NASA Astronaut (and Twitter superstar!) Reid Wiseman ’97 took over the Rensselaer Alumni Association Instagram account to showcase his time at this year’s Reunion & Homecoming. From selfies to tours to football, Wiseman enjoyed the full Rensselaer experience.
Former Rensselaer football standout Andrew Franks ’15 has been named the starting kicker for the Miami Dolphins. See page 14.

FEATURES

18 A Sense of Place
Steven Ehrlich’s award-winning design approach makes connections between culture, climate, people, and place—while embracing the possibilities that modern technology has to offer.

26 A Smart Lighting Revolution
The Smart Lighting Engineering Research Center is developing the systems that will transform the way we live, work, and communicate.

34 The Inventor’s Dilemma
The remarkable story of inventor H. Joseph Gerber ’47, “the Einstein of the 1950s,” and how Rensselaer propelled him to greatness.

DEPARTMENTS

4 President’s View
Broadening perspectives.

5 Mail
Thanks from a trail-blazing alumna.

6 At Rensselaer
Making a Difference 14
Milestones 17

42 Staying Connected
Championing corporate connections.

44 Class Notes
In Memoriam 63

64 One Last Thing
The greatest generation.

Update your address via email at alum.mag@rpi.edu, or write to: Rensselaer Magazine, Office of Strategic Communications and External Relations, Rensselaer Polytechnic Institute, Troy, NY 12180, or call (518) 276-6359.
Welcome to Rensselaer!

Each year, as part of Navigating Rensselaer and Beyond, President Shirley Ann Jackson greets and shakes hands with the newest student members of the Rensselaer community. The new students then proceed down the steps of The Approach and head to Riverfront Park for the annual WelcomeFest. In addition to enjoying a buffet dinner, students get to relax before the start of classes with carnival games and music. This year, remarks were made by President Jackson, City of Troy Mayor and Rensselaer Trustee Lou Rosamilia, Vice President for Student Life Frank Ross, President of the Union Nicholas Dvorak ’16, and Grand Marshal Marcus Flowers ’16.
Broadening Perspectives

New initiatives immerse students in creative, cultural, and ethical explorations

New York Times op-ed columnist David Brooks recently wrote a piece titled “The Big University,” noting what he termed an “emptiness deep down” at universities focused too much on careerism—and not sufficiently thoughtful about helping students to prepare for full lives.

At Rensselaer, though we educate men and women who go on to be extremely successful in their careers, we do not define our mission by narrow pre-professionalism. We seek to teach our students a certain breadth of knowledge, as well as depth in their chosen fields. We work hard to develop their emotional, physical, spiritual, and ethical capacities—because we expect them to be leaders, and leadership does not arise merely from technical skills, but from great skills united on a global scale.

New initiatives are designed to broaden our students’ perspectives—and to encourage them to develop their own ideas about the world around them. For the first time, we have selected a theme for the entire Rensselaer community to consider: resilient leadership for a more resilient world. This theme arose during our 2015 President’s Commencement Colloquy. Now, we are asking both our students and our faculty to consider what resilience truly means, and how to foster flexibility and inventiveness in their work and professional and personal lives—with the ultimate goal of building resilience into economic, social, and physical systems on a global scale.

Many other aspects of Rensselaer pedagogy encourage our students to engage with new perspectives. In the “Inquiry” courses that we have designed for freshmen through the School of Humanities, Arts, and Social Sciences (HASS), the subjects range widely, from an exploration of environmental controversies, to a consideration of whether humans are rational. However, each course encourages critical thinking across the disciplines, with a focus on the ethical issues involved.

Our new “Art_X@Rensselaer” initiative is designed to help all of our students to see the art in science, and the science in art—and then to use this understanding to think, discover, design, and create in new ways. While we have many arts courses that emanate from HASS, Art_X is not about art appreciation, per se. Instead, Art_X focuses on the intersection and union of heretofore disparate disciplines, using ideas such as the “golden mean” that connect the visual arts, architecture, science, and engineering.

We recently celebrated the launch of Art_X with a series of concerts produced by Michael Century, professor of new media and music in the Department of the Arts, in collaboration with faculty at the Center for Biotechnology and Interdisciplinary Studies. One composition sonified data from proteomic experiments provided by Professors Matteos Koffas and Jonathan Dordick of our Department of Chemical and Biological Engineering.

Art_X@Rensselaer is designed to help all of our students to see the art in science, and the science in art—and then to use this understanding to think, discover, design, and create in new ways.

An even more transformative approach to our undergraduate education, which we will be piloting with the Class of 2019, is the Summer Arch. With the Summer Arch, students will spend the summers after their sophomore years in junior-level classes on the Troy campus, benefitting from the focused attention of both their professors and our Student Life staff, as well as from unique cultural experiences that only can occur during the summer season.

Then they will leave the campus for a semester during their normal junior years—either fall or spring—to pursue their passions with great flexibility, whether through co-ops, internships, research, entrepreneurship, or volunteer experiences. We will encourage them to go abroad, and to have the ineffably transformative experience of immersing themselves in another culture. The Summer Arch is an important pivot point to students’ upper-class years at Rensselaer—and to the development of intellectual agility, multicultural sophistication, and a global view.

Rensselaer always has educated especially creative and thoughtful people; the many innovations and discoveries of our alumni and alumnae attest to that. Now we have made creative, cultural, and ethical explorations a pillar of a Rensselaer education, for students in all our schools. We challenge our students to change the world—so we must challenge ourselves, also, to equip them for leadership. The more perspectives we can expose our students to—whether of different individuals, disciplines, sectors, or geographies—the readier they will be to tackle the hard problems, and to build meaningful lives.
Thanks From a Trail-Blazing Alumna

Love the article about the steady increase in the number of women students. As an entering freshman in 1967, I was one of only about 35 females in my class of nearly 1,000. In addition to receiving a first-class education, I had no trouble getting dates (and I ended up marrying one of my male classmates).

Sheila J. (Esposito) D’Avino ’71
Mt. Laurel, New Jersey

Fond Hockey Memories

I enjoyed reading Frank Gardiner’s essay, “Thoughts on Hockey, Diabetes, and Pete Seeger” (One Last Thing) in the Spring 2015 issue. On many occasions during the four hockey seasons that Pete Gardiner wore the red and white for RPI, the Gardiner family spent the weekend at the same venue as we did. We often sat near them at the Friday night and Saturday night hockey games and usually congratulated the players after the games with a visit to Brown’s Brewing Company.

Our love of RPI hockey was the excuse we needed to visit our daughters Becky (MacMillan) ’99 and Jen (Miller) ’01, M.S. ’02, quite often. We clearly remember the highly successful “Cure Diabetes Now” event that Frank refers to in his essay.

William ”Ziggy” Bernfeld ’72
Smyrna, Delaware

Memories of Lake George

I had been accepted into RPI’s master’s program in interdisciplinary urban and environmental studies starting fall 1974. I had just received my B.S. in interdisciplinary environmental studies from what was then the State University of New York at Albany.

In the months before I started classes, I worked for the New York State Department of Environmental Conservation in Lake George. There had been a recent algae bloom and there was concern about the lake’s health, even back then, and even though the gem of a water body was still very pristine.

I was part of a student crew divided into teams that tested lakeside residential septic drain fields with dye to determine if effluent was seeping into Lake George. And, we tested the municipality’s sewer system for leaks.

It was a terrific summer job for a bunch of college kids and I’m grateful that, in a small way, we helped protect Lake George. That practical experience and my master’s degree from RPI helped get me my first job, at the Environmental Protection Agency, in Washington, D.C., and later with the Alaska Department of Environmental Conservation.

Tom Moyer ’75
Fairbanks, Alaska

RPI Wrestling Provided Family

I am writing because I am honored for being selected to the first RPI Wrestling All-Decade Team (see story, page 16). It has truly been a privilege to have wrestled at Rensselaer. I made some of my closest, lifelong brothers through RPI wrestling. A lot of my fondest memories are of practices, matches, and time with my teammates. Being a wrestler can mean numerous things to different people, such as an unwavering commitment to excellence, or a tenacious drive to be the best. For me, however, it’s about being part of a family.

My first year at RPI I struggled, like many do, between the constant demands of academics and an emptiness from not quite finding people I could relate to yet. I was having difficulty finding my “RPI family” and really making Rensselaer a home away from home. Fortunately, at the beginning of my sophomore year, I heard about the RPI wrestling team and decided to check it out. From the first practice I knew I finally had found my “RPI family.”

The coaching staff garnered an incredible sense of camaraderie and unity among the team. Students from all walks of life, all with different experiences, skills, and talents, were able to come together among like-minded individuals and wrestle. The sense of belonging I received from wrestling at RPI was truly incredible. Each practice was physically and mentally rejuvenating, and proved instrumental to my success not only at Rensselaer, but in the years to come thereafter.

I have since gone on to join the military and have received numerous awards for being in the top 1 percent and getting selected to elite programs. I’m not telling you about these achievements to boast, but because I want you to see how significantly RPI Wrestling has shaped who I am and how grateful I am.

Dwight Manganaro ’09
Ludlow, Massachusetts

We’d love to hear from you! To provide space for as many letters as possible, we often must edit them for length. Contact us at: Rensselaer Magazine, Strategic Communications and External Relations, Rensselaer Polytechnic Institute, Troy, NY 12180; email to alum.mag@rpi.edu; or call (518) 276-6531.
New research from an international team, including researchers at Rensselaer, has uncovered the mystery of why large Triassic dinosaurs took more than 30 million years to populate the tropics.

For years, paleontologists have had different theories about why they could find no evidence of large, long-necked, herbivore dinosaurs (sauropodomorphs) living at low latitudes, until at least 30 million years after they first appeared on earth, and 10 to 15 million years after they became abundant at higher latitudes (both north and south of the equator). The new research suggests a highly unpredictable hot and dry climate, linked with high atmospheric carbon dioxide (CO2) concentrations, prevented larger herbivore dinosaurs from inhabiting the area.

“This really is the first time we’ve been able to connect so many environmental dots from a single key region and time in the evolutionary history of early large dinosaurs,” says Morgan Schaller, assistant professor of earth and environmental sciences. “These indicators paint a picture of relatively inhospitable conditions for herbivores at these low latitude locations—there’s no reason for them to remain during hot, very dry, periods when their food sources are unstable.”

As part of his contribution to the research, Schaller used stable isotopes of carbon from ancient soils to estimate atmospheric CO2 levels, finding that the levels were up to six times higher than at present day.

“This finding is significant because with our current understanding of climate sensitivity to atmospheric CO2, it suggests surface temperatures were on average something like 10 degrees Celsius higher than today,” Schaller says.
CEO of OptumLabs Named Entrepreneur of the Year

THE CHIEF EXECUTIVE OFFICER OF OPTUMLABS, Paul Bleicher, M.D., Ph.D. (B.S. '76), has been selected as the 2015 William F. Glaser '53 Rensselaer Entrepreneur of the Year. Established in 1990, the award brings the world of entrepreneurship and innovation into Rensselaer classrooms by recognizing successful entrepreneurs and role models who share their wisdom and experiences with students.

Bleicher has transformed the way clinical trial data is collected, analyzed, and managed. His vision to develop technology that would shift the medical industry from paper-based methods to Internet-enabled solutions led to an industry-leading solution, InForm™, which spearheaded the evolution of electronic data capture for pharmaceutical manufacturers and other life sciences companies.

In his current role as CEO of OptumLabs, Bleicher is guiding an open, collaborative research and innovation center, bringing together a variety of leading health care organizations to harness the power of big data and analytics to drive improvements in health care. Previously, Bleicher was chief medical officer for Humedica, a next-generation clinical informatics company that was acquired by Optum in January 2013.

In 1997, Bleicher was co-founder, initial CEO, and chairman of the board of Phase Forward, the company that pioneered the development of Web-based electronic data capture for clinical trials. As the company grew from concept to a publicly traded company, he served in various capacities until his departure in 2008. He continued as a member of the board of directors until Phase Forward’s acquisition in 2010 by Oracle Corporation.

“We are excited to honor Dr. Paul Bleicher as the recipient of this year’s William F. Glaser ’53 Rensselaer Entrepreneur of the Year,” says Thomas Begley, dean of the Lally School. “Rensselaer students and graduates like Paul demonstrate the strong foundation built by the innovative research and learning environment at Rensselaer, combined with their resilience, determination, and passion to create solutions for today’s world.”

Bleicher received his bachelor’s degree in biology from Rensselaer, and his M.D. and Ph.D. from the University of Rochester School of Medicine and Dentistry. He trained in internal medicine at the Beth Israel Hospital, and in dermatology at Harvard Medical School/Massachusetts General Hospital. He completed a post-doctoral fellowship at the Dana Farber Cancer Institute in the molecular biology of the immune system, and began his career as a physician/investigator and assistant professor at the Massachusetts General Hospital and Harvard Medical School.

