A SYMPHONY OF IDEAS A BACK TO THE FUTURE THE HONOR ROLL OF DONORS

### WPLJOURNAL

DECEMBER 1996

Inaugurating a New Age for WPI

**The Annual Report of the University** 



## WPI JOURNAL

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The inauguration of Edward A. Parrish as WPI's 14th president on Sept. 20, 1996, was an opportunity to celebrate the richness of WPI's history and the promise of its future. It was also a day to share ideas and express opinions that go directly to the heart of WPI's mission as a modern technological university. In this issue of the WPI Journal, we present a sampling of those ideas and opinions:

"Embarking on an Age of Exploration," a message by Connecticut College President Claire L. Gaudiani;

"Making a Difference," the inaugural address of Edward A. Parrish;

"Getting on With the Job of Change," a report on the inaugural symposium.





### Eventful Year Prelude to Exciting Era of Opportunity, Page 11

As one busy academic year ended and another began, WPI found itself on the cusp of a new era in its history. Poised to garner, at last, the national reputation it deserves, WPI launched an ambitious effort to create, by the end of this academic year, a vision for its future.

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Front Cover: Newly installed WPI President Edward A. Parrish delivers his inaugural address to an audience of some 1,800. Story on page 2. Photo by Patrick O'Connor. Opposite: NASA astronaut Michael Lopez-Alegria chats with some young fans during a visit to WPI by the crew of the space shuttle Columbia. Story on page 11. Photo by William Mercer. Back Cover: Bagpiper Eric Clinton '99, a double major (physics and biology) who led guests on a candlelit walk across the Higgins House lawn to the Inaugural Dinner. Story on Page 2. Photo by Jonathan Kannair. (Clinton, who plays French horn in the WPI Concert Band, has been performing on the pipes for less than three years. As a swimming coach at the Special Olympics, he became interested in the instrument when he saw it played at the opening of a swimming meet at the Special Olympics in New Hampshire. "I thought they were cool," he says, "and I'm part Scottish, so I decided to learn to play them.")

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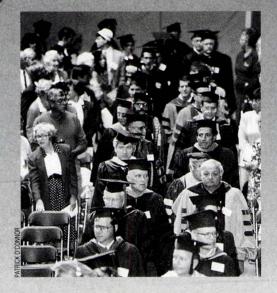
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The massive white tent over the Quadrangle provided a dramatic luncheon venue for the 1,800 guests who attended the inauguration of WPI President Edward A. Parrish. With its graceful curves, the tent served also as a symbol of the sweep of ideas presented on that day.

# A Symphony of Ide

Encapsulated within those ideas was a vision of WPI's future under the leadership of its 14th president, a future that may, at last, bring the university well-deserved recognition as a world leader in technological education.

BY MICHAEL W. DORSEY





he day began with a frenzy of last-minute preparations in the cool morning air and ended with a quiet walk on a warm, moonlit evening along a path lined with candles. Before it was over, WPI would formally install its 14th president and symbolically launch a critical new era in its history. It all transpired under the clearest, bluest skies New England can muster.

The inauguration of Edward A. Parrish on Sept. 20, 1996, was a grand party enjoyed by some 1,800 guests, including delegates from more than 100 colleges, universities, and learned associations and societies. The highlight of the day was the formal installation ceremony, held in Harrington Auditorium and accompanied by the music of three WPI student groups—the Concert Band, the Men's Glee Club and the Alden Voices (women's chorale). It was followed by a luncheon for all under a massive white tent that nearly covered the Quadrangle, and an afternoon symposium in Alden Memorial titled "The New Liberal Education for the Age of Technology."

The festivities stretched into the evening as guests gathered in Higgins House for the gala inaugural reception. Moving from room to room in the former home of Worcester industrialist Aldus Higgins, they took in brief musical selections performed by the Medwin String Ensemble, the Men's Glee Club, the Alden Voices and the Jazz Ensemble. Alpha Psi Omega, the dramatic arts honor society, offered a glimpse of the university's active and diverse theater programs.

With the sun setting over the Higgins House lawn, the fading gloaming revealed a half moon, and beside it, the bright disk of Saturn. The plaintive wail of bagpipes rose into the evening air. The piper, Eric Clinton '99, led Ed and Shirley Parrish and the other guests to an elegant dinner in Harrington, while WPI students lighted the way with candles. The dinner concluded with a spirited performance by the student a cappella group Simple Harmonic Motion.

Music played an appropriate role in the day's events, as the inauguration of President Parrish proved to be a symphony of ideas. Those ideas form the focus for this issue of the WPI Journal, which is also WPI's 1995-96 annual report. They provide a glimpse into the bold new future shaping up for technological education and the pivotal role

WPI will play in shaping that future. In the pages that follow, we present the seminal ideas of the day in the form of President Parrish's inaugural address, the remarks of Claire Gaudiani, president of Connecticut College, and a report on the lively two-hour symposium.

Bold ideas are, perhaps, the most enduring legacy of the inauguration of President Parrish. Along with pleasant memories, they are what the guests took with them as they left Harrington that evening. Stepping out into the night, many stood for a moment to admire the moonlight shimmering on the peaks of the big white tent. Rising sharply into a starry sky, those peaks seemed to be pointing out a new destination for the university, somewhere "out there" in a new frontier of accomplishment





and recognition.

### Embarking on an Age of Exploration



BY CLAIRE L. GAUDIANI, PRESIDENT OF CONNECTICUT COLLEGE

t is a great honor for me to bring you greetings from the men and women of the Connecticut College community and from colleges and universities around the country that hold this institution in such high regard.

This beautiful day and this beautiful hall are a fit setting in which to celebrate the inauguration of President Parrish and the extraordinary career.

This beautiful day and this beautiful hall are a fit setting in which to celebrate the inauguration of President Parrish and the extraordinary career he brings to WPl. With his experience as a widely published engineer and scientist, and a highly appreciated teacher and administrator, he brings a unique set of skills and a unique kind of wisdom to WPl at this moment in its history and at this time in human history. For we are entering an age of exploration. And the best education for the leaders of this new age will be one that connects the practice of science and technology with the deeper understanding of human beings and culture.

Many writers point to the invention of the Gutenberg Press as the reference point for our age. Gutenberg's invention opened a new set of possibilities—possibilities for communication, yes, but much more profoundly, possibilities for access to learning, for sustaining, building and transmitting to future generations the wisdom of human minds working across all fields of endeavor. It was a great moment in human history, the invention of the Gutenberg Press, yet that technology—and that moment—as great as they were, are not the reference points for our age.

In our age, telecommunications and information systems have opened a time much more complicated, much more exciting, and sometimes, much more frightening than the age of Gutenberg—more, in fact, like the age of exploration. In

this new age of exploration, librarians have become navigators, not simply catalogers. Faculty members are no longer simply lecturers as they were after Gutenberg (the word lecturer comes from *a lecteur*, a French phrase that means "to be the one who reads the book to others"); now they are fellow explorers with their students.

Now we move, not one foot in front of the other, step by step, one moment at a time on the linear path, but through geographical space, and forward and backward in time, using a net with multiple options and modes, with parallel processes and programs and progressions. Limited technically only by the speed of light, people around the world without running water, without access to what we would consider everyday technology, have access to satellite dishes and generators and receive the modern world right out of the sky.

In Morocco, in underground dwellings, people watch television and see the same soccer games and the same Dallas reruns that people watch in Paris, London and New York. Corporate scientists from the far corners of the Earth can work together in global teams by meeting in regular video conferences, reducing to nothingness the thousands of miles that separate them. Time and distance have converged through technology. When I consider the printing press in this context, it seems to me that Gutenberg was just an upgrade—one might even say the equivalent of more monks, writing faster, storing more sacred texts-"MonkPerfect 10.1." If that's true, perhaps we can't look at the simple "field of telecommunications" as our metaphor. Perhaps the metaphor is exploration navigating the geography of cyberspace.

Surfing the net, we are, in fact, part of a new metaphor. We are part of a new age in which men and women of all countries and all races and abilities, in their majestic diversity, will engage together in establishing a new framework for human life. We need to know where we are so we can understand what we need to put in the craft with us as we make our progress. Education will now need to engage students and faculty with the world. It will need to engage students with multiple culturesnot just ethnic and national cultures, but disciplinary and problem-solving cultures. We all will need to speak multiple languages—multiple human languages, but also multiple machine and technological languages. Those of us over 40 will be the last generation to speak digital with an accent.

The directions already so well-developed in WPl's project-based education are exactly right for the age of exploration; this institution must be congratulated for the foresight that made its education right for this time. Explorers in science, technology and engineering have brought human beings to this

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We are part of a new age in which men and women of all countries and all races and abilities, in their majestic diversity, will engage together in establishing a new framework for human life."

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age, and WPI's kind of education will be critical to preparing the explorers of the future.

But as a humanist, and a French literature scholar, I believe that this institution, my own institution, and other institutions across the country must continue to work on a way to link the critical, analytical skills even more powerfully with the humane skills. These skills must be developed together, because in this age we will need to have humane skills (for instance, negotiation and conflict resolution skills) at just as high a level as our technical skills. For it will be those who can bring about technical advances and sustain the peace who will bring us peace with prosperity, instead of peace with despair and with the widening gap between the haves and the have-nots.

We will also need to develop authentic communication skills—public speaking skills and listening skills. In an age when technology gives us the opportunity to communicate across wide bands of the human race, those with the best ideas may not prevail unless they are also the ones who can communicate their ideas most competently and effectively.

Team-building skills will also be important in this new age. These are skills you have wisely worked on here at WPI because you understand that while human beings will always be touched by the gifts of the quintessential individual performer, the complexity of our age will increasingly demand teamwork and the capacity of individuals within teams to play a variety of roles to enable the team to do its best work and to be more than the sum of its parts.

In addition to these humane skills, I believe educators must focus more intensively on how we can connect the human spirit to the achievements of the age of exploration. We need to be sensitive to what is important to all human beings, whether they are here in New England or in Africa, Asia or Latin America; whether they are older or younger; whether they are well or sick. We must be willing to look for common ground and a set of transcending values that connect the human spirit across the world.

This will not be easy, but we in America are especially well-suited to this study. We were blessed to be born in this great land, and we are united by a set of documents that lay out an understanding of the human spirit and the obligations and opportunities we offer each other. We are bound together by the Declaration of Independence, the Constitution and the Bill of Rights. Ideas from Greek and Roman civilization, from European humanism, and from the great Judeo-Christian and Islamic faiths, brought the wisdom of the human spirit to the framers of the Constitution.

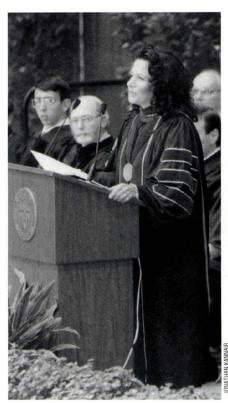
We must assure that this wisdom goes with us in the craft we will construct to travel through the age of exploration. We must not only say that we believe that all men are created equal and that they are endowed by their creator with certain inalienable rights, among them life, liberty and the pursuit of happiness. We must make that set of beliefs real for others, not just those with whom we share a great deal, but for our brothers and sisters around the world. We must dedicate ourselves to that transcending set of goals with the same power with which we pursue the space program and the human genome project.

For our enemies today are not evil empires; they are the potential for racial and ethnic and national conflicts that will break societies apart. Many scholars believe this

potential for destruction is more powerful than any force we have ever met. We must bring together the powers that have motivated the work done here at WPI, the powers of the corporate, trade and business sectors, and the powers of the military and government, to work toward ways to bring about peace and cooperation as we move toward everyone's prosperity.

We have arrived at an important moment. The education you have accomplished here has been part of the strongest work of the age of modernism. Systematizing, efficiency-optimizing technologies have moved us to this extraordinary moment. They have built one wing of the craft. Through the ages, human beings have been building the other wing, one based in relationships moved by the human spirit and by the need for tolerance, compassion and trust. This wing cannot always be accounted for by rational analysis, but the craft will need both wings.

After a while, we will notice that we are not only in a craft with two wings, both working well, but that the craft has become a bird and that both wings are moving with equal strength. Those wings will carry the human race into the 21st century, not into the despair of ethnic rivalries and small destructive wars, of disease, and of the widening gap between the rich and the poor, but into the generosity and ingenuity of the human spirit, born in the kind of education WPI offers. This kind of education will bring us to the place that human beings have only imagined for thousands of years and that was thought to be an ideal that we were not intended to achieve on this Earth. It is a place where the age of exploration can truly begin.



