Women at Rensselaer

As the first class of women marks its 50th Reunion, Rensselaer profiles some of the Institute's newest members and presents an alumni perspective.
Our catalog offers HIGH-QUALITY, authentic Rensselaer apparel at REASONABLE PRICES. You’ll find full-color photographs of our popular T-SHIRTS, sweats, practice jerseys, jackets, and more. And all our products are GUARANTEED TO SATISFY or your money will be cheerfully refunded. Proceeds help to supplement the Rensselaer Athletic Department budget. You can find the Let’s Go Red catalog ON-LINE—including lots of pictures, all the merchandise, and ordering info—at http://www.rpi.edu/dept/athletics/letsgored/

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Pew Award completes Rensselaer’s "triple crown" victory.

It's been 50 years since women first graduated from Rensselaer. Today, they represent an important part of a diverse campus community.

"Unbounded openness" is the distinguishing feature of Rensselaer's School of Science and its dean.

Kaleidoscope
The Advanced Manufacturing Laboratory

Lab Experiment:
Walker renovation has created some exciting reactions. See page 16.
"Triple Crown" Winner

Rensselaer celebrates the prestigious Pew Leadership Award, and has now captured all three national honors for undergraduate education.

In October I had the privilege to accept, on Rensselaer's behalf, the prestigious Pew Leadership Award for the Renewal of Undergraduate Education at ceremonies in Washington, D.C. The honor, in recognition of Rensselaer's pioneering work in curriculum renewal, is sponsored by the Pew Charitable Trusts. The award carries a $250,000 prize that will be used to continue and expand curriculum development.

The Pew Charitable Trusts are renowned for leading critical examinations of higher education and pointing the way for colleges and universities to plan strategically for the future. The recognition and the assistance of the Pew Charitable Trusts will enhance Rensselaer's efforts to build on what we have begun-designing interactive, multidisciplinary curricula using sophisticated computing technology in state-of-the-art facilities.

The award honors "those campuses that have already shown courage in tackling difficult but essential issues of academic renewal. These campuses have made significant progress in redesigning their curricula, recasting the roles and rewards of their faculties, and reallocating resources needed to accomplish their goals."

The Pew Award marks a "triple crown" for Rensselaer—the Institute has now won the three major national awards for curriculum renewal. In 1995, Rensselaer received national recognition with both the Theodore M. Hesburgh Award for Faculty Development to Enhance Undergraduate Teaching and the Boeing Outstanding Educator Award.

When I spoke in Washington at the Pew ceremonies, I reminded the audience that it was Rensselaer's founding faculty member, Amos Eaton, who showed the world that students learn by doing—in the laboratory and in the classroom. It was bold and innovative thinking in 1824. And in 1996, it is still Rensselaer's faculty leading the way in curriculum renewal—defining technological education for the next millennium.

The Rensselaer vision is both elegant and extraordinary. The emphasis must change—from what teachers teach to what students learn.

We call this approach interactive learning. Here is a quick description of Rensselaer's ground-breaking work:

HOW IT ALL BEGAN
Curriculum renewal at Rensselaer began in 1988 when pilot courses in calculus gave students access to high-powered computing that enabled them to focus on the important underlying concepts rather than number crunching.

The calculus initiative prompted faculty to consider new approaches through projects in conjunction with the Anderson Center for Innovation in Undergraduate Education, an incubator for curriculum renewal founded in 1989.

As interactive learning gained momentum, the series of standalone experiments became a focused, Institute-wide initiative. All across campus, faculty are rethinking what students need to learn, implementing new studio courses,
creating multimedia courseware, and devising evaluation studies.

Classroom of the Future
Interactive learning, the intellectual foundation of curriculum renewal at Rensselaer, emphasizes what students learn, rather than what teachers teach.

Rensselaer's pioneering course model, the studio, replaces large-enrollment, lecture-centered classes with smaller, livelier, more interactive classes.

Studio classes merge lecture, recitation, and laboratory sections into one learning environment. The studio replaces large lectures of as many as 750 students with courses where 60 students engage in active teamwork. Faculty step down from the stage to take an active mentoring role.

Breadth and Depth
The renewal of the undergraduate learning experience encompasses a wide variety of activities. Here are just a few examples:
- Project Links, supported by the National Science Foundation, and the Interactive Learning Modules project, supported by DARPA, are developing interactive, multimedia materials for courses in mathematics and electronics, manufacturing, and management.
- The core engineering curriculum is being revised to use a combination of studio environments, computing-intensive projects, and team learning.
- The Forum for Integrated Design supports the collaboration of faculty from all five schools.
- The First-Year Studies program comprises several courses in the School of Humanities and Social Sciences that are multidisciplinary, generally team-taught, and committed to interactive learning.

Facility Renewal
Pioneers of interactive learning at Rensselaer understood that a new way of learning demanded a new kind of physical environment.

This fall, Rensselaer formally dedicated the newly renovated Walker Laboratory, constructed in 1906. From room layout, to furniture, to computer equipment, Walker classrooms are designed to facilitate student team work and faculty mentoring (see related story, page 16).

A new studio for electrical engineering offers students access to the newest instrumentation, and a networked design classroom will support intensive collaboration. Already in use are studio classrooms for physics, calculus, and chemistry.

The Work Continues
Rensselaer's work in creating interactive, hands-on learning experiences for undergraduate students is well begun, but far from complete.

A recent National Science Foundation grant of $200,000 for institutionwide reform will assist further efforts for comprehensive curriculum revision.

Rensselaer reaches out to share its experience with other universities facing the same challenges. Hundreds of academics from the United States and around the world have visited campus to see the studio in action.

Even now, as studio classes and interactive approaches take hold on the Rensselaer campus, those in the vanguard are seeking the next major advance that will enhance the way students learn.

The national media have highlighted Rensselaer's curriculum renewal initiatives with major feature stories in U.S. News & World Report and The New York Times. If you would like copies of these articles, send an e-mail message to president@rpi.edu, or write to me: R. Byron Pipes, President, Rensselaer Polytechnic Institute, 110 Eighth St., Troy, NY 12180-3590.

Students take active responsibility for their own education. Environments are student-centered, team-oriented, project-based, and, if appropriate, enriched by advanced educational computing technologies.
Computer Memories
I found your timeline of the Rensselaer computer facilities fascinating ["The Way to the Web," Sept. '96]. In the fall of 1977 when I entered Rensselaer, we were required to use keypunches for our first semester, primarily due to a lack of public terminals on campus. There was actually a vending machine in Amos Eaton Hall that sold packs of 80 cards for 5 cents.

When the first laser printer was installed in the VCC around 1981 or so, students were charged 5 cents per page of printout, and each job was delivered in a ziplock bag. This 5-cent charge had to be paid up front in real cash; it wasn’t a “funny money” charge to your account.

In 1979 or so I purchased my first floppy disk, an 8” disk for the PRIME system in the graphics lab. I paid $8 (for ONE disk, not a box) and I believe it held 170KB.

E-mail was not common in that day, but some enterprising students wrote a “chat” program on MTS that operated by passing characters through some system registers on the 3033 that weren’t swapped as the system time-sliced between users...

While we can look back to those days as being “terribly slow” in computer terms, the truth is that in our view at the time, things were modern and fast. Which leads me to an observation about our use of the comparatively massive amounts of computer power in our hands today: most of the actual “useful” tasks that we wanted to accomplish, then and now, such as document processing, require fairly small amounts of computer power. Much of the extra horsepower available today, a solution desparately seeking a problem, has been given to such niceties as slick interfaces and audio/video. A slick pop-up full-motion video clip to explain a program feature is possible today, so we use it instead of a few lines of text displayed on a screen.

We pat ourselves on the back for having found a use for all of this wonderful available CPU power, ignoring the fact that the information content supplied is often only marginally better than we had 15 years ago.

Andy Daniel ‘81
San Jose, Calif.

On-Line Compliment
Just wanted to take a moment to compliment your staff on the excellent work being done on-line to complement the alumni print publication ["WWW. RPI.EDU," Sept. '96]...

While it's dangerous to generalize about how the Web is being utilized, it is not unfair to say that Web publications have often been one of two types—a simple linear electronic version of an already extant publication, or in a native hypertext multimedia format which is literally impossible to commit to print. What I see in Rensselaer. Mag is a pleasant hybrid of the two: access to material from the print magazine complemented by original on-line content and graphics in a format which is both hypertextual and easily navigable.