Bleicher is a member of the National Academy of Medicine Leadership Consortium for Value & Science-Driven Health Care. He was recognized as one of PharmaVoice’s 100 Most Inspiring Leaders in Life Sciences in their inaugural edition, and was named a Champion in Health Care by the Boston Business Journal.

“Rensselaer’s commitment to fostering and recognizing entrepreneurial skills has driven innovations in industry sectors ranging from manufacturing and technology to health care,” says Bleicher.

Paul Bleicher ’76, CEO of OptumLabs.

BIOMEDICAL ENGINEERING

Detecting Surgical Site Infections

A TEAM OF RESEARCHERS, led by Eric Ledet, associate professor of biomedical engineering, is investigating whether small wireless sensors incorporated into orthopedic implants could be used to detect surgical site infections. The research is supported by a $429,560 grant from the National Institutes of Health.

According to the researchers, surgical site infections (SSI) are the most common complication following surgical procedures and account for nearly 20 percent of all health care-associated infections. In the United States, 2 to 5 percent of surgical inpatients will develop an SSI, accounting for approximately 300,000 cases per year. These infections pose greater risks when associated with surgical implants, with complications including additional surgery, implant removal, delayed wound healing, increased use of antibiotics, and death.

The researchers will test an antigen-sensitive hydrogel integrated into a small, simple, inexpensive wireless sensor as a non-invasive tool for early SSI detection in cases of surgical implants. The sensor will be incorporated into orthopedic implants. The SSI sensors have the potential to guide therapy, improve outcomes, and reduce readmissions, revisions, and costs associated with implant-related infections.

Ledet’s research focuses on innovative diagnostic and therapeutic interventions for orthopedic and neurosurgical applications. His work in the area of smart orthopedic implants was recognized as “A Top 10 Medical Breakthrough of 2012” by Consumers Digest Magazine and his smart implant technology was chosen as a finalist for the Lemelson Prize in 2013. Ledet’s smart implant work extends to low back pain, fracture fixation, knee osteoarthritis, compartment syndrome, and surgical site infection.
Bloomberg Philanthropies this spring announced that Breathing Lights, the regional submission by the cities of Albany, Schenectady, and Troy, has been selected as one of four projects from across the United States to receive up to $1 million as part of the Bloomberg Philanthropies Public Art Challenge. Other winning projects are located in Gary, Indiana; Spartanburg, South Carolina; and Los Angeles, California.

Breathing Lights, the joint submission from Albany, Schenectady, and Troy, proposes to illuminate up to 300 vacant homes in the three cities nightly over two months in fall 2016. Working with lead artist Adam Frelin, lead architect Barbara Nelson '80, and more than 25 community and private sector partners, including the Lighting Research Center at Rensselaer, this installation aims to regenerate interest in once-vibrant neighborhoods that currently have high vacancy rates.

The project will culminate in a regional summit on vacant homes and neighborhood revitalization that will engage local residents, prospective buyers and investors, and policy makers.

Bloomberg Philanthropies invited mayors of U.S. cities with 30,000 residents or more to submit proposals for innovative temporary public art projects that address a civic issue, and demonstrate close collaboration between artists or arts organizations and city government. Proposals covered a range of issues, such as the revitalization of decayed downtown areas, underutilized waterfronts, and vacant neighborhoods. They also addressed social themes including neighborhood safety, environmental sustainability, and promoting city identity. More than 230 cities submitted proposals for consideration in the Bloomberg Philanthropies Public Art Challenge, representing 68 million residents across the United States.

“The issue of neighborhood revitalization is at the forefront of our efforts in Troy,” says Troy Mayor Lou Rosamilia. “When we first heard about Breathing Lights, we immediately knew it was a way to literally shine a light on the issues of urban vacancy and community development. Breathing Lights is a creative way to engage residents and organizations across the region in a way that can produce meaningful transformation in our neighborhoods and cities.”

“The Bloomberg Philanthropies recognition and support will catapult our region into the world of public art,” says Nelson. “It is an honor to have our proposal evaluated alongside big cities with well-established public art initiatives. We sought to propose a beautiful temporary art installation with permanent impact. We took the Bloomberg Philanthropies objective of art as a vehicle for community and economic development very seriously. This project challenges the public to see vacant structures as economic resources instead of just liabilities.”

Through the Lighting Research Center at Rensselaer, graduate students have been designing an illumination kit for Breathing Lights. As part of the semester-long project, a working prototype was installed in a vacant building owned by the university.
UNDERGRADUATE RESEARCH

Summer Research Programs Offer Invaluable Experience

DOZENS OF STUDENTS FROM UNIVERSITIES including MIT, Boston University, Fisk, Morehouse, and Texas State, as well as undergraduates from Rensselaer, participated in cutting-edge research on campus during the summer as part of several undergraduate research programs offered by Rensselaer.

The National Science Foundation (NSF) has stated that “active research experience is one of the most effective techniques for attracting talented undergraduates to careers in mathematics, science, and engineering.” Rensselaer, which has a longstanding commitment to undergraduate research, offered several opportunities to outstanding undergraduates this summer.

Students conducted research in the Center for Biotechnology and Interdisciplinary Studies (CBIS) through the Louis Stokes Alliances for Minority Participation (LSAMP) program, funded by the NSF.

According to Stan Dunn, dean of graduate education at Rensselaer, “The program is designed to help curious and solution-oriented underrepresented minority students gain confidence in the lab, develop enthusiasm for graduate school, cultivate a professional network, and earn attractive qualifications.”

The program attracted exceptional participants such as Quinetra Gathers from North Charleston, S.C., and now a senior majoring in biology at Fisk University. She worked with Director of CBIS Deepak Vashishth, a professor of biomedical engineering who conducts breakthrough research on bones. Gathers’ research focused on finding a correlation between advanced glycation end-products and bone propagation.

“Quinetra Gathers and all of the LSAMP program participants have the ability to shape and change the world. It is our privilege and responsibility to help them prepare to do just that,” Vashishth says.

Gathers says she “chose RPI because I heard all great things about the school and its facilities. I thought it would be a once-in-a-lifetime experience. Because of this experience, I am thinking about specializing in bones when I become a pediatrician.”

In addition to LSAMP, students had opportunities to do research at Rensselaer through several other programs, including the Smart Lighting Engineering Research Center Research Experience for Undergraduates.

Michelle Bessiake, a junior majoring in microbiology at Texas Southern University in Houston, worked with Research Scientist Fuming Zhang in Robert Linhardt’s lab.

BIOCOMPUTATION AND BIOINFORMATICS

Optimizing Proteins With Less Energy

LINING COMPUTATION WITH EXPERIMENTATION, researchers at Rensselaer have shown that proteins can be engineered to fold more quickly and achieve greater stability by optimizing the interactions between charges on the surface of the chain of atoms that makes up the protein.

“What we showed was that when you modify the charges on the surface of the protein, when you optimize the charges, you create a protein that folds more efficiently and is more stable than its naturally occurring counterpart,” says George Makhatadze, Constellation Professor of Biocomputation and Bioinformatics.

Proteins are composed of a long chain of amino acids. Interactions between the atoms composing the chain cause the protein to twist and turn and ultimately assume a folded shape that requires the least amount of energy to maintain. As the protein folds, the energy of each conformation in the process can be mapped into an “energy landscape.”

The most efficient possible energy landscape would move straight from high to low energy. In reality, most proteins have a “frustrated” energy landscape, with several bumps and rolls as the protein assumes its folded state.

The finding, which stems from his research on altering the speed of protein folding, was surprising because theory predicts that naturally occurring proteins evolved to fold in the most efficient possible manner. Typically, it is within this folded state that proteins accomplish their function.

Equally important, Makhatadze says, is that the work links computation with experimentation. “Using computational modeling, we are able to rationalize why it is that these proteins with optimized charges are folding much faster,” says Makhatadze. “We analyzed why this happens and we showed that—with computation—we can predict the bulk properties of the molecule, that is both the thermodynamics and kinetics, and that allows us to validate the computational model.”

Ultimately, Makhatadze is working to redesign proteins to decrease the speed at which they unfold.
“American Folk Art, Lovingly Collected”

The Worcester Art Museum (WAM) this summer featured an exhibit titled American Folk Art, Lovingly Collected that showcased more than 40 works from the private collection of David Krashes ’49 and his wife, Barbara. The museum called it “an important private collection, recognized as one of the best of its kind in existence.” The exhibition featured an array of paintings and furniture, many on display for the first time, with a particular emphasis on portraits of children, which illustrate the folk artists’ unique approach to using color and toward the figurative treatment of their subjects.

American Folk Art, Lovingly Collected highlighted the rich folk art tradition that flourished in the mid-19th century as homegrown artists traveled from town to town to paint portraits of loved ones for rural families. The artists represented in the exhibition showcase a distinctive folk art practice that grew out of a popular demand for personal keepsakes, and include John Brewster, Zedekiah Belknap, Ruth Henshaw Bascom, William Matthew Prior, and Sturtevant Hamblin, among others.

“The collection stands out not only for its uniqueness, but also for its outstanding quality and documented provenance,” says exhibition curator Paul D’Ambrosio. “It was truly a labor of love for the donors to bring together these works over the course of 60 years, which speaks to their own personal histories as much as the artists and patrons that preceded them.”

The exhibit sheds light on the geographic and social underpinnings that led to the emergence of this artistic practice, including the rise of the middle class, industrial development, and an environment encompassing both rural and urban landscapes. The paintings reflect everyday life as well as the aspirations of ordinary people, according to the curators. As industrialization flourished in central New England between 1800 and 1850, the area witnessed transformative advances in technology, improved transportation, and increased population, resulting in unprecedented levels of prosperity. Individuals carrying higher social status settled in the region seeking success and hired folk artists, particularly portrait painters, to document their achievements and growing families.

“Here in New England, it’s important for people to preserve their roots, the culture they had,” says Krashes, retired founder and CEO of the MMR Group. “On top of that, these paintings represent the first real American innovation in art. We now know that American folk portraiture is a truly original American form of art, not reliant on European traditions.”

Specific highlights of the collection include several examples of children’s portraiture by William Matthew Prior (1806-1873), who was a pioneer in making art accessible to the middle class and is recognized as one of the most influential figures in folk art history. Other highlights include examples of work by Ruth Henshaw Bascom (1772-1848), a prolific portraitist whose work can be characterized by its crisp lines, swaths of color, and silhouetted figures.

Also a part of this collection are painted furniture pieces, including a “Dome Top Box” attributed to an unknown artist from Worcester County and dating to around 1825, and a blanket chest by Nehemia Randall (1810), one of only two known works by this maker in existence. It was furniture that the Krashes first started collecting, after they purchased a 200-year-old home.

“We went to auctions for early American furniture, and started seeing paintings that no one wanted,” Krashes recalls. “Very early we decided we were interested in paintings only of children, because they were usually more colorful and more rare, and because our lives revolved around children.”

“In recent years, there has been a surge of interest in American folk art within the museum community and the art world at large. By presenting this exhibition, our hope is to contribute to the field an important chapter in American folk art history by focusing on the unique artworks being produced in antebellum New England.”
The exhibition examines the rise in art patronage and how the portrait served as both a reflection of social standing and a vehicle for preserving memory, often passed on from generation to generation.
Freshwater Lakes in Global Carbon Cycle

Lakes make up less than 3 percent of the landscape, but they bury more carbon than all the world’s oceans combined. In the global carbon cycle, freshwater lakes and reservoirs are hot spots of carbon cycling and important players in the global carbon cycle.

Understanding that role, as well as the impacts of climate change on freshwater lakes and reservoirs, is central to the work of Kevin Rose, who recently joined the faculty as the Frederic R. Kolleck ’52 Career Development Chair in Freshwater Ecology and assistant professor in the Department of Biological Sciences.

With a focus on aquatic ecology and biogeochemistry, Rose’s work will complement ongoing research through the Jefferson Project at Lake George. “My goal is to understand lakes in a larger context, as part of the global carbon cycle,” Rose says. “As a researcher, one way to get at that context is to look at water quality characteristics, such as water clarity. Water clarity is often tied to the presence of dissolved organic carbon.”

Dissolved organic carbon (DOC) refers to a broad group of molecules that come from the breakdown of organic matter in the watershed. A common example of DOC comes from tea—as dissolved organic carbons emanate from tea leaves when they are introduced into water. Similarly, DOC from leaves and other organic matter lend a brown tinge to lake water, reducing water clarity.

“In many lakes and reservoirs, DOC and algae are the top two contributors to low water clarity,” says Rose. “And water clarity in turn is a huge feature that regulates a number of other characteristics of lakes and reservoirs, such as the depth to which photosynthesis occurs, the depth to which UV radiation penetrates, and heat budgets.”

Nanophotonics expert and physics professor Shawn-Yu Lin has discovered a new type of thermal radiation—in between the two extremes of blackbody radiation and laser light—that could contribute to a cheaper, easier solution for converting sunlight to electricity.

This “third light” is promising because it possesses some of the more favorable traits of both blackbody radiation and laser light.

