Implementing the Strategic Plan:
A Progress Report to the WPI Board of Trustees and to the WPI Community

Edward Alton Parrish, President
January 31, 2003
# Table of Contents

1. Introduction .................................................................................................................. 1  
2. Realizing the Strategic Goals ........................................................................................ 4  
   2.1. Goal 1: Enhance the Quality of WPI’s Academic Programs .............................. 4  
   2.2. Goal 2: Develop WPI’s Position as a National University .............................. 12  
   2.3. Goal 3: Establish WPI as a Leader in Global Technological Education ...... 32  
   2.4. Goal 4: Improve WPI’s Campus Culture and Community Presence .......... 35  
   2.5. Goal 5: Expand WPI’s Educational Resources ............................................. 45  
3. Conclusions ................................................................................................................. 57  

Appendix Performance of Academic Departments ............................................................ 59  
  1. Introduction .............................................................................................................. 60  
  2. Biology and Biotechnology Department .................................................................. 64  
  3. Biomedical Engineering ......................................................................................... 66  
  4. Chemistry and Biochemistry .................................................................................. 69  
  5. Civil and Environmental Engineering ..................................................................... 74  
  6. Chemical Engineering ........................................................................................... 81  
  7. Computer Science ................................................................................................... 89  
  8. Electrical and Computer Engineering .................................................................... 95  
  9. Fire Protection Engineering .................................................................................... 100  
 10. Interdisciplinary and Global Studies ....................................................................... 103  
 11. Mathematical Sciences ......................................................................................... 117  
 12. Mechanical Engineering ......................................................................................... 121  
 13. Management .......................................................................................................... 128  
 14. Physics .................................................................................................................... 134  
 15. Social Science and Policy Studies ......................................................................... 137
1. Introduction

The current WPI Strategic Plan for the period from 2000 to 2010 was the result of much community effort and has served to guide actions and investments over the past three years. This report provides a comprehensive summary of our progress, highlighting major accomplishments as well as significant shortcomings.

As anticipated, some adjustments have occurred due to changes in the internal and external environments, and this will continue to be the case. Nevertheless, it is instructive to chart the path taken in our attempts to reach the strategic goals.

To provide context for those new to WPI, it is appropriate to review the historical development of the plan. A two-and-a-half year effort began with the formation of the Strategic Plan Steering Committee (SPSC) in the fall of 1996, chaired by Prof. Stephen J. Weininger. The SPSC involved a large number of faculty, students, and staff in thirteen task forces, established to investigate important areas and to make recommendations back to the committee. The task force areas and chairs are listed in Table 1.

Table 1. Task forces formed by the SPSC.

<table>
<thead>
<tr>
<th>Area of Concern</th>
<th>Chair</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admissions</td>
<td>Robert Voss, Staff</td>
</tr>
<tr>
<td>Educational Technologies</td>
<td>Pennie Turgeon, Staff</td>
</tr>
<tr>
<td>Financial Resources and Incentives</td>
<td>James Hanlan, Faculty</td>
</tr>
<tr>
<td>Global Opportunities</td>
<td>Richard Vaz, Faculty</td>
</tr>
<tr>
<td>Graduate Programs</td>
<td>William Durgin, Faculty</td>
</tr>
<tr>
<td>Information Infrastructure</td>
<td>David Finkel, Faculty</td>
</tr>
<tr>
<td>Learning Environment and Campus Culture</td>
<td>Jonathan Barnett, Faculty</td>
</tr>
<tr>
<td>New Programs</td>
<td>Helen Vassallo, Faculty</td>
</tr>
<tr>
<td>Outcome Assessment and Feedback</td>
<td>William Farr, Faculty</td>
</tr>
<tr>
<td>Pre-College Outreach</td>
<td>Denise Nicoletti, Faculty</td>
</tr>
<tr>
<td>Project-Based Education and Cooperative Learning</td>
<td>Nicholas Kildahl, Faculty</td>
</tr>
<tr>
<td>Support Services</td>
<td>Louis Curran, Faculty</td>
</tr>
</tbody>
</table>

After a year of work, the SPSC made a presentation to the faculty on April 28, 1997 and submitted its final report, entitled Realizing Our Ambitions, on April 30, 1997, which had been endorsed by the faculty, staff, and students. Both documents may be found at www.wpi.edu/Stratplan/.

The following fall, the Planning and Implementation Committee (PIC) was established under the leadership of Prof. David Cyganski. Its charge was to continue the work of the SPSC and to develop explicit actions to realize the
vision, guiding principles, and goals set forth in the SPSC's final report. PIC reviewed the 165 recommendations of the SPSC task forces and, after incorporating substantial additional input and revision from subcommittees and the community at large (which included ranking the various parts), recommended 21 initiatives grouped under five strategic goals. The final report was amended and then approved overwhelmingly at a faculty meeting on December 3, 1998. Entitled, *Proposed Strategic Plan Implementation*, the full report also may be found at www.wpi.edu/Stratplan/.

Over the next two months, I wrote a draft of the Strategic Plan for presentation to the Board of Trustees at its Retreat over February 19-21, 1999. After considerable discussion, the Board unanimously approved the plan in concept, with the expectation that a final plan would be provided at the next meeting.

In the intervening months, I continued to edit the document and to obtain input from the Cabinet and others. I submitted the final version, entitled *New Ideas, New Vision, New Resources: An Ambitious Plan to Raise the University to New Levels of Quality and Prestige* (also available at www.wpi.edu/Stratplan/), to the Board at its meeting on May 21, 1999 at which it was unanimously adopted. It was subsequently published in September of 1999.

As a reminder, the following vision statement, mission, and core values were explicit in the Strategic Plan:

**Our Vision**

*By 2010, WPI will be a world leader among technological universities focused on engineering, science, and management. Offering integrated theory and practice through a project-based curriculum and global opportunities at all levels of study, WPI will continue to build an environment that promotes innovative thinking, values mutual respect and diversity, highly regards scholarship and teaching, promotes ethical behavior, and engenders lifelong learning for the campus community.*

**Our Mission**

*WPI educates talented men and women in engineering, science, management, and humanities in preparation for careers of professional practice, civic contribution, and leadership, facilitated by lifelong learning. This educational process is true to the founders’ directive to create, to discover, and to convey knowledge at the frontiers of academic inquiry for the betterment of society. Knowledge is created and discovered in the scholarly activities of faculty and students ranging across educational methodology, professional practice, and basic research. Knowledge is conveyed through scholarly publication and instruction.*
Our Core Values and Guiding Principles

Associated with the vision and mission statements of WPI are the community’s core values:

- Academic excellence and world-class quality.
- Tradition, loyalty, and community.
- Integrity, honesty, trust, courtesy, and respect.
- Tolerance, diversity, and pluralism.

From these values, we have adopted the following guiding principles:

- The creation, integration and transmission of technical and scientific knowledge will remain central to our mission, which also requires us to pursue their social, cultural, ethical, managerial, and economic ramifications beyond the boundaries of engineering, science, and technology.
- Project-based and cooperative learning will be central to the curriculum.
- Global awareness will be woven throughout the curriculum and an off-campus experience will be available to potentially every student.
- The learning environment will be assessed continually to ensure a climate that values diversity, emphasizes community, and encourages a difference of ideas and values.
- The community will reassess continually its goals and vision, evaluate its progress, and be cognizant of its relationships and responsibilities to the world beyond the campus.

As a way of tracking our progress in realizing the plan, I developed a Web site (www.wpi.edu/Stratplan/Progress/) that consisted of a spreadsheet listing every action with a link to its status. These data are updated at least annually, most recently on October 31, 2002. It is fair to state that many of the actions have been accomplished, but much remains to be done.

The body of this review is organized around the strategic goals and objectives and presents a comprehensive status report of general progress. For context, each section includes paragraphs from the plan (set out in grey background) that elaborates each goal and its associated objectives. Considerably more detail is available in departmental reports that present progress in terms of the metrics specified in Tables 2.4 through 2.8 of the Strategic Plan. These reports are included in the appendix to this document.
2. Realizing the Strategic Goals

2.1. Goal 1: Enhance the Quality of WPI’s Academic Programs

<table>
<thead>
<tr>
<th>Relationship to Vision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achieving the vision will be possible only if the academic programs truly provide a high quality, value-added education. We must build upon the existing foundation, which includes our project-based, outcomes-oriented curriculum that demands individual and cooperative work in courses, laboratories, and projects and in which students develop leadership potential and “learn how to learn”; intense student-faculty interactions inside and especially outside the traditional classroom extending around the globe; and a culture and flexibility that allow interdisciplinary activities, teamwork, and integration of education and research at undergraduate and graduate levels to a much greater extent than our peers. In addition, we must ensure that our teaching laboratories remain up-to-date in terms of facilities, equipment, and instrumentation.</td>
</tr>
</tbody>
</table>

Objective 1.1 Fully develop the WPI Plan for all students around an “honors college” metaphor at all levels.

An “honors college” implies a small community supportive of tutorial interactions between students and faculty within the context of high-quality programs. WPI can offer this and more, because of an intellectual environment that benefits from our national university status. Of particular relevance are academic and extracurricular experiences for students that foster leadership and entrepreneurship as well as instill a business perspective. Increasingly, the combination of a technical undergraduate degree and a graduate degree in business is beneficial for a successful career in private industry. With our MBA’s focus on the management of technology, WPI is in an enviable position to provide students especially relevant experiences. We also intend to improve opportunities for synthesis in the Sufficiency, for recognizing social accountability in the IQP, and for developing professional maturity in the MQP and in graduate studies. Prerequisites for realizing the objective include increasing the number of full-time faculty while the number of undergraduate students remains relatively constant, raising the quality and diversity of the student body, providing a mechanism for aiding educational development, and having a systematic way of assessing quality improvements.

Action Plans and Status:

- Increase the number of full-time faculty members to at least 220 over the next ten years.

Status: Although we are only three years into implementing the Strategic Plan, we have made much progress in enlarging the size of the tenured and tenure-track faculty. The following table highlights the growth since the fall of 1998,
the year before the Board’s adoption of the plan (excludes those on terminal appointments).

<table>
<thead>
<tr>
<th>Year</th>
<th>Tenured</th>
<th>Tenure-Track</th>
<th>Administrative Faculty</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY99</td>
<td>153</td>
<td>49</td>
<td>4</td>
<td>206</td>
</tr>
<tr>
<td>FY00</td>
<td>154</td>
<td>53</td>
<td>4</td>
<td>211</td>
</tr>
<tr>
<td>FY01</td>
<td>156</td>
<td>58</td>
<td>4</td>
<td>218</td>
</tr>
<tr>
<td>FY02</td>
<td>159</td>
<td>50</td>
<td>4</td>
<td>213</td>
</tr>
<tr>
<td>FY03</td>
<td>157</td>
<td>58</td>
<td>4</td>
<td>219</td>
</tr>
</tbody>
</table>

- Maintain undergraduate program ranking in the top tier of national universities in the popular polls through outcomes assessment and continuous quality improvement.

  **Status:** For the past several years, WPI has been ranked near the top of the second tier in the annual rankings by *US News & World Report*. Consistently, the factor that prevents the University from returning to the top 50 national institutions is academic reputation. Raising name recognition is one of the principal aims of the marketing effort. The magazine has also consistently rated WPI among the top 25 best values in terms of the quality of the education offered for the price, and in the top 50 best engineering programs.

- Establish the Center for Educational Development, Technology, and Assessment beginning in fiscal year 2001.

  **Status:** The Center was established in July 2000 in the Academic Affairs Division. A faculty member, Prof. Judy Miller, was appointed Director, with a half-time appointment. Efforts were further supported in FY02 with the filling of a half-time secretarial position. In FY03, CEDTA is fully operational and involves assistance with instructional technology issues from the Information Technology Division. This action plan is deemed completed.

- Enhance the value of the IQP and establish it as a major capstone experience.

  **Status:** Recognizing the role of the IQP as an interdisciplinary capstone experience, the annual summer reading and quality review of all IQPs now included an assessment of aspects specifically related to such ABET criteria as understanding of professional and ethical responsibility and appreciation of global and contemporary issues. Results of the reviews led to recommendations to COAP and CTAF in support of promotion and/or tenure as well as to the Provost regarding merit raises. In addition, new project sites have been added to provide more opportunities for students and faculty.
• Fund a planning effort to bring the first-year experience into harmony with the WPI Plan in both its academic and social aspects.

Status: Thanks to the funding from the Davis Foundation, WPI has been experimenting for several years with three initiatives to improve the first year experience: The Insight Program, The Tutorial Option, and Course Bridging (between calculus and physics).

The Insight Program, an extended new student orientation, has introduced new academic and social initiatives designed to improve and enhance the educational and cultural experience of our new students. The program was tested with small groups for two years and was expanded to all first year students in the fall of 2001. This program is a college transition program and more. It offers students the opportunity to develop close relationships with fellow students, upperclassmen, and faculty through shared learning and social experiences. All members of entering classes join an Insight team who live in the same residence hall (or are all commuting students), share the same upper-class orientation leader/peer advisor and resident advisor, and have the same faculty academic advisor for the first semester. The Insight program offers an integrated approach to the living-learning community at WPI.

The Tutorial Option blends the teaching of Physics, Math, and Humanities together in a unified learning experience constructed around group projects and intensively utilizing educational technology. The Tutorial is a new way to master fundamental knowledge and at the same time begin intensively the group project approach distinctive to WPI's degree requirements. The Tutorial interactively explores the relationships among physics, math, and humanities while experimenting with alternative learning methods and processes that are entirely outcomes-based. For FY03, the Tutorial Program was renamed Project-Based Learning Community and expanded to two sections. Renovated, dedicated space in Daniels Hall was provided to enhance the experience and environment.

Course Bridging uses the block scheduling method to put students who are taking physics and math in the same math course. Bridging offers the opportunity for students to apply the material being taught in calculus to the material being taught in physics. By timing the introduction of the calculus material to the physics syllabus, the students are able to see the connections between and across disciplines. The Bridged courses include Calculus I and II and Physics I and II, and another set of Bridged courses involves Calculus III and IV and the more advanced Physics 1 and II courses.

In fall 2002, Provost Carney convened a First Year Task Force to focus on some areas of the first-year experience where first-year students in surveys were not reporting activities expected of honors college level work. The task force of faculty, staff, and students is working in 2002-03 to benchmark the WPI first-year curriculum and out-of-class activities against those at
comparable institutions. The task force expects by the end of this academic year to propose changes to the faculty intended to provide greater opportunities for students to experience more "honors college level" learning activities in the first year at WPI.

- Leverage WPI's experience with its network of domestic and global project centers to create a test bed for practice-oriented graduate engineering and management programs.

  **Status:** Plans have been formulated, but funding limitations have prevented implementation. Nevertheless, progress has been made in terms of offering practice-oriented programs leading to a master's degree, for example, in financial mathematics and in industrial mathematics, which is funded by the Sloan Foundation.

- Conduct a thorough review of the Sufficiency experience and report recommendations for improvements no later than the end of academic year 1999-2000.

  **Status:** Review and discussion of the Sufficiency program since 1998-99 has led to consensus about guidelines and expectations for very different kinds of experiences, such as research, performance, and foreign language. The action plan is thus completed.

- Increase the awareness among undergraduates, especially engineering, of the need for acquiring a business perspective.

  **Status:** All entrepreneurship programs were placed in the Management Department under the leadership of Prof. Mac Banks. In addition, the Venture Forum was brought into the Entrepreneurs Collaborative and various board members are being visited to solidify support. Departments and student groups are being contacted to promote entrepreneurship as part of developing and protecting intellectual property through projects.

  A comprehensive revision of the entrepreneurship minor, including the addition of three new innovative entrepreneurship courses (Identifying and Evaluating New Venture Opportunities, Planning and Launching New Ventures, and Growing and Managing New Ventures), was undertaken. It was approved by the Faculty and was implemented in fall 2000. Enrollments in those courses have grown each term, suggesting that students are becoming more attuned to entrepreneurship.

  A brief proposal was prepared on potential initiatives that alumni and friends may fund through gifts. Additionally, a larger proposal to establish a virtual incubator was submitted. In August 2000 the virtual incubator was approved, as was a $50,000 business plan competition for WPI students. The virtual incubator was launched in fall 2001 and the business plan competition was
launched in spring 2001. (Because of last minute turnover in the visiting faculty member position, we were unable to continue the Virtual Incubator. However, the new visiting faculty member, Julian Sulej, was affiliated with the top student incubator in the United Kingdom (at Aberdeen Business School), which is also a virtual incubator. His expertise should be invaluable going forward.)

A student organization, Collegiate Entrepreneurs Organization (C-E-O), open to students in all majors, was launched in 2000-2001. Approximately 50 separate students were involved in the organization, which sponsored informative speakers and business tours. One C-E-O member, James Bigelow, was a finalist in the international business idea contest. He finished fourth overall.

