

Educational Programs and Resources



For more than 175 years, Rensselaer has offered a unique and innovative technological educational experience. As the Institute's visionary leaders have long understood, ensuring the excellence of this experience requires learning opportunities that extend beyond traditional classroom or campus boundaries. Rensselaer's students may choose from a broad range of distinctive advantages designed to fulfill their abundant desire for new challenges.

Especially appealing to Rensselaer's highly motivated and intellectually talented students are opportunities to engage in leading-edge research. Rensselaer's relatively small size enables faculty researchers to work closely with students, and they eagerly include both undergraduate and graduate students in their research work. Such opportunities are available to students in virtually every major offered through Rensselaer's five schools—Engineering, Science, the Lally School of Management and

Technology, Architecture, and Humanities and Social Sciences.

Additional special opportunities include a variety of domestic and overseas student exchange programs, internships, and real-world work experience through the Cooperative Education Program. Rensselaer's portfolio in Education for Working Professionals also offers a highly successful distributed delivery program that extends graduate courses, certificates, and degree programs to students at many leading global corporations. Conversely, the Vollmer W. Fries and other lecture series bring leading industrialists, governmental officials, authors, and outside educator-scholars to the Troy campus.

Recognizing the benefits of such beyond-the-classroom educational opportunities, leading industries and graduate and professional schools throughout the nation actively seek Rensselaer graduates.

Undergraduate Programs

Dean: Prabhat Hajela

Undergraduate programs leading to the Bachelor of Science degree are available in more than 30 fields listed on the inside of the front cover of this catalog. All B.S. programs are normally completed in four academic years. Dual majors are also an option that generally can be completed within four academic years. For information on general degree requirements, refer to the Academic Information section of this catalog. The individual school sections provide detailed information on the specific curricula that each offers.

The Schools of Architecture and Engineering also offer professionally accredited degrees. These are the five-year Bachelor of Architecture degree program and the four-year Bachelor of Engineering degree program. See the School of Architecture and School of Engineering catalog sections for more detailed information.

Additional special options available to undergraduates are described on the next page.

Undergraduate Research Program

As a globally active research university committed to providing student research opportunities, Rensselaer offers undergraduates the opportunity to participate in research projects through the Undergraduate Research Program. This program offers students real-world, hands-on research experience. Students work directly with a faculty member on a bona fide research project for which they can earn either pay or course credit. There is a special summer program as well, in which the students can compete for funding that will allow them to spend a full summer working on a research project. Details on the program and titles of past projects are available at <http://www.rpi.edu/dept/urp/> or in the Office of Undergraduate Education, Walker Lab, Room 4010.

Exchange and Study-Abroad Programs

Studying abroad can broaden students' cultural horizons and offer a new and extended perspective on a technological education. Rensselaer, therefore, offers a wide variety of exchange and/or study-abroad programs to undergraduate students.

Most exchange programs are intended for students in their junior year. Students apply to participate in these programs during the second semester of their sophomore year. Serious consideration for these programs generally requires that students achieve and maintain a GPA of 3.0 or better.

Study-abroad programs with a number of established colleges and universities throughout Europe, as well as with a limited number of Asian and Australian institutions, are available. Participation in these programs is usually for one year. However, some one-semester arrangements are possible. Some programs give priority to specific majors, and some institutions require foreign language proficiency. Detailed information on study-abroad or exchange programs that individual Rensselaer schools administer can be found within the catalog section devoted to the associated school.

A comprehensive list of Rensselaer study-abroad and exchange programs and the associated contact person is provided below. **Regardless of which Rensselaer Program is being considered or if studying abroad is being considered through another university, the student should first contact Bob Conway in the Office of Undergraduate Education.**

- n Undergraduate International Exchange Program
Robert Conway, (518) 276-6822, conwar@rpi.edu
- n International Management Exchange Program
Beth Macey, (518) 276-2388, maceyb2@rpi.edu
- n Architecture Exchange Program
Lecia O'Dell, (518) 276-8478, odell@rpi.edu
- n Global Engineering Education Exchange (Global E³) Program
Lester Gerhardt, (518) 276-6203, gerhal@rpi.edu
- n Swiss Exchange Program
William A. Wallace, (518) 276-6854, wallow@rpi.edu
- n French Exchange Program
Lucien Gerber, (518) 276-8125, gerbel@rpi.edu