Thermal radiation impacts every aspect of daily life. Two of the best-known examples are the light emitted from the sun and from incandescent light bulbs. In both cases, the light is classified as blackbody radiation. It is random and broad spectrum, difficult to harness but easy to produce. In contrast, laser light is coherent and directional but difficult to create.

Lin’s newly discovered light is sharp and quasi-coherent—and can be produced relatively easily and inexpensively.

“It is tremendously exciting when science reveals something new about the fundamental nature of matter, and it is especially gratifying when such a discovery is made by a Rensselaer School of Science faculty member,” says School of Science Dean Curt Brenerman. “I am extremely proud of Professor Shawn Lin for identifying a striking new behavior of photonic crystals that could revolutionize the way we think about blackbody radiation—the common effect that explains why hot materials glow red, yellow, or blue-white depending upon their temperature.

“Right now, “solar efficiency is limited by solar radiation’s very broad spectrum, from ultraviolet to infrared,” Lin explains. “The solar cell only responds to certain wavelengths on the spectrum. The rest of the energy is lost.”

His discoveries raise the prospect of using 3-D photonic crystals and the process developed by his research team to convert broad-spectrum solar light to sharp emissions, of no more than a few colors—all of which could be absorbed and converted by the solar cell.
Evaluating Advanced Headlight Systems

Through its Transportation Lighting and Safety program, the Lighting Research Center (LRC) is evaluating the potential for new lighting technologies and approaches to improve driving safety at night, including new car headlight systems. For the study, vehicle manufacturer Audi AG has provided the LRC with an A7 equipped with adaptive high beam “matrix lights” that allow drivers to benefit from using high beams all the time while selectively dimming a portion of the beam in the direction of other drivers to prevent glare. In the Audi system, the beam pattern is split into numerous individual light-emitting diodes (LEDs) arranged in a grid or “matrix” that adapts to the surroundings in real time.

The LRC earlier studied adaptive high beams as part of a project for the National Highway Traffic Safety Administration (NHTSA) that resulted in a report to Congress on nighttime glare and driving performance.

LRC’s research for NHTSA demonstrated that forward visibility under adaptive high-beam systems was comparable to that under high beams, while disability and discomfort glare for oncoming drivers were comparable to levels experienced when facing low beams. The results of a recently published LRC study of driver visual performance suggest that nighttime crashes might be reduced up to 7 percent when adaptive high beams are used, relative to low-beam headlights.

The research team, led by Director of Transportation and Safety Lighting Programs John Bullough and LRC Director Mark Rea, is evaluating the safety impacts of these new adaptive high-beam systems, which are beginning to appear on international vehicle models.

“Our expectation is that testing at Rensselaer of the Audi MatrixBeam system used in Europe will help ongoing standards development efforts in the U.S.,” says Stephan Berlitz, head of development, lighting functions and innovations at Audi. “We believe the introduction of this technology in the U.S. would be very well-received by customers, just as it has been in Europe and elsewhere, so we are happy to do all that we can to support standards and test procedure development for the U.S. market.”

Although these systems have been widely used in many countries, few tests have been conducted in the U.S. Through the LRC’s evaluations, Bullough and Rea hope to provide objective evidence that might be useful in assessing whether and how adaptive high-beam systems might provide safety benefits compared to conventional vehicle headlights, and how to consistently measure and specify their performance.

The project was first developed for Audi by Rensselaer of the Audi MatrixBeam of development, lighting functions and innovations at Audi. “We believe the introduction of this technology in the U.S. would be very well-received by customers, just as it has been in Europe and elsewhere, so we are happy to do all that we can to support standards and test procedure development for the U.S. market.”

Although these systems have been widely used in many countries, few tests have been conducted in the U.S. Through the LRC’s evaluations, Bullough and Rea hope to provide objective evidence that might be useful in assessing whether and how adaptive high-beam systems might provide safety benefits compared to conventional vehicle headlights, and how to consistently measure and specify their performance.

The National Institutes of Health (NIH) has awarded $1.3 million to Ryan Gilbert, associate professor of biomedical engineering, to support research that could give hope to the thousands of Americans who sustain life-changing spinal cord injuries each year. The five-year grant, from NIH’s National Institute of Neurological Disorders and Stroke, will further Gilbert’s efforts to change cell behavior after spinal cord injury to enable and promote nerve regeneration.

Gilbert and his research team are developing biomaterials that change the behavior of astrocytes following spinal cord injury. Astrocytes are star-shaped cells of the central nervous system. After spinal cord injury, they form a cellular barrier around the injury site to protect it and contain the damage. However, the barrier also disrupts cell regeneration, increasing the likelihood that the spinal cord damage will be permanent.

In a 2014 study, Gilbert and his team demonstrated that electrosprun fiber scaffolds, made of biomaterial, could prompt astrocytes to behave differently—to display markers supportive of axonal regeneration. The NIH grant will help the researchers more fully understand the astrocyte response to the fibers, test them in animals with spinal cord injury and, hopefully, help restore function.

“Based on the data we have thus far, I’m confident that these fibers change astrocytes in positive ways—to support axonal regeneration instead of impeding regeneration,” Gilbert says. “That has far-reaching implications for those who have spinal cord or other traumatic neural injuries.”

Every year, about 12,000 Americans sustain spinal cord injuries that result in partial or complete paralysis below the injury site. “Within the next 10 years or so, I anticipate so many positive outcomes for those with spinal cord injuries—and that’s great news,” says Gilbert.
MAKING A DIFFERENCE

Understanding Healthy Growth and Development

IN AUGUST, RENSSELAER ANNOUNCED A $172,124 grant from the Bill & Melinda Gates Foundation to launch the Healthy Birth, Growth, and Development Knowledge initiative. The grant will be used to integrate multidisciplinary data to better understand the effects of risk factors on growth outcomes, and to develop effective solutions that improve child health around the world. According to the United Nations Children’s Fund (UNICEF), more than a quarter of children under age 5 worldwide are permanently “stunted” due to malnutrition.

This grant is part of a growing partnership between Rensselaer and the Gates Foundation, and the efforts of N.L. “Shasha” Jumbe ’97, who is a senior program officer of quantitative pharmacology with the Gates Foundation.

“By using advanced analytical, visualization, modeling, and semantic web informatics methodologies to extract information from multiple data sources, Rensselaer researchers will assess causal relationships, and quantify risk factors in order to develop novel hypotheses and targeted approaches to impact the health of children,” says President Shirley Ann Jackson.

The initial grant provides support for developing program-relevant ontologies and a set of semantic services, finding and integrating relevant data to support a wide range of analyses, and modeling to identify the intervention packages most effective and efficient for improving the healthy birth, growth, and development knowledge infrastructure.

Deborah McGuinness, Tetherless World Senior Constellation Professor and a member of the Rensselaer Institute for Data Exploration and Applications (IDEA) senior leadership committee, will serve as technical leader. Rensselaer faculty members and graduate students will collaborate with McGuinness on the project.

ATHLETICS

Miami Dolphins Get Their Kicks From Andrew Franks ’15

FORMER RENSSELAER FOOTBALL STANDOUT Andrew Franks ’15 has been named the starting kicker for the Miami Dolphins of the National Football League (NFL). An undrafted free agent, he became the first student-athlete from Rensselaer to play in an NFL regular season game when the Dolphins played the Washington Redskins on September 13. Franks made a 22-yard field goal and both extra point attempts. The Dolphins won 17-10.

“I am incredibly grateful to Miami for giving me this opportunity to realize my dream. I’m looking forward to doing great things here,” Franks tweeted after he was named starting kicker.

Franks, who graduated with a biomedical engineering degree in May, had an outstanding training camp with the Dolphins, consistently making field goals and drawing touchbacks on kickoffs. His longest field goal in preseason was 51 yards.

“We are so proud of Andrew,” says Rensselaer head coach Ralph Isernia. “His work ethic, determination and skill helped him realize a dream of getting to the NFL. The Dolphins are getting a world-class person and we, obviously, wish him all the best.”

One of the most celebrated student-athletes in school history, in 2014 the Carmel, Calif., native was a multiple National All-America as a senior, earning Little AP American Football Coaches Association (AFCA), and D3football.com All-East Region First Team, All-Liberty League Second Team, and Second (punter) Team, along with Special Teams Player of the Year.

For his career, Franks made 37 of 56 field goals and 115 of 123 point-after-touchdowns for 226 points. He averaged 61.2 yards on 202 kickoffs with 85 touchbacks. He set the school record of 61.2 yards on 202 kickoffs with 85 touchbacks. He established school records for career field goals (37), career touchdowns (85), and touchbacks in a season (33). A three-time Liberty League All-Academic honoree, he compiled 3,796 yards on 102 punt attempts with 31 that landed inside the 20-yard line.
Promoting High Performance Computing in American Industry

Lawrence Livermore National Laboratory (LLNL) and Rensselaer are combining decades of expertise to help American industry and businesses expand the use of high performance computing (HPC) under a recently signed memorandum of understanding (MOU).

“It’s well recognized that HPC is key to accelerating technological innovation and to fueling a nation’s economic vitality,” says Fred Streitz, director of LLNL’s High Performance Computing Innovation Center. “Our long, fruitful history of collaboration and joint scientific and technological discovery with RPI is a natural platform on which to build opportunities for companies to advance through the use of HPC.”

Livermore and Rensselaer will look to bridge the gap between the levels of computing conducted at their institutions and the typical levels found in industry. Scientific and engineering software applications capable of running on HPC platforms are a prime area of interest.

“The lack of highly scalable codes, especially commercial ones, presents a real barrier for companies, as does the integration of such codes into existing business workflows,” says Chris Carothers, director of the Rensselaer Center for Computational Innovations (CCI). “Companies have built whole workflows around these applications, but they don’t scale to the platforms available now and they won’t scale to the newer generations of upcoming platforms. This leaves them locked in a position unable to capitalize on advanced R&D solutions that are there for the taking.”

Both Livermore and Rensselaer have built robust computational ecosystems equipped with the necessary resources to scale codes, including the hardware and infrastructure needed for testing and validating the codes, infrastructure, tools for optimization and debugging, and the people harboring the expertise and experience required to program at scale.

The MOU will allow LLNL and Rensselaer to better support the National Strategic Computing Initiative (NSCI) announced by President Obama on July 29, 2015. The NSCI guiding principles ensure continued U.S. leadership in supercomputing by fostering “public-private collaboration, relying on the respective strengths of government, industry, and academia to maximize the benefits of HPC,” and “applying new HPC technologies broadly for economic competitiveness and scientific discovery,” according to the executive order issued by the president.

“We bring complementary strengths to this collaboration. Both Rensselaer and LLNL have a lot of experience developing new software applications, as well as scaling up existing applications. We’re able to draw on the knowledge and work we’ve created and apply it toward advancing industry,” Carothers says.

According to June Deery, associate professor in the Department of Communication and Media, reality TV has changed television and changed reality, even for those who are not among the millions who watch. Deery’s latest publication, Reality TV, is written for a broad audience and it addresses questions such as: How real is reality TV? How do its programs represent gender, sex, class, and race? How does reality TV relate to politics, to consumer society, to surveillance? What kind of ethics are on display?

Drawing on current media research and the author’s own analysis, the publication encompasses the history and evolution of reality television, its production of reflexive selves and ordinary celebrity, its advertising and commercialization, and its spearheading of new relations between television and social media.

“To dismiss this programming as trivial is easy,” says Deery. “Today, reality television merits serious attention and I believe that the analysis included in this study will interest students in media studies, cultural studies, politics, and sociology—or anyone who is simply curious about this global phenomenon.”

Deery’s research focuses on media studies and she is particularly interested in contemporary television and its interface with the Internet. She writes on commercialization, politics, gender, and class. For some time, Deery has also been investigating cultural understandings of fact and fiction and is now exploring their status in multiformat environments.

Experimental Media and Performing Arts Center

New Book Documents Diversity of EMPAC Projects

This fall, the Curtis R. Priem Experimental Media and Performing Arts Center (EMPAC) celebrated the release of Programming EMPAC: The First 4,158 Days, a 688-page book presenting all the events, projects, and works developed and presented at EMPAC thus far. Conceived as a center spanning media, technology, performing arts, and research, EMPAC was a founding initiative of The Rensselaer Plan and has become representative of The New Polytechnic, Rensselaer’s commitment to fostering high-tech multidisciplinary collaboration and learning. Programming EMPAC documents every performance, residency, and research project dating from 2003 to the present.

Over this period of time, hundreds of people from a wide range of backgrounds and disciplines came to create new work—artists, scholars, researchers, and students—all in collaboration with EMPAC’s team. The hardcover book begins with EMPAC in its current state, and ends with its first project: the Wooster Group’s THERE IS STILL TIME... BROTHER. Each project entry is a snapshot, with a brief description and vivid images that combine to form a portrait of EMPAC.