The John and Jean Hughes Foundation funded a proposal by the CEI to launch a Dinner with Entrepreneurs series for WPI students. The five monthly dinners will mix entrepreneurs with students from different majors, administrators, and high school students so all can learn more about entrepreneurship.

Finally, The Department of Management has launched minors in Entrepreneurship, Management, Management Information Systems, and Organizational Leadership, all targeted toward engineering and science majors. The department is reaching out to the engineering and science departments to work with them to identify appropriate course bundles from their respective majors that can be used by Management Engineering (MGE) majors desiring competence in one of those majors. This should result in a stronger MGE major and introduce the business perspective in engineering and science courses through cross-fertilization of ideas and perspectives.

**Objective 1.2 Develop aligned incentives for faculty and staff to promote action plans.**

*If WPI is to realize its vision and provide the kinds of high quality educational and research programs required for the next century, its faculty and staff must concentrate their collective efforts in ways supportive of this purpose. The most important qualities WPI can inculcate in its undergraduate and graduate students are the abilities to think critically, to evaluate the impact of their work on society, to develop sustainable lifelong learning skills, and to adapt and grow. Developing in our students leadership skills, an appreciation of the value of diversity, and an acceptance of responsibility as an educated citizenry requires that the faculty and staff serve as role models in addition to developing and sustaining appropriate broad-based programs. Thus, WPI must have suitable high quality faculty and staff, and encourage and reward activities that are supportive of these intentions. In addition, compensation must remain competitive.*
**Action Plans and Status:**

- **Raise faculty salaries from the 40th to above the 50th percentile of the AITU peer institutions by fiscal year 2005.** Our specific objective is to close the salary gap between WPI and our two principal peers, RPI and CMU.

  **Status:** A multiyear plan for achieving the 50th percentile has been developed. Of the tenured/tenure-track faculty continuing for FY02, 95 or 46.34 percent earned salaries at or above the CUPA midpoint; 15 or 7.3 percent were at or above the CUPA 75th percentile. Of the tenured/tenure-track faculty continuing for FY03, 83 or 50.76 percent earn salaries at or above the CUPA midpoint; 15 or 7.61 percent are at or above the CUPA 75th percentile. Despite the equity increases provided for FY03, WPI gained little ground.

- **Place priority on recruiting outstanding scholars to our faculty who can collaborate across disciplines within the University and outside in a global environment, with particular emphasis on raising the percentage of minorities from 11 percent to 15 percent and of women from 13 percent to 25 percent by academic year 2010-11.**

  **Status:** Considerable effort has gone into recruiting minorities and females to the faculty. Data for the period from FY99 through FY03 are given in the table below. As of the time of writing this report, the percentages stand at 12.1 percent for minorities and 15.8 percent for women, indicating slow progress.

<table>
<thead>
<tr>
<th>Year</th>
<th>New Hires</th>
<th>Women</th>
<th>Minorities</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY99</td>
<td>14</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>FY00</td>
<td>14</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>FY01</td>
<td>14</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>FY02</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>FY03</td>
<td>18</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

- **Provide competitive compensation to our staff.**

  **Status:** A three-year equity plan was established to raise staff salaries to benchmark targets. In support of this, additional equity funds were obtained in FY99 and FY00 from the strategic escrow account and distributed where needed. Beginning in FY01, such requirements were met in our normal operating budget process.

  We learned in the course of addressing staff compensation that CUPA benchmarks used for most exempt staff are of very limited use for IT and library staff. Consequently, the IT division purchases other IT benchmark studies (e.g., Watson Wyatt) for use in staff compensation.
• Through appropriate Faculty Governance, review promotion and tenure criteria for consistency with our vision.

**Status:** Promotion and tenure at WPI requires excellence in both teaching and scholarship. Documentation for excellence in scholarship is quite rigorous. Discussion is ongoing among the faculty with respect to developing similar objective measures for substantiating the claim of excellence in teaching. Is our faculty rewards/evaluation system in sync with our mission and strategic goals? What is the definition of scholarship? The faculty continues to debate these issues.

A pilot test of a more comprehensive, benchmarked course and teaching evaluation system was conducted in fall 2002. The results of that test are being evaluated to determine if WPI should fully implement that system.

• Expand recognition programs for faculty and staff for outstanding performance.

**Status:** Several new awards have been established. The Romeo Moruzzi Young Faculty Award was established, and the Board approved a new Trustees Academic Advising Award. It was awarded for the first time in April 2000. In addition, during fall 2002, a new award for community service in honor of Prof. Denise Nicoletti is being planned. All faculty and staff will be eligible. In addition, Sigma Xi, the scientific research society, has added a faculty research award to the MS and Ph.D. awards.

• Support professional development for our staff.

**Status:** Workshops are conducted to improve management skills of supervisors. In addition, staff members are encouraged to take continuing and professional education seminars and certificate programs, including IT training courses. We also continue to support the enrollment of one female administrative staff member annual in the HERS program at Wellesley College.

A new Teaching Technology Fellowship Program, a two year, professional development and recognition program jointly sponsored between the Academic Affairs Division and the IT Division, was started in FY 02 with 8 recipients; 5 more recipients were added to the program in FY03.

The IT Division is working with HR to create a staff development program that promotes information literacy and technical competency and rewards staff for achieving certain competency levels and for training others within their workgroups (a Departmental Key User Program).
Objective 1.3 Provide increasing opportunities for student involvement in research.

Traditionally, undergraduate students experience primarily knowledge transfer and, to a lesser extent, knowledge application. Graduate students generally also are involved in knowledge generation through their research programs. This objective will allow qualified undergraduates to participate on teams with graduate students and experience the excitement of creating new knowledge. From this experience, these undergraduates may be encouraged to pursue graduate work at WPI or another institution. In addition, such funding opportunities will help WPI attract high quality graduate students. (This objective also supports Goal 2.)

Action Plans and Status:

- Offer summer stipends to qualified undergraduates.

  **Status:** Funding was provided beginning in the summer of 1999 and has continued. To date, thirty undergraduates have participated in research activities.

- Increase the number of research fellowships available to select graduate students.

  **Status:** Funding for an additional 6 fellowships (stipend and tuition) was added in FY01. Four were awarded, each to students new to WPI. Commitments were extended to fill all six. However, two unfilled commitments were allocated to new faculty who had insufficient time to identify new students to bring to WPI early in their first year. In FY02 all fellowships were filled for the fall semester. The total number of graduate fellowships awarded year-to-date was twenty-seven. Finally, in FY03, we obtained funding for an additional six Graduate Teaching Fellowships (stipend and tuition) from the NSF to support teachers gaining the MS degree in preparation of meeting the Massachusetts Frameworks for K-12 education. In addition, six GAANN Fellowships, two Yoo Fellowships, and several NSF Fellowships were implemented.

Objective 1.4 Maintain contemporary teaching laboratories.

Central to our vision are appropriate facilities for students to carry out experimental work associated with learning. Laboratories and the associated equipment and instrumentation must be maintained in a contemporary state to provide students relevant experiences. Funding for this purpose will be provided through the Operating Budget for routine upgrades and through the Capital Budget for major purchases and facilities maintenance.
**Action Plans and Status:**

- Develop a comprehensive plan during academic year 2000-01 to maintain and replace equipment and instrumentation in our teaching laboratories based upon suitable average aging for various categories. Funding required will be allocated annually through the Provost based upon a rolling five-year plan.

  **Status:** An inventory of equipment was conducted during FY01, which included estimates of maintenance and replacement costs. To initiate the process of building a funding source sufficient to replace and maintain equipment and instrumentation at WPI, the Provost’s Office worked with Property Administration to pull an inventory of laboratory/moveable equipment from the Property Administration database. Individual departments were asked to review their lists for completeness and accuracy and to provide feedback to Property Administration to close information gaps.

  A review of this information prompted the decision to enter more detail in the future (e.g., funding sources and maintenance and estimated replacement costs resulting from enhanced communication between Property Administration and the department). Taking these extra steps will help us to better identify WPI obligations and to more specifically pinpoint replacement cycles, maintenance and other costs.

- Give high priority to renovations of teaching laboratories.

  **Status:** Much progress has been made in this area. The following laboratories were renovated during FY00: Goddard 306; Goddard 06/06; Goddard 222; Olin Hall 014; Olin Hall 015; Fuller A21; Salisbury Labs 413; Salisbury Labs 414; Salisbury Labs 415; and Stratton Hall 207. During the next fiscal year, the following laboratories were renovated: Kaven Hall Concrete and Environmental Laboratory; Goddard Hall Bio/Chem Laboratory; and Goddard Hall Chemical Engineering Laboratory.

  In FY02, Kaven Hall environmental and material laboratories were upgraded with $1,000,000 funded from WPI’s capital budget and $500,000 from the Keck Foundation. Also upgraded were Goddard Hall 04, 203, and 217, and Salisbury Labs 310 and 312.

  The centrality and necessity of state-of-the-art laboratories to WPI’s programs presents an enormous challenge to maintain currency of existing laboratories and to build and equip new laboratories.

2.2. **Goal 2: Develop WPI’s Position as a National University**

<table>
<thead>
<tr>
<th>Relationship to Vision</th>
</tr>
</thead>
<tbody>
<tr>
<td>WPI ascribes certain characteristics to the classification of national university. Beyond those, however, are established, recognized attributes</td>
</tr>
</tbody>
</table>
associated with research and scholarship that lead to national prestige and high rankings. Currently, WPI is much less well known for its research than for its teaching. National reputation is enhanced through a critical mass of full time graduate students, scholarly publications, and presentations at national meetings, all of which determine the perceived scholarly quality of the faculty. Such activities require vigorous, externally funded research programs sustained through the efforts of the faculty, postdoctoral fellows, graduate students, and undergraduates. To achieve these outcomes, we will invest in our research programs in specific thrust areas to increase the numbers of graduate students and to attract and retain top scholars. We will facilitate their efforts to teach and interact with high-quality students in keeping with our “honors college” paradigm. We will also seek to develop mechanisms for assisting the faculty with the development of intellectual property rights and technology transfer. In addition, we will improve other indicators of national stature and long-term visibility, such as comprehensive program offerings, average class size, student selectivity and quality, retention rate, geographic applicant base, student-faculty ratio, and percentage of alumni giving annually. Investments in the underlying infrastructure, personnel, equipment, and facilities will be required to address these factors and to achieve our vision. Finally, WPI must develop its public persona (branding) and then market it aggressively through appropriate publications, brochures, and other media that present the desired image.

Objective 2.1  Improve the quality and diversity of the student body.

As stated previously, we intend to retain the current size of the undergraduate student body while increasing the numbers of graduate students. However, other characteristics will change either by design or because of external environmental factors. For example, students of color clearly will become a majority of the high school age population in the near future. Additionally, the absolute need for all students to have computer skills may well lead to an increasing number of females interested in technical careers. Furthermore, the growing importance of a global perspective dictates a larger proportion of international students. We will take steps to increase our selectivity and raise the quality of the student body while addressing these broad issues. Finally, pragmatism demands that we diversify WPI’s population for social, cultural, and, not the least, financial reasons. We must develop a larger undergraduate applicant pool with a higher ability to afford the cost of attendance and thus decrease the demand for need based financial aid. At the graduate level, we need to offer competitive stipends to attract high-quality applicants, especially from women, minorities, and international students, to work with our faculty and undergraduate students in furthering important scholarly pursuits. WPI must capture a larger portion of the available national pool to improve its competitive position and realize its vision.
**Action Plans and Status:**

- Increase funding to the Admissions Office to allow targeted recruiting efforts at private and parochial high schools where demand for financial aid may be less.

**Status:** New funding was allocated beginning in FY00. The number of high schools visited more than doubled, including states not visited previously or within the past four years. A special effort was made to visit independent school counselors who participated in our tours. In addition, there was a significant increase in the number of hotel receptions, where attendance was up sharply. Also, the Alumni Admissions program was restructured and improved and a new selection process and new training program was developed for tour guides.

Significant new funding was allocated for FY02 and in FY03 another staff position was added and funding for new initiatives was provided. Finally, as of this writing we have funding committed for a new admissions and financial aid building.

In a related matter, both the men’s and women’s crew were raised to varsity status a few years ago. This was done to expand our application base and to contribute to the quality of life. Both programs have proven very successful, and as a side benefit have led to tremendous alumni support, which has aided the Capital Campaign.

- Actively recruit exceptional students, and in particular National Merit Scholars, to achieve a combined SAT score of at least 1310 by academic year 2004-05. In addition, 55 percent of freshmen will rank in the upper 10 percent of their high school class by 2004. Fund five new full tuition merit scholarships from the Capital Campaign by fiscal year 2005.

**Status:** The direct mail campaign has been augmented by the purchase of names of students who have taken Advanced Placement tests in disciplines related to our offerings. In addition, a more aggressive merit award process is in place and scholarship amounts were increased for awards to the class of ’05, and five new full tuition merit scholarships were added.

For fall 2002, 17 percent of the entering class received a merit scholarship form the university, up from 13 percent the previous year. The average SAT1 scores for merit scholarship students are approximately 150 points higher than those for the entire entering class. In its first year, the Early Action application option has attracted a very well qualified pool of applicants, with test scores 20 points above the average. Because these students are admitted by mid-December, we have several extra months to work on ‘yielding’ them. In our first year of operation, they yielded at a 36 percent rate, more than 5 points higher than the rest of the overall pool.
Also, a special event for Merit Scholars is held in conjunction with the annual Closer Look program in April. This breakfast has more than 175 admitted students, family members, faculty and staff in attendance last year.

Just over nine percent of the entering class is comprised of students contacted throughout our Advanced Placement exam direct mail effort. These are extremely well-qualified students who have earned AP credit on math and science AP exams and will be awarded credit for the exams when they enroll at the university.

- Attract high quality graduate students from diverse backgrounds with GRE scores greater than 2000 and superior GPAs from the top institutions around the world.

**Status:** The graduate certificate program was expanded in FY01 to include the for-credit option with SIM. After completion of the non-credit certificate, students have the option of applying to a degree program with the approval of the graduate committee in either ECE or Management. Certificate options in FPE and Environmental Engineering are available through the ADLN. Both programs are still using the video tape delivery, but FPE is incorporating Web learning into the program.

WPI has met the goal of attracting graduate students with GRE scores greater than 2000. The average GRE score for committed enrollees for the fall 2001 was 2080. To further support this initiative, WPI improved graduate Web pages and implemented a Web-based application, developed additional corporate fellowship relationships, and developed a CD based on campaign video, now in its second edition. We continue to exceed the target score of 2000 in fall 2002 and applications indicate continued improvement for fall 2003.

- Expand the use of special summer programs for minorities and women and ensure appropriate levels of administrative support and staffing.

**Status:** All such programs have been upgraded and new ones added. WPI continues to participate in Dean Kamen’s FIRST, which is of great interest to our students as well as those in the Massachusetts Academy of Mathematics and Science. Since it attracts thousands of high school students to the regional and national competitions, it is also a good recruiting activity.

Camp REACH is now being supported by the Mass Academy and was held in summer 2002 despite the untimely death of its director, Prof. Denise Nicoletti, on the first day. In fact, the summer was highly successful with record numbers of students in the various programs.

The Office of Admissions has assumed responsibility for Frontiers, a pre-college program for high school sophomores and juniors. In its first year of
operation after this change, the number of pre-college students has moved from 65 students in summer 2001 to 117 students in summer 2002, producing a significant increase in net tuition for the program. A new academic discipline was also added to the program, entitled, "FIRST Robotics," and was enrolled with 30 students. Approximately one-half of the rising seniors participating in the program have applied for admission to WPI for the fall of 2003.

Several new programs have been developed: GEMS Jr. (Girls in Engineering, Math, and Science—target group is middle school girls); GEMS (target group is high school girls); STRIVE, Jr. (target groups are African American, Hispanic, and Native American middle school students); and Alumni Daughters (target group is daughters of WPI alumni). Also, the regular STRIVE program received funding from Intel and the Hoop Dreams program (target group is African American and Hispanic 8-13 year-olds from Friendly House Homeless Shelter) was supported through the Community Service Office. This action plan is deemed completed.

- Recruit freshman classes to attain the following distributions by academic year 2010-11: 35 percent from states outside New England; 30 percent female; 15 percent minorities; and 10 percent international.

**Status:** In early 2002, a Think Tank was convened to address the ongoing challenge of increasing the numbers of minority and women who enroll at WPI. New pipeline, outreach, and financial aid strategies were developed and implemented. Workshops were presented at national conferences focused on the issues of women and minorities in science, engineering, and technology. In addition, a new brochure was developed and mailed to all female prospective students.

Some modest progress has been made in modifying the distributions of students. Under-represented minority representation in the class entering in fall 2002 rose to 5 percent from just under four percent the previous year, and the percentage of women increased by five percent to 23 percent compared to the previous year. Even though these trends are positive, they are not increasing at a rate likely to achieve our objectives, thereby requiring additional attention. While the portion of the applicant pool from private schools dropped by three percent to 28 percent, the portion who matriculated increased by two percent to 31 percent of the entering class.

