and mathematical analysis to model shock waves in the early solar system. To test his theories, Roberge looks for evidence of
modification by shock waves on asteroids. Trapped between Mars and Jupiter by Jupiter's strong gravitational field, the asteroids are the shattered remnants of the planet-building process. “Asteroids provide a glimpse at the building blocks for planets,” he says.

Another lead that Roberge is investigating builds on the work of fellow center member Michael Gaffey of the University of North Dakota.

Gaffey uses spectral analysis to determine what minerals are present on asteroids. His work reveals that these frigid rocky bodies once contained liquid water. And, astonishingly, when fragments of these asteroids, what we know as meteorites, reach Earth some are found to contain amino acids—molecules essential for the development of life and its proteins. His analyses also show that some of these asteroids were heated to thousands of degrees, while some were not heated at all.

This heating could have had a positive or negative effect, depending on the temperatures reached: moderate heating can drive the production of liquid water and amino acids, excessive heat can destroy them. Roberge is investigating a theory that he calls “a crazy idea” to explain and measure the heating of asteroids.

Roberge’s theory is that magnetic fields, which are known to pervade space, provided the energy required to heat the asteroids. “We now know that the early solar system had strong magnetic fields. If we can prove that they were heating the asteroids, we can then begin to simulate important events on these bodies. We would know not only how they were heated but also for how long and to what temperature. We could pinpoint when conditions were favorable for liquid water and amino acids to be made,” Roberge says.

The implications of these discoveries are immense. If researchers can determine the composition of interplanetary matter in the early solar system, they can predict whether material delivered to the prebiotic Earth from space included vital resources for life. The goal is a complete inventory of ingredients available on Earth at the time of life’s origin.

Setting the Stage for Life on Earth

The next piece of the puzzle is to understand what occurred on the early Earth that jump-started the development of life from the raw materials found on our young planet. Research within the center investigates how the available ingredients, whether indigenous to Earth or delivered from space, may have combined into more complex organic molecules on Earth.

Understanding what occurred here on Earth eons ago has broad implications for understanding what may have occurred on the multitude of exoplanets that are being discovered each year, according to Bruce Watson, Institute Professor of Science.

“There is no reason to think that Earth is unique,” Watson says. “In fact, the more work that is done, the more improbable it becomes that Earth is alone in sustaining life. By looking back at the beginnings of life on our planet, we can also understand what may have occurred on other planets early in their existence.”

One aspect of Watson’s research is to understand how plentiful the materials required for life were on Earth at its formation and how much of it may have been delivered from elsewhere. In this research, he works closely with Associate Director of the Center and University at Albany Professor John Delano, as well as Suzanne Baldwin of Syracuse University and Tim Swindle of the University of Arizona.

Important evidence for the influx of material to Earth is actually found not on the Earth itself but on the Moon. The researchers are reconstructing the history of impact events on the Moon as a proxy for what also occurred on the Earth. Unlike the ever-shifting and rebuilding surface of Earth, which is constantly being destroyed and renewed by the forces of erosion and subduction, the Moon preserves the history of craters formed by ancient impacts. Without an atmosphere to produce weather or a subterranean system of lava flows and moving plates like those found on Earth, the surface of the Moon keeps a near-permanent record of impacts on its surface. The research provides much-needed constraints on the possibility of “impact frustration” of life, and also on possible influxes of potential ingredients for life such as the meteoritic amino acids.

Watson is also investigating the environment that existed on the early Earth. Combined with results from other labs, his findings provide surprising evidence for conditions favorable to life—oceans, continents, and relatively cool surface temperatures—very early in the planet’s history.

Watson uses geochemistry to reconstruct the atmosphere and environment of early Earth. To accomplish this, he uses information stored in the chemical memories of ancient minerals. In particular, he focuses his research on the oldest known material on Earth, zircon (ZrSiO₄) crystals from the Jack Hills of Western Australia. Some of these seemingly inconsequential but resilient little crystals, generally no larger than the width of 2 or 3 human hairs, are more than 4 billion years old.

“Zircons have witnessed virtually all of Earth’s history,” he says. “They were here for the start of life. We need to be clever enough to get them to tell that story.”
“THERE IS NO REASON TO THINK THAT EARTH IS UNIQUE,” WATSON SAYS. “IN FACT, THE MORE WORK THAT IS DONE, THE MORE IMPROBABLE IT BECOMES THAT EARTH IS ALONE IN SUSTAINING LIFE.”
Watson has developed a way to estimate the temperature at which ancient zircons formed by measuring the concentration of titanium contained as an impurity in the crystal structure. His work shows that the zircons formed at temperatures consistent with those of rocks forming in the presence of free water. His discovery provides important evidence for the existence of liquid water on Earth very soon after its formation. This is in contrast to the once widely held belief that the Earth at that early time in its history was a boiling cauldron of noxious gases and sputtering volcanoes. Thanks in large part to Watson and researchers elsewhere working on ancient zircons, the early Earth is now believed to have been a much more hospitable place for the development of life.