I am currently teaching Technical & Professional Communication and have plans to incorporate Rensselaer. Mag into the assigned readings when we discuss cross-media writing formats. Congratulations on a job well done.

Mick Doherty
Rensselaer Department of Language, Literature, and Communication
Troy, N.Y.

The World Is Turning...
I was impressed with RPI’s continuing NASA connection; however, the most impressive feat of engineering in the September article was not related to aerospace disciplines, but to good ole civil engineering. In the photograph on page 17, the evidence clearly points to the rechanneling of the Nile River to the east side of the Red Sea, in the Arabian Peninsula. Please, an article on this project. One can only hope it was a Troy Building graduate...

Rev. John F. Herman ’66
Tempe, Ariz.

Editor’s Note: Once again, Rensselaer alumni have proven to have sharp eyes! Several of you noticed that the image on page 17 was flopped. If only we could show you the publication before it gets printed...

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December 1996
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In order to provide space for as many letters as possible, we often must edit them for length. Please address correspondence to: Rensselaer, Office of News and Communications, Rensselaer Polytechnic Institute, Troy, NY 12180, or e-mail to alumni.mag@rpi.edu or call (518) 276-6531.

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Milestones

Harold M. Faigenbaum '23, professor emeritus of inorganic chemistry, died Sept. 24 at his residence. He was 94. Faigenbaum graduated with honors from Rensselaer with a Ch.E. degree in 1923. He was awarded a Russell Sage Fellowship for graduate work, which he completed in 1926 to receive a Ph.D. in chemistry from the Institute.

He became an instructor at Rensselaer that same year and stayed for more than 40 years until he retired in July 1967. He was affectionately referred to as "Mr. Freshman Chemistry" because he was in charge of the entire general chemistry course.

Two floors in the renovated Walker Lab devoted to introductory chemistry have been dedicated to the memory of the late professor.

Faigenbaum was a pioneer in the development of the Advanced Placement Programs of the College Entrance Exam Board. He was active in the promotion of testing programs with the ACS, the CEEB, and the New York State Education Department. He was chief chemist of the New York State Biological Survey for a decade.

Charles Bean, 72, Institute Professor Emeritus of Science, died Sept. 30 while on business in Fairfax, Va.

A member of the National Academy of Sciences and the American Academy of Arts and Sciences, Bean was a world-recognized specialist in magnetism and superconductivity. Retired from General Electric's R&D Center in 1985 after 34 years, Bean joined the Rensselaer faculty part time in 1983 and full time in 1986.

Bean received a bachelor's degree in physics from the University of Buffalo in 1947 and a doctorate from the University of Illinois in 1952. He was a fellow of the American Physical Society and the American Association for the Advancement of Science, an executive of the National Research Council, a director of the Bellevue Research Foundation, and a member and journal editor of the American Institute of Physics and the Biophysical Society.

Sydney Archer, research professor of chemistry and former dean of the School of Science, died Aug. 22 at Albany Medical Center. He was 79.

A national leader in medicinal chemistry, Archer helped develop drugs for treating pain, cancer, drug and alcohol addiction, schistosomiasis, and other medical conditions.

Former vice president and associate director at Sterling Winthrop Research Institute, Archer joined the Rensselaer faculty in 1973. From 1980-85 he served as dean of the School of Science, and, until his death, remained active as a research professor of chemistry.

In 1968, Archer won the Medicinal Chemistry Award of the American Chemical Society. Holder of more than 100 U.S. patents, Archer was named "Inventor of the Year" by the Eastern New York Patent Law Association in 1978.

Archer was a graduate of the University of Wisconsin and received his doctorate in chemistry from Penn State University.

Plane View

The Commons Dining Room, which has served countless students since it was built in 1952, has been undergoing a multiphase renovation. In 1995 a full-scale commercial bakery was added. This year, the campus eatery saw $2 million in improvements, mainly mechanical in nature.

The interior design features student works, such as doctoral and master's theses, drawings and models from undergraduate class work, photos of laboratory work in progress, and more. Flying high above the dining room is the RP-II sailplane, which was designed, developed, and constructed by teams of students in aeronautical engineering over several years.

"We have tried to depict the diversity of student life at Rensselaer and present a sampling of student works past and present," says Barb Nelson, Rensselaer's project manager for campus planning and facilities design.
If They Build It, They Will Learn

A multipurpose saw and a beverage can holder have two things in common: Both are successful products, and both have served as effective teaching tools at Rensselaer.

The products were designed and manufactured by senior engineering students in an industry-university collaboration that is producing students with hands-on, real-world experience and the ability to solve problems on time and on budget.

Rensselaer created the Advanced Manufacturing Laboratory (AML) in 1982. The two-semester interdisciplinary course has been so successful that the university now sees it as a focal point for manufacturing education. As part of its plans for a Multi-disciplinary Design Lab, the School of Engineering is considering expanding the program into an interdisciplinary Teaching Factory to be used at both the undergraduate and graduate levels.

The Society of Manufacturing Engineers also recognized AML's potential with a $43,833 grant. The 50 to 55 students learn basic manufacturing processes and write product proposals. Students then organize two companies, and each must manufacture 300 units of a product. They get extra help from Watervliet Arsenal, which donates 3-D prototypes of each team's product, created through stereolithography.

In 1995-96, American Saw and Manufacturing and BASF agreed to become real-world customers. They provided the project budget and donated managers' time to work with the class.

The students designed and made beverage can holders for BASF to give to customers to show its colorant line, said Steven Goldstein, technical manager for colorants and additives for plastics.

"We have fewer than 20 left," he says. "The sales force, the customers, the people we work with—they all want more."

AML is being conducted this year by Kevin Craig, associate professor of mechanical engineering; Daeyong Lee, professor of mechanical engineering; Stephen Derby, associate professor of mechanical engineering; Sam Chiappone, course manager; and Hugo Walpurgis, CAD/CAM engineer.

HOT ROD

A team of students from the schools of engineering and management has introduced a car that doesn’t guzzle an ounce of gas.

The "Red Hawk," an electric formula race car powered by 24 lead-acid batteries, made its debut at Lime Rock Park (LRP) in Lakeville, Conn., for Vintage Racing Weekend, Aug. 30-Sept. 2. LRP is the team's home track.

Rensselaer is the only school in the Northeast to have developed an electric car. Project leader Ed Lansinger '94, an MBA student on leave from his position at GM, says the car is a tangible way of applying his education.

"We've really achieved an interdisciplinary approach to management and engineering," Lansinger says. "There is heavy involvement from all disciplines. It's really a model of a small corporation."

The Red Hawk project is entirely student-run. Its primary financial sponsor is the United Auto Workers-GM Center for Human Resources. Other sponsors include East Penn Manufacturing, DePaula Chevrolet-Geo, and Arthur Goldstein '53. V

"I think the students did a great job," says Bill Korb, manager of research and development for American Saw and Manufacturing Co.

His company asked the students to design the handle and build samples of a new saw, which is being test-marketed in Japan.

Both companies are working with the class again this year.

The course gets equally strong endorsements from students. Of 504 surveys sent to alumni, 123 were returned. Of these, 114 agreed or strongly agreed that the AML experience had been "beneficial toward my career."

"It was one of the best, if not the best course I took at Rensselaer," says Carlos Yepez, an electrical engineer with Con Edison in New York City. "It gave me the chance to use all of the things I had been learning in my other classes."

"We're really achieved an interdisciplinary approach to management and engineering," Lansinger says. "There is heavy involvement from all disciplines. It's really a model of a small corporation."

The Red Hawk project is entirely student-run. Its primary financial sponsor is the United Auto Workers-GM Center for Human Resources. Other sponsors include East Penn Manufacturing, DePaula Chevrolet-Geo, and Arthur Goldstein '53.
Multimedia Studio Focuses on Environmental Resources

Biology and electronic arts have teamed up to create a "green studio" for the production of environment-related multimedia resources.

The new iEAR/DFWI collaboration is the creation of a CD-ROM that will aid in the identification of phytoplankton, says Sandra Nierzwicki-Bauer, professor and chair of biology and DFWI director.

The CD-ROM tool in development will allow researchers to take a computer picture of a phytoplankton under a microscope and rapidly compare it to thousands of images stored in a computerized database—in the same way the police would run a fingerprint check.

Such a tool would speed water sample analysis and allow much of the identification work to be done by assistants who are not fully expert in that specific field.

"In biological terms, it's the perfect symbiosis," says Nierzwicki-Bauer.