Successful activities sponsored by the Admissions Office and the Office of Women’s and Diversity Programs have been expanded this year with several presentations at national and regional college counseling conferences. In addition, an enhanced financial aid packaging strategy for under represented minorities was implemented for the class entering in 2002. This strategy will be analyzed and refined for the class entering in 2003.
• Recruit students with the intention of retaining emphasis in engineering while strengthening all areas. By academic year 2010-11, the undergraduate program distribution should approximate the following: 70 percent engineering and computer science; 20 percent science; 8 percent management; and 2 percent other.

**Status:** The distribution for undergraduate program matriculants entering in fall 2002 is as follows:

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering and Computer Science</td>
<td>76.8%</td>
</tr>
<tr>
<td>Science</td>
<td>16.9%</td>
</tr>
<tr>
<td>Management</td>
<td>2.3%</td>
</tr>
<tr>
<td>Other</td>
<td>3.8%</td>
</tr>
</tbody>
</table>

**Objective 2.2 Support the faculty’s efforts in research and scholarship.**

WPI has long been known and respected as an undergraduate institution and only recently has developed its graduate research program to the extent of being placed within the Doctoral Universities II class. Substantial investments in select graduate programs and overall research activities will strengthen our position as a national university while simultaneously improving the quality of our academic programs (Goal 1). The National Research Council has established that top-rated programs tend to have more faculty members, larger numbers of graduate students, more reliance on research assistantships than teaching assistantships, more federal grant activity, more publications and citations, and shorter time to the Ph.D. degree than do lower-rated programs. Furthermore, 85 percent of programs ranked in the top quarter in the 1982 survey were similarly ranked in the 1993 survey. Clearly, it takes a long time for major movements of institutions to occur within these rankings. WPI must commit to sustained efforts to improve its relative position. Thus, strategic investments must address the need for distinguished chaired faculty positions and otherwise capitalize on strengths to build a few interdisciplinary thrust areas and expand our activities involving Management of Technology. At present, we lack enough full time graduate students to support a vigorous research program. Further, we must act to reverse the declining number of graduate students in those science and engineering programs of strategic importance to our future. Thus, additional funds must be made available to attract required numbers of high-quality students into these programs. Finally, we must provide financial support for activities not normally fundable from external grants and contracts.

---

1 Subsequent to publishing the Strategic Plan, the Carnegie Foundation for the Advancement of Teaching changed its classification system and WPI is now in the Doctoral/Research Universities-Intensive category.
2 Note that “distinguished” will be determined from WPI’s faculty performance criteria as opposed to traditional measures in use at research-intensive universities.
**Action Plans and Status:**

- Invest in faculty positions, equipment, and facilities to develop the following interdisciplinary thrust areas by building upon existing strengths:
  - Life Sciences and Bioengineering
  - Computer and Information Technology
  - Materials Science and Technology
  - Space Sciences and Engineering
  - Environmental Studies
  - Computational Modeling

**Status:** Beginning in FY00, new funding was allocated to hire new faculty members in thrust areas. Startup funding was provided to meet initial research needs, and laboratory space was allocated and renovated where necessary. In addition, recent decisions concerning acquisition of equipment have all been made in light of the six thrust areas. Large increases in cost sharing of grants were made in support of the accomplishments of specific research initiatives. Also, the multidisciplinary research thrust areas have resulted in increasing faculty collaboration, increased proposal activity, and increased extramural support. A policy of waiving dissertation credit charges for research assistants supported on fully-funded grants (i.e., they include full indirect cost recovery) was implemented. This serves to make WPI’s research applications more competitive. Finally, the new Access Grid facility in the Lower Wedge should greatly facilitate collaboration with researchers worldwide.

In addition, a strategic partnership was established with Haas Automation, Inc., which entrusted WPI with over a quarter million dollars in new machine tools, software and training. This was matched with a gift from the Lufkin Trust, and allowed the creation of the WPI Haas Technical Center for Computer-Controlled Machining. Under the terms of the endowment, every three years, the Haas machines will be replaced with new models.

- Increase the size of the full-time faculty such that the average course load does not exceed three courses per year. New positions should be established in disciplines critical to the development of the thrust areas recommended above and in Management of Technology.

**Status:** Changes to the full-time faculty are documented in the first item under Objective 1.1. While the increased size has reduced the teaching load, on average it still exceeds the objective.

- Seek funding through the Capital Campaign for at least five chaired faculty positions in areas of existing strengths consistent with development of the
thrust areas and Management of Technology, to be filled by nationally-recognized scholars as soon as possible.

**Status:** A previously pledged $1.5M dollar gift has been received and will fund the new Rutman chair in Chemistry. A $2.5M dollar gift is now in our endowment awaiting instructions from the donor for the precise allocation. The Manning Professorship in Chemical Engineering, established with a $2M gift, was awarded to Dr. Stephen Matson. Additional funds, allocated for endowment to support faculty positions, that have been received but are not yet enough to name chairs, total just under a half million dollars. Total dollars donated currently stand at $6,468,199.

- Develop and expand our Management of Technology program, as well as its relationships with the engineering disciplines in particular. Provide resources required to achieve accreditation of the Department of Management by the American Assembly of Collegiate Schools of Business by academic year 2001-02.

**Status:** New funding was allocated for FY00 to hire 2 new faculty members to meet AACSB accreditation guidelines; in fact, two new tenure-track and two visiting faculty members were hired. New funding again was allocated in FY01 to hire an additional faculty member in MIS. With replacements, four new tenure-track faculty members and one Professor of the Practice were hired for fall 2000. AACSB visited campus in November 2001 for their final accreditation visit. The accreditation process is, therefore, nearing completion after several years of substantial effort on the part of the Department of Management and the University. Negotiations over the past six months with AACSB regarding their findings have been productive. We anticipate a final decision on accreditation next spring.

- Develop a new workload model that reflects appropriate credit for advising undergraduate and graduate projects as well as theses and dissertations.

**Status:** The Provost continues to work with Faculty Governance to propose a new workload model. Faculty committees also are considering rights and responsibilities of non-tenure-track faculty. Methods to more effectively evaluate teaching and advising are being evaluated.

- Increase annual research expenditures to $60,000 per faculty member by fiscal year 2006, with increasing emphasis on industrial partnerships where we can build upon our success in attracting project funding.

**Status:** Progress toward increasing anticipated research support is being made through stronger support from the Research Administration Office. This support includes notification of opportunities, assistance in proposal preparation, provisions of seed funding, and regular seminars by federal agencies. Research Administration has also initiated a regularly published
newsletter to increase communications with the WPI community. Sponsored program proposal volume increased 56 percent from $40.9M in FY00 to $63.7M in FY01. Award volume increased 12.1 percent, from $7.5M to $8.4M for the same period. For FY02, the per-faculty expenditure rate rose to $40,138 from $33,139 in FY01. For the 83 faculty members who participated in sponsored programs in FY02, the per-faculty rate was $103,006, up from $81,514 per faculty for the 87 participants in FY01. While we are making strong progress, in these competitive times WPI needs to identify additional ways to accelerate achievement of the target.

- Increase the number of qualified full time MS students to at least 425 and the number of qualified Ph.D. students to at least 160 to allow production of at least 40 Ph.D. graduates per year by academic year 2010-11.

**Status:** Teaching assistantships and WPI-supported fellowships have been increased. Externally supported fellowships, both government and corporate, have been actively sought and the numbers have increased. We need to obtain substantial increases in extramural funding to support research assistantships. Two incentives were established: (1) waiving of tuition for doctoral research credits for students on otherwise fully-funded grants, and (2) substantial increases in available cost sharing on grants.

The following lists the numbers of enrolled full-time graduate students:

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall’97</td>
<td>397</td>
</tr>
<tr>
<td>Fall’98</td>
<td>423</td>
</tr>
<tr>
<td>Fall’99</td>
<td>438</td>
</tr>
<tr>
<td>Fall’00</td>
<td>441</td>
</tr>
<tr>
<td>Fall ’01</td>
<td>470</td>
</tr>
<tr>
<td>Fall ’02</td>
<td>360 (Revised definition of “full-time” to comply with new INS requirements)</td>
</tr>
</tbody>
</table>

The number of teaching assistantships has held steady at 125 the past two years, while there were 86 research assistantships in fall of 2001 and 94 in fall 2002.

- Work to achieve higher ranking for select graduate programs within the National Research Council review to be conducted in 2005, with the intent of second quarter placement in the subsequent review.

**Status:** The National Research Council is presently revising its methodology and criteria. WPI has had input to those revisions. This action will be addressed when the new statement becomes available.

- Endeavor to achieve Doctoral Universities I status by academic year 2010-11.
Establish the Research Development Council beginning in academic year 1999-2000 to review faculty proposals and provide seed funding for new research areas.

**Status:** New base funding of $75,000 was allocated for FY00 to support initiation of faculty research activity likely to attract external support. Additional funding was provided in FY01, bringing the total to $100,000. Funding was reduced to $50,000 in FY02 due to operating budget shortfalls. The RDC prepared guidelines regarding awarding funds to investigators and included an expectation that there be a significant contribution to the Interdisciplinary Research Thrust areas and that at least one major proposal result from the seed funding. The RDC has now been through two proposal/funding cycles. A summary of the RDC proposals and awards can be found in the Research Administration Annual Report at [www.wpi.edu/Admin/Research/Reports/](http://www.wpi.edu/Admin/Research/Reports/). This action plan is deemed completed.

Increase the research incentive returned to principal investigators and their departments to 20 percent of the indirect costs received in the preceding year beginning in academic year 2001-02. When the total indirect costs recovered exceeds $1.8M per year, increase the research incentive to 25 percent.

**Status:** The increased incentive is divided as 12.5 percent to the principal investigator and 7.5 percent to the associated department. During FY00 and FY01 the total indirect cost recovery was approximately $1.52M and $1.06M, respectively. Approximately $1.7M in indirect cost recovery was achieved in FY02. It is anticipated that the 1.8M threshold will be exceeded soon as the research activities continue to expand.

Develop a plan by the end of academic year 1999-2000 for supporting copyrights, patent applications, technology transfer, and development of licensing arrangements for promising innovative discoveries.

**Status:** A policy was developed during FY00 with the exception of new copyright rules applicable to electronic media in courses. Substantial changes in our approach have been required as a result of the closing of the MBI Technology Transfer Office that WPI co-founded and had relied upon for more than ten years. A business plan is being developed and will be ready early in 2003. At that time, it will be proposed that WPI establish its own Technology Transfer Office.

Establish guidelines no later than the beginning of academic year 2000-01 to encourage academic departments to ensure graduate research projects involve
undergraduate students, thereby furthering the integration of our undergraduate and graduate student experiences.

**Status:** Summer research stipends are in place to support undergraduate research experiences. Also, one requirement for receiving stipend support through the Undergraduate Summer Research Program is that undergraduate students must participate with an active team that includes graduate students. REU Programs have expanded significantly and involve WPI students as well as students from other universities. A number of industrially-based summer research experiences have been successfully implemented. This action plan is deemed completed.

- Evaluate the feasibility of designating one or more apartments in Salisbury Estates for temporary use by new faculty members who relocate to WPI or by visiting scholars. A plan should be submitted by the end of fiscal year 2001.

  **Status:** An additional apartment has been reserved for WPI visitors. This action plan is deemed completed.

---

### Objective 2.3 Develop creative partnerships with industry, organizations, and other universities.

As a university with comparatively little bureaucracy, WPI should seek synergism through cooperative ventures with other organizations. Therefore, we will pursue formal relationships with appropriate universities, organizations, and industries in the U.S. and abroad which have similar interests to our own. Such ventures will provide opportunities for sharing resources such as research equipment, faculty and staff expertise, collaboration, and topics for project and thesis research as well as potential funding sources for them.

**Action Plans and Status:**

- Develop a proposal to establish the Center for Bioscience and Bioengineering.

  **Status:** After three years of planning, WPI established the Bioengineering Institute (BEI) in 2002. The BEI forms a bridge between academic science and engineering research and the development and advanced manufacturing of biomedical devices. It engages scientists and engineers from the WPI faculty, other academic and healthcare institutions, government labs, and industry in this effort.

  The BEI supports three activities: applied research, product development, and product realization. Our objective is to develop intellectual property that can be licensed to outside companies and create innovative biomedical devices that can form the basis of new start-up business ventures, potentially creating new demand for advanced manufacturing enterprises in Worcester and Central
Massachusetts as well as stimulating economic growth and creating jobs in the area.

The Institute currently houses four centers, each with a bioengineering focus: the Center for Bioprocessing and Tissue Engineering; the Center for Comparative NeuroImaging; the Molecular Engineering Center; and the Center for Untethered Healthcare.

An external grant of $120,000 was obtained to support the first BEI director while other funding was sought. Federal support of approximately $860,000 was obtained for FY03 and $1M has been committed for FY04. Other funding from various sources is anticipated as well. This action plan is deemed completed.

- Create comprehensive project centers in areas of the world where WPI can contribute to the quality of life and partner with academic and industrial organizations.

**Status:** The Silicon Valley MQP Center was launched in C00 with four funded projects. Eight were completed in C01, and six were completed in C02. Plans are underway for students to complete six projects in C03, and recruiting efforts have begun for C04. In addition, the Wall Street MQP Center began operation in B01 with eight students completing three funded MQPs. Six projects are being completed in B02 and recruiting efforts have begun for B03. Also in B02, three projects were undertaken at MIT’s Lincoln Labs in Lexington, MA. Recruiting has begun for B03 with plans to have six project teams complete their MQPs there. Beginning in AY03-04 students will be completing MQPs with Gillette in three different locations (Boston, London and Germany) during three terms.

The Hong Kong IQP Center re-opened in C02 with twenty-one students and two resident advisors. Twenty-three students with advisors will complete IQPs in C03. The Zurich IQP Center replaced the former Darmstadt operation in D01. Zurich began its first regular term of operation in B01 with sixteen students. Eighteen students completed projects in Zurich in B02. In D03 sixteen students and a faculty advisor will travel to Windhoek, Namibia to launch our first IQP project center on the African continent. The Johnson Space Center in Houston, TX will host fifteen students in C03 as the students complete MQPs and IQPs. Recruiting has begun to send twenty-four students to complete their MQPs in C04.

Off-campus residential Sufficiency programs have expanded as well: Spanish and related topics in Madrid since D01, German in Darmstadt in E01, and Shakespeare and Dickens in London in E01 (continuing the existing E term London Sufficiency program). There is a new focus to provide interdisciplinary Sufficiency opportunities in London during B and E terms. Student interest in the Madrid Spanish Sufficiency is increasing.
• Develop and implement memoranda of cooperation with top universities located near our global project sites.

Status: Considerable activity has occurred in this area. Memoranda of Understanding were signed with four institutions in Asia in FY00. An agreement is in place with the University of Zimbabwe to support the center in Kariba, particularly the participation on project teams of its students with ours. (Teams will be virtual while our students are in Worcester, actual when they are in Zimbabwe.)

The existing agreement with ETH-Zurich (Swiss Federal Institute of Technology) was the basis for active support from ETH (student work space, faculty collaboration, student computer access, etc.) for the new Zurich IQP Center.

Active agreements with the Universities of Puerto Rico and Costa Rica formed the basis for collaborative research undertakings, including several grant proposals that will support both undergraduate and graduate programs.

An MOU was signed with Seoul National University in South Korea for delivery of Fire Protection Engineering certificates and master degrees via ADLN starting in fall 2001. Successful IP based video conferences have occurred in FY02 between WPI’s Worcester Campus and SNU in Korea in support of the program.

MOUs between WPI and the University of Guatemala, Ecole d’Mines (School of Mines) in Nancy, France, the University of Greenwich (UK), the Engineering College of Copenhagen, University of Karlsruhe (Germany), Institut National Polytechnique de Lorraine (INPL) (Nancy, France), Fukui University (Japan), Al Akhawayn University, Ifrane Morocco, National Tsing Hua University (Taiwan), the University of Costa Rica (San Jose, Costa Rica), Colegio Tecnológico de San Juan (Puerto Rico), Temasek Polytechnic, Singapore, and St. Croix Country Day School have been signed recently or are about to be signed.

We formed a Limited Liability Corporation with NEESCom (a local dark fiber provider) to provide Internet2 services to WPI and to colleges and corporate partners in the New England Region. We have built and operate the Goddard GigaPoP, located in downtown Worcester and are marketing to potential customers. An agreement was reached in late 2002 for WPI to take over sole ownership of the GigaPoP, as NEESCom wanted to pull out. We see this as an advantage for the long term.