Watson and postdocs Nick Tailby and Dustin Trail are now developing additional tools to further study these ancient rocks. One such tool could help determine the composition of volcanic gases being added to Earth’s early atmosphere. This knowledge may help to determine both the nature of the chemistry that could have occurred and the types of primitive organisms that could have existed on early Earth. Results so far suggest that primitive volcanic gases were primarily carbon dioxide rather than methane, just as they are today.

The Origins of Life

From deep space to the surface of Earth, the materials for life are in place on a young habitable planet, but how did life erupt from the mix? Other researchers within the center are developing theories and experimental tests to determine how life on Earth began. One of these researchers has been searching for these answers for over 50 years.

Chemistry Professor James Ferris’ seminal research on the chemical origins of life seeks to test the leading origins hypothesis of the “RNA World.” This hypothesis proposes that the first life on Earth was based on ribonucleic acid (RNA) instead of the deoxyribonucleic acid (DNA) that drives modern biology.

“We have been looking for interactions that lead to the origin of RNA,” Ferris says. “For this chemistry to have occurred, the materials to make RNA needed to have been present in large enough concentrations and in favorable conditions to interact with each other.”

Ferris and co-researchers Prakash Joshi and Michael Aldersley have been using a certain type of clay, called montmorillonite, which is abundant throughout the Earth, to grow long chains of RNA. The clay serves as a catalyst for the RNA to grow. It is so good at catalyzing the formation of RNA that it can perform the feat at near room temperature, which is consistent with the environment that Watson and others now believe existed on early Earth.

“Eventually an RNA polymer will become sophisticated enough to be useful as a catalyst itself,” Ferris says. This would be an important step in the leap from RNA polymerization to RNA-based life. Ferris is also working with Delano to investigate how widespread these catalytic clays may have been, both on Earth and on Mars.

Fellow center member Linda McGown, the William Weightman Walker Professor of Chemistry and Chemical Biology, is looking more deeply at the composition of RNA and asking basic questions about the fundamental molecule. “Why adenine, guanine, uridine, and cytosine? Why ribose? Why phosphate? What about these specific, fundamental molecules would make them a viable starting point for life?”

To better understand RNA and its potential as the source for all life, McGown and graduate student Lauren Cassidy are exploring how changing the sugar from ribose to other, similar sugars that likely would have been available could change the chemistry and functionality of RNA. She also studies how the different chemical bases that make up the molecule behave and affect the behavior of RNA.

In addition, she is developing tools that will improve mass spectrometric analysis of the RNA products that are formed at the catalytic clay surfaces studied by the Ferris group as well as other potentially important materials. This collaboration is just one of the synergies that exist between scientists in the center.

“There are multiple collaborations within the center and across disciplines that allow us to make progress in our research that would not occur if we were working independently,” Whittet says. “Strong synergies also exist between our astrobiology team and other members of the NASA Astrobiology Institute who are searching for Earth-like planets in the habitable zones of other stars. We live in exciting times—my expectation is that we will detect habitable Earth-sized exoplanets very soon, perhaps within the next year. Observations capable of determining whether those planets actually host microbial life will soon follow.”

Roberge agrees with this optimistic scenario: “Today we cannot say whether the origin of life is a probable or fantastically improbable event. My hunch is that we will know this soon, perhaps in the next 10 years. At that point, everything will change. We will know that we are one of many life-forms in our galaxy or that we are likely to be the only life-forms. Either way, culture will be dramatically modified.”
Teaching the Next Generation of Astrobiologists

IN addition to their sophisticated research on the origins of life in the universe, members of the New York Center for Astrobiology are strongly focused on a more worldly mission—fostering the next generation of astrobiologists. And they begin this adventure at an early age.

This year marks the third consecutive year that the team will help run an astrobiology program for 50 middle school students taking part in the ExxonMobil Bernard Harris Summer Camp at Rensselaer, coordinated by Assistant Dean of Students Cynthia Smith ’96. The program theme, “The Quest for Life,” allows them to develop mission proposals as NASA scientists would do when planning an astrobiology mission. Students, teachers, and parents from the 2010 camp discussed their experiences on the WAMC Public Radio show “The Best of Our Knowledge,” which regularly features a series of astrobiology-related segments supported and sponsored by the New York Center for Astrobiology.

The center also holds a summer Astrobiology Teachers Academy for high school science teachers to help them integrate astrobiology into their teaching during the school year. This past summer, the Academy included 13 science teachers from across New York state.

In addition to its substantial public outreach, there is a popular undergraduate course in astrobiology offered at Rensselaer and an official minor degree in astrobiology. Each faculty researcher within the center also advises undergraduate and graduate students who are heavily involved in the discoveries of the center.

“The educational and outreach aspects of the center are a huge part of what we do,” center director Douglas Whittet says. One of his most recent graduates is strong evidence of their success.

Amanda Cook graduated from Rensselaer in 2010 with a doctoral degree in multidisciplinary science. She now works as one of the select NASA Postdoctoral Fellows at the Ames Research Center in California. Her work focuses on a new generation of nano-satellites and continues her research on the origins of life that she started in Whittet’s group.

Cook ultimately hopes to pursue a career with NASA in mission design and management. She already has a strong vision for her ongoing search for the origins of life.