“Now everyone can hold EMPAC in their own lap—seven pounds and 688 pages give an incredible testimony to what Rensselaer kicked off with EMPAC as an absolutely unique center in the academic world,” says Johannes Goebel, director of EMPAC. “Even if you have never been to an EMPAC event, or if you had no idea what EMPAC was about, this book will draw you into the multitude of activities in experimental media and performing arts created by EMPAC over the past 10-plus years.”

Readers can download a free PDF of the book or order a hardbound coffee-table version of the book. Go to empac.rpi.edu/publications/programming-empac.

Club Sports

Wrestling Announces The All-Decade Team

Rensselaer head wrestling coach Brad Nelson has announced the first all-decade team in the program’s history. Voting from previous team captains over the past decade, along with a list of prerequisites, determined the team honorees.

“This is such an honor for our program to recognize these individuals,” says Nelson. “There are so many great student-athletes over the past 10 years who have had a hand in building the vision and foundation for this program. It’s great to have them recognized.

I wish everyone could be on it, but this list is truly about the best of the best in many areas.”

Nelson cites one common attribute among the 17 wrestlers named to the all-decade team: work ethic. “They all worked hard,” he says of his former athletes. “They bought into what we wanted to build and what we’re about; they put their heads down and went to work. Through the speed bumps, ups and downs, we just kept progressing.”

And progress they have. From the beginning in 2004 through today, the program has enjoyed much success. It fills a void in upstate New York’s Capital Region as the only school in an 85-mile radius with a wrestling program. Rensselaer has qualified 65 wrestlers for the National Championships, boasted seven national All-Americans, nine National Wrestling Coaches Association (NWCA) Academic All-Americans, four NYS NWCA Dual Meet Championship titles, and five top-four team finishes in the Northeast Conference Championships, to name a few. All of this happened while maintaining a team GPA of 3.25 or higher over the years.

Here is the 2004–2014 All-Decade Team Listing (in order of weight class): Jeff Streu ’12, Kevin Bishop ’09, Ethan Kirk ’14, Kurt Munz ’05, Matt Gineo ’10, Glenn Van Moffaert ’11, Ryan Michaels ’10, Robert Venditti ’07, John Steciuk ’08, Mat White ’12, Aaron Asch ’11, Eric Pace ’07, Jon Pappas ’04, Chris Stabler ’11, Brian Jennings ’11, Mike Sell ’03, Dwight Manganaro ’09.

Follow and “like” RPI Wrestling on Facebook.
PETER FOX, professor and chair in the Tetherless World Constellation and director of the Information Technology and Web Science program, has been elected a fellow of the American Geophysical Union. Fox was selected for “fundamental contributions and impact in science knowledge representation and establishing the Earth and space science informatics discipline.” Fox’s research covers the fields of distributed semantic data frameworks, ocean and environmental informatics, computational sciences and cognitive computing, digital humanities, exploratory large-scale visualization, and solar and solar-terrestrial physics.

KRISTIN BENNETT, professor of mathematical sciences, has been named associate director of the Rensselaer Institute for Data Exploration and Applications (IDEA). Bennett’s research focuses on extracting information from data using novel predictive and/or descriptive mathematical models, and data visualizations, and the applications of these methods to support decision making, and to accelerate discovery in science, engineering, public health, and business.

LEE LIGON, associate professor of biological sciences, has been awarded a Science & Technology Policy Fellowship through the American Association for the Advancement of Science (AAAS). With the support of the 2015-16 fellowship, Ligon will serve for one year at the U.S. Agency for International Development (USAID) in Washington, D.C. While at USAID, Ligon will work on international human rights policy, specifically advancing lesbian, gay, bisexual, transgender, and intersex inclusive development. The initiative is an extension of the agency’s history of advancing human rights by supporting and assisting marginalized and vulnerable populations, and promotes LGBTI-equality efforts through the integration of rights and empowerment in policies and programming.

STANLEY DUNN, vice provost and dean of graduate education, has been elected to serve a three-year term on the Executive Committee of the Northeastern Association of Graduate Schools. The organization is one of four regional affiliates of the Council of Graduate Schools, which is the only national organization in the U.S. dedicated solely to the advancement of graduate education and research.

JOEL PLAWSKY, professor of chemical and biological engineering, has been named head of the Howard P. Isermann Department of Chemical and Biological Engineering. Plawsky’s research interests are at the intersection of colloids and interface science, transport phenomena, and advanced materials. He is considered a world-class expert in transport processes occurring in thin films. He holds seven patents, has been awarded more than $5 million in research funding, and has published more than 135 articles in peer-reviewed journals.

LEE MCELROY JR. has been named director of athletics, after serving as an interim director. He is responsible for overseeing 12 men’s and 11 women’s National Collegiate Athletic Association (NCAA) intercollegiate teams (two Division I and 21 Division III), involving more than 550 student-athletes, as well as the intramural sports program, which engages over 2,000 students. During his 14 years as vice president and director of athletics at the University at Albany, McElroy was appointed to the NCAA Management Council, elected president of the National Association of Collegiate Directors of Athletics, and served as a member of the Board of Trustees for the United States Sports Academy.

RUSSELL WEINSTEIN, assistant professor of economics, has received a 2015 Upjohn Institute Early Career Research Award for his work on the labor market effects of the relocation of financial firms to Delaware in the 1980s. The W.E. Upjohn Institute for Employment Research is an independent research organization devoted to investigating the causes and effects of unemployment. The Institute’s Early Career Research Grants are intended to provide resources to junior faculty to carry out policy-related research on labor market issues.

ASSAD OBERAI, professor of mechanical, aerospace, and nuclear engineering and the associate director of the Scientific Computation Research Center (SCOREC), has been named associate dean for research and graduate programs in the School of Engineering. He will focus on growing the research enterprise by building research teams to address grand challenges, increasing collaborations with industry and foundations, and strengthening engineering graduate programs through recruiting and mentoring of outstanding graduate students. Oberai’s research focuses on development of computational algorithms to model complex multiscale problems, in turbulent flows and tissue mechanics.
A SENSE OF PLACE
Steven Ehrlich ’68 and the team at Ehrlich Architects merge natural elements with the highest building technology to create extraordinary structures that are as sensitive to sustainability and local building traditions as they are to culture, place, and our deep predilection for human interaction.

The vast work of this Los Angeles, Calif.-based firm bedecks landscapes around the globe. From a 500-seat mud-walled university theater in Nigeria, to an airy, solar-paneled Arizona courthouse, to a brownfield-site-turned-nature-center in Los Angeles County, Ehrlich Architects designs buildings that are thoughtful, impactful, adaptable, and relevant. Ehrlich’s creations, in concert with the firm’s collaborative office culture, recently earned the firm one of the industry’s highest honors.

“The marriage of the particular with the universal is one of the great virtues of the firm’s design approach, where connections between culture, climate, people, and place are woven together in a distinct humanistic architecture shaped by circumstance,” wrote Steve Dumez, principal of New Orleans, La.-based Eskew+Dumez+Ripple, in a recommendation that helped earn Ehrlich Architects the American Institute of Architects’ (AIA) Architecture Firm Award for 2015.

The Architecture Firm Award recognizes a practice that “consistently has produced distinguished architecture for at least 10 years.” The 52nd such award presented in as many years, it is the loftiest honor the AIA bestows on an architectural practice.

Over the last 35 years, Steven Ehrlich, FAIA, evolved a genre of architecture that he describes as “multicultural modernism.” It’s a philosophy that blends the simple, vernacular architecture that he embraced during the six years he spent in Africa right out of college with the natural, organic elements of California modernism.

Multicultural modernism considers the site’s climate and constraints as equally as the community’s inhabitants and culture. Sustainability is the taproot of every design.

“It comes down to how can we be both global and local, taking into consideration weather, light, and other elements? And how can we take that fundamental wisdom and also embrace all the possibilities that modern technology has to offer?” Ehrlich says.

The work performed by Ehrlich, his three partners Takashi Yanai, Mathew Chaney, and Patricia Rhee, and the firm’s team of 30 spans the globe, touching almost every landscape. Their projects include cultural centers, libraries, research labs, university arts centers, mixed-use developments, government complexes,
675 West Kendall Street Biotech Laboratory, Cambridge, Massachusetts

700 Palms Residence, Venice, California
hotels, and the homes of some of the most unique people in the world. Each structure treads lightly on the native surroundings.

“This award is an outstanding affirmation, not only of the excellence of Steven Ehrlich’s work, but also of the impact his firm has had over many decades. I’m proud to say that Rensselaer has produced an international leader in the profession of architecture,” says Evan Douglis, dean of the School of Architecture at Rensselaer.

A DELICATE BALANCE

Ehrlich’s designs are noted for balancing environmental stewardship, changing technological industry practices, and responding on the highest level to the complex demands of site-specific communities and cultures. This unified vision, says Douglis, is often missing today from many building designs.

“We have to be careful in the 21st century, as we commit ourselves to the project of sustainability, that we don’t lose sight of the important attributes that underlie great buildings with respect to acknowledging architecture as a ‘social project.’ Buildings need to be experientially enlightening and inspiring, and also bring a sense of joy, celebration, and excitement to the people who pass through them,” Douglis says. “This has been a priority for Steven Ehrlich, and he has certainly risen to the occasion throughout his career when it comes to engendering public space with a powerful sense of community.”

Architecture is changing rapidly, with technology at the heart of the improved design systems that are advancing the industry. Computer-aided drafting and building information modeling software allow architects, engineers, and other craftspeople to better visualize concepts through renderings, simulate how a design will perform in the real world, and operate more efficiently when different sectors work on the same project.

Still, Ehrlich says, successful architects need a rounded education that incorporates the arts into the curricula, much like the education he received at the Rensselaer School of Architecture. Ehrlich was accepted to every college he applied to, but chose Rensselaer because its School of Architecture was doing the most interesting work, he says.

“It was a very powerful experience, studying there for five years,” says Ehrlich, who grew up in Radburn, N.J. The father of three adult daughters and grandfather of a 6-year-old boy, Ehrlich lives with his wife, Nancy Griffin, a journalist and best-selling author, on the western fringes of Los Angeles in Venice.

Good architects appreciate the richness that a community’s history and culture bring to a project, and an arts education allows them to bring that informed perspective into their work, Ehrlich says. It is a human aspect of design that computer software cannot address.

“I think the practitioners of the future need to be very ambidextrous. Not only must they have computer skills, but they also must be very creative and able to draw by hand. They should be open-minded and flexible, and able to make multiple use of various tools and disciplines,” Ehrlich says.

CONVERSATION BY DESIGN

Ehrlich sees technology’s function in architecture as a means of bringing people and nature together, provided technologists embrace their roles as humanists. It’s a role that values human connection and dialogue.

When it opened in 2003, a biotech lab designed by Ehrlich Architects and located in the center of the burgeoning research community in Cambridge, Massachusetts, featured a huge inner atrium with terraces overlooking the center of the building where people could see others gathering. The idea behind these “living rooms in the sky” was to create highly visible platforms where people would be encouraged to communicate in casual, open settings. The architect was SMMA from Cambridge, Massachusetts, whose founder, the late Jon McKee, was also a Rensselaer graduate (Class of 1949).

“There are certain fundamentals regarding how humans gather and relate to each other. It’s still greatly important that people get together and work in a collaborative format because solving problems is a collective effort. In our designs, we want to bring people together, and enhance the chance encounter,” Ehrlich says.
“IT’S STILL GREATLY IMPORTANT THAT PEOPLE GET TOGETHER AND WORK IN A COLLABORATIVE FORMAT BECAUSE SOLVING PROBLEMS IS A COLLECTIVE EFFORT. IN OUR DESIGNS, WE WANT TO BRING PEOPLE TOGETHER, AND ENHANCE THE CHANCE ENCOUNTER.”

STEVEN EHRlich ’68
Another project, an arts center at the University of California at Irvine (UCI), offers yet another window into the firm’s philosophy for converging culture, climate, and environment.

The contemporary campus arts center is a functional, modern blend of brick tile, concrete masonry, and glass. It engages the school’s arts community through a series of balconies, terraces, and open walkways and studios that encourage social interaction. Energy use was minimized by wrapping the exterior of the building with breathable, naturally ventilated rooms and corridors, thereby containing the need for air conditioning to the interior theater and gallery areas. Opened in 2012, the UCI Contemporary Arts Center received the Leadership in Energy & Environmental Design’s (LEED) highest-rated certification of Platinum. Despite all its modern nuances, the arts center blends seamlessly with the rest of the 50-year-old urban campus.

“This project melded the wisdom of the indigenous builder while implementing current technologies as a paradigm for the future,” Ehrlich says.

As a recipient of the AIA’s two most prestigious awards—the Architecture Firm Award (1994) and the 2010 Gold Medal (awarded to an individual architect)—Peter Bohlin ’58 understands the significance associated with the AIA’s top awards. Bohlin, who serves with Ehrlich on the School of Architecture’s advisory board, wrote another of the letters recommending Ehrlich Architects for this year’s Architecture Firm Award.