Other projects include maintenance of the Website for Witness to the Future, Miller's educational CD-ROM, and production of the DFWI home page that will allow visitors to take a "virtual tour" of research activities at the Bolton Landing field station. You can visit the site at http://www.rpi.edu/dep/biol/fwisl.

Miller notes that the iEAR/DFWI collaboration is one example of how the School of Humanities and Social Sciences is a powerful ally for faculty in all departments in the development of effective multidisciplinary ventures.
A SEED OF AN IDEA BLOOMS INTO STUDENT PROJECT

As a student in Rensselaer's pioneering course One Mile of the Hudson, Cori Traub learned to be more aware of her surroundings. Early in the course she realized how little she knew about the Rensselaer campus she calls home. And an idea was planted. Tapping into the botanist beginnings of Rensselaer's first professor, Amos Eaton, she created "A Tour of Common Trees on the Rensselaer Campus," a self-guided walking tour featuring 28 species of trees.

"The main focus of the One Mile of the Hudson course was to get a greater sense of place," explains Traub, a recent graduate of the environmental management and policy master's program. "I learned a lot about the biology of the Hudson River, but I discovered I didn't really know a lot about the biology of my own surroundings, specifically the trees on campus. So I set out to learn more."

The independent project, supervised by biology professor Carl McDaniel, took two semesters to complete and will become part of the campus lore. A pamphlet, available at Rensselaer's Visitors Information Center and Troy's Junior Museum, explains characteristics and terminology of the trees, while a map illustrates a tour of the campus.

"Traub says what she learned at Rensselaer changed the way she views the world. "By nature now," Traub says, "I take notice of my surroundings.""

Good News on the Class of 2000

There's a lot of good news in the statistics on the Class of 2000, according to Teresa Duffy, dean of admissions. With this class, the Institute is moving closer to its goal of refining the size of future engineering classes, closer to balancing the class size of the other schools, and closer to bringing high-quality students to Rensselaer.

"What's wonderful about this class is its composition by school," Duffy says. "We've talked a lot about diversity and this is when rubber hits the road."

While the percentage of women attending Rensselaer remains the same as in recent years (at 25 percent), minority enrollment is up 1 percent, and the international student population remains steady at 5 percent.

Statistics as of Aug. 23 show a Class of '00 enrollment that is 918 members strong. Enrollment in Humanities and Social Sciences increased almost five-fold. Enrollment in the Lally School of Management and Technology is up 3 percent, and Science enrollment is up 2 percent. Engineering pared down its enrollment by 9 percent but still accounts for more than half the student population.

Enrollment by school is: Architecture, 57; Engineering, 490; Humanities and Social Sciences, 38; Management and Technology, 91; Science, 224; and undecided, 18. Also new to campus this year are 144 transfer students.

"We've got an increasingly diversified freshman class who bring different interests and aptitudes to the education they will master," Duffy says.

Members of the Class of 2000 include 43 valedictorians and 42 salutatorians. The combined average SAT score was 1265. There are 511 student-athletes (196 of whom were team captains). Of the 918 students, 233 are women.

Class members come to Rensselaer from 38 states and 22 countries. They include a student who misspelled Rensselaer six times on the application, a skydiver, a homecoming princess, band members of the Screaming Zitis, the winner of the New York City regional bridge-building contest, a woman who played four years of varsity boy's ice hockey, a student who started an underground newspaper, a blueberry picker, two potential Olympians, a juggler, a scuba diver, and a hero.
Paula Simon Named to Board of Trustees

Paula Loring Simon '68 was elected to the Rensselaer Board of Trustees at a regular meeting of the board in October. She was elected to a four-year term.

Simon is the general manager of Metropolitan Life Insurance Company's Rensselaer Information Systems Center, located in the Rensselaer Technology Park. The center employs 260.

Simon was a key participant in MetLife's re-engineering effort, leading a team dedicated to improving the efficiency of the company's information technology services by developing a new technical architecture. Prior to that, she was the general manager of the company's Scranton Information Systems Center in Pennsylvania.

Simon received a bachelor's in electrical engineering from Rensselaer in 1968, a master's in electrical engineering from the University of Illinois in 1969, and an MBA from Boston University in 1977.

She is a member of The Research Board, an industry best-practices organization. She also has served on the Information Systems Advisory Council of the American Management Association.

Simon is a recent past president of the Rensselaer Alumni Association and past president and former trustee of the Society of Women Engineers. She is a member of the B.F. Greene Society of the Patroons of Rensselaer and received the RAAs Albert Fox Demers Medal in 1996 and the Alumni Key in 1982. She also was a Rensselaer Medalist.
Paula Loring Simon '68
Rensselaer Board of Trustees

"Be open to opportunities and choose where you want to go at each step."
It's been more than 50 years since
women first graduated from Rensselaer.

Today, they represent an important part
of a diverse campus community.

By Ellen Katzman

The Changing Face of Rensselaer

As Melissa DeBolt turned the key to
the dorm for the first time, she felt
the same odd mix of excitement
and nerves that had been shared by every
woman who had roomed on campus for the
last 30 years. But unlike any other woman
before her, she is an Electronic Media, Arts,
and Communication (EMAC) major, a pi-
oneering member of a program that is train-
ing men and women for careers in
cyberspace.

“The program was ideal for me,” says
DeBolt. “I've been really interested in art—
I've gone to museums in Europe and I
danced for a while seriously, but I also like
math and science.” In Media Arts Studio, she
is combining her multifaceted background,
editing video clips on computer and setting
them to music.

Close to 25 percent of Melissa’s class are
women; they make up one-third of the trail-
blazing EMAC class. “The Class of 2000 has
definitely one of the most diverse and
accomplished groups of young women yet,”
says Teresa Duffy, dean of admissions, “with
over two-thirds of the class in the upper 10
percent of their high school class.”

From management and technology to
bioengineering, from real-time computer
graphics to CAD-CAM architectural plot-
ting, today's women at Rensselaer—stu-
dents, faculty, and graduates—embrace
emerging technologies and developing
career options. They face challenges of a
changing world: dual career families, cor-
porate restructuring, and down-sizing, but
they are equipped, like the women and men
who came before, with a mindset that allows
them to solve problems and discover solu-
tions—to examine alternatives and create
new options for the ever-changing demands
of the technological future.
Reach for the Stars

When Paula Loring Simon '68, general manager of MetLife's Rensselaer Information Center and newly named to the Rensselaer Board of Trustees, arrived on campus in the fall of 1964, there were no women's dorms. She and the other 21 women in her class were housed at Russell Sage. “We hiked up the Approach, and we had curfews and dress codes courtesy of Russell Sage,” says Simon. “We were neither fish nor fowl. We didn’t fit at RPI and we didn’t fit at Sage.”

But these women persevered. They were “tenacious and bright,” she says. “They were very committed to whatever brought them here.” Only two did not graduate.

Not only did Simon's engineering education provide her with discipline—a way of looking at problems, solving them, and setting priorities—but her years at Rensselaer also equipped her with skills for functioning as a minority in the workplace. In her first position in the electrical engineering department of the University of Illinois, she was the only woman in a faculty composed of over 255 men.

Her life has taught her many lessons that Simon shares freely with women in the Society of Women Engineers. (She helped charter the Rensselaer chapter in the early '70s.) “Be open to opportunities and choose where you want to go at each step.” From software research to systems design and development to management, her career path, says Simon, “has not been a straight line but it has been wonderful.”

Dr. Patrice LaBelle '72 also benefited from her training at Rensselaer. She transferred from a liberal arts school, looking for a school with a strong reputation in science. “The purpose of education [at Rensselaer] was not just getting information, but getting answers that actually worked.” That practical approach permeated the whole school, says LaBelle, and it has been invaluable to her since.

When LaBelle arrived in 1970, two short years after Paula Simon's graduation, things had already begun to change dramatically. As a woman, she was still in the minority, but she was an integral part of the campus community.

Being in the minority never fazed her since she had grown accustomed to being one of the few girls in her advanced chemistry and science classes. With her mother a scientist and her father a doctor, LaBelle never questioned that women had a right to be whatever they chose. So it was not at all strange that she majored in chemistry and eventually received her M.D.

Today LaBelle employs both her scientific and medical background as director of clinical development for Merck & Company Inc., a large pharmaceutical company.

Leading by Example: Playing in the Lab

With expanding opportunities, the women of the '90s face a new set of challenges.