• Explore areas of potential cooperation with Babson College and the new Olin School of Engineering with the possibility of formalizing a Memorandum of Understanding during academic year 1999-2000.
**Status:** Talks have been held with the presidents and other administrative officers at Babson College and Olin College of Engineering regarding resource sharing. Members of the IT staff have met with Olin’s Director of IT to discuss and review Olin’s building plans, electronic classrooms, A/V designs, and network and computing architectures/infrastructure. We also have begun discussions concerning the sharing of electronic library resources with the Olin College. Olin is now beginning to develop their plans for the acquisition of materials for their library. The goal would be to reduce our costs. Both WPI and Olin have similar needs for many electronic resources. We have also met to discuss library furniture issues and acquisitions for the Olin College.

In May 2002, WPI established monthly Regional Internetworking Meetings, with area institutions, including the Olin College of Engineering. Initially our goal was to bring a group together to apply for an NSF High-Performance Network Connection grant for Internet2 connectivity via Goddard I2 GigaPoP (recently WPI purchased NEESCom’s 50 percent ownership, thus giving WPI full ownership). The group has found much in common and has worked to identify commonalities in IT infrastructure among institutions with an eye to reducing costs through resource sharing. WPI supported the group’s exploration to submit an NSF High-Performance Network Connection Grant, which Olin, and the group, eventually decided to postpone until the next round of grants. Institutions participating to date include: Assumption, Becker, Holy Cross, Higgins Armory Museum, Ecotarium, Worcester Telegram, Brandeis, Mount Ida, Wellesley, Clark, UMass Med, and Tufts.

**Objective 2.4 Continue to develop a comprehensive base of programs through aligned resource allocations.**

*The Interface Discipline Program, which began in 1993, successfully built upon existing academic strengths to introduce new programs that broadened WPI’s academic offerings. The popularity of programs like biotechnology, biochemistry, biomedical engineering, and the pre-professional programs in law, medicine, and the arts contributed to our ability to sustain enrollment when other institutions faced serious declines. We will continue to create such programs in the future. In addition, WPI’s programs in the social and humanistic studies that have played an important role in broadening the personal development of students will be given increased emphasis. Our entrepreneurial approach to program development must be continued to assure WPI’s academic offerings meet demand by employers and students. New technology, changing demographics, and increasing competition will require academic institutions to respond quickly with cost-effective programs to meet such changes. In addition, WPI must reduce the cost of delivering its programs while working to improve their quality. Activities in the margin that are not in line with the strategic goals will be refocused or, where appropriate, phased out. Thus, we will commit to the SPSC’s recommendations for a thorough review and restructuring of WPI’s administrative organization and operation as well as of our academic programs.*
Efforts will continue to assess administrative and academic areas with these goals in mind. Finally, we recognize that the career successes of our alumni and their participation in the annual fund are extremely important both to our status as a national university and to obtaining additional resources to invest in academic programs. Thus, we will establish lifelong relationships with alumni to provide ongoing support for their intellectual development and to encourage their investment in WPI.

**Action Plans and Status:**

- Increase opportunities in the humanities and arts by providing a new faculty position in the humanities beginning in academic year 1999-2000. In addition, funds for new equipment to support the theater and music programs will be allocated beginning in fiscal year 2000 to allow increased student participation.

  **Status:** New funding was allocated in FY00 to hire a new faculty member in Shakespeare and writing; a new tenure-track faculty member was also added in fall 2001. Theater and music programs have been provided additional financial support and musical instruments are being replaced as needed.

  A formal agreement for an equal partnership in supporting a joint faculty position with the Higgins Armory was established, and the faculty member is actively working with the department and with Higgins in supporting student projects and related activities.

  The Humanities and Arts Department will occupy space in the new academic building being planned.

  This action plan is deemed completed.

- Continue the efforts of the Reengineering Steering Committee to identify potential areas for restructuring.

  **Status:** A number of projects were undertaken beginning in FY00. For example, the systems and processes for Continuing Education were reengineered at all three campuses. This included the implementation of an integrated information system (Banner) and extensive process redesign. Two separate legacy systems were eliminated, and new processes put in place to ensure accuracy and efficiency.

  Receivables processes were adjusted to achieve significant savings, both in staff resources and enhanced collections. The three primary objectives of this effort were: (1) simplifying processes by reducing steps, eliminating redundancies, and minimizing manual intervention, (2) leveraging technology for breakthrough results (e.g., expanding payment via the Web, automating third party billing, increasing the number of billing cycles, etc.), and (3)
improving customer service by redesigning processes across department lines, specifically with registration, financial aid, and housing.

Expenses associated with planned renovations to Daniels and other facilities associated with reengineering student services necessitated delay of project. With the receipt of a gift to fund a new admissions and financial aid office over the summer of 2002, a new plan is being developed.

- Review academic programs to identify specific areas deemed critical to the success of the thrust areas or otherwise of strategic importance.

**Status:** Departments developed strategic plans in concert with the institutional plan. During FY00, several programs were reviewed with respect to the Strategic Plan and the Thrust Areas. They include Computer Science, Aerospace Engineering, Biomedical Engineering, and Nuclear Engineering. The results led to a recommendation to drop the Nuclear Engineering program, renew efforts to strengthen the first-year experience, and to strengthen the programs in aerospace, biomedical, and computer science. During FY02, academic departments completed reviews against the Strategic Plan metrics. The reports are included in the Appendix.

- Increase our efforts to nurture relationships with our alumni and keep them well informed of ongoing activities and needed investments.

**Status:** From 1997 to 2001, annual giving increased both in dollars and in percentage of alumni participation. Dollars increased from just under $1M to exactly $2M, the target established to be reached by 2003. Participation increased from 23 percent to 31 percent. In 2002, the Annual Fund took a significant hit from a steep decline in the economy. Unrestricted giving dropped to $1.75M and participation slipped to 28 percent.

As of the fall of 2002, there is an entirely new team in place in the Annual Fund Office. This includes a new director and a new assistant director, with one other assistant director who has been in the office for a year.

The strategy over the past several years, which resulted in the doubling of dollars, has been to link annual giving to class reunion and anniversary giving. While this has been highly successful, it does create a more volatile fund than one that is not subject to the differences of classes. Our efforts will be to build a stronger base of higher end (PAC) donors to soften the impact of a weak reunion class in any given year.

Trustee leadership in annual giving has been strong, with the trustees themselves working hard to set an example. Their giving has increased by 50 percent since 1999 levels, representing ten percent of the annual operating funds raised – up from seven percent in 1999.
Hand in hand with a successful Annual Fund is a strong alumni relations program. As with the Annual Fund Office, the Alumni Relations Office has an entirely new team in place as of fall 2002. New programs are already underway. More informal regional events for younger alumni have been taking place and reunion weekend will be greatly changed with an “alumni college” component.

- Establish a Program Advisory Board in academic year 1999-2000 consisting of faculty members appointed by the Provost and Faculty Governance.

  **Status:** After consideration by those involved, it was determined that this was unnecessary. Thus, this action plan has been eliminated.

---

**Objective 2.5 Expand opportunities for synchronous and asynchronous networked learning.**

The emergence of inexpensive, ubiquitous communications technology has resulted in a lowering of the boundaries for the delivery of educational materials anytime, anywhere. Increasingly, courses are being taken locally and remotely by students over the Web, supplementing previous technologies that employed videotapes or satellites and microwave broadcasts. The opportunity to reach geographically distributed students around the globe will strengthen WPI’s position as a national university. Investments in the infrastructure and incentives to involve the faculty in such programs will be necessary to realize the potential of emerging technologies.

**Action Plans and Status:**

- Develop a complete and aggressive business plan for exploiting distance learning opportunities and begin recommended additional programs as soon as possible.

  **Status:** A five-year business plan was presented to and approved by the President and Provost on January 29, 2000. The committee continues work to on the implementation schedule. In addition to growing the ADLN program, the plan calls for development of infrastructure to facilitate widespread use of instructional technology by all faculty members, not just those involved in ADLN.

Implementation of the plan is well underway and began with new hires: instructional designer started August 28, 2000; Web developer started September 5, 2000; assistant director started December 1, 2000; instructional assistants are being hired on a case-by-case basis to support individual ADLN courses with high enrollments. The plan for FY01 projected a 25 percent increase in enrollment for ADLN over FY00. The actual number of credit hours in FY01 exceeded this projection by two percent (27 percent increase).
Discussions are underway with other academic departments to develop additional graduate certificates.

The marketing campaign for ADLN includes: direct mail; advertisements in journals, newspapers and magazines based on program specific audiences; catalog produced and shipping; Web site completely updated; preferred provider status at select corporate clients being pursued; relationships with internal support services are being developed; strategic partnerships with other universities being explored and piloted (e.g., UC Berkeley course in FPE being offered under the WPI name).

Operationally, the new Blackboard Level 5 (myWPI) enterprise-wide system was implemented for use beginning with fall 2000. This required a migration from the prior product and a data integration effort. This was a significant leap forward in the enablement of Web-based materials and courses. All ADLN faculty members are now using Blackboard to deliver their course via the Web or supplement their videotaped-based program.

FY02 projected an increase of 43 percent in credit hour delivery for ADLN over FY01; however, the actual credit hour increase in FY02 was 25 percent over FY01. The ADLN business plan allows for scaling of resources (up and down) so a balanced budget can more easily be maintained. Even though enrollments did not meet original targets, the bottom line for ADLN was improved substantially relative to budget (via cost reductions, producing a break even situation, which was ahead of projected schedule.)

Finally, an MOU was signed with Seoul National University in South Korea for delivery of Fire Protection Engineering certificates and master degrees via ADLN starting fall 2001. Successful IP based video conferences occurred in FY02 between WPI’s Worcester Campus and SNU in Korea in support of this program.

- Determine a strategy for ensuring that programs for on-campus students who opt to take a given course asynchronously are at least budget neutral.

Status: The Director of Graduate Admissions does not believe this is going to be a problem. A survey of FY00 ADLN students revealed that 75 percent would not have come on campus if ADLN was not available to them. A follow-up survey with FY01 Fall ADLN students produced a similar response (73 percent). Similarly, the FY02 survey indicated that 65 percent of ADLN students live more than a one hour drive from any of the WPI campuses (Worcester, Waltham, or Southboro). This situation continues to be monitored.

- Establish an incentive policy for returning a portion of the proceeds from distance learning activities to involved faculty members.
Status: The ADLN business plan calls for 25 percent of gross revenues to be returned to departments willing to take the risk associated with using technology to move far beyond traditional teaching and learning environments to use as discretionary investment/support funds. A Faculty Support Services Group was implemented to provide services for content creation, formatting, Web hosting, instructional design, etc. to aid the transition to technology mediated learning environments. In FY02, additional resources were budgeted for direct instructional support required to offer more classes to more students. On a case-by-case basis, course conversion funds are made available to departments who are developing new ADLN programs. This action plan is deemed completed.

Objective 2.6 Conduct a comprehensive image-building and marketing effort.

The attributes and characteristics of WPI associated with our vision must be captured in the image projected to the public at large and to our various stakeholders. All publications, from admissions materials to departmental promotions to letterheads to business cards, must reflect the personality of the institution. Attention must be given to staff resources required to manage effectively major on-campus events. Recruiting efforts for students, faculty, and staff must be based upon our unfolding vision what WPI is to become, and be consistent with the desired image. All members of the WPI family must communicate the same message so that a consistent picture is developed and reinforced at every opportunity. To this end, we will invest needed funds and effort to ensure an aggressive approach to marketing the University. This investment should help us attract quality students and faculty, facilitate our development efforts, and improve our ability to influence national agendas.

- Develop a comprehensive marketing plan complete with funding requirements beginning in fiscal year 2001.

Status: A “marketing retreat” was held in November 2000 to develop plans and a timetable into 2001. WPI contracted with a Chicago-based firm, Lipman Hearne, to conduct a survey combined with focus groups to determine WPI’s positioning for purposes of marketing the institution to its many constituencies. The principal audience was potential applicants, but it also provided the basis for a comprehensive statement about WPI, which formed the core of how we wish to be perceived by a broad spectrum of audiences. These efforts involved every segment of the WPI community. The Admissions Office was, of course, closely involved. This study was completed in February 2000 and preliminary results presented at the February Board meeting. A final report was presented to the Board at its February 2001 meeting. The Board was updated on progress at its May meeting and work continued over the summer. A Faculty Retreat was held on August 24, 2001, to obtain feedback on plans and input on strategies. A meeting for staff was held September 26 at which similar presentations were made.
All of this work led to a marketing and communications plan, which has been followed over the past two years. As a result, this action plan is deemed completed.

- Complete a review of all marketing materials for consistency and submit recommendations for changes needed by the end of academic year 2000-01.

  **Status:** A review of all publications has been completed and guidelines are in place to achieve consistency in form and substance. This action plan is deemed completed.

- Produce an annual report of research activities highlighting faculty publications, significant grants, discoveries, and the like.

  **Status:** The first research report was issued in November 1999. Since that time, the Office of Research Administration has issued the Report of Sponsored Program Activity on an annual basis. Reports issued in September 2000, 2001, and 2002 are available at [www.wpi.edu/Admin/Research/Reports/Annual/](http://www.wpi.edu/Admin/Research/Reports/Annual/) and cover submissions of proposals, receipt of awards, and analyses of sponsored program expenditures. These reports will continue to be issued annually in September. This action plan is deemed completed.

- Aggressively seek opportunities to publicize WPI.

  **Status:** As of fall 2002, many of the activities associated with fulfilling this action have been accomplished and others are underway. Of particular note are the following: An “elevator speech” card about WPI positioning has been distributed to all employees; and we have hired an Associate VP for Marketing, an E-marketing person, have filled a vacancy in hiring an assistant director of Media Relations, and a full-time editor of the University’s new magazine, called “Transformations.”

  In addition, a new logo was developed and new signage for the campus will be installed in the spring of 2003. New business cards and stationery are now being used and we developed a new WPI Website. We hired an advertising firm and a PR firm to help market WPI more broadly and consistently.

  In November 2002, we completed the second round of television and radio advertising. Evaluation of various metrics is now underway to determine the initial success of the advertising based on a before and after study.

  We have launched a direct marketing program to Massachusetts high school students via a new award for high school teachers—the “WPI Technological Humanist Award.” We also have run several successful evening events for high school teachers and guidance counselors.
2.3. Goal 3: Establish WPI as a Leader in Global Technological Education

**Relationship to Vision**

Offering global opportunities at all levels of study is central to our vision. Global awareness must be woven throughout the curriculum and the opportunity for an off-campus experience should be available to all who can benefit. Investment will be made in additional training for students and faculty alike, as well as additional faculty positions. The International Advisory Board has pointed out that our present off-campus project centers establish a network of multinational independent sites as opposed to a true global network. Our goal must be to structure programs in which students and faculty can interact from sites around the globe to solve problems that involve multiple cultures, but transcend national boundaries.

**Objective 3.1 Expand participation by students and faculty in the Global Perspective Program.**

Presently, about 50 percent of our juniors participate in the Global Perspective Program while completing their IQP requirement. Only a few students complete their Sufficiency or MQP at an off-campus site. Because of the benefits inherent in such participation (increased responsibility and maturity, independence, self-reliance, multicultural awareness), WPI will encourage more students to take advantage of this unusual opportunity. In addition, faculty efforts in support of the Global Perspective Program must be recognized and encouraged. Finally, we will aggressively market opportunities to minor or major in international studies, which provides additional integration of global projects with related courses in humanities and social sciences.

**Action Plans and Status:**

- Seek endowment funds through the Capital Campaign to establish a Global Perspective Program Fund to provide support to develop off-campus MQPs, Sufficiencies, and globally related courses at all academic levels.

  **Status:** Gifts have been received for partial support of an IQP center in Worcester and for the founding of a center in Africa. Beginning in D03, a project center will be functioning in Windhoek, Namibia with sixteen students and a faculty advisor.

- Establish a Faculty Development Fund to support in-house faculty releases and small grants by which the faculty can gain experience and expertise in areas related to WPI’s Global Perspective Program.

  **Status:** Small faculty development grants continue to provide start-up funding for off-campus MQP programs, development of faculty expertise relevant to
the Worcester Community Project Center and other on-campus IQPs. This action plan is deemed complete.

- Leverage WPI’s global sites in facilitating faculty practicums, consulting opportunities, and general networking.

  **Status:** The IGSD FY01 budget was augmented to include funds for global advisors to use with their off-campus advising. Beginning with academic year 2001-02, global IQP advisors receive a small professional development grant to assist them in taking full scholarly advantage of their off-campus advising assignment.

We have received media attention and national recognition through the outreach efforts of IGSD. Examples include: *National Geographic* television episode on WPI work in Venice; recent NAFSA award recognizing the internationalization of WPI; AAC&U Leadership Status; *Boston Globe* articles describing WPI’s aggressive risk management for off-campus activities; featured article in *International Educator*; and Mass High Tech coverage of off-campus projects at various locations around the globe.