“Steven Ehrlich is an extraordinarily fine architect. The firm is a very good example of a modern architecture practice—servicing the full range of clients, institutions, and people in our society. His work is particularly noted for its preciseness. He’s also truly interested in the nature of each place and each client,” says Bohlin, whose architecture firm, Bohlin Cywinski Jackson, has grown from Bohlin and Powell, a two-man team with a tiny office in Wilkes-Barre, Pennsylvania, to an internationally recognized firm with five offices around the country.

Bohlin credits his education at Rensselaer with giving him the springboard from which to succeed. “It gave me a good grounding in the technical aspects of architecture while also nurturing my heartfelt interests in design. I think Rensselaer excels at bridging the world of technology with being a humane place that also nurtures the nature of people,” Bohlin says.

OFFICES WITHOUT WALLS

The culture at Ehrlich Architects—from the diverse staff of designers to the open layout of the offices—reflects the inclusive, multicultural philosophy that the firm weaves into all of its designs. All 35 people work within one large space, in a converted dance hall located in Culver City in western Los Angeles County. The space is open and shared by all, including Ehrlich and his partners.

“Having no private offices breaks down the hierarchy and makes for a more open matrix of communication,” Ehrlich says. He also points to the distinctly different cultures that help shape an eclectic team that is 50 percent women.

Ehrlich opened the firm in Los Angeles in 1979, shortly after spending six years in Africa, including two years in Morocco with the Peace Corps and teaching on his own at Ahmadu Bello University in Nigeria. While there, he became increasingly fascinated with courtyard architecture, and the ways in which people lived indoors and outdoors. After returning to the U.S. and visiting a sister in Los Angeles, Ehrlich decided that the California climate offered the perfect opportunity to explore this dynamic.

Reflecting on his time in Africa, Ehrlich is convinced that travel and exposure to other cultures added another level to his work: “To be a good architect you need to experience life and new cultures, and understand how those experiences can affect designs for the future.”

A CHANGING INDUSTRY

The Rensselaer School of Architecture continues to gain international recognition through programs that enable students to work at the nexus of science, technology, and the arts. The school also is launching new programs that respond to the changes in this rapidly evolving field.

A program beginning this fall will provide graduates with a bachelor of science in building science, a four-year degree. The study of building science focuses on phenomena that inform the design, construction, and operation of next-generation buildings, with students choosing a concentration in construction management, structural engineering, sustainability, lighting, or architectural acoustics.

“We’re very excited about growing the intellectual diversity of the school,” says Dougis. “In fact, beyond the launch of our new B.S. program, the expansion of our graduate programs, and the arrival of exciting new and dynamic faculty, we’re also embracing the all-Institute initiative art_x, which promotes a stronger interface between the arts and the sciences throughout Rensselaer. Although this is certainly not a new proposition for the discipline of architecture, given the intrinsic affiliation historically between the arts and sciences, we’re very enthusiastic about facilitating this important agenda at the Institute level, since it will inevitably result in strengthening the leadership capabilities of the next-generation RPI graduate.”

Architecture, much like other professions linked to the construction industry, took a giant hit after the economic crisis, losing 60,000 jobs between 2008 and 2011. Now, with unemployment numbers declining, consumer spending on the rise, and building on the rebound, demand for architectural services is growing. And that means firms are hiring again.

The U.S. Labor Department’s Bureau of Labor Statistics projects that employment for architects will grow 17 percent...
"HAVING NO PRIVATE OFFICES BREAKS DOWN THE HIERARCHY AND MAKES FOR A MORE OPEN MATRIX OF COMMUNICATION."

STEVEN EHRLICH '68

Ehrlich Architects’ Studio, Culver City, California
Ehrlich Architects’ partner group: Steven Ehrlich, FAIA, RIBA, Takashi Yanai, AIA, Mathew Chaney, AIA, Patricia Rhee, AIA
Russell Davidson, M.Arch. ’86, sits on the board of directors that reviewed the applications for this year’s 2015 Architecture Firm Award. Davidson, incoming 2016 AIA president, is president and managing partner of Kaeyer Garment & Davidson Architects, PC, a 27-person firm in Mount Kisco, in New York’s Hudson Valley.

“What struck me about Steven’s firm is the legacy of quality, social relevance, and the inclusive and diverse composition of the firm. Their philosophy of multicultural modernism is right on target for what the world needs from the architectural profession. I really saw the practical and creative mix that I obtained at RPI, fully matured in the work of Steven’s firm. They do great work that matters to people and it doesn’t look like it is trying to be ‘design.’ It is just plain excellent architecture,” Davidson says.

Indeed, winning AIA awards is not new territory for Ehrlich Architects. In 1997 they were honored with three National AIA Design awards, a rare achievement attained by only three other internationally recognized architects in a single year. But Ehrlich is most proud of the National Architecture Firm Award because it distinguishes the entire team.

“It’s important because it recognizes not just the work of the individual, but also celebrates the matrix of people who collaborate. It really talks about a shared creativity and an energized way of working together,” Ehrlich says.

The AIA plaque honoring this year’s Architecture Firm Award acknowledges Ehrlich Architects for “seamlessly weaving classic California modernist style with multicultural and vernacular design elements, creating something new yet familiar to those communities served by their work. The firm, itself a tapestry of diverse talents and experiences, is leading the professional beyond the walls of the atelier out on to the street and countryside to solve contemporary problems by shaping a more inclusive, humanistic architecture that respects climate, culture, and the genius of place.”

Ehrlich Architects’ designs have been featured in Architectural Digest, Global Architecture, The New York Times, and dozens of other highly regarded industry publications. The firm has won more than 150 awards, including eight National AIA Design Awards and the AIA California Firm of the Year in 2003. The AIA Housing Award that the firm received in 2009 recognized Ehrlich’s own home, 700 Palms, which he built in 2004, which harmonizes with the spirit of his upbeat bohemian Venice neighborhood in Los Angeles.

The almost net zero-energy residence on a busy corner lot combines rustic, recycled materials with a sleek, modern aesthetic. An open floor plan incorporates a narrow indoor pool adjacent to the living room that is popular with Ehrlich’s grandson. The three-bedroom home is cooled through natural ventilation and heated by hot water pipes under the floor, and photovoltaic panels on the roof generate electricity. A glass bridge suspended by steel cables and leading to the second floor—one of Ehrlich’s favorite features—illustrates how technology, art, and primal elements like a huge concrete block wall can exist in unison.

Another key component, the safe processing of immigration defendants, was addressed by designing separate circulation systems for the defendants, court employees, and the general public. “It’s a contemporary interpretation of an ancient solution,” Ehrlich says. The courthouse was named for U.S. Judge John Roll, who died along with five others in the 2011 supermarket parking lot attack that seriously wounded then-U.S. Rep. Gabrielle Giffords.

More recently, Ehrlich is particularly energized by a project that will bring his attentions back to the Hudson River Valley. He is designing a new home in Rhinebeck, Dutchess County, for a couple he met while his family was vacationing at a lake house near Rhinebeck.

The house, which will be built on a 10-acre lot ringed by 300-year-old trees near the center of Rhinebeck, will reflect the firm’s multicultural-modernist philosophy by uniting contemporary design with Rhinebeck’s longstanding building traditions. Its roof and exterior walls will be constructed using modern, corrosion-resistant steel, and weathered barn board installed for siding will weave in the region’s rich farming history.

“Artistically, this project excites and challenges me to create a contemporary vision that is influenced by the rich architectural history of the Hudson Valley,” Ehrlich says, “as well as my client’s interest to incorporate the ancient Japanese philosophy of wabi-sabi and my interest in being local and global simultaneously.”

A few structures remain on Ehrlich’s bucket list: a church or other religious space, a museum, and even a gas station. And a building at Rensselaer Polytechnic Institute.

“Wouldn’t that be great,” Ehrlich says, “to design something for my alma mater?”

From 2012 to 2021, faster than the 10.8 percent projected for overall job growth. The AIA’s chief economist, Kermit Baker, estimates that 6,100 of the 10,400 architectural jobs added since 2011 were added last year, and architecture firms have gained back more than three-quarters of the revenue they lost between December 2007 and June 2009.
A Smart Lighting Revolution

The Smart Lighting Engineering Research Center is developing the systems that will transform the way we live, work, and communicate.

BY JODI ACKERMAN FRANK
LET THERE BE LIGHT, for every step we take throughout a building—automatically, without ever having to touch a switch. Let there be light that will brighten, dim, provide any color we want depending on the task at hand, without having to think about it.

Let there be high-quality light shining down from our everyday light fixtures to transmit data to our laptops and cell phones, network our electronic devices via the Internet for better efficiency, and provide wireless access when and wherever we want it, all while saving energy.

This is the vision of the Rensselaer Smart Lighting Engineering Research Center (Smart Lighting ERC). The mission is to develop next-generation solid-state lighting systems that provide tightly knit assemblages of lighting sources, sensors, and controls that have the power to transform the way we live, work, and communicate.

The result will be lighting systems that are not just relegated to illuminating a room. They will be smart systems that create new ways to optimize human health, safety, and productivity.

In hospitals and homes, for example, a smart lighting system could detect when someone has fallen and summon help, without invading their privacy. Such lighting systems also will one day communicate with building control systems to improve heating, ventilation, and air conditioning operation, as well as security, by knowing where people really are, to automatically provide the right lighting-enabled services when and where they need them.
We are developing smart lighting systems that will provide information to us, directly through the light, which will be faster than the radio frequencies we now use.”

ROBERT KARLICEK

Just as adjusting the color and intensity of light may help contribute to the health and well-being of people, lighting can be used to maximize plant growth. ERC senior research scientist and plant physiologist Tessa Pocock is researching ways in which plants can control their own lighting needs.

Before Pocock joined the ERC team in 2014, she served as director of research at Heliospectra AB, a Swedish company that specializes in LED lighting systems for plant research and greenhouse cultivation. There, she ran a program to develop specific LED light regimes to optimize plant growth while manipulating plant morphology and biochemistry naturally.

“One thing I’m really interested in is increasing nutrient value in crops, and you can do that just by using dynamic LED lighting systems,” Pocock says.

In her lab, Pocock has several growth chambers, where she keeps rows of kale, basil, and a variety of lettuces. The plants are exposed to various combinations of red, blue, and green LEDs. All parts of the visible spectrum are used in photosynthesis, but light also affects plant development. Adding more blue or red light affects different plants in different ways. Red tends to affect germination, plant height, flowering, and leaf area. Blue light affects a plant’s biochemistry, and therefore the nutrient level.

“Light and plants have a complex and important association. By changing the spectrum, you can shake up the plant’s biochemistry and you can push the light-regulated genes to their maximum capacity,” Pocock says. “You can control and regulate the pigmentation, and therefore the nutrient value. The more red the lettuce, for example, the more nutritious it is.”

Plants also emit their own light that is just beyond our visual range, which can be detected with today’s advanced optical instruments. When a plant is under stress, for instance, it will emit deeper red light.

With this knowledge, Pocock is developing a biofeedback system that will allow plants to communicate their lighting needs. The concept is that a plant, through its own light, will signal to the biofeedback device what type of lighting it needs at a given moment. An LED lamp will then automatically adjust to the right setting.
Researchers are also using the visible light spectrum to build new telecommunication technologies that could exceed the speed of today’s best radio frequency (RF) broadband and wireless capabilities to transmit data in unprecedented ways. There are huge implications simply in the ability to control the color of light at any given time, thanks to the advancements in light-emitting diodes (LEDs).

“At the ERC, we are building smart lighting systems that automatically adjust the right lighting for us at any given time, with light coming from the right direction, with the right color and intensity, optimized for human health and productivity,” says ERC Director Robert Karlicek. “At the same time, we are developing smart lighting systems that will provide information to us, directly through the light, which will be faster than the radio frequencies we now use.”

The Smart Lighting ERC, established in 2008 with an $18.5 million grant from the National Science Foundation (NSF), is one of 17 ERCs in the United States. The purpose of the ERCs is to develop interdisciplinary research and education programs in partnership with industry aimed at accelerating the commercialization of university research. The goal is to advance technology and innovation to address significant societal problems and enhance the foundation for economic competitiveness.

The core research partners of the Smart Lighting ERC are Boston University and the University of New Mexico, along with outreach partner schools Thomas Jefferson and Tufts universities. Howard University, Morgan State University, and Rose-Hulman Institute of Technology serve as educational outreach coordinators. Twenty faculty from Rensselaer, along with 10 researchers from Boston University and the University of New Mexico, serve as the research core of the Smart Lighting ERC.

The ERC has enlisted nearly 30 industry partners so far, including major lighting companies GE Lighting, Philips, Osram Sylvania, and Acuity Brands. Other industry collaborators include ABB, which specializes in automation technologies, and AMS, a global provider of high-performance sensors and analog integrated circuits.
Imagine your whole ceiling is a camera now, but you only have one pixel in every light fixture. That’s your new camera, a five-pixel camera. What can you do with that?”

ROBERT KARLICEK
contributes to about 15 percent of the total electrical energy consumption in the U.S.,” says Sina Afsahi ’15, a Smart Lighting ERC postdoctoral associate who was involved in the design of the conference room's lighting system. “We have shown in our research that this number can be decreased by half without loss of illumination quality.”