### **EDITOR'S NOTE:**

A scholar of 17th century French literature, Claire L. Gaudiani has been president since 1988 of Connecticut College in New London, Conn., from which she graduated in 1966. During her presidency the college has nearly tripled its endowment, built or renovated four major buildings, and created four major interdisciplinary academic centers. Gaudiani's institution is creating an innovative approach to educating young men and women in the liberal arts tradition, much as WPI transformed technological education 25 years ago with the WPI Plan. Connecticut College's undergraduate program emphasizes the critical role technology plays in all professions and the growing importance of a global perspective in today's world.

### Making a Difference



BY EDWARD A. PARRISH

"Because of the foresight of the faculty a quarter century ago, the WPI Plan already is the manifestation of the recommendations being heard on the national scene. This suggests to me that WPI can be recognized as a world leader among comprehensive, technological institutions in providing the new liberal education."

stand before you to accept the office of president. I pledge to uphold the standards established by my predecessors and to do my utmost to maintain the high quality of this great institution. My confidence in accepting this charge is fortified by the presence of a strong and dedicated faculty, a committed staff, and loyal students and alumni, who together provide the administration an able partner with which to meet the demands and to seize the opportunities of the future.

Today's ceremony honors WPI and its founders, as well as the entire WPI community—past and present. The founding principles established by John Boynton and Ichabod Washburn still serve this institution well today. Since WPI is the third oldest private university of engineering and science in the United States, these principles have been in place for a very long time.

It is appropriate here to reflect on the formative years of WPI. Through the generosity of Boynton, Washburn and the citizens of Worcester, WPI was chartered officially on May 10, 1865. Our first two buildings, Boynton Hall and the Washburn Shops, greeted incoming students about three years later. They went to classes in Boynton Hall and put theory into practice in the Washburn Shops. The towers of these two buildings came to symbolize the balance of theory and practice that has been at the heart of WPI's educational philosophy ever since, and so was born the Two Towers Tradition. This philosophy became the basis for many of the well-known engineering schools established in the latter part of the 19th century, including Georgia Institute of Technology and Rose-Hulman University. Thus, even in its youth, WPI was already making a difference far beyond its own campus.

On the occasion of his inauguration on Oct. 22, 1925, President Ralph Earle spoke of WPI's close relationship with local manufacturing industries. "All these industries have kept pace with the work of the world, they are in the forefront of mechanical advance," he said. "With all are connected graduates of this college, for in both high and low degree they are identified with Worcester's place in our industrial world, while 80 percent of our graduates are doing men's work in other cities of our nation." It is clear from his remarks that WPI's graduates were also making a difference.

Twenty-five years ago, the faculty of WPI extended the Two Towers tradition in a bold new approach to undergraduate technological education that continues today. Called the WPI Plan, this program combines traditional course work and laboratory instruction with three mandatory projects that challenge student teams to cope with open-ended issues. For the benefit of our guests, let me briefly explain.

The first project is called the Sufficiency. Science and engineering students must complete a project on a theme emerging from an elective series of courses in the humanities or arts; likewise, humanists must do a project in science or engineering. Second, all students must complete the Interactive Qualifying Project, whose domain is the intersection of science, technology and culture; the project emphasizes the impact of technology on society. Finally, they must complete the Major Qualifying Project, which involves problems typical of those found in their professional disciplines and which often addresses economical, ethical and safety issues. These qualifying projects are far from trivial; each requires a substantial part of an academic year. Frequently, projects are sponsored by outside agencies to whom students

About 20 years ago, the faculty began developing off-campus project centers around the world that now range from London to San Francisco to Venice to South America to Thailand. WPI students have many opportunities to work in teams for a seven-week term at one of these residential project centers. Often their projects contribute to solving complex problems of a local community. Further, under faculty guidance, graduate students here on campus are engaged in leading-edge research with outcomes that contribute to the solution of vexing problems and to the nation's wealth of knowledge. Here, then, we see WPI students making a difference.

must present their oral and written reports.

Today, we hear clarion calls for massive changes in higher education. Industry has been especially vocal, asserting that there is too much science in technological curricula. The belief is that graduates are well-grounded in theory, but are unprepared for practice. Furthermore, there are calls for a broad technological education, what I refer to as the new liberal education, to enable graduates to adapt to new technologies and unforeseen branches in career paths. The rapidly changing global marketplace is resulting in growing competition among nations and now adds a new dimension to educational requirements. This afternoon's symposium will provide another forum for raising these and other issues. [See page 8 for a report on the symposium.]

As a result of these growing concerns, several national studies have led to specific recommendations. Among those repeated most often are the following: incorporate hands-on experiences into programs rather than rely just on the classroom; develop teamwork as well as individual capabilities; improve students' communication skills; provide the broad education necessary for students to understand the impact of technology in a global societal context; and instill a recognition of the need for and an ability to engage in lifelong learning. As one of a relatively small number of technological universities in the country, I believe WPI has a special responsibility in helping to meet these challenges.

It is in these challenges that I envision great opportunities for WPI over the next decade. Because of the foresight of the faculty a quarter century ago, the WPI Plan already is the manifestation of the recommendations being heard on the national scene. This suggests to me that WPI can be recognized as a world leader among comprehensive, technological institutions in providing the new liberal education. For example, regional and specialized accreditation bodies are bringing their standards into conformance with these recommended changes, in effect reflecting key attributes of the WPI Plan. This fall WPI will participate in one of two experimental evaluations being conducted by the agency that accredits engineering programs. These visits will be the bases for case studies to be used for training purposes within the agency and by other institutions that will undergo evaluations in the future.

As another example, the National Institute of Standards and Technology has proposed a new Education Category under the Malcolm Baldrige National Quality Award. The draft education criteria parallel those of the existing Baldrige Award and are based upon core values that are at the very heart of WPI: learning-centered education and leadership. Here again, the principal concern is with outcomes, and so the WPI Plan would appear a natural fit. This is strong confirmation

that the educational philosophy bound up in the Two Towers Tradition is likely to be widely recognized and adopted.

My point in mentioning these examples is to say that this institution has been quietly (too quietly, in fact) out in front for many years. Thus, I believe that WPI is positioned to lead the cultural change that will be required of faculties across the country to implement what for them will be a new approach to education.

A cultural change is indeed required, as many faculty members are not accustomed to spending quality time with undergraduate students—especially directing student teams engaged in meaningful project work. About six years ago the National Science Foundation established several coalitions to address educational reform. Thus far, over \$100 million has been expended in support of some 60 institutions. A progress report last month indicated considerable difficulty in assess-

ing outcomes of these new programs, along with organizational problems.

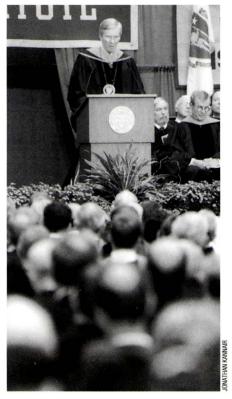
The most telling difficulty, however, was embodied in statements like, "We have learned that faculty members are key to establishing educational reform, but that they often prefer not to participate in the process. While deans may see the need for change, the faculty, as a whole, often does not." Another states, "Our biggest problems have been dealing with the educational community's overall resistance to change and with the structures of the universities that inhibit innovation."

WPI solved many of these problems years ago and by leading the cultural change will again be making a difference. We can begin to do so, for example, through additional faculty presentations on pedagogical research at national meetings, through a planned major education conference at WPI in response to this afternoon's symposium, and by offering workshops to faculty from other institutions.

We cannot afford to be complacent, however. As Will Rogers said, "Even if you're on the right track, you'll get run over if you just sit there." We must continue to reduce costs as well as identify new resources to meet our future needs. Our efforts to expand the base of applicants for WPI's programs must be redoubled, with due attention to various diversity issues. The WPI Plan should be continuously improved, refined and extended

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to incorporate the freshman year and even the master's level within our graduate program. Our international programs should be strengthened, with even greater opportunities for students to develop cultural awareness and foreign language skills as part of their project work.

The graduate program also needs strategic examination and support to bring it more into the campus mainstream. We must continue to integrate our scholarly research and teaching efforts and to develop further concepts like ethics and academic honesty within all our educational programs. Beyond academics, we need to address additional quality-of-life issues on campus. For example, we badly need a campus center, a facility I believe was first proposed in 1925. Other strategic needs are being identified and will be prioritized in the coming year with the help of the entire WPI community.

In closing, I want to say to my faculty colleagues that, as individuals, you are our leaven for making a difference. You contribute as teachers, as advisors, as scholars, as role models, and as friends of your students. It is nearly impossible to measure your impact as it radiates through your students like ripples in a pond. Let me illustrate this point.

In my senior year, one of my teachers at the University of Virginia, Prof. Eugene McVey, asked me to join his research team and pursue graduate work. I had already accepted a job with the Newport News Shipyard and had never even considered graduate school. I gained release from the job commitment and went on to complete my master's and doctorate. This led to a faculty appointment; 10 years later, I was asked to chair the Department of Electrical Engineering. That, in turn, led to my becoming dean of the School of Engineering at Vanderbilt University. Finally, here I am today in the midst of this ceremony rather than at some drydock in Virginia. Clearly, Gene McVey changed my life. I have tried to repay him by mentoring my own students. Some of them are now faculty members who help their students, and so these ripples continue to propagate. Each member of this faculty is an important part of a similar dynamic.

I hope that as president I, too, can make a difference. However, realizing that I am the 14th president to serve WPI is sobering. It brings home the fact that each president has but a short time to hold the baton before passing it on to a successor. The obligation to take a long view that extends well beyond one's own tenure is thus very compelling. I intend to meet this obligation to the best of my ability. I look forward to working with the trustees, the provost and other officers, the faculty, the students, the staff, and the alumni in turning our challenges into opportunities and, together, making a difference.

### Getting On With the Job of Change

In a special inaugural symposium, eight leaders from academia, industry and the accreditation community looked to the future of technological education in the United States.

he world of work has changed dramatically. Today's technological professionals enter a workplace transformed by mergers, downsizing, the globalization of business and industry, the incredible pace of technological change, and the growing importance of small, entrepreneurial companies. To succeed in this new world, they need more than a strong technical education. They need a set of skills and abilities that most science and engineering programs don't currently provide, or provide well. For that reason, technological higher education in the country must change—and change quickly.

That was the conclusion of a symposium held in conjunction with the inauguration of WPI President Edward Parrish. "The New Liberal Education for the Age of Technology" brought together eight leaders from academia, industry and the accreditation community to discuss the state of technological higher education and to make recommendations for its future. In addition to Parrish, the panelists were Eleanor Baum, dean of the School of Engineering at Cooper Union; Douglas Bowman, director of electronics and information technology at Lockheed Martin Corporation; Frederick E. Hutchinson, president of the University of Maine; David A. Kettler, executive director of science and technology at Bell-South Corporation; Mark M. Little, vice president for power generation engineering at GE Power Systems; and George D. Peterson, executive director of the Accreditation Board for Engineering and Technology. The moderator was



"You have to rethink the way you teach, and the way you integrate knowledge from various disciplines, and not be so terribly involved in being a conveyor of information."

—Eleanor Baum





"The half-life of an undergraduate electrical engineering degree is now on the order of five years—if that long. Because the technology is changing so fast, students must gain the learning, decision and analytical skills they need to more forward."

—David Kettler

Joseph Hinchey, chair of the board of trustees of Union College.

In brief remarks that opened the two-hour panel discussion, Bowman explained why many corporations today have an abiding interest in the state of technological education. "More than market share—more than almost anything else—the future of our business depends on the quality of the scientists and engineers we hire."

Bowman said those new hires must be prepared to work in an environment that differs greatly from the workplace of just 10 years ago. "We used to have small design teams and lone engineers," he said. "But the lone engineer has gone the way of the Lone Ranger. Today we work in multidisciplinary teams that need not be colocated geographically, or even limited by political boundaries. Work on projects can continue 24 hours a day as the sun moves around the Earth. And professionals must be able to adapt to the staggering pace of technological change. For example, the division that employs the largest number of people at Lockheed Martin—software engineering—didn't even exist 15 years ago."

While industry will always look to hire engineers and scientists who have received solid technical educations, today they also seek graduates who know how to apply that knowledge to real problems, Little noted. "We are looking for students who have the breadth to go beyond the intellectual application of technology to the real-world application." Just as important, Bowman added, students need to understand the context in which they will

create those applications. "Today, many engineering decisions are made independent of the engineering and technology that might go into a specific product. There are often social, political and economic factors to consider, as well."

