At Syracuse University, research and teaching represent a unified commitment to advancing knowledge and engaging students

By Amy Shires

Twenty years ago, Ben Ware, then chairman of the University's chemistry department, worked hard to recruit a famous organic chemist who was interested in coming to Syracuse. When they met on campus for two days of conversations and seminars, Ware felt certain there was a mutual interest and was hopeful about the potential for a relationship between SU and this academic star. As they were wrapping up their discussions, Ware said, "Now I'd like to talk to you about your teaching." The illustrious scientist replied: "I'll be perfectly honest with you—I don't like to teach. I'll do a decent job, but my real effort goes into my research." At that point, Ware stood, shook the chemist's hand, and said good-bye. "Syracuse University wasn't the place for him," Ware says. "He wouldn't be happy here, because we don't share that philosophy.

Today, as the University's vice president for research and computing, Ware remains steadfast in his commitment to SU's vision of being the nation's leading student-centered research university. "At a research university, the professors who teach are also active scholars," says Ware, who is responsible for the development of research and research funding and the administration of grants processing. At a traditional teaching college, the professors have learned the material and their interest is only in teaching. They teach full time and focus only on instruction; but they are not actively involved in their professions. "There's a different kind of education that comes from interacting with an active..."
scholar," Ware says. "You’re learning from somebody who’s advancing the field at the same time that he or she is teaching. We believe in that model."

Chancellor Kenneth A. Shaw affirms that Syracuse University’s mission—to promote learning—is manifest in research. "Faculty members are actively involved in scholarly activity, research, and creative activity," he says. "A special character of research at Syracuse is that we select and design research programs that support and sustain our educational mission, a central feature of the student-centered research university."

There are many universities that hire faculty with the potential of becoming famous researchers—regardless of their commitment to teaching. But not at Syracuse. "We share this vision of being dedicated to both the instruction of students and the active research and scholarly activity of our respective disciplines," says College of Arts and Sciences Dean Cathryn R. Newton, herself a scientist and Earth sciences professor whose research interests include marine mass extinction and environmental change. "Our faculty are outstanding teachers and prominent scholars who bring intellectual verve and energy to teaching. They are engaged in scholarly activity at a level that is important, relevant, and recognized by the national community. We celebrate that."

**Why Research Matters**

Many factors contribute to the overall degree of excellence achieved by an institution of higher learning, including the quality of the faculty, students, and facilities, and the level of available resources. While each of these factors relies on and contributes to the strengths of the others, all of them are substantially enhanced through a commitment to research. "We want to possess, in the areas in which we concentrate, state-of-the-art facilities and a critical mass of scholars who can work together in teams—people who are recognized nationally as leaders in their disciplines," says Gina Lee-Glauser, executive director of the Office of Sponsored Programs (OSP), which oversees the administration of funded projects (see related story, page 17).

Research plays a major role in fulfilling the goals outlined in the University’s Academic Plan. "The Academic Plan is fundamentally about moving the University forward through strategic, multidisciplinary research partnerships to leverage the expertise of our very best faculty and programs," says Vice Chancellor and Provost Deborah A. Freund. "Its initiatives are aimed at securing the foundation of SU’s student-centered research mission and establishing signature experiences that will distinguish a Syracuse education."

By providing opportunities for the University to increase its resources by raising money from external sponsors, research helps build and enhance intellectual capitals, Lee-Glauser says. "This shows itself in many ways, including contributing to scholarly publications, supporting facility development, providing research experiences to graduate and undergraduate students, and hiring professional experts," she says. Research enables SU to partner with area and national businesses and contribute to the local community. Research and scholarship also increase the University’s interaction with other quality universities across the country and around the world. "It gives us an exchange of scholars that positions SU in the international community as a place that is recognized, a place of renown, a place that is in the loop of the academic professions," Lee-Glauser says. "Research leads to publications that broaden
our reputation. Those publications create interest in and lend credibility to the activities going on in the departments and with the faculty.

In a broader sense, research contributes to the University and general society in the same ways any form of scholarship contributes to humanity’s development. “The generation of new knowledge and synthesis of ideas have always mattered and in some ways have advanced civilization,” says Michael Wasylenko, associate dean of the Maxwell School of Citizenship and Public Affairs. “Ancient and modern intellectual history is filled with new ideas in philosophy, mathematics, engineering, social order, and a variety of other areas.”

Trish Lowney, director of research development at OSP, also sees research as benefiting not only those in the SU community, but all of society. “As members of a university, our role is to educate,” she says. “Research is fundamentally creating new knowledge that builds upon the foundations of previous scholars. This is a dynamic process that stimulates further learning and contributes to the education of those who are here, as well as to society.”