“We are still building an inventory of what chemicals are actually out there,” she says. “New telescopes are coming online soon and we will start learning more about the types of molecules that are present in space as well as in the atmospheres and environments of other planets. Soon we will have the data we need to see how life evolved.”

For further information on all activities of the center, visit www.origins.rpi.edu.
THE PALMER FAMILY—Raymond, Sue, and their sons Josh and Ryan—live in a small bungalow house two blocks from Rensselaer. And though they passed campus every day, the family had no real contact with the school until Josh, a fifth grader at Troy School 14, began falling behind in math and reading. Attention deficit disorder and chronic earaches threatened to hamper him further. That is when someone recommended the Tutor Time program and everything changed.

For the past decade, scores of Rensselaer students have devoted their Saturdays to tutoring children in pre-kindergarten through grade 9 at two Troy locations. And though resistant at first to giving up his own Saturday mornings by attending the tutoring sessions, Josh Palmer quickly grew attached. In place of a teacher and a class of 20, he had the attention of one Rensselaer student for a full hour. In place of textbooks, he had instruction with Yu-Gi-Oh trading cards. With the help of his teachers, the support of his parents, and the Tutor Time appointments he kept faithfully for five years of Saturdays, he improved in school. Then he excelled.

“When he had trouble with the schoolwork we always knew he could get it done at Tutor Time. We knew there was another person to help,” recalls Ray Palmer. “He’s in college now. When he started elementary school, we were talking about just finishing high school.”

At nearly every moment of the day, Rensselaer students and staff are planning or executing dozens of such community projects. This is the side of Rensselaer that unfolds between classes, on weekends, and late at night, as the Institute acts on its commitment to shape the world outside campus borders. Civic engagement, as much a part of Rensselaer’s DNA as engineering and hockey, has only proliferated in recent years as students are encouraged to develop their character beyond academics.
The efforts range from filling trash bags at a neighborhood cleanup, to months of planning for an event with the intricacy of a high-end wedding. Commitments range from fundraising walks to a work study job that stretches over a student’s academic career. Contributions take shape in flashy fundraisers and in quiet moments a student spends overnight at a homeless shelter.

The might of Rensselaer is behind a substantial legacy: $500,000 raised for the American Cancer Society through Relay for Life; $300,000 for Clothe-A-Child; a long-dormant elementary school strings program revived with a gift of musical instruments; a $2.9 million National Science Foundation grant dedicated to getting students in urban schools hooked on science.

There are also the less-measurable efforts: the engineering major who builds robots with visiting middle school students, the student-athlete who starts a church choir, the Asian student who translates Mandarin for a family newly arrived in Troy, the architecture professor who spearheads community rehabilitation.

“With RPI it just seems like volunteering and giving back are part of the community,” says Victoria Baecker, development associate at Unity House, a Troy-based human service agency. “Students want to know, ‘What are the volunteer opportunities for next week, and what are the opportunities after that?’ They just show up.”

On Saturday mornings, about 20 Rensselaer students show up at the two Tutor Time sites (which students even helped renovate) for free hour-long appointments with children that often stretch well into the afternoon. Also devoting her Saturdays is Assistant Dean of Students Cynthia Smith ’96, who launched weekend tutoring in 2001. She sees children with minimal literacy blossom and families with limited income donate materials in gratitude.

“We hear a lot of parents say this has made a huge difference in their lives. They get their kids there and pick them up week after week,” says Smith. “Kids either need help in reading and math or love reading and math and want to spend more time with college students. And our students get a leadership opportunity and a chance to leave the confines of RPI.”

Jacob Katz, a junior with a double major in math and computer science, is in his third year with Tutor Time. Like all the tutors, he is there during Rensselaer school vacations and on long weekends. And like the rest, he gets to apply his academic expertise. “I've been working on eighth-grade algebra,” says Katz, who also plays in two rock bands and takes part in a non-competitive archery club.

For the Palmers, the story only starts with Tutor Time. Josh’s brother Ryan also spent four years with the program. The family used coupons from the program to attend football games and made campus movies a habit. Both Josh and Ryan took skating lessons in the Field House and participated in summer programs on campus. Three years ago, Ray Palmer retired as a corrections officer and joined Rensselaer’s security staff.

Josh is a freshman at Hudson Valley Community College. He says the college next door that he once hardly noticed has shaped his worldview.

“Now, I want to go to a four-year school like RPI,” he says.
VOLUNTEERISM THROUGH GREEK LIFE AND CLUBS

On the Sunday before Halloween, the brothers at Pi Kappa Phi stretched yards of plastic through their house to carve out rooms themed around the likes of Hannibal Lecter and a mad scientist’s lab. The fraternity, housed in a Victorian mansion known as the Castle, has created its haunted house for 31 years. It ranks among Rensselaer’s most long-standing and visible community events. In part that is because of the Castle’s location, in a row of historic buildings downtown.

Also, the Castle’s Halloween fundraiser brings together up to 30 businesses that contribute money to be listed in a book patrons purchase with their $5 admission. The haunted house typically raises about $5,000 in its two-night run, money that benefits cystic fibrosis research.