"We require the students we hire to demonstrate their communicative abilities—written and oral," noted Kettler. "We want to see if they can sell an idea. They will be immersed in project activity with people from different backgrounds and different disciplines, and technological professionals have to be able to articulate their views so those who have no insight into the technology will feel part of the team. Lifelong learning is also important. The half-life of an undergraduate electrical engineering degree is now on the order of five years—if that long. Because the technology is changing so fast, students must gain the learning, decision and analytical skills they will need to move forward."

There is no doubt that technological education must change to prepare graduates who possess these qualities. The question, Baum observed, is how to accomplish that change. "How do you do all that within a traditional engineering program? The way you don't do it is to just keep adding courses. You have to rethink the way you teach, and the way you integrate knowledge from various disciplines, and not be so terribly involved in being a conveyor of information. You have to help your students develop the versatility they need to change as their careers change, as technology changes, and as society changes. So the

"You can't do all this in four years if you want to retain a strong technical core. If we are going to embellish the curriculum with these other necessary skills, we need more time—possibly five years."

—George Peterson



main thing we have to do is teach students how to learn on their own."

Peterson said the same approach should be taken to broadening the liberal component of technological education programs. "Don't simply add a course in the humanities or a course called 'The Impact of Technology' and conclude that you've satisfied that objective," he said.

He added that for a revised technological curriculum to be effective, it must have a clear set of objectives and that these must be clearly communicated to students. "When the expected outcomes are clear to students, the courses they take will make more sense. And since you will be focused on producing a product you've advertised to your students, you can get away from the idea of adding courses and instead integrate the liberal arts and technology throughout the curriculum."

Parrish said colleges and universities also need to rethink the way they deliver a technological education. To deal with the rising cost of teaching engineering and science, they will need to improve the efficiency of their educational programs without eroding their quality. "We have to get our rising costs under control or we will be out of business," he said. "We can't continue to have the escalating costs that have pressed us over the past few years."

"For most of our histories we've operated in a growth mode," Hutchinson said. "But things are different now and it looks like that will be so for a long time. We are having to set priorities as we've never had to before. As we do so, we have to be clear about those priorities."

Parrish described an ongoing experiment at WPI, funded by the Davis Educational Foundation, that trains students to help teach other students. These peer learning assistants help increase the effectiveness of faculty members "without simply adding more students to the classroom. We also have the promise of educational technology, which we've been hearing about for decades," he said. Now, however, with the World Wide

Web, multimedia and so on, the technology has reached a point where we have some powerful ways to engage students and lower the cost of education, without negatively impacting quality."

Noting that "the days are gone when universities could be all things to all people," Baum said educational institutions today can further increase their efficiency and hold down costs by entering into partnerships with other colleges and universities to share programs and resources. "We can collaborate with neighboring institutions," she said. "And with the Internet, our neighborhood can be the whole world. These partnerships may not bring down the costs of our programs dramatically, but they can help us provide a quality education for students while we hold the line on costs."

Even with increased efficiency and the sharing of resources, technological universities may find it difficult to provide students a sound technological education and equip them with the attributes they need to succeed in today's workplace in the span of a traditional four-year undergraduate program, Peterson noted. "You can't do all this in four years if you want to retain a strong technical core," he said. "If we are going to embellish the curriculum with these other necessary skills, we need more time—possibly five years. Will industry pay for that additional time, perhaps in higher entry salaries?"

"That depends," Kettler said, "on what is added in that fifth year. Colleges and universities are delivering a product—their graduates. If industry can find a product it wants and can work in partnership with academia to deliver this product, they will pay for it."

As the symposium concluded, the panelists agreed that there is considerable reason for optimism. They pointed particularly to the growing national consensus within industry, academia, and a wide range of organizations with an interest in maintaining the nation's technical and economic competitiveness on the need for reform in technological education, and to the vision that is emerging for how technological education should evolve. It is a vision that points to a solution not unlike WPI's own project-based, outcome-oriented program, the WPI Plan.

"We are at a stage where people recognize that engineering education needs to change, where accrediting agencies are encouraging that kind of change, and where partnerships are being formed to bring that change about," Baum said. "Getting on with the job is now the challenge. I think you are fortunate at WPI because your president is the person who has the vision to really meet the challenge."

-MICHAEL W. DORSEY



"For most of our bistories
we've operated in a growth
mode. But things are
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time. We are having to set
priorities as we've never
had to before."

—Frederick Hutchinson

# Eventful Year Prelude to Exciting Era of Opportunity

HE PLANETS ARE ALIGNED."
That's a phrase heard often on campus these days. Attributed to WPI President Edward A. Parrish, it is an apt way of summing up what may well be one of the most important periods in WPI's history, a brief window of time during which an extraordinary confluence of events and activities will provide the university an opportunity to seize the national spotlight and gain widespread recognition for its pioneering efforts in technological education.

The momentum began building during a frenzied month last spring, when five major events brought hundreds of visitors to campus. It has continued into the current year as the past WPI serves as one of only two institutions across the nation pilottesting a set of new outcome-oriented criteria for engineering accreditation. And it will be enhanced by an ambitious strategic planning process recently set in motion that will enable the university to chart a new direction for the decades ahead and set the stage for a new capital campaign.

"We have a number of planets lined up right now," Parrish says. "We're turning out the right kind of graduate for today's world. We're way ahead in project-based education and in providing global opportunities. In fact, several major national studies have made recommendations for change in technological education that are already manifested in the educational program we pioneered 25 years ago. Through an ongoing strategic planning process, we have the opportunity to focus on the objectives that will enable us to take advantage of the significant opportunities we have before us and to raise the funds we need to achieve those objectives. Things just don't line up like this every year!"

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The Roman god Janus was the guardian of gates and doors. His two faces look simultaneously to the past and the future. Like Janus, our report this year looks backward and forward to capture an important period of transition at the university.





The WPI Plan's 25th anniversary was observed on Project Presentation Day, top, and Commemoration Day, which included a panel discussion of WPI's next 25 years, bottom.

Here is a review of the highlights of the 1995-96 academic year and a look ahead at what's on tap for the current academic year.

### **The Year Past**

### A MONTH TO REMEMBER

They called it "April Madness."
In the short span of a month,
WPI rededicated a building,
observed the centennial of an academic department, welcomed the crew
of a space mission, and (in two separate
events) celebrated the silver anniversary
of its pioneering undergraduate program.
It was a month to glory in WPI's storied
past and to gaze into its future.

Nowhere was that more true than at the two events organized to focus attention on the **25th anniversary of the WPI Plan.** The first, **Project Presentation Day** 

(April 18), gave the WPI community and the companies and organizations that sponsor WPI's student projects a chance to see the remarkable things students accomplish in their three required Plan projects. The more than 250 student presentations (mostly of Major Qualifying Projects) offered a never-before-seen panoramic view of what students can do if given the freedom and the opportunity to spread their intellectual wings.

The second Plan event, Commemoration Day (April 23), was an opportunity to look back and peer ahead. A luncheon brought together the men and women who drafted the Plan, implemented it and evaluated its progress to recall some of the most eventful and important days in WPI's history. In a panel discussion that afternoon, the authors of five invited papers presented their visions of the next 25 years at WPI; David Warsh, syndicated economics columnist for the *Boston Globe* and *Chicago Tribune*, was the keynote speaker. The day concluded with

the annual faculty convocation and a gala reception for the WPI community. (For more on the Plan's 25th anniversary and a report on the invited papers, see the October 1996 WPI Journal.)

The centennial of the **Electrical and Computer Engineering Department** was observed on April 19. The department welcomed its alumni and other guests to an open house, a panel discussion and a reception and dinner. The panel, made up of ECE faculty members and alumni, engaged in a spirited debate about where the next 100 years may take the field of electrical engineering. At the dinner, guests enjoyed a talk by William R. Grogan '46EE, dean emeritus of undergraduate studies, who described the early years of the department. (For more on the early history of electrical engineering at WPI, see "An Electric Century" in the Spring 1996 Journal.)

On April 29, the focus was the **rededication of Higgins Laboratories.**Completed in 1942 as the

second home on campus for mechanical engineering (the first was Stratton Hall), the building was completely refurbished and expanded beginning in 1994. Ready for the start of the 1995 fall semester, the all-new Higgins Labs includes a 17,000-square-foot addition that houses classrooms and labs, as well as an elevator and the mechanical, electrical and plumbing systems for the entire building. Among the new facilities created in the \$8.5 million renovation is the Design Studio, a suite of labs and a multimedia classroom that is the centerpiece of a new way of teaching engineering design. (For more on the renovations, see "A Mechanical Marvel" in the Spring 1996 Journal.)

April 10 would have been a remarkable day in Worcester if for nothing more than the storm that left behind 14 inches of snow. But the real excitement at WPI that day was caused by the **arrival of eight true heroes**. All but one member of the crew of STS-73, the 16-day scientific mission that flew on the space shuttle *Columbia* in October 1995, came to campus for a day of activities.





Among them was Albert Sacco Jr., head of the WPI Chemical Engineering Department and WPI's first faculty astronaut. The day included "Countdown to Tomorrow," a celebration of the *Columbia* mission and a tribute to the astronauts who made it one of the most successful science missions in NASA's history. (For more on Al Sacco's ride into space, see "Coming Home" in the Winter 1996 *Journal*.)

### ANOTHER SILVER ANNIVERSARY

Just over a quarter century ago, while the university was in the midst of creating the WPI Plan, the Computer Science Department was making its debut. In 1969, long before the age of the personal computer, WPI launched a graduate program in computer science; the undergraduate program began a year later. Since then, the department has built a reputation for excellence in education and research. In 1986 it became one of the first departments in the nation to be accredited by the Computer Science Accreditation Board. In September 1995,

Top, a student-built hovercraft dominates this view of the large project lab in Higgins Laboratories as guests tour the renovated building. Bottom, from left, Columbia astronauts Ken Bowersox, Al Sacco, Kathryn Thornton, Michael Lopez-Alegria, Catherine Coleman, Fred Leslie, Glynn Holt and David Matthiesen during their visit to WPI.

the department hosted a 25th anniversary celebration in Fuller Laboratories, its home since 1990, for many of its 2,000 alumni.

### New Provost Looks To Build on Solid Foundation

John F. Carney II, formerly professor of civil engineering and associate dean for research and graduate affairs at Vanderbilt University, was named WPI's new provost and vice president for academic affairs this spring. Carney succeeded Diran Apelian, Howmet Professor of Mechanical Engineering, who became head of the newly formed Metal Processing Institute, a WPI

research group comprising industrial consortia in the areas of aluminum casting, powder metallurgy and semisolid metals processing. **William W. Durgin** was appointed associate provost for academic affairs, giving him primary responsibility for WPI's academic and research programs. A member of the faculty since 1971, Durgin was most recently dean of graduate studies and research.

Carney sees his role as WPI's chief academic officer as that of building on a solid foundation, one that includes an excellent faculty, outstanding academic and research facilities, a unique project-based undergraduate program, and a global perspective program widely regarded as the leader in global technological higher education. "WPI is a wonderful technological university that doesn't get the national and international recognition it deserves," he says.

Carney's goals for the undergraduate program include trying to expand the benefits of project-based education into the first year, a time when most students spend a

# Financial Statements Fiscal Year 1996

### From the Treasurer:

The fiscal year closing on June 30, 1996 was the first for WPI under new financial accounting standards imposed for not-for-profit organizations. WPI has, in conjunction with our external auditing firm, Coopers & Lybrand L.L.P., developed these reports in a form that we hope is most meaningful to all of the constituencies associated with the university.

While it is not easy to compare FY 96 to FY 95 because of the change in the reporting format, it is clear that WPI occupies a very strong financial position at year end. This strength is due to the effective stewardship and management of the university's assets by the Board of Trustees and, on the operational side, by the effective and concerned commitment of the entire community to balancing the operating budget in a period of time when the stress of financial aid on the budget continues to be extreme.

The year-end results as audited by Coopers & Lybrand are detailed in the new exhibits this year titled "Statement of Financial Position," "Statement of Activities" and "Statement of Cash Flows." They are included in the pages that follow. A notable change is that invested assets are now recorded at market value rather than at book value, as had been the practice in the past. This change alone has resulted in an increase in net assets of approximately \$19 million.

Another change shows the assets reported as permanently restricted, temporarily restricted and unrestricted net assets. Of the \$224,220,529 in net assets at year end on June 30, 1996, \$41,170,281 was temporarily restricted and \$49,222,228 was permanently restricted.

Stephen J. Hebert '66

Vice President for Administration, Treasurer and Secretary of the Corporation

**EDITORS NOTE:** The graphs included with these financial statements are intended to show trends in key financial parameters. For consistency, the FY96 numbers were computed using financial accounting standards in use by WPI through FY95. In many cases, these numbers are not directly comparable to similar numbers included in the financial statements, which were computed using new financial accounting standards (see above).