The color spectrum control capabilities of the lighting in the Smart Conference Room have generated interest from two faculty members who collaborated on a study called Lighting and Mindful Practice (LAMP). The study assessed a meditation practice for stress reduction in the context of different lighting conditions.

Tomie Hahn, associate professor in the Department of the Arts and director of the new Center for Deep Listening, taught a course called Deep Listening and Creativity. Deep Listening is a meditation practice developed by Rensselaer Distinguished Research Professor of Music Pauline Oliveros that is based on music, visual art, science, and technology. Alicia Walf, a neuroscientist who specializes in hormones and stress, is a lecturer in the Cognitive Science Department. She taught a course called Stress and the Brain.

The two classes composed of 35 students met in the conference room for three sessions. The students were exposed to various levels of white light of fixed color temperature and brightness, but with variable color rendering. Students took their heart rates and blood pressure and filled out questionnaires about stress before and after five minutes of meditation.

The lower the light’s color saturation (in which the colors looked more washed out), the higher the perceived stress levels were among the study’s preliminary findings. Heart rates were also the highest under low-saturation conditions. The study was presented at the Psychology Convention at Hunter College in New York City in April.

“It’s valuable to note how different lighting conditions in tandem with Deep Listening meditation practices affect stress levels,” Hahn says.

Karlicek adds, “This new ability to dynamically control the color properties of lighting is being studied in health care, education, and workplace settings to improve well-being and productivity, but there is still a lot to learn.”

Also installed on the ceiling of the Smart Conference Room are 18 time-of-flight (ToF) sensors that form a low-resolution "distance-image" for occupancy sensing and detection. These emerging sensor applications are the primary ERC focus of Richard Radke, ERC deputy director and professor in the Department of Electrical, Computer, and Systems Engineering (ECSE).

During the outset of the ERC research agenda, Karlicek presented Radke with a challenge: “Imagine your whole ceiling is a camera now, but you only have one pixel in every light fixture. That’s your new camera, a five-pixel camera. What can you do with that?”

The idea is that in order to make lighting systems smart, they have to "see," but not so much that they invade privacy.

“The best thing I can do with a current lighting system is put in an occupancy sensor, which can sense that someone has walked into a room. But if the person doesn’t move for 15 minutes, the light turns off again until you wave your arms. That’s not smart lighting. That lighting system is blind,” Karlicek says.

“It would have been a lot easier to use normal digital cameras to help build smart spaces,” says Radke, who specializes in computer vision algorithms for large-scale, human-aware environments. “But we knew the importance of privacy-preserving technologies from the very beginning. You don’t want to feel like your room is watching what you’re doing.”

Radke compares the ToF sensors to the “laser measuring tape” available at hardware stores that measures distances between objects in a room using only light. ToF sensors operate on a similar principle, except that they use modulated infrared light to measure distances. The images on the receiving monitor are viewed as colorful blobs moving about in the conference room, where each person only occupies a few pixels.

The development of the conference room test bed started out with a single overhead ToF sensor in Radke’s lab that covered a space no larger than a student’s desk.

“The ToF sensor is totally different from conventional camera technologies. All the well-developed detection and tracking methods do not apply,” says Li Jia ’14, who earned her Ph.D. in
“There hasn’t been a way to accurately and automatically measure a person’s circadian rhythm unobtrusively. Our technology provides a way to accomplish this.”

John Wen

John Wen, ECSE professor who heads the Department of Industrial and Systems Engineering, is leading a research team that has developed a software application that automatically estimates an individual’s circadian rhythm. It does this by tracking periodic components of body temperature, heart rate, and other signals that make up the phases of circadian rhythm.

The Rensselaer researchers are working with a team led by George Brainard, a neuroscientist who directs the Light Research Program at Thomas Jefferson University, to evaluate the application on patients with traumatic brain injuries. The researchers also are collaborating with a team at the University of New Mexico to study circadian rhythms of individuals with sleep disorders.

“We are exploring areas of human health factors in which smart lighting technology may be employed to improve symptoms and recovery of patients,” Brainard says. “We are studying daytime fatigue, sleep problems, circadian rhythm disturbances, and mood changes that are often reported by individuals who are outpatients suffering from concussion or stroke.”

Brainard is also collaborating with other Smart Lighting ERC researchers and NASA to design and test lighting systems that are intended to improve the circadian adaptation, sleep, and performance of astronauts.

The circadian rhythm can vary slightly from person to person, and even in the same individual over time, in part because the sleep-wake cycle is slightly longer than the 24-hour day. This makes it difficult to create a one-size-fits-all therapeutic light solution.

“So far, there hasn’t been a way to accurately and automatically measure a person’s circadian rhythm unobtrusively,” Wen says. “Our technology provides a way to accomplish this and will therefore help doctors and others build a customized approach for light therapy.”

The app, which is being developed for smartphones as well as for the fitness tracking wristband called Microsoft Band and for other wearable devices, can be connected to lighting systems, or even a simple light box, to help shift an individual’s circadian rhythm back to its normal pattern.

COLOR FOR HEALTH, PRODUCTIVITY, AND WELL-BEING

It is well known that daily cycles of light exposure regulate our circadian rhythms, which repeat themselves about every 24 hours, including the sleep-wake cycle.

Using specific types of light at certain times of the day or night can enhance or hinder the onset and quality of sleep, which has numerous ramifications for human health, productivity, and well-being.

For example, if an LED fixture is adjusted to emit a greater amount of longer wavelengths of light that mimic the setting sun (light that we see in shades of red), it could help some individuals with insomnia sleep better. On the other hand, workers in a factory or in an office environment might be exposed to light that is enriched with short-wavelength (blue) light to enhance productivity. The same blue-enriched light may increase learning in the classroom.

John Wen, ECSE professor who heads the Department of Industrial and Systems Engineering, is leading a research team that has developed a software application that automatically estimates an individual’s circadian rhythm. It does this by tracking periodic components of body temperature, heart rate, and other signals that make up the phases of circadian rhythm.

The Rensselaer researchers are working with a team led by George Brainard, a neuroscientist who directs the Light Research Program at Thomas Jefferson University, to evaluate the application on patients with traumatic brain injuries. The researchers also are collaborating with a team at the University of New Mexico to study circadian rhythms of individuals with sleep disorders.

“We are exploring areas of human health factors in which smart lighting technology may be employed to improve symptoms and recovery of patients,” Brainard says. “We are studying daytime fatigue, sleep problems, circadian rhythm disturbances, and mood changes that are often reported by individuals who are outpatients suffering from concussion or stroke.”

Brainard is also collaborating with other Smart Lighting ERC researchers and NASA to design and test lighting systems that are intended to improve the circadian adaptation, sleep, and performance of astronauts.

The circadian rhythm can vary slightly from person to person, and even in the same individual over time, in part because the sleep-wake cycle is slightly longer than the 24-hour day. This makes it difficult to create a one-size-fits-all therapeutic light solution.

“So far, there hasn’t been a way to accurately and automatically measure a person’s circadian rhythm unobtrusively,” Wen says. “Our technology provides a way to accomplish this and will therefore help doctors and others build a customized approach for light therapy.”

The app, which is being developed for smartphones as well as for the fitness tracking wristband called Microsoft Band and for other wearable devices, can be connected to lighting systems, or even a simple light box, to help shift an individual’s circadian rhythm back to its normal pattern.

COMMUNICATING WITH LIGHT

Another area that Smart Lighting ERC researchers are exploring is a type of visible light communications (VLC) technology sometimes referred to as “Li-Fi.” This technology uses LED light instead of RF signals for high-speed wireless communications.
The term Li-Fi, short for “light fidelity,” was coined by Harald Haas, chair of mobile communications at the University of Edinburgh, to describe the emerging use of VLC for wireless data access. In 2011 during a TEDGlobal conference, he presented a prototype of a device that transmitted a video of blooming flowers onto a screen behind him using a standard LED lamp.

Li-Fi shares the same delivery concept as Wi-Fi except that data is wirelessly transmitted via electromagnetic waves in the visible instead of the invisible RF electromagnetic range.

LEDs transmit data through modulation. The modulation is so fast and subtle that it is imperceptible to the human eye and does not interfere with the quality of illumination.

“With the explosion in the use of smartphones and tablets, there is growing interest in providing new ways to create more data access capacity. VLC brings new opportunities for this capacity,” says Thomas Little, Smart Lighting ERC associate director.

Little also leads the Multimedia Communications Lab at Boston University, where the Communication Test Bed has been set up to develop and evaluate VLC and motion-tracking technologies.

“Lights in the test-bed ceiling are conveniently dispersed to provide both high-quality lighting and deliver data access where users are located in the space,” he notes.

Still, there are many hurdles to overcome before Li-Fi becomes ubiquitous. One challenge is the ability to sustain continuous connectivity as a smartphone, laptop, or other electronic device is moved about in a space.

In the cellular communications world, this technique is called handover, the process of linking phone calls or data wirelessly from one point to another. This allows us to maintain a phone call as we are traveling between cell towers.

Mona Hella, ECSE associate professor at Rensselaer, is leading the sensors thrust in the Smart Lighting ERC to investigate new types of light sensors and signal processing circuits that could make VLC linking capability a reality.

Hella’s research team is creating arrays of photodetectors that can serve as multichannel receivers and light sensors to allow the tracking of light, from one LED fixture to the next. She is also working to increase the bandwidth of the standard silicon-based photodiode to receive the high-speed data streams wirelessly from the solid-state light sources.

Conventional photodiodes are photodetectors that convert light into current. They are inexpensive to manufacture and are used in everything from cameras, smoke detectors, and CAT scanners to barcode scanners and airport security inspection equipment.

In a VLC system, photodiodes integrated into optical receivers capture the incident light (the light directly aimed at a subject) needed for electric current generation. One drawback is that these photodiodes also collect unwanted ambient light, the reflected light that bounces off the walls, for instance. In research terminology, this is called “noise.”

Hella is tackling a two-pronged problem: The surface areas of the photodiode need to be enlarged to capture more incident light, but without collecting unwanted noise and other interferences that hamper the speed of transmitted data.

Hella says Li-Fi and other emerging VLC technologies are important elements in making smart lighting an inherent part of the Internet of Things (IoT), a wireless infrastructure that connects devices and whole systems, ranging from our phones and kitchen appliances to roads, vehicles, and the electric grid, to obtain and share data like never before. By using Li-Fi to help bear the data load, higher bandwidth wireless communications are maintained as more IoT objects compete for RF bandwidth.

“It’s this basic idea of using these different lighting technologies that will be an integral part of the smart world around us,” she says.

“Sensors and robotics increasingly are becoming a part of everything around us. We look at lighting from that perspective,” Karlicek says. “I like to draw on the analogy of the Google self-driving car. The idea is that this autonomous car can be a better driver than we are. At the ERC, we are working toward ways to build lighting systems so intelligent that they know when to be on or off, what kind of light people need, and how to deliver it in the most efficient way, helping us feel and perform better than ever before.”
\[ F_{\text{max}} = \mu (l_r + f_r) / \left( L + \mu_h / L \right) \]
JOE GERBER, a junior studying aeronautical engineering at Rensselaer in 1945, was behind on an assignment designing a twin-propeller aircraft. Doing so meant completing what felt like an endless battery of calculations. It occurred to Gerber, a young man who reveled in saving time, that he could save a lot of it if his ruler could expand. He found the answer in the waistband of his pajamas. Marking measurements on the elastic, he stretched the material to solve problems right from the graphical curves, rather than measuring, computing, and plotting each one. In the process, he shaved off hours.

After a few days, Gerber felt guilty about his improvised shortcut and confessed to his professor that he had cheated.

“The professor said ‘How could you have cheated?’—since everyone had a different assignment—and my dad showed the flexible scale to him,” recalls Gerber’s son and biographer, David Gerber ’86, himself a Rensselaer-educated engineer. “The professor was very excited and showed a lot of other professors.”

The simple innovation, born in the mind of a brilliant Rensselaer engineering student and applauded by the institution, eventually came to be known as the Gerber Variable Scale. It was the first of scores of revolutionary Gerber inventions.

Gerber ushered in an era of American apparel manufacturing. And at the time of his death in 1996, he had invented precision machines that also transformed industries ranging from defense to sign manufacturing. Today, the company he founded with the instrument he invented at Rensselaer, Gerber Scientific Inc., remains a leader in innovation and manufacturing. Given his massive contributions, some analysts maintain that Gerber should take his place alongside Einstein and Edison.
“Joseph Gerber is virtually unknown to the general public. Yet those who know his achievements quite rightly consider him one of the greatest American inventors and businessmen of the 20th century,” notes the Lemelson Center for Inventions at the Smithsonian Institution.

But now, nearly two decades after his death, Gerber appears unlikely to fade into obscurity. President Bill Clinton awarded him the National Medal of Technology and Innovation. This fall, Yale University Press will publish The Inventor’s Dilemma: The Remarkable Life of H. Joseph Gerber, David Gerber’s biography of his father.