“It’s good for everyone,” says Ken Hutchison, Pi Kappa Phi philanthropy chair, who estimates members spend on average 25 hours on the budget, fundraising, program, and floor plan, even before the event. “Troy businesses have been very good about helping out each year and people patriotically attend.”

Tradition runs deep at Rensselaer, and that includes the tradition of civic engagement. The oldest continuously operating project on campus—Alpha Phi Omega’s “Meanest Man on Campus Competition”—has been around since 1958. Faculty, staff, and students vie for the title as “voters” cast their ballots through donations to local charities.

Rick Hartt ’70, recently retired director of the Rensselaer Union, says the Chapel + Cultural Center has always been deeply invested in Troy. Involvement of the C+CC and activism of Rensselaer students in the 1960s, he notes, contributed to the poverty relief agenda that followed.

“Many of Troy’s service organizations didn’t come about until the 1970s and ’80s,” explains Hartt, who tutored at Troy High School as a Rensselaer student. “Unity House didn’t happen until the 1970s. The groups came about with close ties to Rensselaer. And now we work closely with them.”

What is new is the explosion of campuswide volunteer initiatives devoted to changing the world. As Rensselaer has evolved, so, too, have the ways students define themselves beyond their studies. The roster of student clubs, 180, is constantly growing. And of these, 16 are entirely devoted to service.

Rensselaer has its own Habitat for Humanity chapter, its own Red Cross chapter, its own student-led ambulance squad. One group is concerned with India’s development, and another, outreach to Troy. Two clubs of engineering students, 130 in all, work on issues close to home and across the globe. Rensselaer’s Circle K, the collegiate program of Kiwanis International, recently listed four separate community service events in one week.

Dozens more—religious organizations, professional organizations, and those built around hobbies—volunteer...
broadly and take on fundraising. Likewise, so do intercollegiate athletes.

Then there are the five sororities and 29 fraternities, representing 25 percent of undergraduates, which consider philanthropy a serious part of their mission. Matt Hunt, associate dean for the Greek Life Commons, says the organizations nationwide have strengthened their commitment to their communities. Hunt says that while some require members to log a certain number of hours, others work toward a given number of programs.

“These are not your grandfathers’ fraternities,” says Hunt, who has his hands full trying to keep up with the scores of Greek-sponsored events and projects. “We are teaching students to influence the world around them,” says Erin Crotty, director of community relations, who fields frequent requests for volunteer assistance from local organizations and governments. “We see our students step up and lead an effort. They say, ‘I can change my world,’ and create the environment to do it.”

The approach can be decidedly entrepreneurial. When Hunt wanted to involve Rensselaer men in the fight against breast cancer, he came up with Beards for the Cure, among the only male-led fundraisers supporting Susan G. Komen for the Cure, and certainly the only one incorporating facial hair. Participants agreed to put away their razors for the month of November, and accept pledges in return—along with the indignity of having their ever-scruffier images posted across campus. Prizes were awarded at the end based on a judging of the beards. Among the beard growers was the usually clean-shaven Demetri Karanikos, the president of Tau Epsilon Pi, who helped coordinate the event. A senior majoring in mechanical engineering, Demetri worked an eight-month co-op stint with Schick and even helped design a razor that has hit store shelves. He called on the company to bolster Beards for the Cure.

“I have been through preliminary talks with them to supply different razors and shaving items for participants and raffle winners,” he said after staying up until 4 a.m. writing the company a proposal.

Perhaps nothing taps Rensselaer’s collective energy like Relay for Life, the school’s largest community project. Relays are staged in partnership with the American Cancer Society. Teams that raise money pledge to walk a course continuously from dusk to dawn to show solidarity in the fight against cancer. Survivors are honored and those lost to the disease remembered. Relays wear the identity of the given organization.

Rensselaer’s, held in April, is large, detailed, energetic, and flawless. In its maiden run in 2006, the school earned $125,000 and the Cancer Society’s national award recognizing the most money generated by a rookie.

“There are a lot of moving parts and in typical RPI fashion, the Relay excels in all areas,” says Diana Martin, a cancer society regional vice president. “I have been to dozens of these events and RPI’s is an example of how it should run.”

In five years, Rensselaer’s Relay for Life has drawn 6,400
CIVIC ENGAGEMENT, as much a part of Rensselaer’s DNA as engineering and hockey, has only proliferated in recent years as students are encouraged to develop their character beyond academics.

Participants. Members of about 100 teams take turns circling ’86 Field from 6 p.m. till 6 a.m. Participation is so great that at times walkers stand shoulder to shoulder. One ROTC team runs continuously, while a one- or two-person team may vow to walk the entire time. An encampment fills the field with couches, tents, and music. Mirroring the school’s techie identity are hours of “Dance Dance Revolution” and the high-tech prizes raffled off.

When it is over, a 30-member committee starts again, recruiting teams and volunteers, overseeing publicity, sponsorship, and the website, while also managing full course loads.