### REPORT OF INDEPENDENT ACCOUNTANTS

The Board of Trustees Worcester Polytechnic Institute:

We have audited the accompanying statement of financial position of Worcester Polytechnic Institute ("WPI" or the "University") as of June 30, 1996 and the related statements of activities and cash flows for the year then ended. These financial statements are the responsibility of the University's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of WPI as of June 30, 1996, the changes in its net assets and cash flows for the year then ended in conformity with generally accepted accounting principles.

As discussed in Note 1 to the financial statements, during 1996 WPI adopted Statement of Financial Accounting Standards (SFAS) No. 116, "Accounting for Contributions Received and Made," SFAS No. 117, "Financial Statements of Not-for-Profit Organizations," and SFAS No. 124, "Accounting for Certain Investments Held by Not-for-Profit Organizations."

Coopers & Tyland J.J.P.

Boston, Massachusetts October 4, 1996

### AUDITED REPORTS

### STATEMENT OF FINANCIAL POSITION

7une 30, 1996

### **ASSETS**

Cash and cash equivalents	\$	8,897,041
Accounts receivable, net		3,513,567
Accrued income receivable		244,401
Contributions receivable, net		875,475
Inventories		11,600
Deposits with trustees		1,074,532
Prepaid expenses and other assets		1,237,632
Notes receivable		13,692,116
Intermediate and long-term investments		186,330,612
Land, buildings and equipment, net		68,111,281
Total assets	\$ 2	283,988,257

### LIABILITIES AND NET ASSETS

Accounts payable and accrued liabilities	5,625,670
Deposits and deferred revenues	2,427,714
Short-term portion of long-term debt	1,668,502
Annuities payable	1,967,071
Funds held for others	330,377
Refundable government loan funds	8,826,754
Long-term debt	38,921,640
Commitments (Note 9)	
Total liabilities	59,767,728

### Net assets:

Unrestricted	133,828,020
Temporarily restricted	41,170,281
Permanently restricted	49,222,228
Total net assets	224,220,529
Total liabilities and net assets	\$ 283,988,257

The accompanying notes are an integral part of the financial statements.

### STATEMENT OF ACTIVITIES

for the year ended June 30, 1996

Operating revenues:		7,007,700,000,000,000,000,000,000,000,0	Restricted	Total
Tuition and fees	\$ 46,910,644	_	_	\$ 46,910,644
Other educational operations	6,427,083	- N	_	6,427,083
Contributions	6,520,115	\$ 601,906	_	7,122,021
Contract and exchange transactions	12,326,097	_	_	12,326,097
Investment income on endowment	5,085,852	_	_	5,085,852
Other investment income	913,244	150,008	\$ 81,948	1,145,200
Net realized gains on endowment, expended	1,553,515	1,131,052	_	2,684,567
Net realized gain on other investments	164,500	_	_	164,500
Sales and services of auxiliary enterprises	7,651,494	_	_	7,651,494
Other	1,189,343	_	_	1,189,343
Total revenues	88,741,887	1,882,966	81,948	90,706,801
Net assets released from restriction	1,445,481	(1,445,481)	_	_
Total revenues and other support	90,187,368	437,485	81,948	90,706,801
Operating expenses:				
Instruction and department research	30,649,464	_	_	30,649,464
Sponsored research	6,328,533	_	_	6,328,533
Public service	1,949,904	_	_	1,949,904
Institution and academic support	9,938,004	_	_	9,938,004
Student services	4,152,898	_	_	4,152,898
Operation and maintenance of plant	10,728,737	_	_	10,728,737
Student aid	18,724,960	_	_	18,724,960
Auxiliary enterprises	6,669,936	_	_	6,669,936
Total operating expenses	89,142,436	0	0	89,142,436
Change in net assets from operating activities Nonoperating:	1,044,932	437,485	81,948	1,564,365
Realized and unrealized gains	11,973,512	9,022,382	177,934	21,173,828
Contributions	557,574	659,212	2,668,147	3,884,933
Net assets released from restrictions	6,643,154	(6,643,154)	_	_
Change in net assets from				
nonoperating activities	19,174,240	3,038,440	2,846,081	25,058,761
Total change in net assets	20,219,172	3,475,925	2,928,029	26,623,126
Net assets beginning	113,608,848	37,694,356	46,294,199	197,597,403
Net assets ending	\$ 133,828,020	\$ 41,170,281	\$ 49,222,228	\$ 224,220,529

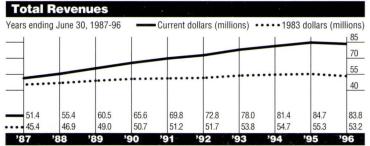
The accompanying notes are an integral part of the financial statements.

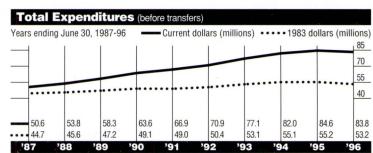
### STATEMENT OF CASH FLOWS

for the year ended June 30, 1996

Cash flows from operating activities:		Cash flows from investing activities:	
Change in net assets	\$ 26,623,126	Proceeds from sales and maturities	
Adjustments to reconcile change in net assets		of investments	73,443,683
to net cash provided by operating activities:		Purchases of investments	(77,409,949)
Depreciation and amortization	5,894,081	Proceeds from sales of land	164,500
Provision for bad debts	53,913	Purchase of land, building and equipment	(5,325,050)
Contributions other than cash	(2,278,933)	Disbursement of loans to students	(2,193,727)
Noncash increase in annuities payable	(80,489)	Repayments of loans from students	1,588,941
Net realized and unrealized gain		Net cash used for investing activities	(9,731,602)
on investments	(23,967,099)		
Contributions restricted for long-term investments Investment income restricted for long-term investments Changes in operating assets and liabilities: Decrease in accounts receivable Decrease in contributions receivable Increase in notes receivable Decrease in prepaids and other assets Increase in funds held for others	(2,668,147) (81,948) 45,317 685,925 (39,750) 42,560 83,601	Cash flows from financing activities: Receipts of refundable government loan funds Contributions restricted for long-term investments Investment income restricted for long-term investments Deposits with trustees Proceeds from issuance of debt Repayment of principal indebtedness  Net cash provided by financing activities	178,597 2,668,147 81,948 315,253 835,869 (1,224,472) 2,855,342
Increase in accounts payable and accrued expenses	387,960	Net decrease in cash and cash equivalents	(2,071,628)
Increase in annuities payable	172,166	Cash and cash equivalents, beginning	10,968,669
Decrease in deferred revenue	(67,651)		
		Cash and cash equivalents, ending	\$ 8,897,041
Net cash provided by operating activities	4,804,632	Supplemental cash flow information:	
			\$ 2,555,972
		Interest paid	\$ 4,333,972

The accompanying notes are an integral part of the financial statements.





### NOTES TO FINANCIAL STATEMENTS

### 1. ACCOUNTING POLICIES

Basis of Presentation In fiscal 1996, Worcester Polytechnic Institute ("WPI" or the "University") adopted Statement of Financial Accounting Standards (SFAS) No. 116, "Accounting for Contributions Received and Made," SFAS No. 117, "Financial Statements of Not-for-Profit Organizations," and SFAS No. 124, "Accounting for Certain Investments Held by Not-for-Profit Organizations." SFAS No. 116 requires that unconditional promises to give (pledges) be recorded as receivables and revenues within the appropriate net asset category. SFAS No. 117 establishes standards for general-purpose external financial statements of not-for-profit organizations, including a statement of financial position, a statement of activities and a statement of cash flows. SFAS No. 124 establishes standards of financial accounting and reporting for certain investments in securities and establishes disclosure requirements for most investments held by not-for-profit organizations.

These financial statements, which are presented on the accrual basis of accounting, have been prepared to focus on WPI as a whole and to present balances and transactions according to the existence or absence of donor-imposed restrictions. This has been accomplished by classification of fund balances and transactions into three classes of net assets—permanently restricted, temporarily restricted or unrestricted.

WPI has defined its primary activities as operating and nonoperating. Operating activities consist primarily of activities supporting the educational mission and purpose of WPI. Nonoperating activities consist primarily of endowment gifts, unspent appreciation on endowment, and contributions for capital use.

Net assets and revenues, expenses, gains and losses were classified based on the existence or absence of donor-imposed restrictions. Accordingly, net assets and changes therein are classified as follows:

**Permanently Restricted Net Assets** Net assets subject to donor-imposed stipulations that they be maintained permanently by the University. Generally, the donors of these assets permit the institution to use all or part of the income earned on related investments for general or specific purposes.

**Temporarily Restricted Net Assets** Net assets whose use is restricted by state law or subject to donor-imposed stipulations that may or will be met by actions of WPI and/or the passage of time.

**Unrestricted Net Assets** Net assets not subject to donor-imposed stipulations.

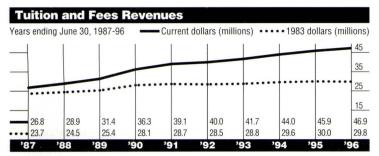
Revenues are reported as increases in unrestricted net assets unless use of the related assets is limited by donor imposed restrictions. Expenses are reported as decreases in unrestricted net assets.

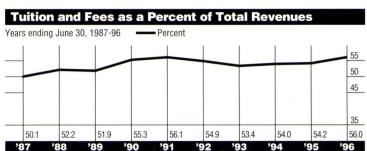
Gains and losses on investments and other assets or liabilities are reported as increases or decreases in unrestricted net assets unless their use is restricted by explicit donor stipulation or by law. Expirations of temporary restrictions on net assets (that is, the donor-stipulated purpose has been fulfilled and/or the stipulated time period has elapsed) are reported as reclassifications between the applicable classes of net assets.

When it adopted SFAS No. 124, the University changed its method of valuation for investments from cost to fair market value, to more appropriately reflect its investment activities. The effect of retroactively recording the market value of investments is reflected in an adjustment to net assets as of June 30, 1995 as reported on the statement of activities.

The following is a reconciliation of previously reported total fund balances at June 30, 1995 to the restated total net asset balances at the same date.

Total fund balances as reported at June 30, 1995 Book to market value adjustment Pledges receivable, net Funds held in trust by others Refundable federal student loans to liability Other Net assets, June 30, 1995		184,268,704 19,392,855 1,561,400 1,568,620 (8,648,157) (546,019) 197,597,403
Permanently restricted net assets consist of the following at June 30, 1996:		
Endowment funds—original principal	\$	44,117,581
Split-interest agreements and perpetual trusts		3,677,311
Student loan funds		1,427,336
· ,	\$	49,222,228
=		
Temporarily restricted net assets consist of the following at June 30, 1996:		
Gifts and other unexpended revenues: Instruction, research and institutional		
support	\$	1,618,288
Acquisition of building and equipment	4	1,789,783
		3,408,071
Endowment funds—unspent income		-,, - / *
and appreciation		33,158,358
		, , , , , , , , , , , , , , , , , , , ,





Split-interest agreements and

perpetual trusts

4,603,852

\$41,170,281

At June 30, 1996, substantially all of the University's unrestricted net assets were designated for specific purposes, as follows:

 Long-term investment
 \$ 100,190,366

 (quasi-endowment funds)
 \$ 100,190,366

 Net investment in plant facilities
 26,618,897

 Loans to students
 3,649,808

 Undesignated
 3,368,949

 \$ 133,828,020

Gifts and Pledges Contributions, including unconditional promises to give, are recognized as revenues in the period received. Conditional promises to give are not recognized until they become unconditional, that is when the conditions on which they depend are substantially met. The net assets of the Alumni Association of WPI, a separate 501(c)(3) corporation, are not reflected on the books of WPI. Net assets were approximately \$1.3 million at June 30, 1996. Contributions of assets other than cash are recorded at their estimated fair value at the date received. Contributions to be received after one year are discounted at a rate of 6 percent. Amortization of the discount is recorded as additional contribution revenue in accordance with donor-imposed restrictions, if any, on the contributions. An allowance for uncollectible contributions receivable is provided based upon management's judgment including such factors as prior collection history, type of contribution and nature of fund-raising activity.

Conditional promises to give and bequests not reflected in the financial statements are approximately \$3,958,000.

Release of Restrictions on Net Assets Received Prior to Adoption of SFAS No. 116 WPI has adopted retroactively the provisions of SFAS No. 116 concerning release from restrictions on temporarily restricted net assets upon incurrence of an expense when both unrestricted and temporarily restricted net assets are available for that purpose. Accordingly, the net asset balances as of July 1, 1995 (the date of adoption of SFAS No. 116) have been restated, as detailed on the statement of activities.