- Conduct a study to determine how best to relate the various components of WPI’s undergraduate program—particularly the Sufficiency, social science requirement, and the IQP—in the context of our Global Perspective Program.

  **Status:** This work is underway, and some outcomes have been submitted by IGSD to faculty governance for approval.

- Evaluate the benefits and costs associated with enlarging the international studies major within IGSD.

  **Status:** This work is underway, but no conclusions have as yet been reached.

- Evaluate the option of creating a Center for Global Technology and Culture to develop appropriate sponsored research in areas related to WPI’s Global Perspective Program and functioning in conjunction with the new Division of Continuing Studies.

  **Status:** The President’s International Advisory Board recommended the concept of such a center at its first two meetings. Its recommendations went through the Campaign Global Committee and on to the Provost and to IGSD. The Center for the Globalization of Technology was established in 2000, but its project development functions have since been subsumed by the IGSD working closely with faculty members in many different departments to develop new MQP sites, including Lincoln Labs, Johnson Space Center, Wall St., and Gillette. This action plan is deemed completed.
Objective 3.2  Make the transition from multinational sites to a global system.

Presently, our off-campus project sites operate independently and do not facilitate participation by students who, for various reasons, remain on campus. Achieving our goal of leadership in global technological education will require an integration of all project centers into a true global system. Such a system has clear implications about improvements to our information technology and infrastructure (see Goal 5).

Action Plans and Status:

- Launch a pilot program during academic year 1999-2000 involving one or more teams of students from on- and off-campus that communicate through the Internet and Web for their work.

Status: Project teams in Worcester and London are exploring communicating via email and BlackBoard. Writing tutors from the Center for Communication Across the Curriculum continue via the Internet to communicate and build their relationships with project teams working off-campus.

During AY02-03, a “tethered consulting” model will be used to provide assistance from WPI’s Center for Assistive Technology to all global teams (and to any on-campus teams that can be identified) that are completing projects involving disability issues. The common themes will be identified in order to form connections among teams attacking similar problems in various locations during the subsequent academic year.

- Develop a plan to integrate the various off-campus sites into a cohesive global system.

Status: The initial intent to integrate around projects in the general area of support for disabled people and research in rehabilitation engineering has not borne fruit. Hence, it has been given lower priority. In its place, members of IGSD faculty and staff are focused on integration around sustainable development. To initiate this cooperative effort involving the London, Boston, and Worcester Centers, representatives of the London Borough of Merton, a long-time IQP sponsor, were invited to September’s Envisioning Worcester conference in the Campus Center. As a result, joint proposals and projects are now under development.

The myWPI portal is fully integrated into the preparation phase for off-campus advising so it can function as academic groupware connecting geographically dispersed teams.
2.4. **Goal 4: Improve WPI’s Campus Culture and Community Presence**

**Relationship to Vision**

Achieving our vision depends critically upon the culture that characterizes our campus. By definition, culture refers to socially transmitted behaviors and beliefs grounded in shared values. Such social forces affect every aspect of the University, are powerful shapers of human behavior, and are extremely difficult to change. Consequently, we will work to nurture a more unified campus culture that has greater unity that at the same time promotes greater diversity. Housing significant numbers of students on campus creates a residential community supportive of shared values. The Salisbury Estates apartment complex will be evaluated as possible additional housing for upper-class students and graduate students. We will also increase our efforts to ensure a safe environment for our community. Of critical importance to sustaining the desired culture is the construction of the new Campus Center, established by the Board of Trustees as the top priority in the Capital Campaign. The Greek System also plays an important role in shaping campus culture and norms of behavior. We will work closely with the Greek leadership to ensure our fraternities and sororities contribute in positive ways to the intellectual as well as the social development of our students. Through a coalition of the Greek System, our professional staff in Student Affairs, and the Residential Advisors in the residence halls, we will continue an aggressive program directed at educating our community about the dangers of alcohol and drug abuse. In addition, the adequacy and condition of campus facilities affects the culture. To provide much needed additional faculty office space and modern multimedia classrooms, a new academic building is included in the Capital Campaign. We also are committed to finding a solution to our parking problem with the ultimate objective of providing considerable green space on the Quad. Attractively maintaining our residence halls, classrooms and laboratories, faculty and staff offices, athletic facilities and indoor and outdoor recreational space, as well as the surrounding neighborhood remains an ongoing priority. Furthermore, we recognize our alumni, other professionals, and corporations as important members of the WPI community. To meet their needs we will expand our adult education efforts and improve the services offered by our Career Development Center. Finally, we will increase our commitment in our local community in terms of assistance to elementary and secondary schools and to the city itself. Together, these actions will lead to the desired holistic intellectual environment, with fewer interdependencies, that will support the transformational changes sought.

**Objective 4.1 Construct and renovate facilities to accommodate social and academic activities and solve the parking problem.**

Building the Campus Center will be the realization of planning over many decades. It will add a third tower of social community and provide the focal point for interchange as well as facilities for student services and organizations. For
these reasons, the Campus Center is the centerpiece of the Capital Campaign and efforts continue to raise the needed $17M. Construction of a new academic building will provide much needed office space and additional modern classrooms. The space vacated by the various departments relocating to the Campus Center and academic building will be renovated to meet other pressing needs.

**Action Plans and Status:**

- Seek to raise the entire $17M for the Campus Center through the Capital Campaign, thereby avoiding any additional debt service funded by the Operating Budget.

  **Status:** Groundbreaking occurred on October 29, 1999, and the new Campus Center was opened officially in March 2001. More than $12M was raised to support this project. This action plan is deemed completed.

- Seek to raise an endowed operating fund for the Campus Center through the Capital Campaign to meet the anticipated annual operating expenses.

  **Status:** No gifts have been obtained for this purpose.

- Seek to raise funding required for the new academic building.

  **Status:** Conceptual design of the building and program definition were nearly completed. However, the continuing increases in project costs for the new academic building resulted in this project being delayed. There is a critical need for additional academic space at WPI, as was confirmed by an external audit. As of fall 2002, the project remains on hold pending a decision by city on institutional zoning. The president much prefers locating the required additional parking off campus (a garage) to preserve future building options, but current zoning requires it to be on the central campus. In addition, a Master Plan for the next 15 to 20 years is now underway and should be concluded by summer 2003.

- Develop a plan for parking on campus that includes additional green space on the Quad.

  **Status:** Design development plans were completed, but the project was delayed pending resolution of academic space costs. As of fall 2002, negotiations are underway with the city regarding the requirement to provide additional parking on the central campus whenever additional academic facilities are undertaken. There are two approaches: a possible change in institutional zoning that would solve the problem, and obtaining a variance from the zoning requirement. Resolution on this issue should occur in spring 2003.
• Develop a plan during academic year 1999-2000 for relocating appropriate offices and operations into space vacated by moves to the Campus Center and new academic building.

Status: The Cabinet held several meetings to develop available options and initial estimates were developed for the costs associated with necessary renovations of vacated space. However, results of planning by architects for the relocations far exceed initial estimates and our ability to fund them. Most such moves were suspended pending other developments. With the gift in 2002 to fund a new building for admissions and financial aid, a new avenue is open and is being explored for reuse of vacated space in Boynton Hall.

• Evaluate possible use of Salisbury Estates for student housing.

Status: A comprehensive study has been completed and recommendations for future use have been presented to the Cabinet. Because of the very high costs associated with changing the usage, the current usage will continue. This action plan is deemed completed.

Objective 4.2 Improve ethnic and gender diversity in our community.

Previous objectives addressed the desire to increase the numbers of minorities and women. This objective reflects our intent to ensure a welcoming and supportive campus environment for diverse populations. To this end we will encourage our Greek System and other various support groups to work together to provide social opportunities for all students to interact and provide resources for programming of appropriate events.

Action Plans and Status:

• Assess the climate on campus as it relates to ethnic, gender, and sexual orientation.

Status: The Quality of Life survey was distributed in the spring of 2000 to assess the campus climate. This effort was coordinated with the Committee on Advising and Student Life. Results were presented in the fall of 2000.

The study showed that the greatest areas of satisfaction for WPI students were with on-line registration (97 percent), safety in the residence halls (95 percent), willingness of staff and faculty to help (94 percent), safety on campus (94 percent), availability of an escort service (92 percent), and access to course teachers (92 percent).

Regarding campus climate, 80 percent of WPI’s students of color were satisfied that WPI maintained a climate free of harassment, along with 86 percent of Caucasian students and 95 percent of Asian students. Also, 58 percent of WPI’s students of color were satisfied with the sense of community
and belonging on the campus versus 70 percent of Caucasian students and 64 percent of Asian students. However, three percent of students of color felt that the campus climate was hostile when it comes to race and ethnicity compared to two percent of Caucasians and 0 percent of Asian students.

Regarding the campus climate on sexual orientation, 11 percent of students of color felt the climate was hostile while 14 percent of Caucasians and nine percent of Asians felt similarly.

Overall, 82 percent of students of color reported satisfaction with WPI along with 92 percent of Caucasian and 78 percent of Asian students. A second Quality of Life survey will be distributed electronically in January of 2003.

- Create a position in the Division of Students Affairs responsible for carrying out activities that further multicultural awareness and plurality on campus.

**Status:** Several steps have been taken as part of this action. A full-time Assistant Director of Admissions for multicultural activities was hired in FY00, and a new Director of Diversity and Women’s Programs began work in December 2000. Also, a full-time Director of Minority Affairs began work in January 2003. The position focuses on the retention of and quality of life for underrepresented students. The director oversees the Excellence in Math, Science and Engineering Program (EMSEP), WPI’s retention and academic success initiative focusing on personal, academic, and career development and support. The director assists the Office of Admissions in its efforts to recruit qualified students of color to WPI.

A prayer room for students has been established. While ecumenical in nature, it will respond to the present needs of our Muslim students. Plans are proceeding to establish a Multicultural Center on the WPI campus. The primary goals of the Center are to give minority and marginalized students a place to build community and to provide a centralized location for all students to learn about various cultures. A program for the Center has been developed with student input, and the location and funding sources for the center are currently in development. This action plan is deemed completed.

**Objective 4.3 Provide a safe environment for our community that fosters learning and development with appropriate alternatives to alcohol and drug abuse.**

Campus safety is an important element in all of the efforts to achieve our vision. The successful recruiting and retention of faculty, students, and staff is dependent upon a high degree of perceived and real safety and personal well being. We will assure that our campus police are properly equipped and trained, that the campus is illuminated adequately at night, and most importantly that educational programs and alternative social activities are provided to appropriately and proactively address alcohol and drug abuse.
**Action Plans and Status:**

- Establish a permanent coalition consisting of student leaders and professional staff from Student Affairs to monitor and to recommend changes in programming addressed at alcohol and drug abuse.

  **Status:** An additional $25,000 was allocated in FY00 to support more alcohol-free programming. This allowed more Friday night activities and midnight breakfasts, which have become extremely popular as alternatives to the party scene. The annual CORE Survey data indicate we are making some progress in the areas of the percentage of WPI students drinking and in underage drinking. Our statistics are significantly below the national average, but still unsatisfactory. WPI continues to participate in the Worcester Licensing Commission College and University ad hoc Committee.

  The Director of Health Education continues to develop strategies for: myth reduction programs concerning alcohol and other drugs; holding students accountable for violations; promoting substance free activities for the campus; facilitating programs on important student health issues; and, expanding recreation facility hours and utilization. Also, the AOD Coalition was established comprised of students/staff to address educational strategies: educational strategies; environmental strategies; early intervention; and enforcement strategies.

  During FY2001-02, 70 healthy-alternative programs were implemented on “party nights” (Tuesday, Friday, and Saturday) as non-alcoholic events. CORE survey results for this period show 51 percent of WPI students prefer not having alcohol at parties, and 90 percent prefer not having drugs at parties.

  WPI has joined the Massachusetts State Wide Coalition on Underage and Problem Drinking, which is a commitment to collaboration with approximately 50 other universities across the state. This commitment pledges WPI to work together with these institutions to continue exploring prevention steps appropriate for our campus, and to share strategies that have been successful.

  Finally, the Princeton Review rated WPI 14th in the nation as a gay friendly institution.

- Conduct a study to determine requirements for additional lighting on our campus or within our peripheral properties.

  **Status:** All areas where lighting was a problem from a safety standpoint were corrected during 2000. Any such problems that may arise are taken care of immediately. This action plan is deemed completed.
**Objective 4.4 **
*Expand efforts to meet the needs of adult learners.*

WPI is a strong advocate of lifelong learning, which is a principal outcome of our distinctive program. Thus, WPI has a responsibility to provide educational opportunities to its alumni as well as others seeking to upgrade and renew their skills. While previous efforts have been extremely successful, more can be done given the growing needs. According to the January 11, 1999 issue of *Business Week*, 44 percent of today’s college students are adults over 24 and they want skills we can provide. We will thus expand our efforts and place priority upon increasing the scope of our activities and improving our ability to reach wider audiences.

**Action Plans and Status:**

- **Prepare a proposal for the creation of the Division of Continuing Studies with the intention of beginning operation no later than academic year 2000-01.**

  **Status:** The Department of Continuing and Professional Education was established effective July 1, 2000. This new title more accurately defines the nature of the operation and the term “department” was selected as more appropriate. This action plan is deemed completed.

- **Complete a business plan by the end of fiscal year 2000 for locating the Division in the new academic building.**

  **Status:** A business plan was developed and presented and the Department was prepared to support its presence in the building through self-sustaining programs. However, this plan was been abandoned due to the high cost of the building. This action plan is deemed completed.

- **Extend distance learning activities in partnership with participating academic and support departments to increase enrollments 5 percent annually.**

  **Status:** Initial work was with various non-academic departments (Continuing and Professional Education and SIM) to offer select programs via distance learning. The ADLN management also had discussions with the Mass Academy, Electrical and Computer Engineering, and Computer Science Departments concerning programs. The library support plan for ADLN students was implemented.

  In June 2001, WPI submitted a FIPSE proposal for on-line master’s and continuing education certificates in mechanical engineering/lean manufacturing that included three departments: ADLN, Mechanical Engineering and Continuing and Professional Education. Of the 400 pre-proposals received, WPI was among the top 100 invited to submit final
proposals. Due to cut backs in funding, only four proposals were approved; unfortunately, WPI was not one of them.

In fall 2002, the ADLN efforts continue to follow the business plan, with some alterations associated with reduced growth rates to both revenues and expenses.

- Expand opportunities for adult learners on the Worcester campus to serve the regional technical and professional community through credit and non-credit programs.

**Status:** The new Dean of the School of Industrial Management (SIM) has developed a five-year business plan for significant growth in programs and participants. The FY01 budget provided significant investments to enlarge the activities in anticipation of significant expansion. Additional resources were contained in the FY02 budget, consistent with anticipated growth.

As of fall 2002, SIM is expanding its offerings and appears to be ahead of budgeted revenues. Students in the various programs are entering various masters’ programs at about an 80 percent rate, thereby adding tuition revenue.

- Investigate the feasibility of offering for-credit undergraduate courses and expanding the graduate certificate programs, including Web based, and provide recommendations to the Provost no later than the end of academic year 1999-2000.

**Status:** New graduate certificate programs were developed through SIM for New England Electric System (FY00) and Terradyne (FY01). Also, a partnership led by the Department of continuing and Professional Education was developed with Lucent Technologies for interdisciplinary graduate courses involving faculty members from ECE, CS, and Management.

The Mass Academy relationship will potentially drive some of the undergraduate distance learning possibilities (e.g., dual enrollment option for students across the state) if appropriate pricing can be established. AP courses at the high school level are priced significantly lower than undergraduate courses and WPI tuition levels.

A new graduate certificate program for Wireless Communications was established for delivery through ADLN. The program officially launched in the spring of 2002. ADLN and SIM are collaborating educational needs of corporate adult learners for certificate and master degrees through distance and blended (a mix of on-site and distance) learning alternatives. New certificate programs for IT professionals in .NET, Java and Oracle DBA/Developer were also introduced and are being delivered at the branch campuses through the Department of Continuing and Professional Development. In the spring 2003, a program for National Grid is being
delivered via videoconferencing technology from the Worcester Campus to a National Grid site in Syracuse, NY.

During FY02, an evening certificate program in Project Management was introduced to reach a more diverse audience. This program had only been available during the day. Also, SIM collaborated with ECE and Graduate Admissions to introduce a Graduate Certificate in Information Security at the Waltham Campus.

The Department of Continuing and Professional Development was a founding educational partner for the Lean Manufacturing Conference at the Centrum (October, 2002). It was also approved as an authorized training provider for Massachusetts companies eligible for Workforce Development Training Grants. More than 20 companies have already partnered with WPI to improve their productivity and their employees' skills through this program.

**Objective 4.5 Enhance the Career Development Center.**

Our move to strengthen our status as a national university requires due attention to both students and alumni in the area of counseling, evaluation, and placement services. The current mission of the CDC is focused on undergraduate and graduate student career services. We will make the investments necessary to ensure a fully functional operation capable of meeting the needs of students and alumni alike, whether local or remote.