Some of the most evident benefits of academic research in recent years are reflected in technological advances. “Advanced technology is increasingly pervasive in nearly every aspect of life,” says Edward Bogucz, dean of the L.C. Smith College of Engineering and Computer Science (ECS). “Opportunities abound for further innovations that will benefit society.” Ware agrees. “Clearly, we wouldn’t have computers, lasers, and other modern tools if not for academic research,” he says. “Those things are a result of the work done at universities.” As an example, Ware points to the study of quantum mechanics, which advanced in the 1920s and ’30s and came through a period of enormous intellectual activity as scientists began to understand the energy levels of atoms and molecules. “A tremendous amount of knowledge came out of what appeared to be very fundamental research,” he says. “And then someone figured out how to turn that knowledge into what is now called the laser. If you gathered as many scientists and engineers as you could and said, ‘Work together to make the brightest light you possibly can,’ they’d build giant lightbulbs and reflectors; they’d never come up with the laser. Scientists came up with the laser because they cared about the fundamental nature of atoms and molecules, and asked, ‘What is matter? What are the rules that matter has to follow?’ Because scientists cared about that, they were able to develop the laser. That’s the power of research.”

**How Research Happens**

While the universal purpose of research—to generate new knowledge—remains fairly constant regardless of its form, methodologies vary greatly among disciplines. Syracuse is an especially interesting place to examine research and scholarship, Ware says, because the University possesses a strong core of arts and sciences disciplines that do traditional kinds of work in the sciences, social sciences, and humanities, as well as professional schools where scholarly activities are extremely varied. “The word ‘research’ applies to much more than the traditional understanding of the term,” Ware says. As a chemist, he is most familiar with the kind of scientific research that involves working in a laboratory, achieving a result, and sharing that information by publishing it. “But there are many other forms of research and activities that the word ‘research’ doesn’t really describe, but that are the effective equivalents of research around the campus,” he says.

In many of the professional school fields, theoretical research isn’t of much value unless it’s related to a real-world environment. “Faculty move the field forward by actually affecting the work of practicing professionals,” Ware says. “In the more fundamental arts and sciences disciplines, the real product—the real value—is an intellectual one. The application comes later.”

At the University’s professional schools, scholarship sometimes takes the traditional form of pure research, in which faculty do studies and publish scholarly papers. However, research at these colleges more often consists of some kind of professional involvement, where faculty members participate in the real-world activities of such fields as education, law, management, social work, or any number of other disciplines. “At ECS, for example, research looks much like it does in the basic sciences,” Ware says. “But it is more applied, and is often conducted in partnership with companies. At the Newhouse School, faculty are out there talking and working in the field with people who are advancing Internet activities for journalism, publishing magazines, or producing TV programs. That’s important, because it keeps faculty current and engaged in their disciplines. They aren’t satisfied with saying, ‘Well, I learned this material some time ago and now I repeat it to students.’ They are actively doing the work of their professions.”

Professional involvement is also valued as an important form of research at the School of Information Studies, where exploration is cited as one of six core values. “As a leadership school in our field, we place a high priority on research that underlines professional practices,” says Dean Raymond von Dran, whose school’s faculty research output
A Tradition of Expanding the Frontiers of Knowledge

From its beginning, Syracuse University recognized the importance of graduate study and scholarly research. As early as 1876, the College of Arts and Sciences offered post-graduate courses, which led to a Ph.D. program in 1909. Today, SU offers graduate programs in all 11 of its schools and colleges and awards more than 1,900 graduate degrees a year. This remarkable growth from a small cluster of classrooms in 1870 to a major research institution in 2002 is the result of decades of progressive thinking, daring choices, and creative partnerships.

During its first 75 years, the University's main focus was on providing a comprehensive undergraduate education for men and women. Several new schools and colleges were created to prepare students for emerging professional fields. Following the influx of more than 9,000 returning World War II veterans in 1946, Syracuse transformed itself into a research university, expanding beyond its early borders to offer graduate courses in engineering, mathematics, and management at study centers throughout New York State.

The Institute for Sensory Research (ISR) was created in 1957 as an outgrowth of Professor Jozef J. Zwislocki’s bioacoustics laboratory. An interdisciplinary research center focusing on the structure and function of human and animal sensory systems, ISR expanded to include the study of touch and vision. Today, the innovative research of ISR scientists paves the way for technological advances that enrich the lives of millions of people affected by sensory defects.