Martin says the $500,000 Rensselaer has raised is enough money to provide 500 nights at Hope Lodge, a New York City residence where families can stay as a loved one undergoes cancer treatment. Relays also fuel cancer society research grants. There are seven such grants in the Capital Region.

In October, the organization announced a four-year $720,000 grant to support Lee Ligon, a Rensselaer assistant professor of biology studying links between cancerous and non-cancerous cells as breast cancer spreads.

“I think people would be really happy to know that the dollars they raise for Relay eventually find their way back in research, sometimes right in their own communities,” says Martin.

Beyond Athletics

Chris Radz, a swim coach with Capital District Special Olympics, asked Shannon O’Brien, swim coach at Rensselaer, if her organization could use the college pool for a day.

“We not only got the pool but the entire team!” marvels Radz.

Her organization also gained a Special Olympics meet that has taken place for eight years. Visiting athletes, who swim in pools across the region, do not mistake Robison Pool for any other venue. It is bright, large, and the water is cold, they say.

“It’s not an ordinary place. It’s a college,” says Stephen Caruso, 57, who specializes in breaststroke. “Put it this way: it’s an honor to go there and be accepted and be able to swim with the students. They’re pretty fast—our team can be fast, too. A lot of times the students are impressed.”

Other intercollegiate teams make their mark beyond the competitive arena with events that benefit, uplift, or educate. The women’s soccer team participates in an animal shelter volunteer day, the men’s tennis team is planning clinics in Albany parks. Men’s hockey players took
At nearly every moment of the day, Rensselaer students and staff are planning or executing dozens of such community projects. This is the side of Rensselaer that unfolds between classes, on weekends, and late at night, as the Institute acts on its commitment to shape the world outside campus borders.

part in a Mystery Sports Reader day, reading to preschoolers.

The women’s basketball team weaves the ethos of caring into an exceedingly rigorous schedule—on average 30 hours of practice, conditioning, and study sessions weekly in addition to games. Coach John Greene expects his 15-member squad to take part in a calendar of events that includes a Heart Association walk, clinics at local schools, and a "Coaches versus Cancer" tournament. Individual players coach at American Athletic Union games and give their time to Ronald McDonald House or a homeless shelter.

“What I ask of them is substantial,” says Greene. “I’ve always felt that with ability and opportunity come responsibility to yourself, your family, and your community.”

He points proudly to the fact that members of the squad have won significant campus awards. The 2010 Livingston W. Houston Citizenship Award, honoring Rensselaer’s “first citizen,” went to guard Whitney Coleman ’10. Among other things, the award cites a level of altruism that all but erases the town-gown line.

The same might be said about the swim team. Shannon O’Brien, who coaches men’s and women’s teams, is from Troy. Her father, Tom, was a Special Olympics board member. When asked to share the Rensselaer pool, she did not hesitate.

Rensselaer swimmers help with timing, coaching, and by cheering for the visitors. The meet also includes a four-member relay made up of two Special Olympians and two Rensselaer swimmers. O’Brien sees her athletes as the winners.

One year, she recalls, a child with autism was terrified to get into the water. He became fascinated by a Rensselaer swimmer, Kevin. “Kevin stayed by his side for the entire meet and the boy ended up getting in,” she says.

“Every year after that, he really looked forward to seeing Kevin,” O’Brien notes. “It’s a very humbling experience and I think it makes my athletes take a step back and realize that they have it pretty good being a college athlete.”

Impact on local children

Ann Capobianco, a guidance counselor at Doyle Middle School in Troy, looks out her office window to the Rensselaer campus across Burdett Avenue, a visual symbol of the school’s interconnectedness. “I’d say it’s a partnership,” she notes. “Rensselaer is embedded in the community.”

Perhaps no one benefits more from the Institute’s outreach than local children. Rensselaer students tutor them in their schools, at after-school programs, and at Tutor Time’s weekend sessions. Three or four times a semester, Rensselaer’s Big Brothers and Big Sisters invite them to campus to see what happens in the big collection of buildings on the hill above Troy.

As a Rensselaer sophomore, Stacey Kurian was deciding whether to focus on geotechnical or structural engineering. But she was certain about wanting to get back to her community work. All through high school in Rockland County, Kurian worked with children with learning disabilities and autism. As a college freshman, she had her hands full managing her course load.

But at the start of sophomore year, she contacted Unity House. Now every week, she walks 10 minutes down the hill, away from exams and assignments, to Unity Sunshine. For the next two and a half hours she plays games, does art projects, and reads to toddlers.

Kurian is among scores of students whose volunteer effort is not affiliated with a club or event. That is in part what makes it rewarding; it is something she does on her own.

“I could use the time to brush up on studies—school work does come first,” she says. “In three hours I might be able to work out a math problem. But it doesn’t compare to what I get from being there. Tuesday is my favorite day.”

In 2009, Rensselaer greatly enhanced young peoples’ cultural lives, contributing 25 violins, 16 violas, and 14 cellos to revive Troy’s elementary school strings program. The gift led to the hiring of a strings instructor and an educational partnership with the Albany Symphony Orchestra. The district later purchased more instruments to expand the orchestra from three to all six elementary schools. Last fall, 175 students were playing the violin, viola, or cello. Many performers have already moved well beyond “Twinkle, Twinkle, Little Star,” to work on more challenging pieces. And as they graduate, Doyle Middle School will gain an orchestra.