Contributions with Restrictions Met in the Same Year Contributions, other than those for capital use, received with donor-imposed restrictions that are met in the same year as received are reported as revenues of the unrestricted net asset class. Release of Restrictions on Net Assets for Acquisition of Land, Building and Equipment Contributions of land, building and equipment without donor stipulations concerning the use of such long-lived assets are reported as revenues of the unrestricted net asset class. Contributions of cash and other assets to be used to acquire land, building and equipment without such donor stipulations are reported as revenues of the temporarily restricted net asset class. The restrictions are considered to be released at the time of acquisition of such long-lived assets.

**Cash and Cash Equivalents** Cash and cash equivalents include cash on hand and short-term investments with maturities of 90 days or less when purchased.

**Inventories** Inventories, consisting principally of alumni souvenirs, are valued at the lower cost (first-in, first-out) or market.

**Deferred Financing Costs** Deferred financing costs relate to debt issuance costs that are amortized over the life of the bonds. Total amortization expense for the year ended June 30, 1996 was \$69,852.

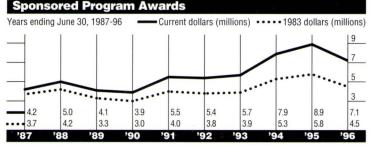
**Sponsored Research** Revenues associated with research and other contracts and grants at the University are recognized as related costs as incurred. Indirect cost recovery by the University is based on a predetermined fixed rate.

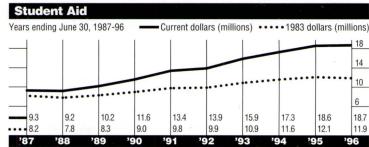
**Property, Plant and Equipment** Land and land improvements, buildings and equipment are recorded at cost at the date of purchase. When assets are retired or otherwise disposed of, the cost and related accumulated depreciation are removed from the accounts, and any resulting gain or loss is reflected in operation for the period. The cost of maintenance and repairs is charged to income as incurred, significant renewals and betterments are capitalized.

WPI depreciates capital assets based upon their useful lives. The policy applies to assets acquired with an expected useful life of three years or more and a cost greater than \$500. Depreciation is calculated using the straight-line method, half-year convention over the following estimated useful lives:

Land improvements	10-20 years
Buildings and improvements	20–50 years
Equipment	3–10 years

Depreciation expense for the year ended June 30, 1996 was \$5,824,229.





Split-Interest Agreements and Perpetual Trusts The University has split-interest agreements with donors consisting primarily of charitable gift annuities, pooled income funds and irrevocable charitable remainder trusts. Assets held in trust are separately invested and are included in intermediate and long-term investments on the statement of financial position. Income distributions are made to beneficiaries in accordance with the trust agreements.

Contribution revenues for charitable gift annuities and charitable remainder trusts are recognized at the dates the agreements are established, after recording liabilities for the present value of the estimated future payments to be made to the respective donors and/or beneficiaries. For pooled income funds, contribution revenue is recognized upon the establishment of the agreements as the fair value of the estimated receipts, discounted for the estimated time period to complete the agreements. Such contributions, net of the related liabilities, are classified as increases in temporarily or permanently restricted net assets based on donor-imposed stipulations.

The present value of payments to beneficiaries of charitable gift annuities and charitable remainder trusts and the estimated future receipts from pooled income funds are calculated using discount rates from 6 percent to 10 percent.

Vested Vacation Accrual WPI accrues a liability for estimable compensated absences (vested vacation for hourly and salaried employees) as required by FASB Statement No. 43.

Tax-Exempt Status The University is exempt from federal income tax under Section 501(c)(3) of the Internal Revenue Code.

Use of Estimates in the Preparation of Financial Statements The preparation of the financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

### 2. ACCOUNTS RECEIVABLE

Accounts receivable consist of the following at June 30, 1996:

Total accounts receivable	\$ 3,513,567
Less: allowance for doubtful accounts	473,278
	3,986,845
Other receivables	1,908,150
Sponsored research	\$ 2,078,695

### 3. NOTES RECEIVABLE

Notes receivable consist of the following at June 30, 1996:

Total notes receivable	\$	13,692,116
Less: allowance for doubtful accounts	,	15,849
		13,707,965
Other		108,677
Student loans	\$	13,599,288
Julie 30, 1770.		

Notes receivable are principally amounts due from students under federally sponsored loan programs that are subject to significant restrictions. Accordingly, it is not practicable to determine the fair value of such amounts.

### 4. CONTRIBUTIONS RECEIVABLE

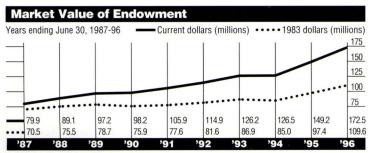
Unconditional promises are expected to be realized in the following periods:

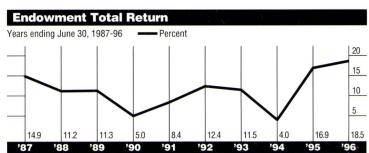
In one year or less	\$ 670,595
Between one and five years	604,880
Less discount of \$81,690 and	
allowance of \$318,310	(400,000)
	\$ 875,475

### 5. PROPERTY, PLANT AND EQUIPMENT

Property, plant and equipment consists of the

	\$ 68,111,281
Less: accumulated depreciation	43,004,683
	111,115,964
Construction in progress	3,067,982
Equipment	24,069,562
Buildings	78,837,572
Land and land improvements	\$ 5,140,848
ollowing at June 30, 1996:	
roperty, plant and equipment consists of the	





### 6. INVESTMENTS

Investments in equities, bonds, mutual funds and funds held in trust by others have been reported in the financial statements at fair value. Investment in the realty trust is reflected at cost. Fair values for investments held through limited partnerships are estimated by the respective external investment managers if fair values are not readily ascertainable. Cash and investments at June 30, 1996 were as follows:

		1996					
				Split-Interest			
	_	Endowment		Agreements		Other	Total
Cash and cash equivalents	\$	2,327,748	\$	534,547	\$	6,034,746	\$ 8,897,041
Equities		84,244,067		4,328,700		12,000	88,584,767
Bonds		15,097,631		4,614,420		100,000	19,812,051
Mutual funds:							
Equity funds		36,981,458		_		:	36,981,458
Fixed-income funds		23,480,809		_		208,900	23,689,709
Realty trust*		3,000,000		_		_	3,000,000
Oil and gas, L.P.*		7,581,344		_		_	7,581,344
Bioventures, L.P.*		1,075,114		_		_	1,075,114
Other Partnerships*		2,918,115		_		_	2,918,115
Other*		700,000		241,880		_	941,880
Funds held in trust by others *				1,746,174		_	1,746,174
Total intermediate and							
long-term investments		175,078,538		10,931,174		320,900	186,330,612
Total	\$	177,406,286	\$	11,465,721	\$	6,355,646	\$ 195,227,653

<sup>\*</sup>Not publicly traded

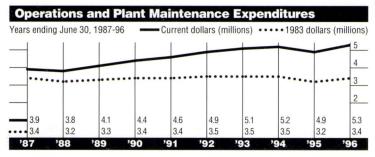
**Endowment Income and Spending** At June 30, 1996, there was a total of 46,851,917 units, each having a market value of \$3.698. Of the total units, 19,739,480 were owned by endowment funds and 27,112,437 were owned by internally designated funds.

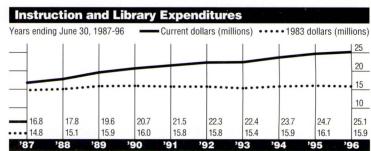
A summary of the market value per unit and the income per time-weighted unit for the pooled investments held as of June 30, 1996 and in each of the prior four years is as follows:

	Income Per	Market Value	
	Time-Weighted Unit	Per Unit	
1996	\$ 0.106	\$ 3.698	
1995	0.114	3.190	
1994	0.094	2.968	
1993	0.121	3.028	
1992	0.149	2.857	

The University observes a spending rule with respect to unrestricted investment income on investments of the endowment. In accordance with that spending rule, the University distributed 5.5 percent of the average unit market value for the previous two years to current operations.

The spending rule distribution for fiscal 1996 is .165 per time-weighted unit, which was comprised of .106 of income per time-weighted unit and .059 per unit distributed from accumulated capital gains.





Intermediate and long-term investments at June 30, 1996 include the following split-interest agreements:

Charitable gift annuities	\$	2,148,149
Charitable remainder trusts		4,416,008
Pooled income funds		2,620,843
Perpetual trusts		1,746,174
	\$	10,931,174

Investment Return The investment return in the Statement of Activities can be summarized as follows:

Investment return in excess of amount designated for current operations	\$ 21,173,828
Investment return designated for current operations	8,998,171
Total return on investments	30,171,999
Other realized and unrealized gains	622,380
Other investment income, unrestricted	1,063,252
Return on endowment	28,486,367
Net realized and unrealized gains	23,400,515
Investment income	\$ 5,085,852

Investment income is net of management expenses of \$825,441.

### 7. LONG-TERM DEBT

Long-term debt at June 30, 1996 amounted to \$40,590,142. Schedule I summarizes the components of long-term debt. The aggregate amounts of principal due for each of the next five fiscal years are as follows:

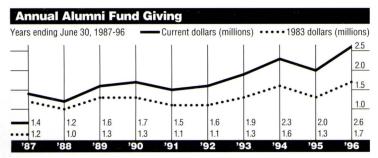
1997	\$ 1,668,502
1998	1,850,519
1999	1,903,159
2000	2,015,597
2001	5,556,286
	\$ 12,994,063

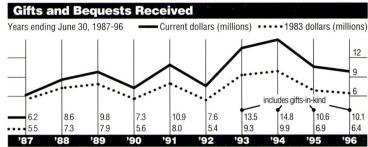
On Oct. 1, 1988, WPI deposited with Trustees sufficient funds to defease HEFA Series B Bonds that mature July 1, 2000. The amount of Series B principal outstanding at June 30, 1996 was \$3,750,000.

In compliance with the University's various bond indentures, deposits with Trustees at June 30, 1996 include investments in debt service and reserve funds of \$1,074,532.

The bond agreements contain restrictive covenants that, among other restrictions, include the maintenance of certain financial ratios.

The University has an interest rate swap agreement (the "Agreement") with an investment broker in order to reduce the cost of borrowing on certain outstanding debt. At June 30, 1996, the notional principal amount of the Agreement is \$30,000,000. The Agreement effectively changes the interest rate exposure on the Series C and E (see Note 7, Schedule I) bonds to a variable rate based on specified bond index. The initial swap transactions under the terms of the Agreement terminate in fiscal 1997. On April 12, 1994, WPI entered into a second swap agreement for Series C and E commencing in fiscal year 1994 and terminating in fiscal year 2000. In fiscal 1996 WPI recognized approximately \$440,000 of investment income from the agreements. At June 30, 1996, the University had recognized \$2.1 million of income cumulatively from the agreements, which is included in unrestricted net assets. The University is exposed to credit risk in the event of nonperformance by the counterparty. The University is also exposed to market risk with respect to the second agreement.





Note 7, Schedule 1: Summary of Bonds, Notes and Mortgages Payable June 30, 1996

	Maturity	Interest	Original	Amount Due With	Balance in June 30,
Purpose and Definition	Date	Rate %	Issue	One Year	1996
Bonds Payable:					
Housing and Urban Development:					
Series A - April 1, 1969 (1)	7/1/97	2.75	\$ 987,000	\$ 50,000	\$ 97,000
Series B - April 1, 1969 (2)	7/1/01	2.375	919,000	40,000	209,000
Series C - April 1, 1969 (3)	7/1/19	3.00	1,160,000	25,000	752,000
				115,000	1,058,000
Massachusetts Health and Education	nal				
Facilities Authority:					
Series A - July 1, 1977 (4)	7/1/03	4.7-5.3	4,150,000	180,000	1,480,000
Series C - Oct. 1, 1988 (5)	9/1/00	5.7-7.10	7,985,000	700,000	4,055,000
Series E - Dec. 1, 1991 (6)	9/1/17	6-6.75	23,745,000		23,745,000
Series J-1 - Dec. 27, 1994 (6)	1/1/05	Variable	3,995,523	303,284	3,995,523
Series J-2 - June 7, 1996 (6)	6/1/16	Variable	3,936,894	105,464	835,869
				1,288,748	34,111,392
Mortgage Payable: Ellsworth-Fuller Student					
Residence Center (7)	12/31/03	7.25	1,950,000	96,004	920,750
Unsecured Notes:					
Fleet Bank - 9/28/93	10/1/00	Libor+.135	4,500,000	168,750	4,500,000
Total bonds and mortgages payable (8)				\$ 1,668,502	\$ 40,590,142

- (1) Collateralized by land, building and equipment known as Morgan Hall (carried on the accounts at \$833,817) and pledged net revenues, from the operations of the dormitory and dining hall located therein.
- (2) Collateralized by land, building and equipment known as Daniels Hall (carried on the accounts at \$598,040) and pledged net revenues from the operations of the dormitory and bookstore located therein.
- (3) Collateralized by land, building and equipment known as Stoddard Residence Center (carried on the accounts at \$794,075) and pledged net revenues from the operations of the dormitory and health center located therein.
- (4) Pledged as collateral are \$1,628,000 of internally designated endowment funds equal to 110 percent of the principal amount of the bonds outstanding, which are held by a Trustee in the Debt Service Reserve Fund. Various academic revenues are pledged for the HEFA Series A bonds.
- (5) Various academic revenues are pledged for the HEFA Series C bonds.
- (6) The bonds are collateralized by pledged tuition receipts.
- (7) Interest is at 7.25 percent, of which 3 percent is paid by WPI and the balance is paid by the U.S. Department of Housing and Urban Development.
- (8) The total amount outstanding at June 30, 1996 approximates fair value based on estimates using current interest rates available for debt with the same remaining maturities.