Throughout her academic life, Kay C Dee has had to invest in herself, and it has paid off. She is completing her doctorate in biomedical engineering in four and a half years with six publications and 19 presentations at national and international scientific conferences.

Her love of chemistry, of experimenting, or what she refers to as “playing in the lab” led her to seek a college education. But the road wasn’t easy. Her parents were divorced, and she had to finance her own education.

“I entered every contest—I wrote patriotic speeches. I wrote essays. I did math problems. If there was money involved I gave it a shot. And I actually came up with the money,” says Dee.

She majored in chemical engineering. “Because I had the idea that chemical engineers came up with something useful for society. I had visions of designing new drugs and curing cancer,” says Dee.

Dee was drawn to Rensselaer's Graduate School and biomedical engineering by the research of Associate Professor Rena Bizios, now her adviser. Bizios researches cellular bioengineering, exam-
ining fundamental questions like how bones heal.

With no financial aid, "I took a big gamble," says Dee. "No one was going to invest in me until I invested in me. And I did—I invested that first year, and it paid off."

Her groundbreaking research on cell and tissue engineering, designing biomaterials for implants that will encourage bone growth, has won Dee the GE Faculty for the Future Award, and the American Society for Engineering Education Apprentice Faculty Grant, among other awards and honors.

Dee has a positive mindset—she sees herself as a person, not a woman, at Rensselaer. But she admits the road is a hard one.

"By the time you're a woman on the graduate level, you're pretty focused and pretty determined. If you make the choice to be a minority in a particular situation then you have to draw on your inner strength," she says.

"By doing what I'm doing and being who I am, I hope to lead by example. I hope that some students will think that they might also go 'play in a lab.' "

A Delicate Balance

Assistant Professor Natacha DePaola, recently awarded the NSF Early Career Award, is successfully juggling the demands of her academic career, her graduate students, teaching, and a young family.

Born in Venezuela, she was raised in a society and a family that did not shy away from women in strong roles. "Down there," says DePaola, "women have a lot of important roles—you often have women who are professors and teachers and in government. To some extent more often than you see here."

She grew up with an interest in physics, designing and building gadgets from her earliest childhood. Looking for something more interesting than pipes and engines, she fastened onto biomechanics, and her love of research pointed her to academia.

Completing her undergraduate degree in mechanical engineering in South America, she went to MIT for her master's, where she met her husband.

She and her husband, Aleksander Ostrogorsky, an associate professor of...
mechanical engineering, spent the early years of their marriage commuting on weekends between Harvard Medical School (where DePaola was completing her doctorate) and Columbia (where Ostrogorsky taught). After a brief respite when they both were employed at Columbia, DePaola was offered a position at Northwestern and almost simultaneously Ostrogorsky received an offer from Rensselaer.

"It was the right time in our careers, and it seemed like the right thing to do," says DePaola. "Now we were commuting—only a few more thousand miles. Once you get on a plane it doesn't make too much difference.

"It was a difficult time," continues DePaola, who had her hands full with the couple's 4-month-old son at Northwestern. Two years ago a vacancy opened up in the biomedical engineering department at Rensselaer. "I was really very fortunate that Rensselaer was looking for someone—right in my department, right in my field—and they offered me the job."

Rensselaer was equally fortunate. Last year, DePaola received the prestigious Whitaker Biomedical Research Grant and was recently given the NSF Early Career Award. Her research on the application of fluid dynamics to arteriosclerosis has received national recognition.

The Leaders of Tomorrow

Rensselaer has always supplied leadership for industry, government, and academia. Kristen Trout '97 (Grand Marshal) and Monica Loseman '97 (President of the Union) have already shown skills that will be the stepping stones to future success.

Trout is a senior in chemical engineering and Loseman is in her last year at Rensselaer in the accelerated management-law program. Both on the dean's list, they have successfully balanced their studies and the demands of their offices.

"The women who are here are exceptional, not only because they've been through the program at Rensselaer," says Loseman, "but because they've had to deal with being in the minority and have helped change other people's perceptions of the women at Rensselaer."

Loseman has had her goal in mind since she was in third grade. Where others wanted to be police officers or firefighters or ballet dancers, Loseman wanted to be President of the United States. Her ambitions haven't altered much since then. She sees her law degree as paving the way to a career in management or government. "I have big plans. I want to be a CEO or big in politics."

Trout is action-oriented and wants to see Rensselaer student government spend less time planning and writing and more time accomplishing—setting concrete, realizable goals.

She thrives on the rigorous engineering curriculum and brushes aside gender bias or discrimination. "You can do what you want. The only obstacles are the difficulties of the classes themselves. There are plenty of males who can't do the stuff either."

Like the women who came before them, Rensselaer's women of today and tomorrow all have different challenges and different aspirations. But they are all women of Rensselaer, and they are ready to face the unexplored world of our technological future.

SNAPSHOTS

The women of Rensselaer add an important depth to the overall community. Their experiences and backgrounds are as diverse as their interests:

Donna McCabe

Composer; performance artist; M.F.A. student
A computer science major with an electronic music minor as an undergraduate, McCabe was drawn to iEAR's marriage of art and technical expertise. "I'm interested in breaking out of the routine. That's why I became an artist."

Antoinette Maniatty '87
National Science Foundation Young Investigator; Clare Booth Luce Assistant Professor of Mechanical Engineering; B.S Mechanical Engineering, Rensselaer; Ph.D., Cornell University

Maniatty returned to Rensselaer after graduate study because of the opportunity to collaborate with faculty from many disciplines. "I love being a professor because I like the freedom to pursue my ideas."

Michelle Emrick

Junior; biochemistry/ biophysics major; Executive Officer, women's intercollegiate rugby team

Last year, as team captain, Emrick was instrumental in organizing Rensselaer's first women's rugby team to compete in an official intercollegiate league. "This year, we have more than 20 women competing. Now that we're part of a league, we actually have a schedule of teams we play. It's been great meeting all these people."

Tashonna Webster

Senior; biology major; member of the Black Students Alliance; violin player with Rensselaer's orchestra

Webster pursues a rigorous academic schedule to prepare her for a future career in medicine. Playing the violin in the orchestra gives her some down time. "I'm happy to do things with other people like play in the orchestra. It also gives me the chance to show people what I've done."

Oksana Holovetsky

M.T. MBA student; undergraduate degree in engineering physics from Lviv Polytechnic Institute, Ukraine

Before joining Rensselaer's MBA program, Holovetsky worked in Lviv's Incubator Center as a consultant. "With all the changes in Ukraine, there have been numerous cuts to financing—now there are too many engineers. I didn't want to forget my engineering training, which is why Rensselaer's Management and Technology MBA program fed my goals. I plan to become a manager of technical enterprise."

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Making a Difference

Rising to the Challenge
Kresge Foundation grant spurs donors to support Walker Lab renovation

Thanks to hundreds of gifts from graduates, friends, corporations, and foundations, Rensselaer has successfully completed “the Kresge challenge” by raising $3.2 million in gifts and commitments for the Walker Laboratory renovation.

This fund-raising challenge resulted from a $750,000 grant from The Kresge Foundation to help renovate Walker, which has been Rensselaer’s main undergraduate chemistry building for nearly a century. The grant was contingent on Rensselaer raising an additional $3.1 million in new gifts and commitments from many donors.

Grants from The Kresge Foundation are intended not only to help improve facilities but also to stimulate new giving for the same cause from the grant recipient’s community of philanthropic supporters.

This grant certainly had that effect as many donors responded generously. For example, in the final months of the challenge, Rensselaer received significant new support from many trustees. This giving was motivated in part by a separate challenge gift of $100,000 from the Jonsson Family Foundation announced by trustee Ken Jonsson. This gift was contingent on support from all trustees.

The success of the Kresge Challenge reflects a tireless effort by many trustee volunteers, especially: Neal Barton ’58, chair of the volunteer committee; Dick Bouchard ’58; Sam Heffner Jr. ’56; chairman of the board; David Hirsch ’65; and Harvey Zeve ’52.

A formal rededication ceremony took place in October.

Annual Fund: Where the Money Goes

An independent marketing company recently surveyed 787 graduates from a range of class years, majors, interests, and giving behaviors about their thoughts on the Rensselaer Annual Fund.

“We learned that Annual Fund donors give for reasons of altruism, loyalty to Rensselaer, and desire to help both Rensselaer and the next generation of students,” says Terri Van Patten, director of annual giving and regional advancement. “But many alumni haven’t yet participated in the Fund because they aren’t sure where their gifts go.”