Preprofessional Programs

The baccalaureate program in a number of fields in the Schools of Science and Engineering will prepare Rensselaer students to receive secondary school (grades 7-12) teacher certification from New York State. These courses of study must be done in partnership with several local colleges which have New York State registered teacher education programs. If a decision is made early enough in a Rensselaer student's

undergraduate career, then courses can be taken at several local universities leading, upon graduation, to a Rensselaer degree in the student's chosen major, together with preliminary teacher certification. Students who are too far along in their Rensselaer education may obtain certification through a fifth year at other institutions. For further information, students should contact Lester Rubenfeld, the director of the Center for Initiatives in Pre-College Education, at nubenl@rpi.edu.

Prehealth Programs Rensselaer successfully prepares students to enter medical and other health professional schools. These students major in such fields as biology, chemistry, biomedical engineering and other engineering programs, mathematics, physics, or psychology. With their adviser, these students develop a plan of study that allows them to fulfill professional school prerequisites while earning their B.S. degree. For further information, students should refer to the Prehealth Web site: <http://bio.bio.rpi.edu/MED/> or contact members of the Prehealth Professions Committee located in 1W14 Science Center, (518) 276-8427.

Accelerated programs that permit students to complete undergraduate and professional studies within an abbreviated period of time are also available. For detailed information, see the School of Science section of this catalog.

Prelaw Programs The baccalaureate program in a number of fields will prepare Rensselaer students to enter law school. Rensselaer graduates who obtain law degrees are equipped to enter general practice or to serve in important legal positions in business, industry, or government. In cooperation with Albany Law School and Columbia University Law School, Rensselaer has also developed accelerated programs that permit students to earn law degrees within six years. After a three-year accelerated undergraduate program, the student enters law school. Upon completion of the fourth year, the student receives the B.S. degree. The J.D. is awarded at the end of the sixth year. See the Science and Technology Studies program within the School of Humanities and Social Sciences section and the Lally School of Management and Technology section of this catalog for further information.

Public Service Internship Program

The Public Service Internship (PSI) is an upper level course that matches student's skills with community needs. Interning throughout Troy and the Capital region, students work for 80 hours at non-profit organizations and government agencies. The aim of the course is to help students learn how to participate as active citizens in their own communities. By putting technical skills to work in the real world, students gain tangible hands-on experience. Community organizations, in turn, get motivated and highly skilled workers to accomplish goals that might not otherwise be met. Together, both groups benefit through sustainable change. For more information please see <http://www.rpi.edu/%7Eintems/> or contact Sharra Vostral, Department of Science and Technology Studies at (518) 276 6381.

First-Year Courses

Rensselaer offers special courses or course sections in first-year subjects designed to accommodate the diverse backgrounds and preparations of entering first-year students. These include special course sections for advance placement students and for students who require extra help.

Reserve Officer Training Corps

Reserve Officer Training Corps (ROTC) programs are available on an elective basis for students desiring commissions as officers in the armed forces. ROTC programs are undertaken concurrently with baccalaureate degree studies.

Graduate Programs

Office of Graduate Education

Vice Provost and Dean: vacant

The Office of Graduate Education at Rensselaer provides current graduate students with the administrative, academic, and curricular information they need to progress through their courses and programs. This includes assisting in changes to student degree status and advising on thesis, registration, and graduation issues, and providing approvals and processing for withdrawals, academic dismissals, and leaves of absence. The office closely monitors the effectiveness of graduate education policies and recommends and institutes adjustments to improve program quality. Online information and forms can be located at the Office of Graduate Education homepage at <http://www.rpi.edu/dept/grad/gradschool.html>

All doctoral programs and many master's programs involve students in research activities that generally are supported by government, industry, or foundations. Faculty members serve as senior investigators for a wide range of challenging research projects and are assisted by postdoctoral investigators and graduate students. Research opportunities for graduate students are also an important part of many Rensselaer research centers. These centers include the Scientific Computation Research Center (SCOREC), the Center for Integrated Electronics (CIE), the New York State Center for Polymer Synthesis, the New York State Center for Automation Technologies, the Rensselaer Nanotechnology Center, and the Severino Center for Technological Entrepreneurship. Additional information about these centers can be found in the Research Resources and Centers and several other sections of this catalog.