### 8. PENSION PLANS

WPI contributes to a defined contribution plan (TIAA-CREF) for academic and nonacademic personnel. Contributions to TIAA-CREF are based on a percentage of payroll. The University's pension costs amounted to \$2,342,933 for the fiscal year ended in 1996.

### 9. COMMITMENTS

During fiscal year 1995, WPI entered into commitments with several limited partnerships to invest \$4,000,000. These partnerships invest in real estate and venture capital investments. As of June 30, 1996, WPI has funded \$2,065,000, and has remaining commitments under the agreements of \$1,935,000.

The University has guaranteed a \$1,287,000 mortgage debt of two fraternities. The mortgages are collateralized by real property owned by the fraternities.

WPI is obligated under noncancelable operating leases for various facilities and equipment. Assets under these lease agreements consist of office furniture, computer equipment, office space and storage facilities.

Commitments under noncancelable operating leases provide for minimum rental payments for the next five fiscal years of:

1997	\$ 401,464
1998	384,888
1999	328,443
2000	265,008
2001	265,008
	\$ 1,644,811

Rental expense was \$111,616 for the year ended June 30, 1996.

### 10. CONTINGENCIES

WPI has pending several cases that have arisen in the normal course of operations. WPI believes that the outcome of these cases will have no material adverse effect on the University's financial position.

The University's sponsored research program and indirect cost recovery are subject to the future audits by the respective sponsoring federal agency as provided for in federal sponsored research regulations.

Management believes that such audits will not have a materially adverse effect on WPI's financial position.

### WPI TRUSTEES AND OFFICERS

As of 7une 30, 1996

### **BOARD OF TRUSTEES** (Numbers in parentheses indicate trustee committee appointments)

John M. Nelson (3,5,6) Chairman Chairman, Wyman-Gordon Company

Peter H. Horstmann '55 (1,5,6,9)Vice Chairman

Director of Human Resources Chronicle Publishing Company Ronald L. Zarrella '71

(1,4,5,6)Vice Chairman Vice President and Group Executive General Motors Corporation

George T. Abdow '53 (9,10) Chairman of the Board Abdow Corporation

Paul A. Allaire '60 (4,7) Chairman and CEO Xerox Corporation

Paul W. Bayliss '60 (1,4,5,8) Independent Consultants

Robert H. Beckett '57 (2,4,5,10)

Daniel I. Coifman '67 (1,3) Manufacturer's Representative Able International Corporation

Thomas A. Corcoran (4,5,10) President and COO

Lockheed Martin Electronics Michael A. DiPierro '68 (1,3) President, Baystone Corporation

Warner S. Fletcher (4,10) Fletcher, Tilton & Whipple P.C.

Robert A. Foisie '56 (7,9) President, Matick North America Inc.

John C.S. Fray (1,3) Program Director Integrative Animal Biology National Science Foundation

John J. Gabarro '61 (1,3,8) UPS Foundation Professor of Human Resource Management Harvard Business School

Barbara Bain Gatison '74 (1.3.8)

President, SNET Wireline Communications

James N. Heald II (7,9)

Wilfrid J. Houde '59 (1,4) President, W.J. Houde & Associates

M Howard Jacobson (3,5,6,7) Senior Advisor, Bankers Trust

Charles C. Johnston '57 (2,4,5,7)Ventex Technologies

Paul J. Keating II '64 (1,6,9) President, RoofBlok Ltd.

Gordon B. Lankton (1,4) President, Nypro Inc.

Peter H. Levine (1,3) President and CEO The Medical Center of Central Massachusetts

Claude P. Mancel '71 (1,4) Vice President for Research and Development, Europe, Middle East and Africa N.V. Procter & Gamble Company

F. William Marshall Jr. (3,5,7) President and CEO SIS Bank

Myles McDonough (5,9,10) Chairman of the Board Flexcon Company Inc.

Philip R. Morgan (3,7) President and CEO Morgan Construction Company

Judith Nitsch '75 (5,9,10) President

Judith Nitsch Engineering Inc. David P. Norton '62 (1,3) President Renaissance Solutions Inc.

John F. O'Brien President and CEO Allmerica Financial

Edward A. Parrish (1,3,5) President, WPI

Windle B. Priem '59 (4,5,6,8,10)President, North America Korn/Ferry International

Leonard E. Redon '73 (1,5,9) Vice President Fastman Kodak Company President, Customer Equipment

Service Division Carol L. Reinisch (1,2,3) Chair, Department of Comparative Medicine Tufts University School of Veterinary Medicine

Stephen E. Rubin '74 (1,9) President and CEO, Intellution Inc.

John J. Shields '69 (3,5) President and CEO King's Point Holding Inc.

Gordon H. Sigman Jr. '59 Vice President, Business Development and Marketing Hamilton Standard

H. Kerner Smith (1,4) President and CEO Stone & Webster Inc.

Claude-Alain Tardy (1,3) Vice President and General Manager, Abrasives, North America and Asia Saint-Gobain Norton Company

Donald Taylor '49 (4,8,10) Sullivan Associates

### **EMERITI MEMBERS**

Walter J. Bank '46 (7)

John Lott Brown '46 President Emeritus University of South Florida

Robert Cushman Chairman of the Board, Retired Norton Company

C. Marshall Dann '35 (10) Dann, Dorfman, Herrell and Skillman

Richard A. Davis '53 (1) J&R Associates

William A. Delphos '74 (1,4) President, Delphos International

Albert M. Demont '31

William P. Densmore '45 (1,2)Retired

Irving James Donahue Jr. '44 Chairman, Donahue Industries Inc.

Raymond J. Forkey '40 (4) President, Retired Coppus Engineering Corporation

Howard G. Freeman '40 (1,3) Founder and Chairman, Retired Neles-Jamesbury Corporation

Anson C. Fyler '45 Management Consultant

Caleb D. Hammond '37 Chairman Emeritus, Hammond Inc.

William E. Hanson '32

Francis S. Harvey '37 (9) President and Treasurer Harvey & Tracy Associates Inc.

Milton P. Higgins Retired

John E. Hossack '46 (3,7)

Chandler W. Jones '26 Retired

Carl W. Lewin '39 Retired

C. John Lindegren Jr. '39 (1) President, Lindco Inc.

Arthur J. LoVetere '60 (3,7) Chairman, Reflexite Corporation

John C. Metzger Jr. '46 (4) Group Vice President, Retired E.I. du Pont de Nemours & Co. Inc.

Charles R. Michel '37 (1)

Stanley C. Olsen President, Gulf to Lakes Corporation

Hilliard W. Paige '41

Raymond J. Perreault '38 (9) President, Retired Falls Machine Screw Company Inc.

Donald E. Ross '54 Retired, MPB Corporation

Miriam B. Rutman (1,4) President, The Herald Press

George E. Saltus '53 Retired

Bell Telephone Laboratories Inc.

Dorothy M. Simon

S. Merrill Skeist '40 (4) President Spellman High Voltage **Electronics Corporation** 

Robert C. Stempel '55 (4) **Energy Conversion Devices** 

Howard C. Warren '42 Retired

Robert J. Whipple (10) Fletcher, Tilton & Whipple P.C.

Leonard H. White '41 (9) Chairman and Treasurer R.H. White Construction Company

### KEY TO THE COMMITTEES OF THE BOARD

(Assignments effective July 1, 1996)

1. Academic Planning and Student Affairs Committee

2. Audit Committee

Budget and Finance Committee

Development Committee Executive Committee

Executive Compensation Committee

Investment Committee

8. Nominating Committee

9. Physical Facilities Committee

10. Trusteeship Committee

### OFFICERS OF THE UNIVERSITY

Edward A. Parrish President

### OFFICE OF ACADEMIC AFFAIRS

John F. Carney III Provost and Vice President for Academic Affairs

William W. Durgin Associate Provost for Academic Affairs

Lance Schachterle Assistant Provost for Academic Affairs

### OFFICE OF BUSINESS AFFAIRS

Stephen J. Hebert Vice President for Administration, Treasurer, Secretary of the Corporation

Frank P. Conti

Controller and Assistant Secretary

Sylvia Cucinotta Associate Treasurer

John E. Miller Associate Vice President for Business Affairs and Director of Physical Plant

### **DIVISION OF STUDENT AFFAIRS**

Bernard H. Brown Vice President for Student Affairs

Janet Begin Richardson Assistant Vice President for Student Affairs and Dean of Student Life

### OFFICE OF UNIVERSITY RELATIONS

John L. Heyl Vice President for University Relations

### LEGAL COUNSEL

Fletcher, Tilton & Whipple P.C.

### ACADEMIC DEPARTMENT HEADS

Kenneth A. Stafford Aerospace Studies Ronald D. Cheetham Biology and Biotechnology

Robert A. Peura

Biomedical Engineering

Albert Sacco Jr. Chemical Engineering James B. Dittami

Chemistry and Biochemistry Robert W. Fitzgerald Civil and Environmental Engineering

Robert E. Kinicki Computer Science

John A. Orr Electrical and Computer Engineering David A. Lucht

Center for Firesafety Studies Lee Fontanella

Humanities and Arts

Hossein Hakim Interdisciplinary and Global Studies Division

McRea C. Banks II Management

Gordon C. Branche Mathematical Sciences

Mohammad N. Noori Mechanical Engineering Steven R. Lindberg

Military Science Raymond R. Gilbert Physical Education and Athletics

Thomas H. Keil **Physics** 

Douglas W. Woods Social Science and Policy Studies

### HE YEAR IN REVIEW

great deal of their time taking conventional math, science and engineering courses. He says he would also like to see WPI continue to evolve into a broad-based technological university with programs—such as the existing pre-health and pre-law programs-that will appeal to students who may not be interested in becoming engineers, but who want to be technically literate when they graduate. Such programs may also help WPI increase its enrollment of women.

Carney says he would like to expand the full-time graduate program above its current enrollment of about 400 students, with most

of the increase in the master's program. "Industry is interested in hiring students with master's degrees," he says. As an active scholar with more than 140 publications in the field of structural mechanics, including the design

and two as head of the Department of Civil Engineering at Auburn University in Alabama, Carney says he sees himself as a faculty member first and an administrator second. "This is the first year that I will not be teaching in the classroom," he says. "I know what faculty members go through. I know what it takes to be a good teacher, to do research, to write proposals, to serve on committees. I think it is important for us to build a system of trust where the faculty and the administration can work together. I think we can make a lot of progress, and I look forward to the challenge."

### FROM THE GROUND UP

WPI was not just a busy place this year, it was a noisy one, too, at times. Several major construction projects transformed a WPI residence hall, a street and several laboratories. The largest project was the renovation of Sanford Riley Hall, the university's first on-campus residence facility. Completed over the summer, the \$3.3 million project restored the building to its original glory and added a host of modern amenities, including new furniture in every room, new energy efficient windows, and an elevator. It was also the first step in a five-year plan to

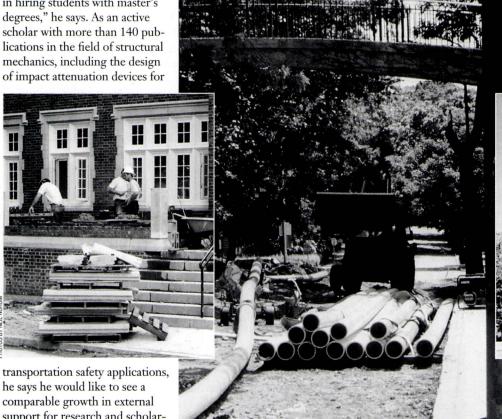
> renovate the majority of the university's residence halls. The Ellsworth-Fuller complex is slated to be overhauled next summer.