Landmark computer research at SU began in 1963 with Professor J. Alan Robinson’s work on the problem of finding proofs in geometry, from which he developed the fundamental system of machine-executable deductive reasoning known as “resolution.” This became the predominant method of machine-based deduction. Logic programming, designed to make computers capable of deductive reasoning at high speeds, was a special adaptation of Robinson’s fundamental system.

Pioneering work at SU in electrical engineering led to the analysis of electromagnetic field problems. In 1968, Professor Roger Harrington published the monograph “Field Computation by Moment Methods,” which revolutionized the analysis of electromagnetic field problems and antenna design. Harrington went on to investigate the analysis of electromagnetic effects within modern electronic circuits.

In 1974, Syracuse changed the name of the School of Library Science to the School of Information Studies to better represent the increasingly important role of all kinds of information in our society. The school undertakes major research in the field of information resource management. National security and health care are only two of the critical areas that benefit from ongoing research at the school.

The growing interaction between SU and industry was an exciting development during the next decade. Under the University’s leadership, the New York State Center for Advanced Technology in Computer Applications and Software Engineering (CASE Center) was established in 1984 as a collaboration among SU, New York State, and the corporate sector. The center acts as a catalyst for basic and applied computer research by providing an environment in which University and corporate personnel share facilities and ideas to advance knowledge that will lead to the creation of new products and processes.

Following the CASE Center’s success, the number of research centers and institutes in SU’s schools and colleges increased dramatically during the 1990s. Here are some examples:

- **THE CENTER FOR HEALTH AND BEHAVIOR** in the College of Arts and Sciences facilitates research on the behavioral aspects of health.
- **THE CENTER FOR NATURAL LANGUAGE PROCESSING** in the School of Information Studies advances the development of human-like language understanding to produce software with capabilities for government, commercial, and consumer applications.
- **THE CENTER FOR THE STUDY OF POPULAR TELEVISION** in the S.I. Newhouse School of Public Communications examines the role of entertainment television in shaping popular culture.
- **THE GEOFOAM RESEARCH CENTER** in the L.C. Smith College of Engineering and Computer Science develops innovative applications of geofoam (an expanded polystyrene foam) and facilitates technology transfer.
- **THE GLOBAL AFFAIRS INSTITUTE** in the Maxwell School studies issues raised by an interdependent world of diverse cultures, economies, and political systems.

At the dawn of the 21st century, researchers continue SU’s long tradition of responding quickly and creatively to the changing needs of society by generating new knowledge and strengthening the mechanisms by which it can be converted into practical use for the public good. The University’s newest endeavor, the Center of Excellence in Environmental Systems (see related story, page 24), brings together a dynamic group of participants from academic institutions, corporations, and economic development groups to create new technologies, solutions, and applications that will improve human health and productivity in built and urban environments. —Christine Yackel
is among the University's highest. In addition, the school encourages research opportunities for graduate and undergraduate students. "Our faculty's research always involves students, giving them the experience to be leading information professionals," von Dran says. The School of Information Studies has established several research and development centers, including three interdisciplinary centers that are administered in collaboration with other SU colleges.

Ware also points to the training of professionals as a significant form of research. "That's something SU does extremely well," he says. "You're not going to have architects without an architecture program, or lawyers without a law school. The impact we have there is on both the advancement of the discipline and the development of people who know how to do this activity in the real world—who have not just read the books, but have been engaged with the scholarly activity of the faculty members who are in those respective disciplines."

At the Maxwell School, research often focuses on the areas of social policy and the implications for society of an aging population, says Wasylenko. The Government Performance Project, administered by the Alan K. Campbell Public Affairs Institute, evaluates the effectiveness of management systems and examines the role of leadership in local, state, and selected federal government entities—research that Wasylenko describes as "an enduring and important theme" for the school. "People in the Maxwell School are not only involved in doing research in their disciplines," Ware adds. "They also sit on government committees that are actively involved in the public affairs of the nation, and they have an impact on what goes on. The same thing is true of scholars all across campus."

Creative activity represents another less traditional mode of research that occurs at SU. "It's important to recognize creative activity as a hallmark of what we do," Ware says. "All of our artists create. They don't just teach other people how to create. Our music faculty members give recitals in addition to instruction. Our drama faculty members perform as well as teach. Creative activity is their equivalent of research." Ware also points to the contributions of the people who study and teach in the University's Creative Writing Program. "The understanding they have for how to craft the language—and how to appreciate other people's crafting of the language—is amazing. We have a group of scholars who advance the skills of their students in ways that wouldn't be possible unless they excelled at this kind of activity themselves."