In addition to graduate students working full-time at the Troy campus, more than 2,000 working professionals seek degrees on a part-time basis through Rensselaer at Hartford and distributed sites.

Education for Working Professionals

Vice President and Dean, Rensselaer at Hartford: John A. Minasian

Education for Working Professionals (EWP) is one of Rensselaer's four core enterprises and encompasses a range of programs designed specifically for current and future workforce leaders with a range of high-end, customized degree, certificate, and professional development programs. Program content flows from the heart of Rensselaer's research strengths and unique academic programs. The EWP organization supports the Rensselaer vision by forging strategic partnerships with businesses, governments, universities, and innovative professionals who impact society and technology around the nation and the world.

Rensselaer's educational enterprise for working professionals is dedicated to providing an interactive learning environment for students who are seeking high-level knowledge while they hone their analytical capabilities and leadership skills and enhance their innovative thinking. The intent is to have Rensselaer graduates—executives, senior professionals, managers, and individuals with high potential—become architects of their futures. With dramatic increases in the rate of change, working professionals expect and demand an academic environment that fits the evolving needs of their fast-paced world.

Rensselaer at Hartford

Rensselaer at Hartford, a branch campus of Rensselaer Polytechnic Institute, provides a challenging educational environment and a dynamic learning experience for students who need to balance their professional, academic, and personal lives. More than 800 students attend classes at Rensselaer's Hartford campus and southeastern Connecticut regional site.

Rensselaer at Hartford offers graduate programs in Business Administration, Management, Computer

Science, Computer and Systems Engineering, Electrical Engineering, Engineering Science, Mechanical Engineering, and Information Technology. Specialized programs include Dual Master's Degrees, the Weekend MBA, the Executive Master's Program, and the one-year professional M.S. in Computer Science, as well as several graduate certificates in Computer and Information Sciences and Engineering. Courses are delivered by faculty with significant industry experience, solid academic credentials and scholarship, and exceptional teaching skills whose expertise is grounded in sound research and best practices on a global basis. Each course is designed to meet the needs of working professionals seeking to advance their careers and enhance their organizations' successes. Rensselaer graduates are entrepreneurial and personify the Institute's slogan, "Why not change the world?"

Distance Delivery

For the past 18 years Rensselaer has pioneered the application of state-of-the-art technologies to deliver high-quality, interactive learning experiences in distributed environments. Rensselaer is a leading provider of graduate-level, distributed education programs for working professionals at leading corporations and government agencies all over the world. Students participate in Rensselaer courses, certificates, and degree programs from their workplace, at home, or on the road using a range of distributed delivery technologies, including videoconferencing, videostreaming, CD-ROM, and online conferencing tools, together with face-to-face interaction during faculty visits. Distance courses originate from Rensselaer's Troy, Hartford, and Groton site campuses and are supported by course Web sites and other means that provide communication and collaboration tools to facilitate interaction between students and faculty and among students. Rensselaer is known for excellence in content, delivery, and services, and has received considerable national recognition and numerous awards. Degree and Certificate programs in Engineering, Science, Information Technology, Management, and Technical Communication are available via distance.

Regional Site in Southeastern Connecticut

Rensselaer operates a regional site in southeastern Connecticut. Many faculty from Rensselaer's Hartford campus travel to the southeastern Connecticut site to teach courses. On-site courses are supplemented with distributed delivery of courses from Rensselaer's Troy and Hartford campuses via videoconference delivery. Online courses are also available to students. Many of the degree and certificate programs available on the Hartford campus are also available at the southeastern Connecticut site.

Navy Nuclear Program

Rensselaer operates a regional site in Malta, N.Y. for graduates of the Navy Nuclear Power Training School who are stationed at the Kesselring site in West Milton, N.Y. Navy personnel enter the program with one year's worth of undergraduate coursework and Rensselaer provides the remaining course work for students to complete a B.S. in Nuclear Engineering or Engineering Physics within two to three years. Rensselaer courses are primarily taught onsite in Malta by faculty from the Troy campus. Onsite courses are supplemented by one or two online courses each semester.