“Children are used to hearing the music of pop culture on the radio and on television,” says Jason Boemio, curriculum leader for the district music department. “But now they see there’s a whole genre of music that goes back hundreds of years. They are playing the famous instruments the famous composers played and wrote for long ago and they see that it’s lasted.”

Local schools also reap the benefits of Rensselaer’s stock-in-trade with
programs designed to cultivate the next generation of engineers and mathematicians. Ron Eglash, professor of science and technology studies, is devoting a five-year $2.9 million National Science Foundation grant to finding approaches needed to get minority students interested in science, technology, engineering, and math. In addition, about 120 low-income students take part in STEP—Science and Technology Entry Program—a state-funded initiative at 60 colleges that allows motivated students from grades 7 through 12 to learn about science and related fields. Weekend programs, usually on campus, may involve earth science or robotics or researching for an upcoming science fair. STEP also offers SAT-readiness sessions and visits to other colleges. The leaders are Rensselaer students and staff.

“Our students learn and have role models,” says Capobianco, the Doyle guidance counselor. “I think when you look at someone who has been accepted at RPI, it’s no small feat.”

Rensselaer is also one of the nation’s 30 colleges to host a two-week ExxonMobil Bernard Harris Summer Science Camp, started by and named for the first African-American to walk in space.

Bernice Girma, who has had her two sons enrolled in STEP and Bernard Harris, says the experiences challenged their imaginations and taught them about commitment and follow-through. And science. At Bernard Harris, her son’s team was assigned to design a sustainable village in outer space for 700 people. They created the water system, housing, and educational system and built the exhibit using recycled materials. Scientists from ExxonMobil and Rensselaer evaluated the projects.

“Every day, most kids are not thinking about picking 700 people to live in outer space,” says Girma. “This is something kids don’t normally get exposed to, and my son is only in middle school.”
Global Reach, Global Impact

Rensselaer’s international alumni are staying connected

The Rensselaer Alumni Association (RAA) is made up of 95,000 individuals who live and work literally all over the world. The global reach and global impact of the alumni network has been on display as President Shirley Ann Jackson and a Rensselaer delegation traveled to both China and South Korea over the past few months.

Last fall in China, some 60 Rensselaer alumni and officials from academic partner institutions honored President Jackson with a reception and award presentation, hosted by the Rensselaer Alumni Chapter of China. President Jackson was in Tianjin for the World Economic Forum. Shufeng Xu, parent of a Class of 2007 graduate and honorary president of the RAA China chapter; Xinfeng Wang, MBA ’03, president of the RAA China Chapter; and Longjun (Peter) Zhu, MBA ’99, secretary general of the RAA China chapter, were instrumental in pulling together the program, along with the Office of Alumni Relations. Both Xu and Zhu are recipients of the RAA Key Award, which recognizes outstanding service and support of the advancement of Rensselaer.

During the reception, the China chapter screened Why Not Change the World?—a video created by the leaders of the chapter that highlights the career achievements of Rensselaer alumni in China. The video may be viewed online at alumni.rpi.edu/china.

President Jackson was in South Korea in February to receive an honorary doctoral degree in science and technology from the Korea Advanced Institute of Science and Technology (KAIST). She took the opportunity to meet more than 50 alumni and friends who gathered at the Shilla Hotel in Seoul to hear about the accomplishments of The Rensselaer Plan. South Korea Chapter Chair Young Gil Kim, Ph.D. ’73, president of Handong Global University, and Sung Min Hong ’89, secretary of the South Korea chapter, were also on hand. Kim had received an honorary doctoral degree from KAIST along with President Jackson.

“It’s always encouraging to see the enthusiasm of alumni and alumnae no matter where they are in the world,” President Jackson told The Poly.

“Clearly, our international alumni are committed to strengthening awareness of Rensselaer.”

International alumni activity is by no means limited to China and South Korea. There recently have been events in Mumbai and Bangalore, India, and in Switzerland, Singapore, and Hong Kong. Alumni in Europe are working to move alumni programs forward. Visit the “RPI Alumni in Europe” subgroup of the RAA’s LinkedIn group at www.linkedin.com (search “Rensselaer Alumni Association” to find the main group) to learn more. Alumni who join LinkedIn may connect with others living abroad in many locations—recent posts have come from as far away as New Zealand!

If you are living internationally and are interested in connecting with other alumni in your area, contact Jeff Schanz, assistant vice president for alumni relations, at schanj@rpi.edu or (518) 276-6205. You may also make connections by joining the RAA on Facebook (www.facebook.com/RPlalumni) or LinkedIn (Rensselaer Alumni Association), following on Twitter (@RPlalumni), or visiting the alumni website at alumni.rpi.edu.

LIBERTY MUTUAL INSURANCE PROGRAM

Liberty Mutual now offers an auto, home, condo, and renter’s insurance program for Rensselaer alumni. Watch your mailbox for more information, or visit the website at www.alumni.rpi.edu/service.