The Gerber Variable Scale and several more Gerber devices are housed in the Smithsonian’s permanent collection and the institution’s archives hold some of his papers. Now, the Smithsonian’s National Museum of American History features him in “American Enterprise,” a new exhibition telling the stories of 80 of the most interesting individuals who shaped American business.

Peter Liebhold, who curated the exhibition as chair of the museum’s division of work and industry, called Gerber’s inclusion “a slam dunk.”

“There are some people like him, but not a lot, who really combined an inventive capability with the ability to bring things to market and get the job done,” notes Liebhold, who knew Gerber. “Joseph Gerber could use the straight engineering part of his brain, but, then, also a different part, the innovative side, to get people to go along with his ideas.”

As remarkable as anything Gerber did is the fact that he ever arrived on American soil to soak up the opportunities, including his education at Rensselaer, that helped propel him.

As a Jew growing up in Nazi-occupied Austria, Gerber had survived persecution, confinement, and escape by age 15, along with the loss of his father. David Gerber is quick to note the link between his father’s harrowing youth and the urgency he felt thereafter to get results.

But Gerber’s story is also the Rensselaer story. The school not only offered Gerber a top engineering education, but also professors who shepherded and promoted his unique ideas. Rather than punish a shortcut, they helped figure out how to bring the concept to fruition.

“Joe Gerber’s contributions were immense and RPI has every right to be proud of its part in the story,” says Liebhold. “Had he gone to another school, I don’t think things would have worked out as well and the world would be a lesser place.”

David Gerber, an engineer and a lawyer, closely observed his father when he worked at Gerber Scientific for more than a decade. To write the biography, he conducted more than 100 interviews about his father’s life, career, and company.

He titled Part I “The Fall” and Part II “The Ascent.”

“Most people’s lives are in a different direction,” he noted recently from his home in West Hartford, Connecticut, as The Inventor’s Dilemma was about to be published. “Early years are supposed to be the easier ones.”

Born in Vienna in 1924, Joseph Gerber was 13 when Germany absorbed Austria. Jews, often accomplished in medicine, music, and business, became instant outcasts. Anti-Semitism forced Gerber to leave school. He was sent to a labor camp, Mauer bei Wien, and released, perhaps because of his young age.

Soon, he and his father escaped to Switzerland, as Gerber’s mother remained behind to care for her parents. Father and son fled across the frozen Rhine River, at the Austrian-Swiss border, where a Swiss police guard apprehended them and sent them to jail. They were returned to Austria, and put on a train they believed was bound for Dachau. The boy saw a way out.

“He was able to disengage a latching mechanism high up on a door,” says David Gerber. “I guess the train wasn’t moving too quickly and they jumped. They found their way to a town and were able to take another train back to Vienna.”

Gerber’s father was later deported to Poland and his family never saw him again. But after imprisonment and escape, Joseph Gerber and his mother left Europe legally in 1940, once the U.S. government gave permission.

“A remarkable aspect of this story is that my father was in Vienna for two years under the Nazis and then emigrated. Most Jews who remained in Austria in 1940 were killed or remained in hiding,” Gerber notes. “He and his family experienced many different things—hiding, camps, escapes, imprisonment, and mass deportation—in those two years.”

Even so, when he arrived in an unfamiliar country, barely speaking the language and having missed four years of school, Gerber enrolled at Weaver High School in Hartford with an

They made a deal. If Gerber could pursue freshman and sophomore classes on his own and pass the exams, he could advance as a junior. He succeeded—becoming sleep-deprived and suffering health problems as a result. Two years later, he received several scholarships to enroll at Rensselaer (and later scholarships from Rensselaer), his “dream school.” Now, he was much like other American college students.

“Once he got into college he was able to relax a little bit,” David Gerber says. “He went on dates and had a normal existence.”

Still, he hungered to extract as much from the hours in a day as possible. At Rensselaer he developed a sound understanding of engineering fundamentals, along with an appreciation of what engineers do.

“The way his mind worked, he just looked for better ways to do things,” David Gerber notes.

Gerber says his father lined his bedroom walls with his designs for cars, aircraft, and fashion. On weekends, he built prototypes of his inventions in the aeronautics building. He was also concerned with devising tools scientists could use to compute graphical data more simply. How could numbers be turned into shapes and shapes into numbers? “Everything he (later) does is along those lines,” explains Liebhold.

It was during his junior year at Rensselaer that he created his clever pajama-waistband ruler. His roommate exclaimed, “I’ll be a cockeyed monkey!” recounted Gerber in a 1950 radio interview, when he experienced the time-saving results.

On seeing the device, his professor lost little time calling in colleagues. Gerber built a prototype in the aeronautics building machine shop and showed it to Professor Paul Hemke, influential head of the aeronautical engineering department. He called it a “revolutionary engineering device.”

When Gerber returned home for vacation, he mentioned the device to Abe Kopplemann, a newspaper distributor and mentor Gerber had worked for during high school. Using a prototype, Kopplemann invited one engineer to use the device and another to use traditional methods to solve a series of calculations. The participant who used the scale finished considerably faster.

Kopplemann urged Gerber to get a patent. Gerber said he did not have the money and he declined Kopplemann’s offer to give it to him. The two agreed to be partners.

“Kopplemann proposed that my dad take 60 percent of the equity,” says Gerber, “but my dad insisted on an even 50-50 split.”
By the middle of the 20th century, artisans had largely been replaced by factories, with interchangeable parts allowing mass production, says the Smithsonian’s Liebhold. But he notes that then, as now, there was constant worry about American companies losing pace to manufacturing overseas. And improving efficiency to keep the competitive edge was just the sort of challenge Joseph Gerber reveled in.

He was still at Rensselaer in 1945 when, using Kopplemann’s investment, he launched Gerber Scientific Instrument Co. in Hartford to manufacture his variable scale. In place of an elastic waistband, a coil was stretched alongside a second spring that marked the measurements. The two could extend the desired length using a metal slide. The instrument, which could measure and scale distances quickly, was used in aeronautics, oil well prospecting, and bomb detection.

Ronald Webster, an engineer who spent 39 years with Gerber Scientific, says that with the variable scale the company built a diverse base of customers who soon wished for other computing devices, and then more elaborate technical solutions that often did not yet exist.

“Mr. Gerber didn’t just come out with an invention and then say, ‘Let’s go out and make it,’” recalls Webster, who eventually became president of the Gerber Scientific Products division. “More often, he invented something to solve a problem.”

Webster recalls how his boss would go on the road to sell the variable scale, say, to a government facility, and come back with an order for a plotter or data reader. He was backed by a workforce of like-minded creative thinkers who worked night and day to produce the product.

“Then Mr. Gerber would say, ‘We have that plotter. Let’s see if we can sell it to IBM or RCA,’ and they would often give us the contract,” explains Webster. “We were a small company working on some major projects that often pushed our limits.”

Gerber left a legacy of some 650 domestic and foreign patents. He pioneered automation in drafting and circuit board production and even created a computer language, all based on a premise of numerical control. But he had the greatest impact

“The GERBERcutter allowed the U.S. to hang onto the garment cutting and, to a degree, the garment business, for quite a long time. Instead of the easy-to-sew garments offshore, you have expensive tools and higher skilled workers here to make them wildly more productive.”

PETER LIEBOLD
on apparel manufacturing, which into the 1960s stubbornly remained a workplace of workers seated at sewing machines.

Gerber pictured ways to cut fabric to minimize waste. Until now, operators crawled over the stacks of fabric and moved large, motor-driven knives that sliced from the sides. He wished instead to plunge the knife from above like a pen. Doing so would allow pieces to be cut close together, leaving little wasted fabric and saving considerable money.

“The second problem was holding the fabric. It jiggled and formed waves,” says David Gerber, who recalled his father sketching ideas on shirt cardboard. “He came up with the idea of a vacuum compression below the table to help hold the material in place.”

To keep the knife straight, he borrowed from his aeronautical training at Rensselaer: He analogized the knife to an airplane wing cutting through the air.

The result, the GERBERcutter, solved these problems and established numerically controlled cutting and patterns designed on computers.

“The GERBERcutter allowed the U.S. to hang onto the garment cutting and, to a degree, the garment business, for quite a long time,” says Liebhold. “Instead of the easy-to-sew garments offshore, you have expensive tools and higher skilled workers here to make them wildly more productive.”

And the cutter cut more than dresses and pants pockets. Manuel Gaetan ’58, an engineer and technical writer, notes, in fact, that the technology caught on in the garment sector only after surfacing elsewhere.

“One of the first cutters was used for General Motors to cut upholstery for its seat covers,” says Gaetan, who knew Gerber both because of the Rensselaer connection and because he covered the industry for Bobbin magazine. “I have even seen Grumman use a Gerber cutting machine to cut components for aircraft.”

And Gerber had yet another weapon as powerful as his technical brilliance: his personality. In an arena of introverted, remote engineers, he was a man in a tailored pinstripe suit who stood side by side with machinists as he invented, took prospective clients to lunch, and told his engineers that selling was as important as good ideas.

His charisma and talent for marketing elevated him to something of an iconic American businessman—an individual Liebhold would call “a Thomas Edison of the 1950s.”

Gerber came to the attention of the Smithsonian in the early 1990s when he solicited letters of support to be considered for the National Medal of Technology and Innovation, the nation’s highest such honor. Liebhold says that people constantly approach his office seeking confirmation of their importance. Gerber stood out.

“The more we read about him, the more excited we got. I did oral histories of him. We collected materials of his for our exhibitions,” recalls Liebhold. “He became one of my go-to guys in manufacturing.”

The validation did help him win the National Medal, which President Clinton awarded Gerber in the Oval Office in 1994. The honor recognized Gerber’s leadership in inventing,
Business magazine, which wrote an article about the Gerber Variable Scale. The story convinced the DuPont Company to devote an episode of “Cavalcade of America,” a popular radio show the company sponsored, to Gerber.

The program profiled such individuals as George Washington and Elizabeth Cady Stanton, who shaped American history. Titled “Young Man in a Hurry,” the Gerber episode aired in 1950 with Cornel Wilde, a well-known actor, in the lead role.

In a background interview, Gerber told the show’s writers that the opportunity to study at Rensselaer had represented a turning point. By receiving scholarships to attend, he learned “that in the USA it was true you could accomplish things if you were willing to work.”

Ron Webster attributes the camaraderie at Gerber Scientific to the fact that the man in charge was smitten with the work and invited good ideas. Even after working for two days on a project without going home, Webster found himself looking forward to the next one. “Finally, the product would be out the door and you’d be thinking you’d take tomorrow off,” Webster says, “and Mr. Gerber would say he had two more ideas he wanted to start on immediately—and you wanted to keep going with him!”

Just like his earlier days, Gerber worked nonstop, routinely clocking 16 hours without appearing tired and calling in frequently during vacations. He did not stop even after he suffered a stroke later in life. During this period David Gerber sat in at meetings for his father and often brought the notes to him at the hospital.

“His room at the hospital was filled with prototypes,” he recalled in a newspaper interview.

In 1949, Gerber visited Rensselaer and told the president, Livingston W. Houston, about his company—and how it had taken root when he was a student. Houston felt Gerber’s work, and Rensselaer’s role, deserved notice. The Institute contacted Nation’s

“In 1949, Gerber visited Rensselaer and told the president, Livingston W. Houston, about his company—and how it had taken root when he was a student. Houston felt Gerber’s work, and Rensselaer’s role, deserved notice. The Institute contacted Nation’s

“RPI is interested in what students are doing, in collaborating on how to make the idea into reality... Rensselaer treats students like adults. It’s in the DNA.” —DAVID GERBER

Business magazine, which wrote an article about the Gerber Variable Scale. The story convinced the DuPont Company to devote an episode of “Cavalcade of America,” a popular radio show the company sponsored, to Gerber.

The program profiled such individuals as George Washington and Elizabeth Cady Stanton, who shaped American history. Titled “Young Man in a Hurry,” the Gerber episode aired in 1950 with Cornel Wilde, a well-known actor, in the lead role.

In a background interview, Gerber told the show’s writers that the opportunity to study at Rensselaer had represented a turning point. By receiving scholarships to attend, he learned “that in the USA it was true you could accomplish things if you were willing to work.”

On a subsequent visit to campus, someone at Rensselaer arranged for Gerber to visit Cluett Peabody’s Arrow division, in Troy. Discussions there led him to develop the first automated sewing machine.
The institution that figured so prominently in Gerber’s early thinking would continue to support and inspire him. Gerber spoke widely about Rensselaer, hired its graduates, and served on the Board of Trustees from 1981 to 1993.

But if he stood out because of his unique background, his personality, and his enormous body of work, Gerber’s experience at Rensselaer is what promising students could, and still can, expect. Over its long history, Rensselaer has helped translate ideas sparked in its classrooms and labs into innovations that find their way into people’s lives.