Professional Development Programs

Lifelong learning is essential to continued professional growth. The Centers for Professional Development supports this pursuit by providing a series of training programs, ranging from one to five days in length, that take advantage of the research and teaching strengths of the institution. Content includes Information Technology, Technical and Professional Development, and Management and Technology. Rensselaer at Hartford is also part of an internationally acclaimed network of the Center for Creative Leadership offering the finest, most effective leadership and executive development courses available. In addition to programs offered for open enrollment, the Center also offers services to companies and organizations for dedicated training and development. This includes organization needs assessment, development of custom

content to meet those needs, and consistent delivery of this content across multiple locations and times.

Quality/Continuous Improvement programs and events are offered through a unique arrangement with the Connecticut Quality Council (CQC), a non-profit, member-driven organization founded in 1990 and operating as a non-degree entity of Rensselaer at Hartford.

Professional Engineering

Professional Engineering seminar topics and preparatory programs for the Professional Engineering Exams are provided in our Engineering course schedules and Web site. The exam review courses for Part I (EIT) and II (PE) and Land Surveyor are held evenings for 10 to 12 weeks prior to the April and October state exams. Rensselaer at Hartford works closely with the State of Connecticut to provide testing schedule information as well as application requirements.

- n Fundamentals of Engineering (EIT) Review Course
- n Professional Engineering Review Courses (Mechanical, Electrical, and Civil)
- n Land Surveyor Review Course

Division of the Chief Information Officer

Chief Information Officer: John E. Kolb

The Division of the Chief Information Officer (DotCIO) provides information strategies, services, and technology and collaborates with Rensselaer's diverse campus constituents to find solutions for changing educational research, communication, and business needs. DotCIO responds to the rapid evolution of distributed computing and the need for combining computing and communications services and supports Rensselaer's nationally recognized interactive learning initiatives.

Campus computing facilities offer students a variety of software including programming language compilers, desktop publishing packages, spreadsheets, and computer-aided design packages, as well as electronic mail and conferencing.

Of the Division of the Chief Information Officer's seven departments, students interact most closely with Academic and Research Computing and Research Libraries. Therefore, these two departments are described below.

Academic and Research Computing

Director: Sharon Roy

Web site: <http://www.rpi.edu/computing>

Academic and Research Computing (ARC) provides educational computing services and assistance in support of Rensselaer's learning and research activities. Computing is integrated into the curriculum and is an essential component of course work and communication.

ARC consists of 5 groups: Consulting and Research Computing, Help Desk Services, Educational Technology Services, the Campus Computer Store, and Rensselaer Computer Repair. Some of the department's responsibilities include: administering the Mobile Computing Program, software licensing services, and the numerically intensive computing service providing consulting for researchers; maintaining the registrar-scheduled computer classrooms; and deploying software for all public computing sites. Professional staff members assist students, faculty members, and other computer users by providing specialized consulting, Rensselaer-specific documentation, and training through short courses. At the Help Desk in the Voorhees Computing Center (VCC), services can be requested from any Division of the Chief Information Officer department, and consulting help is available from the ARC staff.

As part of the Mobile Computing Program (<http://www.rpi.edu/laptops>), all undergraduates are required to have a laptop computer. There are network ports in public buildings across campus and in every residence hall room. The wireless network is expanding and includes large portions of core campus buildings.

Each student receives a Rensselaer Computing System (RCS) account that allows access to the campus network, the Internet, RPIInfo (Rensselaer's Web site), electronic mail, and library services.

Campus computing facilities offer students several platforms including PCs running Windows and UNIX. Several hundred public PCs in classrooms and labs are connected to the network. From a single workstation, personal computer, or laptop, a student can connect to several different host computers on campus as well as to off-campus host computers, data services, and networks. A variety of software is available including numeric and symbolic computation programs (Maple and MATLAB), programming language compilers (C, C++, and Fortran), desktop publishing packages and spreadsheet software (Microsoft), computer-aided design packages (SolidWorks), graphics packages, and electronic mail programs. Specialized software for course work is also installed in some locations.

Some of the larger public workstation areas are located in the Voorhees Computing Center (VCC), Troy Building, Folsom Library, and Russell Sage Laboratory. The VCC is open 24 hours a day.