Gifts to the Rensselaer Annual Fund are unrestricted and are used where they are most helpful to students—for scholarships, curriculum renewal efforts, and investments in leading-edge technology in refurbished classrooms. Donors who prefer to suggest how their gifts are directed can choose from scholarships, fellowships, undergraduate or graduate academies, Institute operations, and the Folsom Library.

The Fund helps meet the increasing costs of providing a technological education and attracting the finest students. These expenses cannot be met by tuition or a few gifts alone; broad participation is crucial.

Currently, Rensselaer’s percentage of alumni participation is lower than some competitors. Lehigh (49.6%), Cornell (41.4%), Rice (39.3%), MIT (37.8%), Georgia Tech (32.2%), and WPI (28.5%) all surpass Rensselaer’s alumni participation rate of 20.8 percent. This statistic figures heavily in rankings by U.S. News & World Report, in giving decisions by private philanthropic foundations, and in student recruiting.

Gifts Wraps

▲ The W.M. Keck Foundation (Los Angeles) has awarded Rensselaer a $640,000 grant to renovate and equip a new multidisciplinary laboratory for research on water quality. Faculty from the schools of Science, Engineering, and Humanities and Social Sciences will conduct research projects from the new facility in the Materials Research Center.

▲ Hewlett-Packard has awarded Rensselaer $418,395 in electronic test equipment and computer equipment for a variety of programs. One equipment gift has helped Rensselaer create a new studio classroom for the study of circuits and electronics. Each year, 225 students, in sections of 40 to 50 students, will use the new facility for two highly interactive, technology-enriched courses that will integrate fundamental concepts and professional practice.

▲ For the second year, the Helen V. Froehlich Foundation (Chicago) has awarded Rensselaer a gift to support research on water quality at Lake George. Rensselaer’s Darrin Fresh Water Institute will use the award of $97,834 to investigate the possible presence of zebra mussels, a nuisance mollusk that could disrupt the lake ecosystem and damage the surrounding environment.

1996-97 Annual Fund Progress

Rensselaer/December 1996 15
Walker lab, as seen decades ago. Turn the page for today's exciting, state-of-the-art renovated Walker facilities.
With the Walker Lab renovation deemed a success, Rensselaer forges ahead on renewing and revamping its historic green-roofed campus

By Margaret M. Knight

When Walker Laboratory opened in 1906, it represented Rensselaer's enthusiastic embrace of a bold new era. The impressive new chemistry building was the ultimate teaching laboratory for the 20th century.

Now, at the venerable age of 90, Walker has re-emerged from a two-year renovation one of the most modern, innovative teaching facilities anywhere. Its transformation marks the first step in Rensselaer's commitment to create a 21st-century campus with its historic architecture intact.

What we call the "green-roofed campus" consists of the ivy-covered brick and limestone academic buildings erected between 1905 and 1934 under the stewardship of President Palmer Ricketts. These gracious buildings, a familiar area landmark and Rensselaer's most visible link to its past, evoke nostalgia among alumni and seized the imagination of R. Byron Pipes.
Early in his presidency, Pipes announced, "I am making the renewal of Rensselaer's green-roofed campus a major priority. The renovation of these buildings will contribute to the preservation of the historic heart of the Rensselaer campus while providing today's students with facilities that will incorporate the latest developments in technological education."

The Walker renovation has been, quite literally, a smashing success. Although the appearance of the exterior was altered little, the interior was gutted—stripped down to the floors, beams, and studs—and totally rebuilt. Almost immediately off-campus voices were adding their praise to rave reviews from faculty and students.

In June Rensselaer received a 1996 Historic Educational Building Award from the Preservation League of New York State. "This award," the League said, "recognizes the effort to preserve historic educational buildings and continues their use as educational facilities. The League congratulates all those involved in the effort to demonstrate that historic school buildings can still meet modern educational needs."

**RENOVATING UP**

The remarkable thing about the Walker renovation is not that Rensselaer decided to save an old building, according to Ted Mirczak '66, senior director of campus planning, Rensselaer was able to preserve the original "footprint" of the building for use as it was originally intended without sacrificing its appearance.

Historic sensitivity but not subservience was the key. "We're not trying to be purists," Mirczak says, adding that if these buildings were on the historic register, renovation might be impossible. "But we are trying to respect their historic character," he says.

The Walker towers are constructed of brick that closely matches the original, accented by a contemporary interpretation of the 1905 limestone detailing. The replacement windows, near replicas of the originals, are constructed with solid wood frames, exterior aluminum cladding, and double glazed argon-filled energy-efficient glass. All exterior walls were fully insulated, as was the new copper-clad roof.

The decision to use copper was based as firmly on practicality as sentimentality. True, it is the green patina of the roofs that gives these buildings their familiar name. But copper is also a smart financial decision. "Most of these old roofs have lasted close to a hundred years and we fully expect to get that out of them again," Mirczak says.

"There's always been adaptive reuse and preservation of buildings by schools concerned for their heritage," he says. "What usually happens, however, is that a building will be renovated 'down' to a low-tech use because that's much easier.

"The decision to adaptively reuse Walker and employ flexible high technology to support interactive learning is remarkable," Mirczak continues. "We took a building originally constructed for chemistry education and renovated it to be a state-of-the-art chemistry teaching laboratory. And not only did we do that—and win an award for it—we did it for less per square foot than it would have cost us to build a comparable new building!"

The cost, about $11 million for the renovation itself and $2.5 million for equipment, worked out to roughly $207 a square foot compared to between $250 and $300 a square foot for new construction. At the same time, requirements of the Americans with Disabilities Act were met and virtually all the building's deferred maintenance ($5,672,000) was eliminated.

The trickiest part of renovating is deciding how to accommodate the high-tech infrastructure—the miles of wires and cables and vents—and new safety and accessibility requirements like additional stairways, elevators, and exhaust fans.

By adding two exterior towers, one for the required secondary stairs and the second for the elevator and HVAC equipment, Rensselaer was able to preserve the original "footprint" of the building for use as it was originally intended without sacrificing its appearance.

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Inside it's an entirely different matter.
courage collaborative work and easy movement—

Here history ends and the future begins.

CHANGING THE WAY STUDENTS LEARN AND TEACHERS TEACH

Shortly after 8 o'clock on a brisk September morning, no one on the top floor of Walker is thinking about matching bricks or "historically correct" windows. The 48 students in Associate Professor Tom Apple's Chemistry I course are seated, not in rows of desks, but at small work tables. They're huddled in groups of four over a problem Apple has just posed to illustrate his introduction to the structure of atoms. In one corner there's a heated debate in progress. Apple and two student assistants move about the room watching, listening, and stopping to answer questions.

Looking up from the group he's helping, Apple raises his voice above the din to give the answer. He's not as interested in who got it right, as in whether or not everyone understands. "If you didn't get this and someone in your group did, get them to show you how they did it," he says.

"Students often make the best teachers," Apple says. "I've been doing this for years and sometimes I forget what made it click for me. But a student who's just figured something out can explain it beautifully."

Later the class moves across the glass-walled corridor to its own dedicated laboratories where, still in groups of four, they tackle experiments keyed to today's discussion.

This is interactive learning, an educational revolution that is permeating instruction in virtually every discipline at Rensselaer and garnering high praise [see sidebar, page 21]. Although specific innovations vary greatly from course to course, the underlying principle is quite simple—shift the emphasis from what teachers teach to what students learn.

Interactive learning requires students to participate more actively in their own education in environments that are student-centered, project-based, communications-intensive, and, where appropriate, enriched by advanced computing technologies.

Apple and Professor Alan Cutler are principal investigators for a two-year $115,000 grant from the National Science Foundation to develop, implement, test, and publish an approach to teaching general chemistry in a studio setting. The project, now in its second year, includes all students in the School of Science taking Chemistry I and II and is investigating faculty efficiency, student performance, and general satisfaction.

In the new studio model, introductory classes are divided into sections of about 50 students each. The old structure—big lecture, smaller recitation, and long, once-a-week lab—is gone, replaced by two two-hour sessions each week. Short lectures, lively class discussion, team-centered problem solving, and hands-on lab experiments are an integral part of each class period.

The studio format intensifies faculty-student interaction, Cutler says. And Apple is convinced it's a big improvement. "In the 'old' days," Apple says, "labs would often get out of sync with the lectures, and worse, I had little idea if the students were really with me. I'd see some heads in the lecture hall nod in understanding and think everything was fine until I gave a quiz and realized how wrong I was. I am quite sure that these students will out-perform general chemistry students at any university in the country," he says.