**Action Plans and Status:**

- Evaluate the needs for staffing and other resources to ensure delivery of high-quality services.

  **Status:** CDC Task Force was appointed and final report and recommendations presented to Cabinet. Funding priorities elsewhere have held back full implementation, but the action plan is completed.

- Appoint a task force beginning in academic year 1999-2000 with representation from the CDC and the Alumni Association to develop a plan for joint activities in support of our alumni.

  **Status:** The Vice President for Student Affairs appointed a task force consisting of alumni, a trustee, and appropriate staff. This activity was made a part of a more comprehensive restructuring of the Alumni Association to better serve the alumni and institution. The Task Force completed its work in May 2000. Recommendations were delayed because of budget impact, but the action plan is completed.

- Provide support for the creation and maintenance of a mentoring Web site for alumni through the WPI Webmaster’s office.
Status: As of summer 2002, we have the capability to accomplish this with our current database. However, we are awaiting alumni names who will serve as mentors from the Alumni Office. It is expected that this will be operational by next fall. A Website does exist for alumni to search for jobs and for alumni to post openings. Consequently, this action plan is deemed completed.

In a related matter, discussions are underway to create an office environment at WPI’s Waltham Campus for alumni to use for a period of time while they are looking for work. We are exploring this concept and having periodic meetings.

- Determine the feasibility of creating a facility for video conferencing and interviewing complete with cost estimates.

Status: Video conferencing equipment was donated and installed for use during academic year 2001-2002. This action plan is deemed completed.

Objective 4.6 Maintain facilities and surrounding peripheral properties according to master plan.

Over the past few years, WPI has taken deliberate actions to reduce the level of deferred maintenance to about $12M. Major renovations have been made to several classrooms, Higgins Laboratories, Salisbury Laboratories, Sanford-Riley Hall, Ellsworth/Fuller Apartments, and Daniels Hall. Extensive renovations to Morgan Hall will be completed by the summer of 2000. We intend to continue an aggressive schedule of maintenance and refurbishment to our facilities both on and off campus to protect their value and to imbue pride in our campus.

Action Plans and Status:

- Maintain a rolling five-year maintenance plan for all facilities.

Status: Considerable work is done every summer to maintain properties. For example, these peripheral properties have been painted: 18 Hackfeld, 49 Institute, and 10 Elbridge, while these were re-roofed: 49 Institute, 13/15 Schussler, 16 Elbridge, and 150 West Street (garage). Two additional houses were painted and another two re-roofed over summer 2000 and during FY01, $1,110,000 was expended for maintenance. For FY02 the following maintenance was accomplished: neighborhood improvements for $77,600 and campus appearance for $71,100. The five year planned maintenance stands at $1,238,200.

- Continue an aggressive facility maintenance and renewal program based upon an annual reinvestment goal of 2 percent of the Current Replacement Value (CRV) of the campus physical plant. Maintain deferred maintenance below $10M.
Status: Within Alumni Gym, offices for Men’s and Women’s Crew, Women’s Basketball, and Healthy Alternatives/Recreation were renovated and newly furnished. Over summer 2000, the Morgan Hall dining facilities were completely renovated and over summer 2001, Stoddard Quad brick was replaced. In addition, several classrooms were renovated and equipped with electronic aids, the most extensive work being done in Olin 107. Despite these efforts and those involving routine annual projects, deferred maintenance has increased to nearly $15M and will require increased attention.

- Continue to be proactive in the neighborhood and community.

Status: Working with the Worcester Business Development Corporation (WBDC) and the Chamber of Commerce, WPI hosted a group of executives from Walsin Lihwa Corporation in Taiwan on August 26, 2000, concerning locating a research operation in Worcester. Then WPI hosted the Korean War Memorial event on September 17, 2000. We continue to monitor real estate in proximity to the campus for possible purchase and renovation and have acquired the Bernstein property on Boynton as well as the house at 150 West Street. In addition, WPI is in partnership with the WBDC as co-owners of the Gateway Park property.

**Objective 4.7 Enhance support for K-12 system and the local community.**

WPI acknowledges its commitment to participate effectively in the further development of the community in which we live. WPI’s distinctive fusion of teaching, learning and research, from the first year through the doctorate, can extend to encompass problem solving within this larger Worcester and regional community. Many people at WPI serve on local boards to bring their expertise to solving local problems and enhancing our community relations. WPI will commit to expanding opportunities and recognition for students, faculty, and staff who enhance our role in the local community. For example, since the inception of the IQP as a degree requirement at WPI, hundreds of WPI students and faculty have participated in projects to support the K-12 system and various non-profit organizations in Worcester. Building on the base of these projects, WPI has created and supported new programs in such areas as a publicly-supported high school for gifted math and science students (the Massachusetts Academy) as well as many formal pre-college programs (FIRST, Camp REACH, various high school science and math experiences including the regional science fair). These activities enrich both the region and WPI, by increasing ability and interest of students in mathematics and science. WPI and our community will be served well by focusing these outreach efforts to achieve the best results possible.

**Action Plans and Status:**

- Establish a Worcester Community Project Center (WCPC) as an integrated part of WPI’s global project network.
Status: Significant funding was obtained to launch the new project center, part of whose focus is on K-12 education. Five student teams began preliminary work in A ‘00 leading to full-time IQPs in B ‘00 on the following topics: 1) researching the history of the Prescott Street Gateway Park to assist in brown fields remediation (sponsor: Worcester Business Development Corporation); 2) the “Engineering Pipeline Collaborative”—designing and documenting curricula for the Doherty High School pre-engineering program (sponsor: Worcester Public Schools); 3) a plan to develop and fund a 12-month calendar of activity for the Commons in Worcester (sponsor: City of Worcester Marketing Director’s Office); 4) a plan to improve the effectiveness of marketing Worcester’s Centrum Centre (sponsor: City of Worcester Marketing Director’s Office), and 5) overcoming the digital divide in Worcester (sponsor: Worcester InfoTech Project).

The WCPC began partnerships with four municipal organizations in fall 2000—the City of Worcester Marketing Department (Susan Black); the Worcester Business Development Corporation (David Forsberg); the Worcester Public Schools Engineering Pipeline Collaborative (Dennis Ferrante), and the Worcester InfoTech Project (Tom Wharton.) These partnerships continued in the 2001-02 academic year, with an additional 5 or 6 partners being added to accommodate the three-fold increase in project activity in the WCPC. This action plan is deemed completed.

- Develop a program to acquaint primary and secondary school students and teachers with applications of technology.

Status: The Massachusetts Academy of Mathematics and Science continues to provide teachers with a number of free professional development programs, both in-term and in the summer. The WPI Teacher Preparation program, directed by Prof. John Goulet, typically has a dozen students involved. Effective Oct 1, 2001, WPI is a licensing site for teachers in the state of Massachusetts. WPI summer outreach now involve Camp REACH for fifth and sixth grade girls, as well as several summer programs aimed at older students. This action plan is deemed completed.

2.5. Goal 5: Expand WPI’s Educational Resources

Relationship to Vision

Key to realizing the vision is a robust information technology infrastructure. Indeed, every one of the strategic goals is dependent upon library services, up-to-date computing resources, and high bandwidth networking. Thus, the infrastructure itself is a strategic resource and must be kept current and allow access by students, faculty, and staff regardless of their locations. WPI is accelerating its commitment to world-class operations and technological leadership through the establishment, this past year, of the Office for Information Technology, led by a new Vice President. Current network demand has saturated
our connections to the Internet, inhibiting the development and use of educational technology as well as research activity and impeding our progress significantly. While demands on the library are changing its nature from a repository of information to a distributor of knowledge that increasingly will take digital form, the need for adequate space including student study and collaboration areas will continue for many years. Thus, it is an especially critical component of the infrastructure and must be given high priority for available resources.

**Objective 5.1 Improve library resources, services, and facilities.**

As one of the most critical resources available to our faculty and students, the library must be provided adequate resources in terms of space and funding. While cooperating with other educational institutions attempting to stave off extraordinary price increases for periodicals, we will work to provide adequate funding to ensure that our holdings and access to electronic resources are sufficient to support our educational and research programs. In addition, we will strive to keep library staff current with technological developments to facilitate assisting patrons in the use of electronic resources. We also intend to dedicate all space in the current library facility to associated activities. Furthermore, recognizing the trend to digital libraries, we will continue to take advantage of opportunities to participate in experiments and collaborate with other institutions in providing access to online materials.

**Action Plans and Status:**

- Increase funding effective with fiscal year 2000 to begin improving the holdings and access to electronic resources.

  **Status:** The funding for holdings was increased by $130,000 and another $55,000 was allocated for electronic access during FY00. Examples of additions of electronic sources include JSTOR and the IEEE/IEE digital library. In FY2001, $170,000 was added to the library materials budget to purchase new print and online journals, electronic databases, and digitized back runs of older journals. This enabled Gordon Library to provide quality resources to the WPI community, such as three years of electronic access to Web of Science—a very valuable research tool. In FY02, $149,000 was added to the library’s budget to purchase electronic and print periodicals and to purchase electronic databases. At the end of FY02 the library subscribed to 7,000 electronic journals, 833 print journals, and 150 electronic databases. The print collection increased by 4,247 volumes to a total of 275,299 volumes. This action is deemed completed.

- Work with state officials to identify funding of off-campus space for the Massachusetts Academy of Mathematics and Science, with a decision no later than academic year 2000-01.
**Status:** A suitable nearby site was been identified in the Gateway Park vicinity and space leased. The lease of fiber to network the new location to campus was negotiated and an OC-3 (155 Mbit/s) link installed. The move was accomplished in August 2001. Occupants reportedly are quite pleased with the location and additional space gained for programs. This action plan is deemed completed. (However, with the current budget crises in Massachusetts, future funding levels for the academy are uncertain. The administration will work with the new administration to determine its intentions.)

- Upon completion of the Campus Center, release the Archives Room in the Gordon Library from use as meeting space.

  **Status:** Discussions were held about the usage of the Seminar and Archives Rooms. A decision was made to return the Seminar room to the library in fall 2001. This action plan is deemed completed.

- Create plans for an attractive, environmentally controlled archives facility and a preservation program to preserve our history.

  **Status:** With the release of the Seminar Room for library use in the summer of 2001, a complete reorganization of the Archives and Special Collections areas was accomplished by expanding into half of the former Seminar Room space during FY02. An attractive Reading Room was created for the Fellman Dickens Collection and additional storage space enabled the Archivist to consolidate collections from five different areas into the one area. This action plan is deemed completed.

- Review existing architectural reports during academic year 1999-2000 to develop a plan for the renovation of vacated space and the improvement of the appearance and functionality of the entire building.

  **Status:** Three meetings with architects from Shepley Bulfinch were held to develop a program for a newly renovated library. Jay Lucker’s (MIT) initial assessment was included in the review. Extensive data on use of the collection and building were analyzed by the architects and library staff, and structural and mechanical engineers reviewed the building.

  The architects presented an initial concept to the Renovation Committee in late September, 2000. Discussions of synergies possible due to co-location of specific academic and IT functional groups were discussed with the architects.

  A Library Vision Committee was appointed by the president in November 2001 to prepare a report outlining its assessment of what WPI’s library of the future should be. The committee presented its report to the president in May 2002. During the course of its deliberations, four open meetings and two focus groups for faculty and students were sponsored by the committee in March 2002 to gather input from the WPI community. The complete report, along
with the consultant’s report who facilitated the open meetings and focus groups, can be found on the myWPI portal in the Marketing and Operations Planning section.

- Explore digitizing options for older journals as a means of permitting greater access, reducing the need for storage, and preserving the content of deteriorating physical volumes of importance.

**Status:** Digitizing older periodicals in-house is extremely expensive and will not be done. Instead, Gordon Library is purchasing digitized older journals through commercial vendors when these are available. Gordon Library is a member of NELINET, which plans creation of a digital library of locally owned New England related materials and we plan to pursue this option. Purchase of older runs of digitized journals continues through JSTOR. Other full text electronic publishers, such as IDEAL, are also offering back runs of their journals so that the availability of older journals in electronic, full text format is increasing.

Currently, Gordon Library continues to purchase older journals in electronic format, such as the American Chemical Society’s back files and is working with a group of engineering libraries to have the JSTOR project add old engineering journals to its ongoing digitization of old journals. Gordon Library purchased the ENCompass software from Endeavor Information Systems, Inc., in June 2002. This software enables the creation of digital databases with metadata creation for excellent searching capabilities. Plans include creation of the Electronic Thesis and Dissertation collection as the first of these local databases. Other plans include digitization of the Woodbury Collection and the potential creation of a database of student projects.

The Fire Protection Engineering Department, in collaboration with the Academic Technology Center (formerly the Instructional Media Center) and the Gordon Library, submitted a proposal to the NSF’s digital library initiative for the development of a comprehensive digital library collection for the fire protection community. The proposal went unfunded in the FY02 grand round, but WPI was strongly encouraged to resubmit in FY03.

- Work with Faculty Governance during academic year 1999-2000 to evaluate electronic submission of theses and dissertations and the merit of joining the Networked Digital Library of Theses and Dissertations.

**Status:** WPI joined the Networked Digital Library of Theses and Dissertations, and attended a conference. The Faculty approved mandated submission of these and dissertations at its February 2002 meeting. Library staff worked with the Committee on Graduate Studies and Research to prepare the motion and rationale. As of January 2003, 151 theses and 25 dissertations are included in the Web database. This action plan is deemed completed.
• Develop information literacy programs to support faculty and staff and to assist students in appropriate use of information resources for academic work.

**Status:** Several tutorials are now available at [www.wpi.edu/Academics/Library/Training/tutorials.html](http://www.wpi.edu/Academics/Library/Training/tutorials.html). There has been tremendous demand for our offerings in this area, and the BlackBoard system is used to bring this important information literacy program on-line and to a wider audience. Large numbers of training sessions are offered each year, with demand increasing.

A draft of Information Literacy Competencies for graduating WPI students is listed on the library Website and covers the life-long research skills that identify an information literate student. This action plan is deemed completed.

• Create a plan to meet the needs of students and faculty at satellite campuses and other remote locations.

**Status:** The library staff visited the Waltham and Southboro campuses to ensure awareness of library services. Web pages specifically designed for distance learners were created which contain all the library policies and services available and a new program was established to send books to distance learners. The Instruction Librarian has created a series of videos for distance learners, which is delivered via our new streaming video server to this audience.

In FY02 and FY03, planning is underway to provide synchronous reference assistance at first through AOL Instant Messenger and then through a software interface to assist users when they have problems in using electronic resources remotely.

**Objective 5.2 Establish state-of-the-art computing resources and network performance.**

Usage of the computer network for academic and administrative purposes is growing at a rapid rate. To meet demand, WPI has recently doubled its connectivity to the commodity Internet and now has four T1 lines (each providing a capacity of 1.544 megabits per second). In addition, the Greek houses have wireless connectivity to the campus network. We will monitor usage and, as necessary, continue to expand the capacity to the Internet to ensure that faculty and students are able to perform their work. A major step was taken at the end of 1998 when WPI joined the Internet2 consortium. Internet2 will provide options for considerable increases in bandwidth, fixed latency, and predetermined quality of service when demanded by new techniques such as learningware, digital libraries, tele-immersion, and virtual laboratories for educational and research purposes.
**Action Plans and Status:**

- Develop a plan during academic year 1999-2000 for upgrading the wiring where needed to handle the throughput required by streaming video, voice and data convergence, real-time collaboration, and other high bandwidth applications.

**Status:** This has involved a massive effort to upgrade all the academic and administrative campus network connections to switch 10/100 Ethernet over copper wire capable of carrying gigabit Ethernet speeds. The first year of a three-year plan to replace the wiring was completed when Lucent provided a large fraction of the cable infrastructure through a gift. Multiple gigabit-capable twisted-pair and fiber-optic cable were run to each drop. Fuller Labs, Atwater Kent, and the Project Center were upgraded during this phase.

In spring of 2000, the second year of this very successful project saw upgrades to Higgins Laboratories, Stratton Hall, and Kaven Hall. Boynton Hall was completed in fall 2000 and networking and A/V wiring of the new Campus Center and the new Mass Academy location were completed in Fall 2001.

In September 2000, we activated our OC3 (155 Mbs) connection to Internet2, and replaced our 6 T1 (9.24 Mbs) commodity Internet lines with DS3 (45 Mbs) of commodity Internet. We committed to joining the Internet2 advanced network experiment, and now we have that connection. In December 2000, we switched to another Internet provider who offers fiber Ethernet connections to the commodity Internet. We can increase our data rate, up to 100 Mbs, just by making a phone call, rather than waiting the lengthy time that is required for a telephone-style circuit, so we are now able to provide improved performance much more quickly, as the need arises.