For high performance computing (long-running, numerically intensive jobs), a Batch Cluster and several UNIX workstations are available. In addition, a cluster of high-performance Linux workstations can run programs that employ parallel processing.

The Rensselaer Research Libraries

Director: Loretta Ebert

The Rensselaer Research Libraries, comprised of the Folsom Library and the Architecture Library (located in the Greene Building), provide the university community with information resources and services in support of both teaching and research missions. Researchers can access over 290,000 print book titles, 31,500 electronic and print journals, 23,000 electronic books, and view several extensive image databases. Collaboration with the Cole Library (Rensselaer at Hartford) further enhances library support on both campuses.

When researchers need material not held by one of the Research Libraries, they can initiate online interlibrary loan requests or use the Connect NY service to borrow books directly, and receive rapid delivery, from a statewide consortia holding over 3,500,000 titles. They may borrow books in person from more than 50 regional libraries. The Libraries also offer Rensselaer faculty, research staff, and graduate students fully subsidized access to Ingenta, a document delivery vendor for more than 20,000 journals.

Reference & Instructional Services' librarians with subject expertise are available to assist students and researchers personally and also provide specialized classes and workshops on such topics as "Research in a Digital Library," "Biotechnology Resources," and "Patent Searching." A "Virtual Reference" service places patrons, wherever they are, just a mouse click away from consulting a reference librarian.

RensSearch, the Rensselaer Research Libraries' information gateway at <http://library.rpi.edu> provides a variety of services including an online catalog, access to electronic resources, guides to services, and the latest library news. The Libraries' Archives web pages provide a digitized history of the Institute.

Notwithstanding the emphasis on digital resources, the Rensselaer Research Libraries continue to be an important "place" on campus for intellectual and social nourishment. Transponders have recently been installed throughout Folsom Library to provide wireless network access.

Patrons may socialize and have lunch in Folsom's Library Café, peruse the latest best-selling fiction and non-fiction books in Folsom's Class of '96 Reading Room, browse music CDs or film DVDs, or just relax

in the Architecture Library's bright and airy reading room. Small group meeting rooms can be reserved for collaborative work and group study. Seminar and conference rooms are available to Student Union-recognized groups. The Friends of the Folsom Library sponsor monthly "Lunch & Learn" topics in a casual setting. Folsom's 4th floor provides breathtaking views of New York's Capital District and the Hudson Valley. A unique stainless steel water sculpture, designed by Charles Moore, rises from Folsom Library's third floor up through the fourth floor, creating a soothing ambience for study.

Advising and Learning Assistance Center

Director: Jeannie Steigler (Interim)

The mission of the Advising and Learning Assistant Center is to provide a unified approach to supporting students and faculty in the learning and advising processes. The Center provides academic support in the form of services and programs designed for students to become more effective and efficient learners.

The center coordinates academic advising events, counsels individual students, offers workshops, advises undecided students, trains learning assistants (la), and teaching and learning assistants (tla) who work with students in the residence halls, and provides help to students for whom English is their second language. The center strives to improve the quality of faculty, staff, and student interaction. In addition to fostering a strong mentoring atmosphere, the center carries out functions to enhance the basic principles of performance by minimizing exam anxiety and improving time management, note-taking, textbook reading, and general learning skills.

The center also provides information and makes referrals, interprets, administers and makes exceptions to Institute policies and procedures; serves as a support service for students experiencing academic difficulty; and processes all academic standing issues regarding academic awards, dismissals, suspensions, and probation.

Additionally, the center's staff serves on a number of campus committees that are involved in program adjustments, curriculum changes, and general advising issues. The center is a resource for departments to help train faculty and professional staff in academic advising.

The center also takes part in a strong collaboration effort with other support services on campus (Office of the First-Year Experience, The Dean of Students Office, Counseling Center, Career Development Center, and the Office of Graduate Education) to help assure that positive, helpful, and exciting connections are made early and throughout the student's experience at Rensselaer.