Walker Laboratory—redesigned specifically to encourage collaborative work and easy movement from discussion to experiments and back—is the ideal setting for the pedagogical revolution. It houses labs for synthesis and analytical chemistry, each next to a computer classroom; instrument rooms; two lab-with-computer-classroom suites for general chemistry; a biochemistry lab; and space for offices, conferences, informal faculty-student interactions, and observation of interactive learning. Research-grade equipment gives students experience with instruments identical to those they will use in their future careers, and powerful multimedia computers put a world of information at their command.

From room layout to furniture to computer equipment, Walker classrooms are designed to facilitate student teamwork and faculty mentoring.
Now, almost a century later, the renovation of the Ricket education are marked by a similarly flexible, pragmati

A CAMPUS FOR THE NEW CENTURY

Walker is just the beginning of an ambitious plan that includes three more buildings. Next in line, the Troy Building is already being gutted. And before the end of 1999, Pittsburgh and Lally will have been checked off the list.

Although these renovations and relocations are being carefully orchestrated, there is no grand all-encompassing master plan for the campus. Instead, there is a philosophy, a set of guiding principles. Those principles include the Institute's commitment to

- upgrade existing facilities to support changes in pedagogy and improve support activities;
- preserve and adaptively reuse historic structures to the most appropriate and best use;
- enrich the campus environment with physically accessible and friendly places where people can gather and learn informally; and
- set a high standard of excellence in design and construction for appearance, safety and accessibility, durability, long-term flexibility, low energy and environmental impact, and technological and educational innovation.

A major advantage of the philosophy versus master-plan approach is flexibility. Without it, campus renovation might have stopped with Walker while awaiting funds to proceed with Carnegie, also approved for renovation and originally next in line.

But recent large donations to the Lally School of Management and Technology, most notably a $15 million gift from Kenneth and Thelma Lally, have bolstered phenomenal growth in that school and made possible its move to larger quarters in a renovated Pittsburgh Building.

Instead of throwing a grandiose plan into disarray, the Lally gift set off an impressive chain reaction. The president, dean of the faculty, and vice president for student life (along with the registrar, bursar, dean of students, and other student-service operations) will move to the renovated Troy Building next summer. Then work will start on Pittsburgh. When the management people are settled in Pittsburgh, Lally will be readied for the Institute Advancement division.

Like Walker, Troy and Pittsburgh will undergo major internal and external work to upgrade mechanical and technical systems, address accessibility issues, and eliminate all deferred maintenance. In addition to administrative and student-service offices, the Troy building will house two showcase interactive learning classrooms on the main floor. The Lally building, which has recently seen improvements, will need far less work than the others.

SEIZING THE MOMENT

Instead of marking the end of Rensselaer, a devastating fire that destroyed the Main Building in 1904 sent the Institute up the hill to its present location. A promise from Andrew Carnegie to finance a new building if suitable land were obtained galvanized the university. Thousands of dollars were raised from alumni, friends, and Troy citizens. Within a year the 10-acre tract had been purchased and two new buildings were under construction—Carnegie (named for the benevolent industrialist) and a new chemistry laboratory (named to memorialize Class of 1886 alumnus William Weightman Walker and express gratitude to his mother for her large gifts in support of chemistry education).

Those two buildings were the beginning of a phenomenal period of growth and benevolence. Russell Sage Laboratory, erected with a $1 million gift from Margaret Olivia Sage, was dedicated in 1909. In 1912, the Pittsburgh Building became the first on a college campus to be built by gifts from the alumni of a sin-

*Main Building stood between Seventh and Eighth Streets where the remains of the Approach are located. For more about the fire and building of the Ricketts campus, see "Born in Flames," Rensselaer magazine, June 1991.
ts campus and the concurrent revolution in undergraduate
approach and by equally impressive financial support.

gle city. Gifts from the Class of 1887 built
the '87 Gymnasium and donations from
the City of Troy honoring the Institute's
centennial in 1924 erected the Troy
Building. Similar contributions led to
Amos Eaton Hall (1928), a new student
union (now Lally Management Center,
1928), the Greene Building (1931), and
the Ricketts Building (named in honor of
"the Builder" and completed after his
death in 1934).

In his history of Rensselaer,** Samuel
Rezneck noted the absence of an overall
plan for growth, saying, "if
any plans ex­
isted, they were extremely flexible. [Rick­
etts's] procedures were thus entirely
pragmatic..., as dictated by avai lab l e
means and the possibilities of the
moment."

Now, almost a century later, the reno­
vation of the Ricketts campus and the
concurrent revolution in undergraduate
education are marked by a similarly flex­
ible, pragmatic approach and by equally
impressive financial support.

Major grants from the National Sci­
ence Foundation, the Kresge Foundation,
the Fund for the Improvement of Post-
Secondary Edu-
ation, IBM,
AT&T, Boe-
ing, GM, and
GE—together
with alumni
gifts—have giv­
en Rensselaer
the power to
expand its
ini­
tiatives.

The most
recent, a major
challenge grant
from the Kres­
ge Foundation
to support the
Walker renovation, was secured in Au­
gust when alumni and friends met the
terms of the challenge by pledging more
than $3.1 million in new commitments.

When plans to renovate Walker were
first announced, Rensselaer Trustee Neal
Barton '58, who led the volunteer com­
mittee overseeing fund raising for the
project, said, "We must preserve the
beauty of our campus and at the same
time, supply the cutting-edge techno­

ology needed for a 21st-century education."

Reaching back into its past, Rensselaer
is creating the learning environments of
the future. At the venerable age of 90,
Walker Laboratory is again emblematic
of the Institute's enthusiastic embrace of
a bold new era.

For more photos of the interior and exter­
or of Walker today, visit Rensselaer. MAG
on-line!

Accolades for Interactive Learning

Many prestigious external endorsements confirm Rensselaer’s
national leadership in the reform and renewal of undergraduate
education. Most notable among these are:

Pew Leadership Award for the Renewal of Under­
graduate Education (1996)

In October Rensselaer was given this prestigious honor in
recognition of the Institute's pioneering work in curricu­

lum renewal. The award, sponsored by the Pew Charita­
ble Trusts, carries a $250,000 prize that will be used to
continue and expand curriculum development (see President's View, page 2).

Theodore M. Hesburgh Award for Faculty Develop­
ment to Enhance Undergraduate Teaching (1995)

Rensselaer was the sole recipient of this national award cre­
ated to acknowledge and reward successful, innovative fac­
sity-development programs that enhance undergraduate
teaching, and to inspire the growth of such initiatives at
colleges and universities throughout the nation.

Boeing Outstanding Educator Award (1995)

Ten Rensselaer faculty members were the first winners of
this national award designed to spotlight a college or uni­
versity that has made a significant difference in under­
graduate teaching in engineering, manufacturing,
computing, mathematics, and chemistry.

Kresge Foundation Challenge Grants (1996, 1990,
1979)

In August of 1996 Rensselaer successfully met the terms
of a $750,000 challenge grant from the Kresge Founda­
tion to support the renovation and equipping of Walker
Laboratory. Two earlier Kresge challenges, the first in sup­
port of renovations to Russell Sage Laboratory and the sec­
ond to purchase computers for one of the Institute’s first
major initiatives in interactive learning, were also met.
Kresge awards are considered a particularly prestigious en­
dorsement of the recipient’s programs because the Foundation’s national grants process is singularly competitive.

The student body at Rensselaer outnumbers the entire population of Union County, New Mexico, where School of Science Dean Doyle Daves grew up.

The family cattle ranch was 26 miles from the nearest town and a long, long way from any city.

Those rural roots, amid mile-high mountains and boundless grassland, may have nurtured Daves's wide perspective and open-minded outlook—something science itself nurtures but hard-boiled researchers and academics often lose.

"I was interested in everything. Whatever you mentioned sounded good to me," says Daves, recalling his boyhood approach to choosing a career.

Chemistry sounded good. What's more, it was required for the job he took at 60 cents an hour washing laboratory glassware at New Mexico Highlands University.

As it turned out, he liked chemistry and stayed with it, eventually transferring to Arizona State University.