The physical and psychological gap between the east and west sides of the WPI campus



was closed this summer with the conversion of a large section of West Street into a tree-lined pedestrian mall. The centerpiece of the mall is Reunion Plaza; its fountain and stone benches are intended to create a quiet, contemplative space in the center of the now united campus. Also adding measurably to the quality of campus life

was the renovation of the Grille, a popular campus dining spot in the Wedge between Daniels and Morgan halls, and the transformation of the campus bookstore under a new owner. Tatnuck Bookseller operates the largest independent bookstore in Massachusetts (on Chandler Street in Worcester) and has provided the WPI community with an online link to its retail outlet.



support for research and scholarship. "We have a unique projectbased undergraduate program with a truly global perspective," he says. "However, a balanced graduate program can make an undergraduate program better. People with vibrant research programs are also, by and large, wonderful teachers because they are staying current in their field. And the university is a much

the opportunity to work with graduate students on cutting-edge research." Having served in academia for more than 30 years, including 15 as a faculty

member at the University of Connecticut

richer place for undergraduates if they have

The campus was bustling with construction work during the year as crews renovated Sanford Riley Hall (left), turned part of West Street into a pedestrian plaza and repaved the rest of the street (center), and built new research laboratories in Salisbury Labs, including a new greenhouse that provides a dramatic addition to the WPI skyline (right).

### THE YEAR IN REVIEW

WPI's academic and research facilities also received a major boost during the year. A new biochemistry laboratory constructed in Goddard Hall will serve the research, student project and teaching needs of this growing academic discipline within the Department of Chemistry and Biochemistry. Work continued throughout the year on six major laboratories and supporting spaces in Salisbury Laboratories to be used for

research and project work in biology and biotechnology. The \$2 million project, funded jointly by WPI and the National Science Foundation, will result in state-of-the-art laboratories for work in such areas as molecular genetics, invertebrate zoology and bioremediation. A new pyramidal greenhouse atop the building will support work in plant physiology and biotechnology.

### A NEW SATELLITE LAUNCHED

The letters WWW are readily recognized as the initials of the World Wide Web. At WPI, they've also come to stand for the university's campuses—Worcester, Westboro and Waltham. With the opening this fall of its second satellite, WPI now offers graduate courses and continuing education programs at three sites in Massachusetts.

The Waltham campus occupies space in an office building just off Route 128 near a large concentration of high-technology companies. A wide range of graduate and continuing education programs are being offered at the site, including graduate courses and certificate programs in management and computer science, specializing in computer and communications networks, software engineering and interface design, technology marketing and the management of technology. (All can be applied to a WPI graduate degree.) Also offered are professional development seminars and certificate programs in UNIX/C and C++ programming and client-server technology.

The Westboro campus, which opened in 1988, serves a high concentration of technical and management professionals in the Route 495 and Central Massachusetts areas. "Our experience in Westboro," says President Parrish, "confirmed our belief in the demand for WPI's programs in [the Waltham] region."





Left, Que Nguyen '97 and assistant professor José Arguello in the new biochemistry laboratory. Right, the members of the 1996 Strive class; short for Strive for College and Careers in Mathematics, Engineering and Science, this is a summer program for students from underrepresented minorities.





Top, from left, Director of Continuing Education Arlene Lowenstein, Director of Graduate Admissions Lisa Jernberg and WPI President Edward Parrish helped open WPI's third campus, in Waltham, Mass. Bottom, from left, Manuel Gomez, director of the University of Puerto Rico, Mayaguez, Parrish, and Stuart Ramos, UPRM chancellor, penned an agreement forging an alliance between the two institutions.

MORE HIGHLIGHTS OF THE YEAR PAST WPI and the University of Puerto Rico, Mayaguez (UPRM), home to the largest engineering school in Latin America, signed a memorandum of understanding to create a new center for student project work and academic collaboration. The center will be funded by the two universities, Xerox Corp. and the National Science Foundation. The agreement marked the culmination of two years of work by Mohammad Noori, head of WPI's Mechanical Engineering Department, Hamid Davoodi '88, associate professor of mechanical engineering at UPRM, and Mohammad Saffar '89 (Ph.D.), assistant professor of civil engineering at UPRM. It will be an avenue for student and faculty exchanges and joint research projects and graduate programs. Puerto Rico is also home to a WPI student project center.

Agreements were signed for joint programs with two law schools: Suffolk University Law School in Boston and Franklin Pierce Law Center in Concord, N.H. This endeavor gives students interested in using their engineering or science education as a stepping stone to careers in law (particularly the law of intellectual property) the opportunity to seek early admission to either law school.

WPI was accepted for membership in the National Consortium for Graduate Degrees for Minorities, furthering its goal of providing graduate training in engineering and science to a larger number of students of color. The consortium provides WPI with greater recognition within the communities of color, helps make its graduate programs financially accessible to more underrepresented minorities, and opens the door to networking with other institutions across the United States.

### THE YEAR IN PREVIEW

Norman R. Augustine, president and CEO of Lockheed Martin Corp., was the speaker at WPI's 128th Commencement. Augustine was awarded an honorary doctorate, as was Duane D. Pearsall, inventor of the first low-cost battery-powered smoke detector; Howard G. Freeman '40, inventor and founder of Jamesbury Corporation (now Neles-Jamesbury); and Albert Sacco Jr., head of WPI's Chemical Engineering Department and the university's first faculty astronaut.

The Admissions Office had a banner year, with the enrollment of the fifth largest class in WPI history. The Class of 2000 has 689 students, including 152 women and 41 students of color, new records in both of these categories.

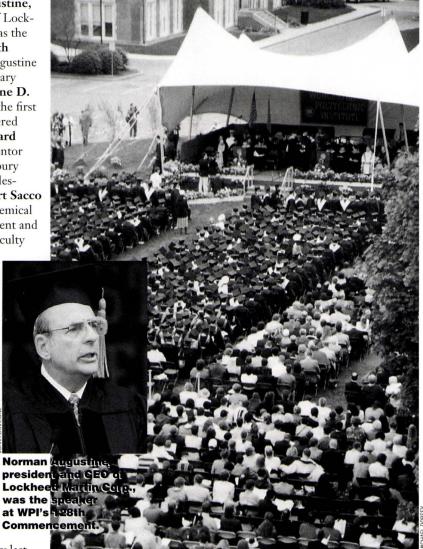
Planning for the proposed campus center continued during the year. Having developed a program for a combined campus center

and recreational facility last year, the Campus Center

Committee worked with Stannmar Inc., a design-build firm specializing in athletic facilities, to conduct a study that determined that it is feasible to locate the facility in an expanded and fully renovated Alumni Gymnasium.

WPI was one of eight members of the Colleges of Worcester Consortium to share a \$44,880 grant from the Department of Education Fund for the Improvement of Post Secondary Education (FIPSE) to be used to develop comprehensive programs for the prevention of drug use and alcohol abuse and the violence associated with them.

The offices of Multicultural Affairs and Minority Student Affairs were combined into the Office of Minority Affairs and Outreach Programs, which will focus on the recruitment and retention of minority students and coordinating diversity initiatives, among other responsibilities.



### **The Year Ahead**

ACCREDITATION GOING ACCORDING TO PLAN

This fall, a team of visitors from the Accreditation Board for Engineering and Technology, which accredits engineering programs at the nation's colleges and universities, was on campus to evaluate WPI's programs in civil, chemical, electrical, industrial, manufacturing and mechanical engineering. It is a visit ABET has made periodically for many decades.

This year's visit was a little different, however. After a quarter century that has seen ABET and WPI struggle to measure the university's project-based undergraduate program against the board's traditional accreditation criteria, ABET adopted a sweeping new set of standards that, much like the WPI Plan, emphasize outcomes (what students learn and what skills and qualities they gain) instead of process (what courses and labs they take).

Called Engineering Criteria 2000, the new standards were developed by ABET's **Engineering Accreditation** Commission (then chaired by WPI President Edward Parrish) with extensive input from various engineering societies and from the businesses and industries that employ technological professionals. The centerpiece of the new criteria, Criterion 3 (see box, next page), is a succinct list of the qualities graduates should take away from their undergraduate education. With a few changes of wording, this set of criteria could easily be a description of the goals of the WPI Plan, notes President Parrish. "The new ABET criteria, along with a number of national studies of the future of engineering education, have indirectly confirmed that the WPI Plan is what this country needs in the way of an educational system."

The new criteria underwent a one-year comment period that led to approval by the full ABET board in November. The criteria will apply to all engineering programs in the nation in the year 2001, following a five-year implementation.

A critical step in implementing the new criteria is a two-year pilot test program,

a process in which WPI is playing a critical and highly visible role. In the first year of the test, engineering programs at one private and one state-supported institution (WPI and the University of Arkansas) are being evaluated under the new standards. The University of Arkansas was chosen because it has just begun to develop an outcomeoriented approach to technological education. WPI was selected because, with more than 25 years of experience with the Plan, it has a better feel for outcome-oriented education than perhaps any institution in the nation and has much to teach ABET and its member institutions, notes William W. Durgin, associate provost for academic affairs.

"We volunteered to be accredited under the new criteria and we recognize that we have an important role to play in this process," Durgin says. "ABET has had no experience conducting this outcome-based accreditation. They are looking to WPI for

### THE YEAR IN PREVIEW

help in developing the accreditation procedure. The results of this experience will become a case study that will be used to train ABET evaluators. This study will also be distributed to every engineering department in the nation to provide guidance for other schools as they come up for accreditation under the new rules. It should also serve as an excellent vehicle for creating

### **ABET CRITERIA 2000**

### FROM CRITERION 3. PROGRAM OUTCOMES AND ASSESSMENT

Engineering programs must demonstrate that their graduates have

- an ability to apply knowledge of mathematics, science and engineering
- an ability to design and conduct experiments, as well as to analyze and interpret data
- an ability to design a system, component or process to meet desired needs
- an ability to function on multidisciplinary teams
- an ability to identify, formulate and solve engineering problems
- an understanding of professional and ethical responsibility
- · an ability to communicate effectively
- the broad education necessary to understand the impact of engineering solutions in a global/societal context
- a recognition of the need for and an ability to engage in life-long learning
- a knowledge of contemporary issues
- an ability to use the techniques, skills and modern engineering tools necessary for engineering practice

national recognition for what WPI has accomplished over the last 25 years."

The ABET accreditation team working with WPI this year is drawn from the Engineering Accreditation Commission itself, whose members normally serve as visiting team chairs. "The idea is to train the team leaders so they, in turn, can train the more that 3,000 men and women who serve on ABET visiting teams each year," Durgin says.

This year's accreditation process is also a learning experience for WPI, he says. "While we've had a great deal of experience delivering an outcome-oriented educational program, we are still gaining experience in measuring those outcomes. This year, to help ABET understand what students accomplish under the Plan, we've selected

at least six students in each department and asked them to compile a detailed portfolio illustrating the work they've done in their classes, labs and projects during their studies at WPI. The contents of their portfolios, standing alone, should demonstrate the expected outomes. We'll also be able to present the results of the peer reviews we now do for all three of the required Plan projects.

"To prepare for future accreditation visits, we are now asking all students to compile portfolios of their work at WPI, which will also benefit their career development. We hope to follow these students for the early part of their careers to measure the impact the Plan has on their professional and personal lives. We plan to create a formal system for determining what employers think of our graduates. All of these measures will help us evaluate the success of our undergraduate program and to continually improve it."

### FAST TRACK TO A STRATEGIC PLAN

"Of those to whom much is given, much is required," John F. Kennedy once said. According to President Parrish, the national educational community has given WPI an invaluable gift—the growing conviction that something very much like the WPI Plan is the right approach for the future of technological higher education. That conviction provides the university with a precious opportunity to step into the national spotlight and gain well-deserved recognition as an educational pace-setter. But there is some important work to be done first, Parrish says.

"WPI has a big opportunity right now. A number of national studies of what needs to be done in technological higher education—by the likes of the National Research Council, the American Society for Engineering Education and the National Science Foundation—have pointed in directions that WPI took some 25 years ago. That's good news for us, but we can't simply sit on our record. We have to keep evaluating and improving what we're doing. That requires strategic planning."

This year WPI began work on a new strategic plan. WPI's current plan was completed in 1990, and Parrish says much has changed since its six major goals were formulated. Perhaps most important, WPI continues to face financial constraints, caused principally by a combination of the high cost of operating a technological education program and the escalating cost of providing financial aid to students. These costs combine to continually shrink the pool of operating revenue WPI derives from

tuition. "We need to stop doing things as we have for the last 25 years or so," Parrish says, "and come up with some new ways of doing business."