**Working Together**

Approximately 500 research projects are currently supported by external sponsors at Syracuse University, with the federal government being the largest source of funding, followed by private foundations, corporate sponsorship, and state funding. The Office of Sponsored Programs assists faculty in obtaining external funding for research activities in many ways. It provides information about the availability and interests of potential sponsors, helps recognize a potential match between a sponsor's needs and a faculty member's research goals, and assists faculty with developing and submitting effective grant proposals.

The office also identifies and encourages new opportunities for interdisciplinary research and educational activities—an important initiative of the University's Academic Plan. "Because we work with faculty from all disciplines, we are in a unique position to recognize the potential for interdisciplinary connections," says Lee-Glauser. "We bring together faculty members who otherwise might have no
idea of each other’s research activities, because we think they may benefit from knowing each other and, possibly, working together.”

For example, in response to a National Science Foundation initiative, OSP brought together two School of Information Studies faculty members to collaborate on a multi-university, interdisciplinary e-government project. “In terms of collaboration,” Lowney says, “what we find today across the spectrum of disciplines is that the ‘easy stuff’ has already been discovered. What must happen next begins with a cross-fertilization of disciplines, of having people who are able to translate the language of their own fields, to communicate and advance understanding of issues that are really between the boundaries of disciplines. That’s something the University is trying to foster.”

But facilitating and developing relationships doesn’t happen overnight. As with any partnership, it takes time for co-researchers to make connections and establish trust. “There may not be any collaboration potential at the moment,” Lee-Glauser says. “But maybe two or three years down the road someone will remember, ‘Oh, I met that person way back when, and now I see a need for the skills she presented.’ We’re planting seeds to facilitate that process.”

**Student Centered**

Syracuse’s vision is a blending of the focus on instruction and student learning and a continued commitment to research. “A student-centered research university brings new ideas to students and encourages them to think for themselves,” says Wasylenko. “Transferring an existing body of knowledge to students is only one aspect of a good education. Pushing at the boundaries and working on new ideas must be part of learning. Research skills are important to developing young and not-so-young minds.”

Students benefit from engagement with active scholars in a variety of ways. “Faculty talk to students about the tools of their trades, tools they are actively using. And that’s a very vibrant kind of instruction,” Ware says. In addition, students at all levels can actively participate in research at SU (see related story, page 18). “In the sciences, for example, most of our majors become associated with one of the research labs, and actually do research,” Ware says. “Some even publish papers as a result of their scholarly work. They learn to be productive scholars, even as undergraduates.”

Some universities focus on research at the expense of teaching, perhaps because a university’s reputation in academic circles is largely determined by scholarship and research. But that’s not the case at Syracuse. “The fact that our college is nationally recognized for excellence in both teaching and research makes Syracuse an ideal place to study engineering or computer science,” says Bogucz. “We are pioneers of the student-centered research university, where students are the top priority in a vital and active environment of discovery and learning.”

Whether or not students are directly involved with faculty research, Wasylenko says, they benefit by having faculty introduce them to new areas of thinking, which encourages them to develop their ideas. “Knowledge is not static and new ideas constantly arise and need to be integrated into their lives and their work,” he says. “Learning that the world is changing—that what you think you know for sure today may evolve into a new idea—is a critical point to address in an undergraduate education.”

Just as research work makes SU faculty members better teachers, their work as teachers can contribute to their success as researchers. In the process of struggling to achieve the higher level of understanding that faculty are working to instill in them, students ask questions that a faculty member is not likely to otherwise consider. “Sometimes those questions are pregnant with ideas that can advance research or scholarly thinking,” Ware says. “You go back over those fundamental issues and think, ‘You know, I’m worried about the third decimal point on this thing, and yet there’s a fundamental part of it that I don’t understand—that nobody understands.’ Students help you work through that, and when that happens, the ability to bring your research into the classroom is really powerful.”

When he lectures, Ware often notices that students seem more interested in what he says when he shares his own enthusiasm about his work. “I’ll come to a concept and say, ‘This is the subject of my research. This is what I do.’ When you explain your own engagement with that issue, students perk up; they get really motivated. You can almost hear them thinking, ‘Wow! This is something so important that this guy spends his life trying to figure it out.’ Or you can tell them about Professor X who is working on a specific research project right now: ‘Here’s what she’s doing to advance the understanding of this field...and we think she’s just about to break through on this concept.’ That really inspires students. It gives them the feeling they are in a special place, a feeling of involvement that is only possible in places where there is creative research.”