After college, Daves accepted a position at Midwest Research Institute in Kansas City, Mo. Two years later, he traveled across the continent to earn a doctorate at Massa-
Post-doctoral work at Stanford Research Institute took Daves to California. Then teaching, research, and administrative positions followed at the University of Oregon Medical School, Oregon Graduate Center, the National Institutes of Health in Bethesda, Md., and Pennsylvania’s Lehigh University where, for seven years, he served as professor and chair of the department of chemistry.

If it seems that life has taken the rancher’s son far from the limitless vistas he grew up with, it isn’t so. Daves has never rubbed the long look from his eyes. He still can’t take the narrow view.

When Daves became dean of Rensselaer’s School of Science in 1989, that wide perspective came with him. And he found it here.

Unbounded openness is the school’s distinctive feature. Like Union County, New Mexico, it’s a place with no walls and few fences.
The School of Science embraces every Rensselaer student, and its alumni include engineers, architects, government leaders, and corporate managers. That's because this school has responsibility for 80 percent of the freshman curriculum and teaches more than half of all sophomore courses.

The Rensselaer revolution in undergraduate education—recognized in the prestigious Hesburgh, Boeing, and Pew awards—began in the School of Science and spread Institutewide.

"Doyle didn't invent interactive learning. It was already started in math when he arrived, but he saw the implications and he started promoting it," says Richard Lahey '64, dean of engineering.

As a consequence we are known all around the world," says Lahey. "Just yesterday I had every dean here from Iowa State, wanting to see what we're doing in math, physics, chemistry, and engineering, and how they could start it.

The 1997 edition of "America's Best Colleges" from U.S. News & World Report says: "When it comes to educational purposes, no college or university is doing more to use computers than RPI."

"There are areas in which we can say we're number one in the country," says Lahey, "but this is one. And it's all because of Doyle's encouraging it and pushing it.

This commitment by School of Science faculty to excellence in undergraduate teaching enriches every student at Rensselaer, regardless of major. There are no walls around this school.

There are no walls within the school either. Science students are encouraged to discover what interests them. They need not pick a major until the end of their sophomore year, and can then tailor a course of study that bridges many university departments and most closely fits their unfolding aspirations.

"When I came here, I felt my way around," says Michelle Emrick '98, an Emily Roebling scholar who calls herself "a product of America" because she's lived in Iowa, Michigan, Arizona, and Oklahoma.

"I knew I wanted science, but I had no idea what branch I wanted, and I didn't want to get trapped in something and say 'Ugh, how do I get out of this!'," says Emrick, who represented undergraduate students at the October dedication of the newly renovated Walker Laboratory, home of Rensselaer's celebrated studio chemistry facilities [see story, page 16].

A junior, Emrick is now majors in biochemistry/biophysics but is still exploring broad career options: medicine, pharmaceuticals, an MBA in technological entrepreneurship, an academic career with a Ph.D., or even certification as a high school science teacher.

Openness to student interests and changing marketplace needs characterize new School of Science initiatives in graduate education as well.

Not long ago, most graduate students in physics, biology, math, and other scientific fields were headed for doctorates and scholarly careers in laboratories or lecture halls.

Those opportunities have decreased greatly.

"We can't ignore the fact that most of our students are not going to be professors like us," says Daves, speaking of the sweeping changes that have come in industry, government, and academic, where funding for basic research has dwindled and Ph.D.'s struggle to find work.

In response, Rensselaer alumni on the Science Advisory Council urged the school to provide expanded opportunities for graduate study geared to the marketplace.

Today, the school offers a master's degree in applied science, specifically designed for men and women who seek top business and industry jobs for which a bachelor's degree is no longer sufficient.

This professional master's degree provides highly desirable opportunities for interdisciplinary study in microelectronics manufacturing, polymer science, photonics, chemistry and entrepreneurship, software engineering, and applied groundwater science, to list a few.

"Rensselaer alumni care deeply about the Institute and are committed to our success," says Daves. "What's more, they are far closer than we are to the heartbeat of corporate America. We could never have pulled off the master's degree in applied science without the push that came from Rensselaer grads."

The school's boundary-free perspective is especially demonstrated in an emphasis on research that is truly interdisciplinary and synergistic. Geologists join forces with chemists who work with biologists who interact with physicists who team up with mathematicians who cooperate with computer scientists.

More important, School of Science research is not fenced off from the School of Engineering, the Lally School of Management and Technology, the School of Humanities and Social Sciences, or the School of Architecture.

This is especially apparent, says Daves, in three research areas to which Rensselaer's School of Science has given intensive, focused emphasis:

At Rensselaer some of the world's leading mathematicians, computer scientists, and engineers work together to create computer simulations that open a new world of theoretical exploration, discovery, and analysis. They design new molecules, simulate the behavior of high-temperature materials, test new theories in physics, even try out delicate surgical procedures. The showcase of synergism in this field is Rensselaer's Scientific Computation Research Center. "That center is a great example of Rensselaer scientists and engineers working together on solutions to common problems that will benefit everyone," says Lahey.
**Advanced Materials**

School of Science researchers work side by side with engineers to develop tomorrow’s high-performance plastics, computer chips, or the composite materials to replace body parts or make space flight affordable. These scientists are key participants in Rensselaer’s Center for Integrated Electronics and Electronics Manufacturing, the New York State Center for Polymer Synthesis, and the Center of Excellence for Advanced Interconnect Science and Technology recently created at Rensselaer by the Semiconductor Research Corporation.

**Groundwater Systems Science**

Life—and the quality of life for all people—depends on abundant sources of fresh water for nutrition, medicine, agriculture, industry, recreation. Rensselaer scientists are fast becoming leaders in understanding and protecting this indispensable resource through multidisciplinary research at the Darrin Fresh Water Institute, joint projects with the U.S. Geological Survey regional office in the Rensselaer Technology Park, and a cooperative, NSF-funded graduate program with Columbia University. The newly created Keck Foundation Water Quality Laboratory features faculty researchers in biology, chemical engineering, earth and environmental sciences, economics, and environmental and energy engineering [see related sidebar, page 27].

"Congress and corporations are less interested today in funding small projects with one or two researchers who work alone," says Daves. "They favor large projects that will have a significant impact on major economic and social concerns, and they are looking for multidisciplinary proposals that can garner $5 or $10 million in government, private, and university support and promise to make a clear difference in the world."

"At Rensselaer, we have a history of working across the lines and that’s our advantage," says Lahey. "At other universities, the boundaries between schools are very rigid. Here we put materials engineers and mathematicians and physicists and chemical engineers together in a common research project. The boundaries are very, very porous."

Doyle Daves changed when he came to Rensselaer.

He spent most of his life as a research scientist, working on the design and synthesis of chemicals that could be of biological and medical importance.

This spring, for example, Daves and a colleague at Oregon Graduate Center announced their discovery of the sex pheromone in Asian elephants. The discovery, published in *Nature* and the result of 16 years of tedious, complicated research, may help stem the decline of the Asian elephant and bolster our understanding of the role of chemicals in mammalian communication.

"I came here to build research. Before I came to Rensselaer, I knew very little about teaching undergraduates," says Daves.

But Daves wasn’t at Rensselaer long before he discovered that the university had to pay immediate attention to undergraduate instruction or abandon its responsibility, lose its reputation, and fail to attract top high school students.

"Placing the same value on undergraduate education that we placed on research involved a fundamental shift for me and the faculty. But we set out to make Rensselaer the leading school in undergraduate science among all research universities in the country. And we did it! But we must now balance that by concentrating on those interdisciplinary research areas in which we have the opportunity to be world class."

Balance between teaching and research is the key to the future, says Daves. The most promising prospects for world acclaim and future funding lie in interactive learning, multimedia education, precollege programs, and research in scientific computation and applied analysis, advanced materials, and groundwater systems science, says Daves.

"Visitors from other universities always ask me, ‘How did you get your faculty to go along with these new ideas?’ I say, I didn’t. The ideas were theirs. I only
encouraged a little and stood back and cheered."

There is still much to do. Daves and the faculty want to expand the application of computers to scientific investigation. They must effectively incorporate the resources of the World Wide Web. They want to develop the use of student portfolios that would help decide final grades based on concrete evidence of student accomplishments and teamwork. They want to foster peer learning and make students even more responsible for their own educational direction and progress. And they intend to make education increasingly informal—perhaps even more chaotic—where the classroom becomes more truly a place of discovery, surprise, and freedom.

"We are still in the early stages," says Daves. "I look for a university 10 years out that will make this time seem pretty conservative."