The Anderson Center for Innovation in Undergraduate Education

Director: Bradford C. Lister

Since its inception in 1990, the Anderson Center has served as an incubator for curriculum reform and a driving force for change and innovation in higher education. In brief, the Center's mission has been to develop, research, and support new teaching methods and technologies with the aim of improving education, both on and off campus. The Center is dedicated to extending Rensselaer's leadership position as one of the premiere learning environments in higher education. It supports faculty involvement in educational computing, develops new techniques and facilities for interactive learning, and conducts research on cognition, learning, and the assessment of learning outcomes. Current projects encompass research on student learning styles, interaction and peer-based learning in student teams,

constructivist approaches to teaching complex systems, and the use of asynchronous learning networks for on-campus instruction.

The Anderson Center facilitates faculty involvement in the renewal of undergraduate education through a series of hands-on workshops on interactive learning and an annual Colloquium on Teaching and Learning. Center staff are available for consulting on all aspects of studio teaching and educational technology. Externally, the Center hosts hundreds of visitors each year from all over the world who come to Rensselaer to learn about our teaching practices. In addition to the director, associate director, and administrative assistant, the Anderson Center employs Web developers, assessment specialists, video production personnel, and a cadre of undergraduate and graduate research assistants. Center staff have expertise in experimental design, statistical analysis, course redesign, protocol analysis, assessment of learning styles, instructional design, and Web-based multimedia development.

Institute Diversity

Vice-Provost for Institute Diversity: Kenneth Durgans

The Office of Institute Diversity serves as a campuswide advocate, liaison, consultant, and clearinghouse to enhance campus synergy among faculty, students, and staff. Part of its mission is to provide leadership and direction in creating a “seamless” diversity perspective that capitalizes on the creativity and richness of Rensselaer constituents. It is proactive in its efforts to align campus diversity initiatives with the vision and mission of the university, thereby fostering the growth of a community that embraces intellectual, geographic, ethnic, and gender diversity. Institute Diversity is located on the fourth floor of the Walker Laboratory.

Center for Initiatives in Pre-College Education

Director: Lester A. Rubinfeld, Professor of Mathematical Sciences

Program Home Page: <http://cipce.rpi.edu>

Realizing that for too long now the nation’s best research universities have often sat idle while our system of public school education has not met expectations, Rensselaer is taking the lead in forging new relationships which will become models for others to follow. Educators at all levels and leaders in government, business, and the philanthropic community, are unanimous in their deep concern that students in kindergarten through twelfth grades are not being properly educated and are not ready to enter the technological workplace that awaits them. Therefore Rensselaer believes that it shares with the nation’s schools an obligation to develop and deliver a first-class education to students at all levels. It also believes that the work of this Center in pursuit of that goal can enrich its own intellectual environment, tap new sources of funding for these outreach efforts, deliver substantial long-term benefits to its admission efforts, and improve its public and community relations. To achieve its vision, CIPCE seeks to foster innovations in pre-college education that build upon Rensselaer’s strengths and traditions in pedagogy, interactive learning, educational technologies and teacher education. Its activities include:

- n A graduate M.S. in Natural Sciences program over three consecutive summers for secondary school mathematics and science teachers.
- n Professional development projects for teachers including on-site classroom support; after school workshops; and summer institutes
- n The development of interactive multimedia instructional materials.

- n The development and integration of robotics activities into classroom curriculum, including distance experimentation.
- n The use of online and other distance learning technologies to facilitate its professional development activities.
- n Cognitive research focused on how technology affects student learning.

M.S. in Natural Science

The challenges presenting themselves today in the realm of mathematics and science education are vast and complex. Never in our time has education in these areas been more vital and important. Never has it been more difficult to teach. Students in these times present much greater demands, and also potential, than their predecessors.

Getting young people excited about mathematics and science is a task that has added to the challenge of teachers. And yet, if a teacher can learn to inspire observant inquiry by infusing the curriculum with the kind of immediacy and relevance that makes it compelling to students, the job itself will be much more fulfilling for the educator as well.

Excellent teaching of mathematics and science occurs when the teacher has a broad-based, in-depth view of content, knowledge of how to integrate it with other disciplines, and the ability to use modern instructional technologies to vitalize classroom activities.

Rensselaer's program provides teachers with an opportunity to upgrade their qualifications and examine how their curricula can make the best use of advancing technologies. Our goal is to help secondary school science and mathematics teachers enhance their skills with new techniques, tools, and a rich body of scientific and mathematics content.