Perhaps the best way to sum up the significance of research at Syracuse University is to think of it as a way of sharing passion—a quality that Lowney sees as critical to a successful researcher. “So much research is made up of a lot of stuff you just have to plow through,” she says. “You have to crunch it down, like the pieces of a puzzle, until you see how the pieces fit together. Then you have to interpret the pieces to find the picture, putting it all in context with unknown pieces that might still be missing. The truth is there can be drudgery in research, and if you don’t have that passion, if you don’t have that drive and commitment to your discipline, you might give up before that wonderful ‘ah-ha!’ moment.”

Ware puts it this way: “If you are passionate about your discipline, you will want to be engaged in it. You won’t be content just to read what other people are doing. That’s something we see and encourage at all levels at Syracuse: a passionate enthusiasm for learning—and for doing.”
Embracing Discovery

Gina Lee-Glauser’s children tell her she is a workaholic. That’s not surprising, considering the enormous challenge she has taken on as executive director of the Office of Sponsored Programs (OSP), which guides and assists the University community in obtaining and administering external support for research, training, and creative activities. “I’m working to change the culture of how we do business at OSP,” Lee-Glauser says. “The faculty are our customers—I want to increase SU’s external support by reaching out to faculty in all disciplines.”

Lee-Glauser brings a broad perspective to her new role at SU. Born in Seoul, South Korea, she moved to the United States in 1974, attended high school in Staten Island, New York, and graduated with a mechanical engineering degree from SUNY Buffalo in 1982. After graduation, she worked as a development engineer specializing in fiber optics at Bell Labs in Reading, Pennsylvania. Two years later she returned to Buffalo to get married and pursue a master’s degree in mechanical/systems engineering. Her specialty is a hybrid of electrical and mechanical engineering. “After earning my graduate degree, I worked in the missile division of Moog Control on Patriot and nuclear missile systems,” Lee-Glauser says. “I was the first female engineer hired in the missile division.”

A few years later Lee-Glauser and her family moved to Potsdam, New York. Her husband, Mark Glauser, now a professor of mechanical and aerospace engineering in the L.C. Smith College of Engineering and Computer Science, taught mechanical and aeronautical engineering at Clarkson University, and she worked at General Electric. In 1989-90, she won a National Science Foundation Creativity Fellowship, which allowed her to work on a doctoral degree in mechanical and aeronautical engineering at Clarkson. “The fellowship encourages young women to pursue advanced degrees in the physical sciences,” Lee-Glauser says. “I never thought of myself as Ph.D. material, but now I’m glad I didn’t shut any doors.”

Ph.D. in hand, Lee-Glauser and her two children moved to Hampton, Virginia, where she did postdoctoral work in the spacecraft dynamics division at NASA’s Langley Research Center, while her husband continued teaching at Clarkson. The family was reunited when she accepted a research position at Clarkson and later became head of sponsored programs. “I chose not to seek tenure because my family life is important to me, and I wanted to have maximum flexibility to accommodate our two-career marriage,” she says. “But I published 11 archival journal papers—just in case—during my Ph.D., postdoctoral period.”

In January 2000, Lee-Glauser was named executive director of SU’s Office of Sponsored Programs. One of her main responsibilities is to double external funding over the next decade as part of the Academic Plan’s initiative to ensure greater faculty success. “I love administering sponsored programs because I understand how academia and industry work—I know where the sacred cows are,” she says. “I also like being on the leading edge of technology and bringing people together in collaborative research projects.”

Coming from such a technical background, Lee-Glauser experienced a “rude awakening” at SU, realizing she had to embrace a broad spectrum of academic and professional programs. “I had to put my arms around the whole University and familiarize myself with the needs of non-technical disciplines, such as the humanities and visual and performing arts,” she says. “I meet with deans and faculty all over campus to learn how best to help them achieve their programmatic and research goals.”

As part of her professional responsibilities, Lee-Glauser reviews proposals for various funding agencies (such as the National Science Foundation and the U.S. Environmental Protection Agency), and evaluates mechanical engineering programs for the Accreditation Board for Engineering and Technology and for distance-learning programs for the New York State Education Department Institutional Capability Review. She also serves as an advisory board member of the National Research Council’s Associateship Programs, participates in graduate dissertation reviews, and mentors engineering students. “I’m particularly interested in mentoring young women studying engineering and the physical sciences,” she says.

After living in a small college community for so many years, the move to Syracuse has proven to be an adjustment for Lee-Glauser and her family. “We’re still getting used to life in the ‘big city,’” she says. “But I’m glad we no longer have to travel two hours to Montreal just to dine at a good restaurant.”

—Christine Yackel