The innovations in undergraduate education, the responsive new graduate opportunities, and major projects in cooperative research have succeeded because Daves and the science faculty refuse to be fenced in by narrow, depleted ways of thinking. For example, the Science Advisory Council is made up mostly of Renselaer alumni who majored in engineering.

"For me to build an advisory council of people who have careers like mine wouldn't give me much new insight," Daves says. So much for walls and fences!

"Doyle didn't invent interactive learning. It was already started in math when he arrived, but he saw the implications and he started promoting it. As a consequence we are known all around the world."

Richard Lahey '64
Dean of Engineering

The Darrin Fresh Water Institute is helping us understand—and protect—our water resources
The next time you take a bath, fish a clear mountain stream, canoe across a lake, or drink a glass of cool water, be grateful for the work of Rensselaer’s Darrin Fresh Water Institute, a key center of multidisciplinary teaching and research at Rensselaer.

Founded in 1967, and later named to honor Margaret A. and David M. Darrin ’40 for their generous support of environmental research and education, the DFWI has become a leader in helping the world understand and protect water resources. DFWI facilities on the Rensselaer campus recently expanded when The Keck Foundation created a three-room water quality laboratory with advanced instruments for sampling and analysis. At Bolton Landing on New York’s Lake George, the DFWI field station includes a new 7,500-square-foot facility for teaching and research.

Geologists, biologists, engineers, chemists, economists, and specialists in dozens of other diverse disciplines work here as a team. Like the School of Science, this center has no walls—a fact that becomes crystal clear when you talk with Sandra Nierzwicki-Bauer, professor and chair of biology, who directs the DFWI.

“It involves all schools, embraces all departments, relies on the whole university for support, and helps mobilize local, state, national, and international resources to solve fresh water problems,” says Nierzwicki-Bauer.

“Our first director was Nick Clesceri, an engineer,” she points out. “We have important links to environmental engineering, chemical engineering, management, the humanities—you name it. Fresh water issues are extremely complex. Work has to be multidisciplinary.”

DFWI research is examining the short-term and long-term effects of human activity on Lake George, ways to control fast-growing nuisance plants such as the water chestnut and Eurasian milfoil, and the complex interactions of microbes and phytoplankton that form the key beginnings of the biological food chain. And there’s more:

**Acid Deposition**

When industries and automobiles create snow and rain contaminated by nitric and sulfuric acids, the entire ecosystem is affected. The impact of acid deposition on the Adirondack Mountains and ways to limit such destruction anywhere are the targets of a government-supported DFWI study.

**Zebra Mussels**

DFWI researchers are developing DNA probes that can detect microscopic larvae and provide early warning of zebra mussel infestation. Where adults colonize, these pesky creatures disrupt the natural ecology, clog water systems, and leave smelly, ugly shell waste on beaches.

**Pollution Chemistry and History**

PCBs, dioxins, heavy metals, raw sewage, and other waste materials have long polluted reservoirs, lakes, rivers, and groundwater systems. DFWI researchers are tracing where pollutants came from, where they went, what they did, and what can be done.

**Electronic Resources**

Experts from Integrated Electronic Arts at Rensselaer (IEAR) have teamed up with DFWI researchers to begin developing an interactive CD-ROM that will help identify and catalog phytoplankton. Participants in this unusual project that links Rensselaer’s School of Science and the School of Humanities and Social Sciences are also working on cable telemcasts of the Bolton Landing lecture series, production of an educational video, and the creation of a spectacular DFWI home page (http://www.rpi.edu/dept/bio/fwi/).
FALL WEEKEND HOSTS STUDENT LEADERS

Current and former student leaders gathered on campus, at the special invitation of the Rensselaer Alumni Association, to take part in activities during Fall Alumni Weekend, Sept. 27-28.

Some 40 Grand Marshals, Presidents of the Union, Poly editors, Phalanx members, and other leaders through the years attended a dinner in the Heffner Alumni House, where they shared stories and heard remarks from former and current student affairs administrators, including Byron Evans, former vice president of student affairs; Carl Westerdahl, former dean of students and former director of alumni relations; Eddie Knowles, current dean of students; Rick Hartt '70, director of the Union; and David Haviland '64, current vice president for student life.

"There's a real tradition here of student leadership through the years," said Haviland. "It's helpful for the current students to see that. They sometimes feel they have the world on their shoulders."

Alumni from as far back as the '30s attended a forum where they heard from current student leaders and reflected back on their own eras.

Jim LaPosta '80 and Bill Duggan '80 had both served as Grand Marshal. "It's gratifying to come back and see some of the projects we started that have come to fruition," they said.

"The leadership opportunities I had at Rensselaer contributed more to my growth and success than what we did in the classroom," added LaPosta, who said he finds that students who had leadership experiences in school are more successful in business.

Monica Loseman, current President of the Union, told the alumni about the Archer Center for Student Leadership Development, whose programs reach more than 3,000 students each year through both classroom and extracurricular experiences.

"It gives us a cutting edge when competing with other graduates for jobs," she said. "It's what students want and it's what the business world wants."

Jay Hawthorne '39, former Poly and Transit editor, among other activities, echoed these sentiments. "I was very pleased to learn that the Institute had adopted leadership programs," he said. "Today, more than ever, in the work place it's mostly teamwork. You can't operate as an individual like in the old days of Thomas Edison," he said. "It's very important that you get this instruction before you go out in the world where it's both needed, and you need it."

Other Fall Alumni Weekend activities included a student parade and a tailgate party in the Quad, followed by a varsity football game against the University at Albany. The RAA board of trustees and several RAA committees also held meetings during the weekend.
Class Notes

Class Notes Deleted for Privacy Concerns
Imagine the Possibilities!

Greetings from the Rensselaer Alumni Association, and welcome to our newest members, the Class of ’96. It will be exciting to see the impact this diverse, motivated group makes in their careers and communities—the possibilities are endless!

Like our alumni, the RAA strives to make a difference, too. Programs and services for alumni are available locally, internationally, and on the Internet. And the Institute benefits from the knowledge, time, and financial support alumni give. Everyone benefits from the partnership—it can benefit you, too.

Serving Alumni

- Regional alumni chapters worldwide sponsor networking and educational events
- SkillSearch, a professional search firm, links corporate clients with alumni
- Class reunions are an opportunity to enjoy campus, memories, and friends
- The RAA offers a great selection of merchandise, travel programs, and a terrific credit card for alumni
- Professional networking opportunities are offered on campus and nationally

Serving Rensselaer Students

- Share your professional and career advice as an alumni mentor in the Archer Center for Student Leadership Luncheon Program
- Attend brunches, receptions, and convocations for students, and share your experiences
- Support the RAA Teaching Award, which provides funds for improvements in the teaching environment and classroom experience

Serving the Institute

- Help recruit high-caliber students to Rensselaer by attending regional admissions programs and college fairs
- Participate in phanathons, Reunion class gifts, and other projects to strengthen the Institute’s financial future

Welcome, Class of 1996, to the Rensselaer Alumni Association—65,000 strong and growing. Get involved, and discover the possibilities a partnership with the RAA holds for you!

The 85 members of the RAA Board and committees come together from all over the country to serve alumni, students, and the Institute. Each of the 14 shaded states is home to at least one RAA Board member.

1996-1997 RAA Executive Committee

Following is a list of the members of the RAA Executive Committee and their hometowns. The entire Board of Trustees and its committees are made up of 85 members, ranging in class year from 1938 to 1998. To contact an RAA Board representative, write to raa@rpi.edu, or call the alumni office at (518) 276-6205.

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(Not Every Action Has an Equal Reaction)

Gifts to Rensselaer cause things to happen...students receive scholarships and fellowships, more professorships are established, and new curricula are developed—and through Rensselaer's gift planning program you decide the formula that's best for you. You can make gifts using cash, but there also are assets other than cash that you can give—stocks, bonds, mutual funds, real estate, percentage of a business, and collectible items. All these assets help keep the high quality of Rensselaer's education in motion. To learn more about how your gift can help Rensselaer, contact Ruth Killoran or Laura Havens-O'Brien at Rensselaer's Office of Gift Planning, 110 8th Street, Troy, New York, 12180 or call (518) 276-8726.

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CHANCES ARE, if you’ve been around for more than 170 years, you have a lot of history. At Rensselaer, we’re proud of our history and of the history made by our faculty, students, and alumni. The new pictorial history of Rensselaer takes readers through 170 years of the building of the Institute, relating its growth to changes in society and illustrating the tenures of outstanding leaders who have shaped Rensselaer.

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