Most recently, we signed with a provider who offered a Gigabit Ethernet fiber connection, which has the same variable bandwidth capability. Now, in February 2003, we are using 45Mbs from this newest provider, and are still using 15M from the formerly mentioned 100Mbs provider, whose contract is not yet expired. We are paying less than half the cost per megabit as we were paying just a year ago, and much less per megabit than any other university in Worcester. Desire for this sort of access is a factor driving area universities to want to partner with WPI via the Goddard Collaborative.

Fiber optic cable was run to the office and classroom faceplates, so that future higher speeds can run over this fiber link. The campus backbone was upgraded from quad OC12 (2.4 gigabits per second) to multiple fiber gigabit Ethernet links. The new campus center has a liberal distribution of 10/100 Ethernet ports, as well as full wireless coverage. The library is also covered with wireless networking, as is Fuller Laboratories and portions of Higgins Labs. As of February 2003, wireless access points have been installed in many
academic buildings and to cover the largest residence halls as well. As of February 2003, only Salisbury Labs remains to be upgraded.

The institutional CATV network was upgraded in FY02 to provide increased capacity to send and receive audio and video signals to and from any location on the Worcester campus. An upgrade to the entertainment network will be determined by the industry’s readiness to support digital broadcast technology.

This action plan is deemed complete, although upgrades will continue.

- Develop a plan during academic year 1999-2000 for periodic upgrades of central servers and desktop computers for faculty and staff.

**Status:** Available data indicates more than 700 desktop PCs. On a three-year cycle at $2125/unit, this requires $1,487,500 total or $495,833/year.

All central supported equipment has been: (1) inventoried, (2) has had its replacement value estimated, (3) been categorized for preferred replacement time-cycle (2, 3, 4, 5+ years), and (4) categorized for accounting purposes (expensed, or capitalized). The inventory activity was expanded to include most of the IT equipment in academic and administrative departments that were not previously supported by central IT. The inventory was further expanded (with data gathered by the Provost Office) to include non-IT laboratory equipment on campus and at the branch campus. Based on this information, a five-year plan for upgrades of this equipment was developed, along with the estimated costs. These costs are being worked into the budget model.

FY02 saw extensive upgrades of servers, most changing platforms from the Alpha server backbone (True64 UNIX, and VMS) to an Intel platform. The UNIX infrastructure implemented several Linux clusters, one for general academic computing and one specifically targeted for high-level computation requiring parallel processing. Other UNIX infrastructure for support services (Web, e-mail etc.) were also upgraded to the new technology. The ERP system database, traditionally on a single VMS Alpha platform, was upgraded to an eight-processor Intel platform system running Oracle. Additional environments for testing and implementation are now on separate Intel servers.

FY02 desktop and printer upgrade cycle implementation was impeded by fiscal constraints. Public facilities (labs and classrooms) have been given priority and are being maintained within a 3-year cycle. Individual desktop PC’s and office printers are being replaced for equipment below acceptable configurations for current software, and individual requests evaluated and processed based on computing need.
FY03 budget resources continue to be constrained extending individual desk top replacement to individuals with justified need (evaluated on a case-by-case basis) or a 5-6 year life cycle in general. Public facilities remain a focus and continue to be maintained with a life cycle of three years or less. Despite these fiscal difficulties, the planning was accomplished and this action is deemed completed.

- Develop a plan during academic year 1999-2000 for maintaining suitable contemporary computer laboratories.

**Status**: There are some 350 computers in various laboratories. Tradeoffs were studied between purchase and leasing options for an annual need of about $248,000 worth of machines. At present, upgrades are handled through the normal budgeting process. These labs have been generally maintained at a slightly higher level of upgrade cycles at every 3-4 years compared to the 5-year cycle on much of the single-user desktop equipment. This level of upgrade has been necessary for use in classroom teaching situations and to keep up with the hardware requirement to run new versions of key applications. The labs also provide a location for the general user to go to run software that may require hardware beyond that of their “personal” PC.

We are continuing maintenance of lab software, which included upgrading the operating systems from Windows 98 to Windows 2000 during the summer of 2002.

- Evaluate the need to require all freshmen to purchase a computer, taking into account the impacts on requirements for campus-wide computer laboratories.

**Status**: WPI currently does not require students to purchase computers. An initial study was undertaken during FY00, with a final report completed in February 2000. This study concluded that not enough classrooms were wired to justify making this a requirement and the campus wiring plan currently does not cover per-seat wiring. In addition, the faculty has not indicated a need.

A related question involves the use of mobile devices. We have seen an increase in the use of mobile devices since WPI started providing wireless network access in the library and Campus Center. Laptop computers are available for short-term loan from the library circulation desk and from the information desk in the Campus Center. Input from various groups of students has been more negative than positive to the idea of WPI instituting a requirement of a mobile device. Many students question the cost of a mobile device and the ability to perform all of the work they want on a notebook computer (which is generally lower in processor, memory and storage) along with the use of a notebook keyboard and monitor. We have also been able to acquire very little definition of where a mobile device would be integrated into academic content. There is limited evidence from RPI that the adoption of
laptops has improved academic performance. Seton Hall and Wake Forest (liberal arts schools) have had more positive results, but seem to relate to providing access to networking. In the fall of 2000, several IT staff attended an IBM Fly-In day at Bentley College to learn how they have successfully implemented a laptop-computing program. WPI IT staff members also had discussions with staff from Seton Hall and Bentley College about their implementation and assessment activities and how they might apply to WPI.

On January 10, 2001 approximately 40 faculty and staff attended a workshop on Technology and the WPI Classroom of the Future. Two major topics were considered in breakout sessions: (1) what learning experiences would we like to offer to our students, and (2) what technologies are required to support these learning experiences? A short written summary report was delivered to the Trustee Technology Committee at the February meeting of the Board of Trustees. The IT division is also investigating the use of other portable devices (e.g., Compaq iPAQ personal digital assistants), new laptops such as the IBM TransNote, and wireless connectivity for academic use.

In FY02, the IT Division funded a laptop pilot project to determine the feasibility of a laptop requirement. In all, 51 participants completed the pre-surveys and 44 participants completed the post-surveys. The study group was made up of three classes (ES3011, HU145x, ME3711). Surveys consisted of 27 assessment statements that asked participants to indicate how they felt their laptop-facilitated experience compared to that of their traditional classroom experience. Preliminary findings concluded that the majority of respondents found the laptop experience to be the same as a traditional classroom. Respondents were more enthusiastic towards the notion of a laptop-facilitated course in the pre-surveys than in the post-survey.

Ongoing discussion in this area (general PC and mobile requirements) continues into FY03 relative to academic benefits, academic distractions, and financial impact to the university and students, as well as specific performance requirements in areas requiring higher end computing. Alternatives of handheld and other full computing devices are also being investigated and evaluated. The laptop study continues in FY03 and has been expanded to include an examination of the faculty preparation required for a laptop-facilitated course.

The Academic Technology Center recently received 55 Compaq iPAQs (free of charge). Participants in the Teaching Technology Fellowship program (faculty and IT support staff) are currently evaluating the use of PDAs as both productivity tools as well as a resource tool within the classroom. A full PDA pilot is scheduled for fall 2003.

- Determine the feasibility of providing faculty, staff, and students off-campus access to the WPI computer network suitable for use of the Web.
status: We have taken a path of encouraging the use of independent ISPs to connect to campus services. We also added Virtual Private Network (VPN) support to provide a secure path for full access to campus services. This offers a secure connection to WPI (authentication and encryption) and makes the traveler appear to be "on campus" when on the road, or even when using a local ISP.

In examining area networking options in conjunction with the Goddard Collaborative, which is working on connecting area universities together, we have been having discussions with Charter Cable. This corporation has spoken favorably of peering with WPI, and the collaborative, so that traffic from a connection on Charter Cable would directly route to WPI or others in the collaborative, which would offer performance benefits to WPI students, faculty, and staff who use Charter cable modems at home. Currently, traffic from a home cable modem would go to Charter’s ISP, to WPI’s ISP, and then to WPI. Direct peering would cut out those intermediate ISPs and offer improved performance.

As of summer 2002, a MS-Terminal server was implemented. This creates the ability to remotely connect to a Windows server (on campus) that will run software applications on the campus server. This capability will address issues for some distance learners whose local PCs have issues that inhibit the direct execution of the software necessary for their courses. This action plan is deemed completed.

Objective 5.3 Create and maintain sufficient electronic classrooms to support on- and off-campus programs.

As a national technological university, WPI must provide suitable teaching facilities. Considerable coursework and related communications are now occurring over the Web, and this trend will increase in the future. In addition to providing access to the network from every office and residence hall room, similar access must be available from classrooms. Beyond merely access, classrooms must be equipped with appropriate audio-visual aids and computing equipment to facilitate instruction along with student experimentation and learning. In addition, we must assure certain facilities are equipped to support our growing Global Perspective Program.

Action Plans and Status:

- Maintain sufficient inventories of computers, video displays, peripheral devices, and software such that appropriate classrooms can be used as studios.

Status: In FY00, $68,000 was allocated to maintain electronic classrooms, the TV Studio and its adjacent control facilities, and the Multimedia Resource Lab. In FY01, we upgraded our on-line teaching and learning environment from a stand-alone course management system, CourseInfo 4.0, to a campus-
wide learning and information portal, Blackboard 5.0 - level 3. This system was integrated with the Banner information system for data transfer. We also added streaming media capabilities and services to complement existing Web-based content. The Multimedia Resource Lab hardware was upgraded from Dual P200s to Dual PIII800s with new 250Mb zip drives and 48X CD ROMs. Software on these machines was also updated to the most current versions of 3D Studio Max, CorelDraw, and Adobe PhotoShop. The Academic Technology Center successfully met all its FY02 goals of creating new electronic learning facilities on campus as well as its renovation goal to keep existing technology current.

In FY02, it continued to migrate its existing production equipment from an analog archive format to a digital archive format (move from SVHS to DVCAM) and move the acquire phase of television production from analog cameras to digital.

A faculty development program, jointly sponsored by IT Division and Academic Affairs, was initiated in FY02. It is called the Teaching Technology Fellowship program and its purpose is to help the faculty address the issue of instructional technology and its implications for teaching and learning. IT staff members are also working with various faculty members on the development and submission of grant proposals to help support various technology-mediated learning projects. Also in FY02, the Multimedia Resource Facility was upgraded to the latest suite of products from Adobe (Acrobat, Illustrator, PageMaker, Photoshop, and Premiere). The cameras and pan/tilt mechanisms in the TV studio were upgraded to a new digital triax system; remote productions equipment was upgraded; and a portable Web-casting rack was designed and deployed. Additionally, the Academic Technology Center successfully Webcast multiple events on campus to the entire world. The first event was “Imagining the Future” where many people across the country viewed the images from the Odeum. The second event was to aid in the launch of WPI’s new marketing campaign. The launch event was simulcast across WPI’s cable TV network, as well as across the globe using the Web. In addition, WPI’s 2002 Commencement exercises were viewable on the Web.

In a partnership with SCT and Blackboard, the Academic Technology Center and Computing and Communication Center (CCC) worked to help develop an event-driven interface/system to transfer information immediately from the SCT Banner software application to the Blackboard community and Learning Portal software. WPI was one of thirty schools selected to participate in the Blackboard 6.0 beta testing program.

Finally, the Academic Technology Center and the CCC are in the process of building a new multi-function, triple projection, video conferencing annex. The Lower Wedge is being renovated to accommodate a space that will house WPI’s Access Grid node, the ability to IP and ISDN video conference, and the
ability to project three unique sources to an audience of approximately 24 people. The facility is scheduled to open in early 2003.

- Maintain an inventory of suitable notebook computers for use by faculty, students, and staff participating in off-campus activities.

  **Status:** In FY00, $84,000 was allocated to sustain a notebook inventory necessary to meet mobile computing needs of our growing off-campus programs. To keep inventory current, reduce costs, and place more notebooks in the hands of faculty and students, the entire inventory is turned over about every 18 months, selling the used machines to the campus community at 50-60 percent of purchase price. In FY01, $89,000 was allocated and in FY02, $76,000 was allocated. This same level of funding is anticipated for the near term.

  In response to the concerns of overseas travel in the wake of 9/11, and to assist the IGSD in providing a safe project experience, the Academic Technology Center added over 170 global mobile phones to its inventory. This provides a measure of security for the students.

- Construct a Global Classroom in the planned new academic building to allow distance learning and multimedia classroom technologies to unite WPI’s worldwide operations.

  **Status:** Two state-of-the-art distance education classrooms were designed for the new academic building (now on hold). Designs for the additional classrooms and computer labs in this building were completed. Capabilities included front or rear projection, high-quality audio, video cameras, computers, network access for each student, slide, VCR, document, DVD/CD projection, projection screens, acoustics, and numerous other IT items. Consideration is currently being given to renovating the large classroom in Fuller Labs to provide these facilities, as well as two other classrooms.

- Employ next generation application software developed as part of the Internet2 initiative for distance learning, real-time collaboration, virtual laboratories, digital libraries, and instructional management as it becomes available.

  **Status:** Our Internet2 connection via the Goddard GigaPoP became live on October 10, 2000. Our current level of connectivity is OC-3 or 155 Mbits/s. The academic building wiring upgrades provide the necessary internal infrastructure for all to take advantage of this resource. We are now marketing Internet2 and commodity Internet connectivity via the GigaPoP to Worcester area colleges and universities, UMASS, UMASS Medical, and corporate partners such as EMC.
Numerous presentations on WPI and Internet2 have been made to the Worcester City Counselors, Metro West Chamber of Commerce, the CIO’s and CFO’s of the Colleges of Worcester Consortium, the Dot.Commonwealth Road show, EMC and other groups. We are holding events to make faculty and staff more aware of what Internet2 has to offer and have numerous discussions with individual faculty members about research opportunities and possible areas of research mentioned in our NSF high performance grant award.

We continue to attend Internet2 member meetings and demonstrations, and to explore Internet2 applications and middleware initiatives, including the Access Grid, the high performance computing Alliance, Distributed Storage Initiative, NLANR Joint Techs meetings and the planning of an Internet2 day.

In spring 2002, we started meeting with area universities to try to stimulate interest in application for an NSF grant to help them connect to Internet2. Although they did not organize themselves in time to apply for a grant in that cycle, we have continued to meet. The group has decided to be called the Goddard Collaborative and has a better chance at participating in another NSF grant, which has just been announced. They plan to incorporate the collaborative so that it can receive grants that could be used to help establish better networking infrastructure in the area and help them connect to Internet2. A subcommittee established at the last meeting on January 23, 2003, will be working on the grant application. The Goddard GigaPoP would be their connection point to Internet2. The last three meetings were at Assumption, Olin, and WPI, and the next one will be at the Antiquarian Society, giving a sample of the institutions participating.

In fall 2002, installation of the WPI Access Grid node and the Networks Operations Center began in the Lower Wedge, which was renovated extensively to accommodate the new occupants. These renovations to the facility took longer than expected. The Academic Technology Center is currently working on the complex AV system and a demonstration of the facility is scheduled for the Trustee Technology Committee in February 2003 with a more “public” launch occurring sometime shortly thereafter.

3. Conclusions

As I hope is clear from this report, we have made considerable progress towards achieving our goals and objectives. Several of the action plans associated with specific objectives have been completed, others are far along, and some remain just out of reach. Given that this is just the fourth year into the ten-year plan, overall we can take satisfaction in knowing the effort involved in its creation was worthwhile.

Naturally, events have not evolved completely as expected. The dramatic change in the economy and the events of September 11, 2001, certainly impacted
our ability to implement all of our plans. Still, WPI is stronger today than four years ago by nearly any measure, and especially in the quality of its human resources and infrastructure.

We will continue to make adjustments in carrying out the Strategic Plan, modifying both rates of change and directions, as dictated by circumstances. I believe the plan remains valid in terms of its goals and objectives. If we were to choose to undertake the development of another strategic plan at this time, I suspect it would retain very similar statements.

I want to thank the WPI community for supporting the efforts to achieve the aspirations it set forth in the document approved by the Board of Trustees in May 1999. I look forward to more progress and accomplishments in the future.
Appendix

Performance of Academic Departments
1. Introduction

In Section 2.6 of the Strategic Plan, a set of performance measures is set forth to help assess our progress in implementing the various actions associated with the goals and objectives. Table 2.3 therein addresses fiscal accountability, and has been the basis for reports issued annually to the Board, FAP, and various administrators that compare WPI and several other related institutions using various operating and financial-strength ratios. The other metrics specified in the Strategic Plan are listed in Tables 2-4 through 2-8, and are replicated below for reference. They are the basis for departmental assessments that follow.