The process of drafting a new strategic plan began over the summer as Parrish and his cabinet (a group of senior administrators), soon joined by the secretary of the faculty and the chair of the faculty Committee on Governance, developed a process for creating the plan and drafted a vision statement for the university. At a retreat this fall, the Board of Trustees also discussed the state of the institution and possible directions for its future. And in October, 60 members of the faculty and administration met in a weekend retreat to discuss ways of bolstering two key elements of the undergraduate program, the Interactive Qualifying Project and the Global Perspective Program, widely considered the elements that give WPI a distinct edge in undergraduate technological education.

"We've had people coming at these issues from many different directions and with different ideas," Parrish says. "What's become clear to me from all of these discussions is that everyone—the faculty, the administration, the students and the trustees—seems to have a shared vision of WPI. There is a consensus about our strengths, our traditions, and our opportunities for the future. That's really important, because it gives us a head start—we don't have to start from scratch. I've proposed an ambitious timeline for creating a new strategic plan. But as I've watched this common vision emerge, I've thought to myself, 'By God, we can do this!"

The responsibility for guiding the creation of the plan has been turned over to the Strategic Planning Steering Committee, made up of the provost, two academic department heads, six other faculty members, three other members of the administration, one undergraduate student and one graduate student. Stephen J. Weininger, professor of chemistry and biochemistry, is the chair. Parrish says the committee will involve many members of the WPI community on study committees that will investigate a wide variety of issues as the planning process moves toward completion in March 1997.

"Before the end of the academic year, we need to settle on our goals and objectives for the next decade," Parrish says. "These will become the basis for the goals of the new capital campaign (see page 18). We can't take too long to complete this process. If we wait two years to complete our strategic plan, this window of opportunity—this planetary alignment—may pass us by. The time to act is now."

### FINANCIAL SUMMARY AND HIGHLIGHTS

By Stephen J. Hebert '66

Vice President for Administration, Treasurer and Secretary of the Corporation

here are two major elements of WPI's financial operation. One is the day-to-day activity of the university; WPI finished the year with a surplus of approximately \$14,000. The other major component is what is commonly referred to as WPI's endowment. During the fiscal year the market value of assets managed under the umbrella of the endowment grew by \$25 million, to \$177 million.

Considerable appreciation must be extended to the faculty and staff for their management of the university during the year. A solid budget was developed, reflecting a thorough attempt at including all expected revenue and expense, and the faculty and staff managed those resources well, conserved when and where possible, and brought the budget in on balance. In an organization as diverse as WPI, this does not happen unless everyone is focused on achieving financial success.

The university's endowment is managed by the Board of Trustees with specific responsibility delegated to the Investment Committee, chaired by F. William Marshall Jr. The trustees engage a variety of money managers to manage the assets. WPI's total return of 18.5 percent in FY96 placed us well ahead of the national average for college and university endowments (17.2 percent). The Investment Committee's objective for allocating the endowment's assets was that 70 percent would be invested in equities; at year end, about 71.5 percent of the assets was invested in domestic and international equities.

During the year we executed an interest rate swap that will produce significant interest savings on our debt of approximately \$40 million over the next 2.5 years. The swap was made possible by the favorable interest rate scenario that emerged during the year.

One measure of the strength of an institution is its calculated endowment per undergraduate. At approximately \$63,000, WPI compares favorably in this regard and is likely to be in the top 100 of the 3,600 U.S. colleges and universities at year's end.

Each year the university approves a spending rule that applies a percentage of the assets of the endowment to the operating budget. For many years, the spending rule has been 5.5 percent, about average for colleges and universities throughout the country. The amount available is based upon a moving average of the total market value of the endowment at the conclusion of the previous two fiscal years. While it would be good to reduce this rate as we go forward, the operating budget is partly dependent on this income, making such a move difficult. Still, the endowment is the flywheel that keeps the university moving forward; the growth in the value of the endowment is positive for the future of WPI.

For the last fiscal year approximately 30 percent of tuition income was returned in the form of financial aid, which was budgeted at \$12.5 million. This continues to be a source of concern and little comfort is taken from the fact that most of our peer institutions are experiencing the same pressures as they recruit students who have a higher need for financial aid than do students at typical liberal arts-oriented colleges and universities. While WPI is fortunate to be able to balance the budget despite financial pressures, considerable effort must be exerted to find ways to alleviate these pressures so that investments may be made in new programs and facilities.

YEARS ENDED JUNE 30, 1996 AND 1995

General Operating Funds (Thousands of Dollars)	1996	1995	Percent Change
Tuition, fees and other			
educational revenues	\$53,338	\$51,502	+3.6%
Student financial aid	18,725	18,636	+0.5
Gifts and bequests received	10,131	10,574	-4.2
Revenues from sponsored research programs	6,329	7,871	-19.6
Total staff benefit expenses, before allocation	7,067	7,276	-2.9
Endowment and Similar Funds (Thousands of Dollars)	1996	1995	Percent Change
Beginning market values	\$154,734*	\$127,600	+21.3%
plus: Investment results			
Income (interest and dividends)	\$5,086	\$4,743	
Realized and unrealized gains	20,716	15,522	
Total investment results	\$25,802	\$20,265	+27.3
less:			
Used in support of college	(5,739)	(4,545)	+26.3
Net reinvested in endowment	20,063	15,720	+27.6
plus:			
Additions to endowments, mostly from gifts	2,609	9,087	-71.3

\*Computed using new financial accounting standards adopted by WPI in FY96.

Five-Year Summary of

Total Return Data	'96	'95	'94	'93	'92
WPI Total Return	18.5%	16.9%	4.0%	11.9%	12.4%
WPI Policy Index	16.6	18.5	3.2	13.5	13.5
S&P 500	26.1	26.1	1.4	13.6	13.5
LB G/C Bond Index	4.7	12.8	-1.5	13.2	14.2
CPI Index	2.8	3.1	2.5	3.0	2.8

Copies of the complete audited financial reports for WPI for Fiscal Year 1996 can be obtained by writing to:

WPI Office of Business Affairs 100 Institute Road Worcester, MA 01609-2280

## A Strong Team Moves Forward: The Year in University Relations

By John L. Heyl Vice President for University Relations

could not begin this report without extending a special thanks to Ron Baird, who filled in as acting vice president for university relations for a good part of the past academic year. While continuing to also perform his duties as director of corporate relations, Ron moved the entire office forward on all fronts. It was with a great deal of regret, but also with the recognition that no one was more deserving, that we in University Relations said farewell to Ron this past May as he moved to Washington, D.C., to become director of the Sea Grant Program at the National Oceanic and Atmospheric Administration.

Many of the efforts of the Office of University Relations during the past 12 months have been directed at strengthening the office's infrastructure. Moving the Alumni Office under the umbrella of University Relations has permitted us to better allocate resources and to increase our services to alumni and other constituencies. As part of this move, we created a new team of Annual Fund personnel that, for the first time, enables us to bring together into one cohesive unit the Alumni Fund, the Parents Fund and two new funds: the Friends Fund and the Business and Industry Fund.

In response to a request from the Alumni Association and the Alumni Fund Board, and recognizing the importance of the work of both of these groups, the university underscored its commitment to these areas by adding personnel. This has permitted the Alumni Affairs Office to reinvigorate its activities for students through the Student Alumni Society and to develop such new programs as the Alumni Gateway on WPI's World Wide Web site. The Gateway offers an online alumni directory, access to job listings, and class home pages. Likewise, the Alumni Fund has strengthened its commitment to young alumni through a more active "GOLD" (graduates of the last

decade) program and has actively begun to re-establish the Class Agents Program.

The efforts of the Alumni Fund this past year yielded record results. According to Anne M. McPartland Dodd '75, chair of the Alumni Fund Board, the fund "crushed" its 1995-96 goal of \$2.25 million, raising \$2,630,230, plus \$314,489 in matching gifts (the total exceeded the record of \$2.25 million set in 1994). Incidentally, the Fund

The efforts of the Alumni Fund this past year yielded record results. According to Anne M. McPartland Dodd '75, chair of the Alumni Fund Board, the fund "crushed" its 1995-96 goal.

Board has set an ambitious target of \$3.2 million for the current fund year; the board also hopes to see the participation rate for the fund rise from 25 percent in 1995-96 to 30 percent in 1996-97.

The extraordinary gifts of two anniversary classes were important contributors to the fund's success. At Reunion in 1996, President Edward Parrish, on behalf of the university, accepted two gifts, each in excess of \$1 million. The Class of 1946 raised an amazing \$1,430,000, a total that represented the participation of 58 percent of the class. The unrestricted portion will go toward the planned campus center. The class of 1956 raised \$753,304; an anonymous class member pledged to match the total, bringing the final tally to \$1,546,162. Nearly half of the unrestricted portion will go toward the West Street pedestrian plaza; the balance will fund a new multimedia computer laboratory. (Anniversary class gifts are raised

over a three-year period, so only a portion of the gifts was actually counted in this year's fund total. Both class gifts included interest and corporate matching gifts.)

The President's Advisory Council also had a banner year. The 270 members of the PAC—a group of alumni, parents and friends who make yearly gifts of \$1,500—contributed over \$2 million, or some 78 percent of the Alumni Fund total. Both of these

figures represent new records. During the current year, WPI is observing the 25th anniversary of the founding of this most generous group.

A major new initiative of our office is to increase the university's visibility and recognition. We have developed a marketing strategy through which we will focus our energies on a limited number of specific target markets. In a parallel effort, we will work to place WPI before audiences when and where our message will not be drowned out by the marketing programs of other

competing institutions. We are fortunate to have received both guidance and financial support from a number of trustees; with that support, we have hired PepperCom, a public relations firm, to work with us in this undertaking, which we hope will help WPI achieve a level of recognition equal to its superb quality.

Preparations are also under way for a new capital campaign. While still in the early planning stages, it is already clear that this fund drive will be a volunteer effort of significant proportions. Seeking funds for goals that are linked directly to needs developed through a communitywide strategic planning effort (see page 16), the campaign will reach out to all alumni and friends of WPI. Trustees and other especially close friends will begin to solicit each other in the spring. Simultaneously, we will begin to organize class committees for an official major campaign launch, planned for the spring of 1998.

### Volunteers Make the Difference

s hard as we work, the staff of the Office of University Relations cannot do the entire job of advancing the mission of WPI, raising resources to assure its continued growth and development, and serving the needs of our alumni. We depend on the energy, skills, knowledge and enthusiasm of a remarkable team of volunteers, including the men and women who serve on the Board of Trustees, the Executive Committee of the Alumni Association, the Alumni Council, the many Alumni Association working committees, and the Alumni Fund Board. Listed below are just a few of the leaders of the university's many volunteer boards and committees:

Anne M. McPartland Dodd '75 Chair, Alumni Fund Board

Patricia A. Graham Flaherty '75 Chair, Alumni Survey Committee

Peter H. Horstmann '55 Vice Chair, WPI Board of Trustees

August C. Kellerman '46 Chair, Class of 1946 50th Anniversary Gift Committee

Allen H. Levesque '59 President, WPI Alumni Association

Robert B. Maynard Jr. '63 Chair, WPI Alumni Association Master Plan Committee

Peter D. McDermott '73 Alumni Liaison, WPI Venture Forum

Samuel W. Mencow '37 Chair, Alumni Publications Committee

Patrick T. Moran '65 Chair, Class Boards of Directors

John M. Nelson Chair, WPI Board of Trustees

Henry W. Nowick '57 Chair, President's Advisory Council

Roger N. Perry Jr. '45 President, Tech Old Timers

Harry W. Tenney Jr. '56 Chair, Class of 1956 40th Anniversary Gift Committee

Harlan B. Williams '50 Chair, Alumni Online Service

Ronald L. Zarrella '71 Vice Chair, WPI Board of Trustees

### 1995-96 WPI HONOR ROLL OF DONORS

WPI gratefully acknowledges the support of the thousands of individuals, foundations and corporations whose contributions of \$9,953,504 in cash and gifts-in-kind through the Alumni Fund, the Parents Fund, minicampaigns and general development efforts during the 1995-96 fiscal year (July 1, 1995, to June 30, 1996) are already at work making WPI a stronger and more outstanding institution. Space does not permit the listing of all their names. An additional \$1,976,746 was pledged during the fiscal year. These commitments will be listed in future reports as they are received as cash or gifts-in-kind.

### \$100,000 and above

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p parent(s) of WPI undergraduate students/alumni

gp parent(s) of WPI graduate students/alumni

deceased

### 1995-96 WPI HONOR ROLL OF DONORS

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