SEND US YOUR EMAIL

Many alumni communications are sent via email only, in an effort to eliminate waste and reduce costs. Please don’t miss out on any of your class, chapter, or affinity information! To ensure Rensselaer has your email address, visit the alumni website at http://alumni.rpi.edu. Use the alumni ID number printed on the mailing label of this magazine to sign in and update your own contact information, or simply send an email to alumni_update@rpi.edu with the email address you prefer, and any other updated contact information.

RENSSELAER ALUMNI ON LINKEDIN

LinkedIn is one of the largest free professional networking sites on the Web. More than 10,000 alumni are already members of the Rensselaer Alumni Association group. Join now to tap into the powerful, worldwide alumni network. Visit www.alumni.rpi.edu and click on the LinkedIn icon at the bottom of the page to get started.
Creating “Rensselaer Traditions”

The Red & White Student Organization’s Traditions Committee is creating a “Rensselaer Traditions” book that will capture the Institute’s most beloved traditions. Do you have great memories about traditions such as the Pushball Rush, Dutchman’s Shoes, the old Student Union, or Freshman Beanieys? Share your experiences about these traditions or any other great memories from your time at Rensselaer. Submit the tradition you remember, and would like to see represented in the book, by filling out the online form at http://redandwhite.alumni.rpi.edu/traditions or by contacting Geoff Seber at seberg@rpi.edu or (518) 276-2324.

July

23 13th Annual Rensselaer Alumni Day at the Del Mar Racetrack. Join local alumni in a private box for an exciting day at the races. San Diego, Calif. For information, contact Kathy Kinsey at kinsek@rpi.edu or (518) 276-2832.

27 Radiation and Fukushima: Risks, Releases, and Impacts. Join fellow alumni to hear from Peter Caracappa ’98, Rensselaer’s Radiation Safety Officer. He will discuss the nuclear accident in Japan and how it might affect Southern California and the world. Manhattan Beach, Calif. For information, contact Kathy Kinsey at kinsek@rpi.edu or (518) 276-2832.

August

4 Boston Chapter Summer Picnic and Tour of Natick Labs. Local alumni will tour the Army research facility, then enjoy a picnic with accepted students and their parents. For information, contact Kathy Kinsey at kinsek@rpi.edu or (518) 276-2832.

6 Annual Student Send-Off Reception. Join members of the Washington, D.C./Baltimore chapter to meet and greet alumni, current students, and incoming students and their parents at the home of John White ’83 and Cleopatra White ’84. Upper Marlboro, Md. For more information, contact Susan Haight at haighs@rpi.edu or (518) 276-6042.

7 Rensselaer Club of New Jersey Picnic With the Class of 2015. Join area alumni for this annual summer picnic, and help to welcome the incoming Class of 2015. All current students and alumni are invited. Cranford, N.J. For more information, contact Alumni Relations at alumni@rpi.edu or (518) 276-6205.

14 Austin Chapter Brunch. Join area alumni to help send incoming Class of 2015 students off to Troy University of Texas Golf Club. For more information, contact Susan Haight at haighs@rpi.edu or (518) 276-6042.

15 RPI Hockey Golf Outing. Fans interested in meeting the players and staff and supporting the men’s hockey program are invited. Shaker Ridge Country Club, Loudonville, N.Y. For details, contact Kevin Anderson at anderk8@rpi.edu or (518) 276-6777.

16 Rensselaer Alumni Network Meeting. Enhance your career, and network with other area Rensselaer alumni. La Madeleine-Perimeter, Atlanta, Ga. For more information, contact Suzanne Turcotte at turcos2@rpi.edu or (518) 276-4132.

17 Summer Send-Off Dessert Reception with the Class of 2015. Hartford, Conn. Help us welcome incoming students and their families to the Rensselaer community. For more information, contact Susan Haight at haighs@rpi.edu or (518) 276-6042.

23 Welcome Barbecue for Incoming Class of 2015 Students. The Commons, Troy campus. Local alumni volunteers are needed to help welcome new students to Rensselaer at this annual picnic. For more information, contact Geoff Seber at seberg@rpi.edu or (518) 276-2324.

October

21-23 Reunion & Homecoming Classes ending in 1 and 6, mark your calendars for your special milestone Reunion. Greeks, athletic teams and special interest groups will also be planning programs. For more information, visit www.alumni.rpi.edu/reunion.

Hockey in Colorado?

In the years that I spent “on the Hill,” the most memorable event had to have been the 1954 victory of the Rensselaer ice hockey team in the NCAA tournament held in Colorado Springs. I was one of the cheerleaders, and we had hoped that some of us would have been taken with the team, but that was not to be.

Last fall, I noted that the team was playing against Colorado College on October 8-9. Friends invited me to stay with them in Colorado Springs. On the morning of the 8th, we took the cog railway to the summit of Pikes Peak. While appreciating the view, I slipped on some loose stones, fell on rock, and broke my hip. So I was operated on the morning of the 9th, and listened to the game on the radio that night (we tied that one and lost the previous night). I spent almost a month in rehab before coming home to New Jersey.