In 1986, four Rensselaer engineering and computer science students—Laszlo Bardos ’86, Andrew Dressel ’84, John Haller ’86, and Sean O’Sullivan ’85—wanted to develop inexpensive mapping for the PC and wound up starting Mapinfo, the world’s leading producer of desktop mapping software. Like Gerber’s work, the concept got off the ground with the support of mentors at Rensselaer. Michael Marvin, a Rensselaer administrator, helped the entrepreneurs find financing and he lined up management advice from Rensselaer Trustee Warren Bruggeman ’46.

And Colleen Costello ’12 says that Rensselaer—Sean O’Sullivan, a current member of the Rensselaer Board of Trustees, in particular—was crucial in promoting and investing in Vital Vio, the company she and James Peterson ’12 co-founded to produce the bacteria-killing lighting technology they devised as students. The technology is now used in many major hospitals.

“We have a great network of advisers that we met through Rensselaer,” Costello says. “The whole ecosystem within RPI is incredibly helpful for networking in the Capital Region and meeting other entrepreneurs.”

And two students who both graduated with dual degrees in mechanical engineering and product, design, and innovation (PDI), laud the institution for guiding them after they came up with an organic alternative to environmentally harmful foam insulation. The pair, Eben Bayer ’07 and Gavin McIntyre ’07, wound up starting Ecovative Design LLC, which has doubled in size every year and landed a spot on Fast Company’s list of the world’s top 10 most innovative companies dedicated to social good.

Bayer and McIntyre say some of their mechanical engineering peers thought using agricultural waste and mushrooms was crazy. But their professor, the late Burt Swersey, did not.

They told The New Yorker that Swersey thought their idea was so important, that after they graduated and left the area, he called them repeatedly to implore them to leave their jobs and return to work on their invention.

He prevailed and with his guidance, Ecovative launched in the Rensselaer Incubator, later moving to a factory in Green Island. Bayer says he wants Ecovative to be the Dow or DuPont of the century—without the chemicals.

David Gerber says his father might have voiced similar sentiments about his own dreams more than 60 years ago.

“RPI is interested in what students are doing, in collaborating on how to make the idea into reality,” notes Gerber, an alumnus who took the unusual step of writing a book about another alumnus, his father. “A lot of schools say they are doing this now, but Rensselaer isn’t just jumping on the latest bandwagon. Rensselaer treats students like adults. It’s in the DNA.”
Rensselaer Alumnae Take Justifiable Pride in their degrees, and in their strong connections to their alma mater and fellow graduates. Once they leave Rensselaer to embark upon exciting and successful careers, that same type of pride is felt in their connections at the corporate level. Developing opportunities for engagement among alumni, the corporations they represent, and the Institute creates opportunities for a range of mutually beneficial interactions and relationships, and is an important area of focus of the Rensselaer Alumni Association (RAA).

The Rensselaer Corporate Champions Program is a comprehensive engagement model designed to leverage, build, and expand corporate partnerships. Corporate Champions in various locations act as conduits for communication and involvement, sharing information, organizing events, and opening doors for research collaboration. They are able to identify and connect senior leadership in companies with Rensselaer leadership, and they help to develop strategic alignment opportunities between companies and Rensselaer.

A result of the Corporate Champions program has been a resurgence in the number of alumni programs hosted within a company for Rensselaer alumni employees. Successful events have been held at Sikorsky, GE, Cisco, and Corning, and have featured company and Rensselaer representatives, each sharing a vision of collaboration. Look for more events taking place at locations around the country in the coming year.

Another way to discover fellow alumni in your corporation is through RPI Spirit Day. The fifth annual program will take place on Feb. 5, 2016. Group photos have been submitted with the hashtag #RPISpiritDay from companies as large as Boeing, GE, and National Instruments, as well as from small corporations with just a few employees. “While Spirit Day is a fun event, the connections made when you discover fellow Rensselaer alumni at your corporation can be very valuable,” says Jeff Schanz, assistant vice president for alumni relations.

It’s clear to the RAA that professional resources are a top priority for alumni, and reaching out to alumni at their place of work is a strategic way to facilitate these connections. The RAA leadership looks forward to continuing to build the alumni corporate community. If you would like to discuss facilitating connections at your place of business, contact the Alumni Office at alumni@rpi.edu or (518) 276-6205.

### EVENTS CALENDAR

**JANUARY**

23 Mayor’s Cup. Times Union Center, Albany, N.Y. Join fellow hockey fans as RPI takes on crosstown rival Union at the Times Union Center. A pre-game reception will be held, featuring remarks by Coach Appert. Contact Peter Pedone at pedonp@rpi.edu or (518) 276-6061.

29-30 Women’s Hockey Alumnae Weekend. Women’s hockey alumnae are invited to return for their annual game on Saturday, as well as the varsity games on Friday against Colgate and on Saturday against Cornell. Contact Peter Pedone at pedonp@rpi.edu or (518) 276-6061.

**FEBRUARY**

5 5th Annual RPI Spirit Day. Wear your RPI gear, and share your pride in your degree with the world! Then, share a photo of yourself, your friends, or your co-workers on social media with the hashtag #RPISpiritDay. For more information visit the website at alumni.rpi.edu/spirit.

5-6 Men’s Hockey Alumni Weekend. Men’s hockey alumni will return to campus for their annual game on Saturday, as well as the varsity games on Friday against St. Lawrence and the Big Red Freakout game against Clarkson University on Saturday. Contact Peter Pedone at pedonp@rpi.edu or (518) 276-6061.

Sikorsky held a reception for Rensselaer alumni this spring. (l-r): Jeff Schanz, Rensselaer; Mike Ambrose, Sikorsky; Arianna Kalian ’93, Sikorsky; Bill Sisson ’91G, United Technologies Research Center; and Michael Bivens, Rensselaer.
Distinguished Service Award
Richard O. Bollam ’66

Alpert Fox Demers Medal
Wanda K. Denson-Low ’78
Diane Ozovek Howard ’82
Roger E. Mike ’70
Theodore J. Wojnar Jr. ’80

Alumni Key Award
Albert W. Bromberg ’59
Robert C. Eckart ’73
John G. Lonski ’73
Douglas A. Mercer ’77
Josef C. Mueller III ’86

RAA Teaching Award
Professor Thomas C. Sharkey, Department of Industrial and Systems Engineering

RAA Red & White Emerging Leader Award
Whitney T. Gervais ’16
Gavin M. Nortisky ’16

Director’s Award
Terence Barton ’92, ’01G
Donald A. Burgio ’89
Brian F. Nock ’13, ’13G
Mechelle A. Norton ’78G
Karl P. Oestreich ’79
Norris A. Pearson

Alumni Admissions Recognition of Excellence Award
Kenneth A. DeGhetto ’50

Craig W. Angell ’35
Chapter of the Year Award
The Rensselaer Alumni Chapter of Boston,
Ashley B. Brandin ’06, President

In tribute to their outstanding commitment to the Institute and their fellow alumni, the Rensselaer Alumni Association (RAA) and the Office of Alumni Relations have recognized an outstanding group of volunteers with the 2015 RAA Awards. The awards were presented at the 29th annual RAA Awards Dinner on Oct. 1 during Reunion & Homecoming weekend.

Richard O. Bollam ’66 (left) received the Distinguished Service Award (DSA), the highest award presented by the RAA. The DSA recognizes “distinguished service by alumni or friends to Rensselaer, to a profession, to the nation, or to humanity.” Bollam was selected in part for being the visionary force behind the creation of the Rensselaer Alumni Association Endowment Fund. The fund is designed to encourage and inspire broad-based engagement and philanthropic support to Rensselaer among our students and alumni/ae around the world.

“The RAA Awards program allows us to publicly recognize our most valuable alumni partners—our outstanding volunteers,” says RAA President Teri Kozikowski ’85. “This year’s group of honorees is truly amazing.”

If you know of an alumnus or alumna who is deserving of special recognition, nominate them for a 2016 RAA Award. For criteria, and information on how to submit an award, visit alumni.rpi.edu/RAAwards.

For more information on the RAA Awards program, visit http://alumni.rpi.edu/RAAwards.
Senior attacker Angela Cascio is co-captain, for
the second season, of the field hockey team, one of 11 women's varsity intercollegiate sports teams at Rensselaer.
The Greatest Generation

A non-veteran’s memories of a post-war campus | BY SAM FLETCHER ’50

I was privileged to meet “The Greatest Generation” long before Tom Brokaw coined the phrase in his celebrated book. In the fall of 1946, my draft card had expired and I enrolled as a pink-cheeked freshman aeronautical engineering student at Rensselaer Polytechnic Institute in Troy, New York.

The “Big War” was over and it was time for all of the returning veterans to play catch-up on their lives and their interrupted education by taking advantage of the GI Bill. Three quarters of the incoming freshman class at RPI were vets—old men—in their late 20s and some even up in their 40s! And they didn’t come to college alone—the married brought wives, and kids, and new babies, and dogs and cats. And all of them brought a burning desire to get the most from their education so that they could make up for lost time and get on with the business of making a career designing, building, and developing something in America. These guys not only studied hard but also worked all sorts of side jobs to support themselves and their families. It was nearly impossible to go anywhere around campus or in downtown Troy without seeing a familiar face working in a store, selling papers, and making deliveries. If you didn’t find the vet, you would be sure to encounter the vet’s wife working to add to the family payroll.

Sporting events were a real family affair. I remember football and lacrosse games where the stands were packed with moms and kids of all sizes rooting for “Old RPI” and the dads who were out on the field in the game. Many of the married vets with families were housed in “Tin Town,” an assemblage of surplus Quonset huts that the school had parked in a field up the hill from the main campus. These huts became homes with furniture and decorations that were a sharp contrast to the arched corrugated metal ceiling that was the trademark of the Quonset hut. The area was replete with play sets, bikes, and all the other stuff for active families with children.

I recall reading some years ago that the Class of 1950 set all sorts of academic records at RPI. Whatever the vets lacked in learning, they made up for in determination and effort. I believe that the GI Bill and the veterans it educated may have been the greatest program ever conducted in this country and that the United States of America rode a tidal wave of accomplishment and global success for many years afterward as the result.

Non-vet freshmen were housed in the Quadrangle dorms, and I was shoehorned into a Church V suite with three others. Every would-be Aero needs some flight time, so I brought a u-controlled model airplane, my “Cherry and White Flier,” to school and regularly flew it in the center of the Quadrangle. When winter came, I’d clear off a patch of snow for a take-off runway and fly until it ran out of gas and dead-sticked into a snow bank. I went away for a weekend and returned to find my flier parked on my desk with a neat row of broken propellers. It turned out that my dorm mates had enjoyed a weekend of flying until they ran out of props.

I came to RPI on a scholarship from Grumman Aircraft Engineering Corporation that required me to keep a B average, and was very motivated to study hard and keep up with those vets. Everything went well the first year; however, disaster struck in my sophomore year when a letter from Dean Baker arrived at home announcing that “your son has a grade of less than 3.0 (in English II) for the first eight weeks of the present semester. The passing grade is 3.0.”

Translation—your son is flunking! I’ve never sweated so hard to produce good compositions, but Ms. Tarbell wasn’t impressed. I finally squeaked through the course with a C—the only blot in the entire four years. It took only a short time after I started in flight test at Grumman to learn that the ability to write clearly and concisely was far more important to my career than all of that calculus and higher math.

Sam Fletcher ’50 earned a B.S. in aeronautical engineering. After graduating, he joined Grumman as a flight test engineer, and served as program manager for the A6 Intruder, F111B (The “Edsel”), and G-1 Gulfstream.
Rensselaer students expect the world to be radically transformed in their lifetimes, with the pace of change accelerating. Futurists tell us they will need to reinvent themselves in their careers. Like our alumni and alumnae before them, our students understand their lives will be full of surprises that will demand flexibility and dedication.

The Rensselaer community is committed to preparing this next generation for disruptions and opportunities, providing the capabilities, perspectives, communications skills, and values that will enable them to lead transformation, with understanding, daring, and judgment.

The Rensselaer Annual Fund helps to provide a world-class educational experience to our students, helping to prepare them to meet the demands and challenges of the 21st century. Gifts to the Rensselaer Annual Fund are essential to this mission.

Please join us in supporting our students with your gift to the Rensselaer Annual Fund. Give.rpi.edu/future.
Whose life will you change?

As a longtime Rensselaer professor, Frank Valente understood the value of a Rensselaer education. And, he wanted to help future generations benefit from our strong legacy of innovative pedagogy and research.

By making a generous gift through his will in 1985, Frank established a scholarship in memory of his parents.

Now, in 2015, the Valente family legacy lives on at Rensselaer through Elizabeth Castro, Class of 2016. Elizabeth is studying computer and systems engineering, and is a member of the Rensselaer crew team and the Alpha Gamma Delta sorority.

Create a lasting legacy by making a gift through your estate.

Visit www.alumni.rpi.edu/giftplan to learn more. Or, contact Arthur Tracy at (518) 276-2561 or tracya@rpi.edu.