So in a period of 56 and a half years (from the spring of 1954 to the fall of 2010), I have yet to see Rensselaer play ice hockey in Colorado... and I now doubt that I ever will. If I do not, it will not be due to my not trying!

Cherry and White, fight fight!

Jack Cunningham ’56, M.S. ’59
Spring came late to campus, but not before students
could enjoy new plantings and trees in bloom as classes came to an end and the Institute prepared for the 205th Commencement ceremony.
THE NEED FOR ENERGY IS THE GREATEST PROBLEM OF THIS CENTURY. Our global population of 6.5 billion will grow to 9 billion by 2050 and reserves of our most dependable energy sources are finite. We need new sources of energy and chemicals, and long-range research is necessary to address this long-range need. The problem is not lack of energy, but the issue of harnessing it—the amount of sunlight that reaches the Earth in just one hour contains enough energy to power our entire globe for a year.

In 2008 my wife, Johanna, and I established the Baruch Center for Biochemical Solar Energy Research at Rensselaer to explore photosynthetic approaches to utilize solar energy. Led by Professor K. V. Lakshmi and her team, the Baruch Center builds on Rensselaer’s strong foundation of energy research and focuses on the molecular chemistry and biochemistry that enables plants to convert solar energy into life-sustaining energy. The Baruch Center embraces Rensselaer’s multidisciplinary approach to problem solving, encouraging full-solution innovations through collaboration of minds from many fields.

I have spent over 40 years connecting great ideas and great company builders. Our greatest successes have implemented multidisciplinary approaches and utilized partnerships to excel. I believe that important innovations are found at the intersection of today’s developing fields, for example, IT advances have dramatically expanded the possibilities of genome sequencing and synthetic biology. At interfaces like this, Moore’s law meets Mendel’s law and new solutions, true innovation, and real value are created. Such innovations take collaboration of great minds across disciplines.

One example is Codexis Inc.’s (NASDAQ: CDXS) use of DNA shuffling to develop novel enzymes that lower cost and improve efficiency in industrial processes. Codexis’ platform systematically evaluates DNA combinations to optimize solutions, leveraging expertise from both IT and biotechnology. Codexis is also succeeds through powerful partnerships; for example, they are collaborating with Shell to employ Codexis’ advanced enzymes to the manufacture of advanced biofuels because of the exponential nature of technical change, and the understanding of systems infrastructure that is required. This puts a huge burden on startups who have to build a robust platform and create upstream and downstream channels to succeed.

To compete in today’s environment, organizations must create partnerships. Established companies can provide startups with developed infrastructure, distribution channels, and capital. On the other hand, established companies are now looking to startups for key innovations.

Moving forward, startups and established companies must work together. Huge synergies can be achieved if each does what they do best—bringing together valuable insight and resources, and achieving faster paths to market. Together, we are able to make the greatest impact possible. Companies and organizations should seek to form useful coalitions.

Combining great minds will exponentially increase our ability to discover, apply, innovate, and achieve. Partnerships and collaboration will enhance the United States’ continued success as a technology innovator. The collective effect is much greater than the sum of the parts.

As founder of the venture capital firm, CMEA Capital, Tom Baruch is an industry innovator, making pioneering investments in semiconductor technology, bio-technology, and energy and materials science since the inception of CMEA in 1989. Currently, Baruch sits on the board of eight technology companies. He is an inaugural member of the National Advisory Council on Innovation and Entrepreneurship, advising Secretary of Commerce Gary Locke and the Obama administration. He serves as an adviser to the Advanced Research Projects Agency for Energy (ARPA-E), the U.S. Council on Competitiveness, and the Kaufman Foundation. He is also a member of the board of trustees at Rensselaer, where he holds a B.S. in engineering. He and his wife, Johanna, funded the Baruch Center for Solar Biochemical Research. Baruch also holds a J.D. from Capital University.
Click, You’re Connected.

The official site of Rensselaer Athletics has everything you need to stay connected with Rensselaer sports.

> Follow your favorite teams on Facebook, Twitter, or YouTube. Sign up to receive mobile updates with scores, news, and more on your cell phone.

> Find schedules, tickets, and the latest updates for all 23 varsity sports.

> Order your official Engineers apparel, including sweatshirts, T-shirts, hats, and more!

rpiathletics.com
Reunion & Homecoming keeps getting bigger and better! Over 3,000 alumni, family, and friends returned last year to celebrate Class Reunions and enjoy gatherings with fellow Greeks, athletes, and other special interest groups. This year, even more are expected to join us!

Highlights this year will include: President Jackson’s State of the Institute Address, a question-and-answer competition with IBM’s supercomputer Watson, the FanFest carnival midway, a performance by the Portland Taiko Asian American drum group, Class Reunions for classes ending in 1 or 6, and so much more!

For details on group celebrations, a schedule, hotel information, and more, visit alumni.rpi.edu/reunion or contact alumni@rpi.edu.

Go Green for Reunion & Homecoming!
Registration for Reunion & Homecoming will be available online in August. Make sure we have your email address so you don’t miss out. Go to alumni.rpi.edu/gogreen to update your contact information.