### Table 1-4. Goal 1: Enhance the Quality of WPI’s Academic Programs

<table>
<thead>
<tr>
<th>Outcome Objectives</th>
<th>Performance Measures</th>
<th>Responsible Parties</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Fully develop the WPI Plan for all students around an “honors college” metaphor at all levels.</td>
<td>Faculty size; number National Merit Scholars; ranking of undergraduate program; impact of first year; curriculum improvements; graduation rate; practice graduate program statistics; IQP quality; learning outcomes; number large (&gt;35) classes.</td>
<td>Provost’s Office; Admissions Office; Faculty Governance.</td>
</tr>
<tr>
<td>1.2 Develop aligned incentives for faculty and staff to promote action plans.</td>
<td>Faculty diversity; faculty and staff salaries compared to benchmarks; employee satisfaction; effectiveness of reward system.</td>
<td>Provost; Director of Human Resources; Assistant VP Student Affairs; Multicultural Awareness Staff Member; Faculty Governance.</td>
</tr>
<tr>
<td>1.3 Provide increasing opportunities for student involvement in research.</td>
<td>Number students in summer research; impact of graduate fellowships.</td>
<td>Associate Provost.</td>
</tr>
<tr>
<td>1.4 Maintain contemporary teaching laboratories.</td>
<td>Adequacy of funding for equipment and instrumentation maintenance and renewal; average age statistics.</td>
<td>Property Administrator; Provost’s Office; Dean, Division of Continuing Studies.</td>
</tr>
</tbody>
</table>

---

3 These reports are also located on myWPI in the Marketing and Operations Planning organization.
<table>
<thead>
<tr>
<th>Outcome Objectives</th>
<th>Performance Measures</th>
<th>Responsible Parties</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Improve the quality and diversity of the student body.</td>
<td>Admissions parameters; undergraduate geographic composition; distribution of majors; number applications from independent high schools; percentage minorities and women; percentage of students receiving financial aid.</td>
<td>Admissions Office; Director, Financial Aid; Assistant VP Student Affairs.</td>
</tr>
<tr>
<td>2.2 Support the faculty’s efforts in research and scholarship.</td>
<td>Impact of thrust areas on faculty and graduate student recruiting; annual research expenditures; number proposals and awards; number publications; faculty and graduate student support levels; AACSB accreditation status; average course load for faculty; minimum and mean GRE scores; annual number Ph.D. graduates; number full time graduate students; annual research expenditures per faculty member; amount of Indirect Costs recovered.</td>
<td>Associate Provost; Thrust Area Directors; Academic Department Heads; Director, Plant Services.</td>
</tr>
<tr>
<td>2.3 Develop creative partnerships with industry, organizations, and other universities.</td>
<td>Number of partnerships; value added; statistics associated with Silicon Valley center and other new ventures.</td>
<td>Provost Office; Dean, Division of Continuing Studies; VP University Relations.</td>
</tr>
<tr>
<td>2.4 Continue to develop a comprehensive base of programs through aligned resource allocations.</td>
<td>Student participation in humanities and arts programs; status of academic programs; alumni satisfaction with preparation; percentage and average gift value of alumni participation in Annual Fund; endowment per student; payroll per student credit hour delivered.</td>
<td>Provost’s Office; Faculty Governance; VP University Relations.</td>
</tr>
<tr>
<td>2.5 Expand opportunities for synchronous and asynchronous networked learning.</td>
<td>Number students involved in distance learning; number courses offered; number companies participating.</td>
<td>Dean, Division of Continuing Studies; Provost’s Office; VP Information Technology.</td>
</tr>
<tr>
<td>2.6 Conduct a comprehensive image-building and marketing effort.</td>
<td>Uniformity of publications; name recognition; changes in number of applications; geographic base of applicant pool.</td>
<td>University Relations; Dean, Division of Continuing Studies.</td>
</tr>
</tbody>
</table>
Table 1-6. Goal 3: Establish WPI as a Leader in Global Technological Education

<table>
<thead>
<tr>
<th>Outcome Objectives</th>
<th>Performance Measures</th>
<th>Responsible Parties</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 <em>Expand participation by students and faculty in the Global Perspective Program.</em></td>
<td>Dollar value of scholarship fund; faculty involvement; number projects conducted at global sites; number faculty and students involved with sister institutions.</td>
<td>VP University Relations; Provost’s Office; Faculty Governance, Dean, IGSD.</td>
</tr>
<tr>
<td>3.2 <em>Make the transition from multinational sites to a global system.</em></td>
<td>Number teams involving remote sites; degree of integration of global sites.</td>
<td>Dean, IGSD.</td>
</tr>
</tbody>
</table>

Table 1-7. Goal 4: Improve WPI’s Campus Culture and Community Presence

<table>
<thead>
<tr>
<th>Outcome Objectives</th>
<th>Performance Measures</th>
<th>Responsible Parties</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 <em>Construct and renovate facilities to accommodate social and academic activities and solve the parking problem.</em></td>
<td>Funds available; adherence to construction timetable.</td>
<td>VP University Relations; VP Student Affairs; Assistant VP Student Affairs; VP Administration; Director, Plant Services.</td>
</tr>
<tr>
<td>4.2 <em>Improve ethnic and gender diversity in our community.</em></td>
<td>Quality of life on campus; role and value of support groups.</td>
<td>VP Student Affairs; Assistant VP Student Affairs; Multicultural Awareness Staff Member.</td>
</tr>
<tr>
<td>4.3 <em>Provide a safe environment for our community that fosters learning and development with appropriate alternatives to alcohol and drug abuse.</em></td>
<td>Safety statistics; number violations of alcohol and drug policies; results of CORE Alcohol and Other Drug National Survey; results from Higher Education Research Institute National Survey.</td>
<td>Director Public Safety; Campus Safety Officer; Assistant VP Student Affairs; Healthy Alternatives Office.</td>
</tr>
<tr>
<td>4.4 <em>Expand efforts to meet the needs of adult learners.</em></td>
<td>Net revenue; numbers of faculty and students involved.</td>
<td>Dean, Division of Continuing Studies; Director, ADLN; Academic Department Heads.</td>
</tr>
<tr>
<td>4.5 <em>Enhance the Career Development Center.</em></td>
<td>Number students and employers involved; placement rates; number of alumni participating.</td>
<td>Director, Career Development Center; VP Student Affairs; VP University Relations.</td>
</tr>
<tr>
<td>4.6 <em>Maintain facilities and surrounding peripheral properties according to master plan.</em></td>
<td>Progress against maintenance plan; deferred maintenance balance; state of grounds and facilities; neighborhood relations.</td>
<td>Director, Physical Plant.</td>
</tr>
<tr>
<td>4.7 <em>Enhance support for K-12 system and the local community.</em></td>
<td>Number programs; number participants; summer program net revenue; number students in teacher certification program.</td>
<td>Provost’s Office; Dean, Division of Continuing Studies; Assistant VP Student Affairs; Director Minority Affairs; VP University Relations.</td>
</tr>
<tr>
<td>Outcome Objectives</td>
<td>Performance Measures</td>
<td>Responsible Parties</td>
</tr>
<tr>
<td>--------------------</td>
<td>----------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>5.1 Improve library resources, services, and facilities.</td>
<td>Relocation of Mass Academy; library budget constraints; number projects involving digital library; off-campus usage statistics.</td>
<td>Associate Provost; Director, Gordon Library; VP University Relations; Director, Plant Services; Faculty Governance; VP Information Technology.</td>
</tr>
<tr>
<td>5.2 Establish state-of-the-art computing resources and network performance.</td>
<td>Network capacity; Internet usage statistics; modes of off-campus access; state of computer laboratories and central servers.</td>
<td>VP Information Technology; VP University Relations; Provost’s Office.</td>
</tr>
<tr>
<td>5.3 Create and maintain sufficient electronic classrooms to support on- and off-campus programs.</td>
<td>Usage rate of IT in classes; state of electronic classrooms; notebook computer usage rates.</td>
<td>Director, Plant Services; Director, Instructional Media Center; Provost’s Office; Director, CEDTA.</td>
</tr>
</tbody>
</table>
2. **Biology and Biotechnology Department**

   *Objective 1.3 Provide increasing opportunities for student involvement in research.*

   **Performance:**

   - BB instituted five concentrations within a single major (Biology and Biotechnology) to more clearly define the academic program.
   - Under the umbrella of pre-health, BB continued to be responsible for assisting students in finding projects at the UMMC and TUSVM project centers.

   *Objective 1.4 Maintain contemporary teaching laboratories.*

   **Performance:**

   - To help bring teaching labs up to contemporary standards, BB submitted a CCLI A&I proposal to purchase new equipment, including computers for our modular teaching lab. While it was not funded, we were encouraged to resubmit this year.

   *Objective 2.1 Improve the quality and diversity of the student body.*

   **Performance:**

   - BB continues to have the only department with >50 percent women! In support of the Gender Equity proposal submitted to NSF, one faculty member authored a section on freshman advising and two volunteered to mentor students in the summer research part of the proposed program.

   *Objective 2.2 Support the faculty’s efforts in research and scholarship.*

   **Performance:**

   - Several members of the BB department belong to thrust areas and continue to write grants in both the life science and environmental areas.
   - BB submitted grants to several federal agencies including NASA, NIH, NSF, and Sea Grant.

   *Objective 2.4 Continue to develop a comprehensive base of programs through aligned resource allocations.*
Performance:

- BB again was the recipient of a number of donations from Pfizer, including equipment and supplies. All of this was organized through a BB alumnus.

Objective 4.2 Improve ethnic and gender diversity in our community.

Performance:

- One faculty member in BB is entering her third year as an Insight Advisor. One served as an advisor in the past academic year, and another has volunteered for the upcoming year.
3. Biomedical Engineering

*Objective 1.1* Fully develop the WPI Plan for all students around an “honors college” metaphor at all levels.

**Performance:**

- Implemented significant curriculum revisions over the past year in preparation for ABET accreditation.

- All undergraduate (UG) class sizes below 35 except for Introduction to Biomedical Engineering (BE 1001) which also contains a number of non-BE majors (approximately 12 out of a total of 48 in the class).

- Incorporation of learning outcomes into the BE UG curriculum in preparation for the ABET accreditation visit in December of 2002.

*Objective 1.2* Develop aligned incentives for faculty and staff to promote action plans.

**Performance:**

- Attempting to recruit women faculty member in current BE Department faculty search.

- Equity increase in salary of BE Department Laboratory Manager in FY02 to be more competitive with candidates with comparable job descriptions.

- Equity increases in faculty salaries at all levels to be more competitive with peer institutions.

*Objective 1.3* Provide increasing opportunities for student involvement in research.

**Performance:**

- Number of UG BE students in summer research programs has increased due to more students enrolled in BS/MS program.

- Number of graduate students applying to the Joint Ph.D. Program in Biomedical Engineering and Medical Physics (in conjunction with UMass) has increased yielding admission of higher quality candidates and an increase in the total number of Ph.D. students associated with the BE graduate program.
Objective 1.4 Maintain contemporary teaching laboratories.

Performance:

• Significant investments in the BE Department infrastructure include: (1) Approximately 2000 square feet on the 4th floor of Salisbury Laboratory was renovated (at a cost of ~$500,000) during the 1999-00 AY for BME teaching and faculty research laboratories; (2) Approximately 1000 square feet on the 1st floor of Salisbury Laboratory was renovated (at a cost of ~$200,000) during the 1999-00 AY for a new BE Department office; (3) Approximately 1000 square feet on the 3rd floor of Salisbury Laboratory was renovated (at a cost of ~$350,000) during the 2000-01 AY for two BE faculty research laboratories; and (4) Approximately $100,000 has been invested over the past three years to upgrade our animal-holding facility and small-animal-surgery teaching laboratory on the 3rd floor of Salisbury Laboratory.

Objective 2.2 Support the faculty's efforts in research and scholarship.

Performance:

• Impact of Life Science and Bioengineering thrust area has been leveraged into the Bioengineering Institute with improved research opportunities for BE faculty and additional support for BE graduate students.

• Increased funding opportunities through the Bioengineering Institute should increase annual research expenditures, the number of proposals submitted and resulting awards, the number of associated research publications, as well as the faculty and graduate student support levels.

• Support for BE graduate students has increased through the funding of 15, 3-year GAANN awards (to Profs. Peura and Sotak) from the Department of Education over the past five years.

• Recent Whitaker funding to Prof. Ross Shonat provides summer and academic year salary support for the PI as well as graduate student support (support from this grant contributed $10,534 to reimbursed salaries in the FY ’02 BE Department budget as well as 20 percent IDC to WPI).

Objective 2.3 Develop creative partnerships with industry, organizations, and other universities.

Performance:

• Developed 3-year collaborative partnership with AstraZeneca Pharmaceuticals that resulted in a $529,648 award (Prof. Sotak).

• Developed industrial internship programs with support from The Whitaker Foundation (Prof. Peura).
• Prof. Peura is also responsible for the BE Department Project Center that develops new MQP project opportunities for BE students with UMass Medical School, Tufts University Veterinary School, Silicon Valley Project Center as well as industrial entities.

• Developed the Joint Ph.D. Program in Biomedical Engineering and Medical Physics with the Graduate School of Biomedical Sciences at UMass Medical School (will be admitting our third year of students into the program which currently has five Ph.D. students enrolled).

Objective 2.4 Continue to develop a comprehensive base of programs through aligned resource allocations.

Performance:

• Conducting surveys of alumni satisfaction as part of BE Department ABET preparation.

Objective 3.1 Expand participation by students and faculty in the Global Perspective Program.

Performance:

• Developed first BE MQP project with Silicon Valley Project Center.

Objective 4.4 Expand efforts to meet the needs of adult learners.

Performance:

• Conduct most graduate courses in the evening and offer them once/ per week in order to better accommodate working students.

• All BE faculty are involved in teaching at least one graduate course that can be taken by adult learners (although working students that actually take advantage of these courses has declined in recent years).
4. Chemistry and Biochemistry

Objective 1.1 Fully develop the WPI Plan for all students around an “honors college” metaphor at all levels.

Performance:

- We have hired three new faculty members in the past three years, all with strong/promising research potential, which addresses both Goal 1, Objective 1.1 (faculty size) and Goal 1 Objective 1.3 (opportunities for students in research). Notably, CBC is making an effort to hire in two focus areas, which impact greatly on the thrust areas outlined in the strategic plan. Thus, we hired one faculty member in the area of biochemistry (Thrust Area- Life Sciences) and we hired two in the area of molecular design and synthesis with specific emphasis on crystal engineering (Thrust Area- Materials).

- We have designed and put in place a term-long research project, The Amino Acid Project, which now serves as the laboratory portion of CH1030. This addresses Goal 1, Objective 1.1 (impact of first year, curriculum improvements).

- We have designed and put into place a term-long research project, The Transition Metal Project, which provides the content of CH2670, Experimental 4. This addresses Goal 1, Objective 1.1 (curriculum improvements).

- We have changed our Undergraduate Project Presentation Day to a poster session, which helps to promote interest and involvement by all students and faculty. Previously, we ran parallel sessions for chemistry and biochemistry, which limited participation by faculty and students. It also limited discussion and presentation of each to only 10-15 minutes. This addresses Goal 1, Objective 1.1 (curriculum improvements).

- We now run a graduate student poster session on the same day as Project Presentation Day. The posters are judged and a prize is awarded. It helps to promote interest and involvement by all students and faculty and it contributes to a much richer academic environment. Faculty and students are now much more aware of what is happening in their colleagues’ laboratories.

- We have redesigned and implemented our approach to teaching general chemistry, reducing class size from ca. 360 to ca. 90 students, which addresses Goal 1, Objective 1.1 (impact of first year; number large classes).
Objective 1.2 Develop aligned incentives for faculty and staff to promote action plans.

Performance:

- With respect to this goal the department drafted a vision statement and we track our progress in a number of key areas. A draft version of the tracking document is attached at the end of this report.

Objective 1.3 Provide increasing opportunities for student involvement in research.

Performance:

- In the last five years at least 22 undergraduate students completed externally funded summer research programs in our department.

- Faculty members like Professor Kris Wobbe and Jim Dittami regularly direct undergraduate research activity in their lab, which does not count for credit (non MQP). Professor Wobbe supported and trained four undergraduates in her lab this past year and has signed on two for the coming year. Professor Dittami also supported and trained two undergraduates in the past year. Many of these students come to us under the CBC Scholars program. This is a merit scholarship that is offered to incoming students. The impact is to increase the number and quality of our student body. Over the last four years we have had 18 CBC scholars, of which nine entered in the current year!

- Hughes Proposal- (see below)- A proposal was submitted to the Howard Hughes foundation that fits a number of goals and objectives, including maintaining contemporary research laboratories, providing opportunities for student research, improving the quality and diversity of the student body, supporting research, improving our technical education, and expanding our educational resources.

Objective 1.4 Maintain contemporary teaching laboratories.

Performance:

- We have steadily upgraded equipment in the general chemistry and sophomore labs to provide a contemporary laboratory experience, which addresses Goal 1, Objective 1.4. This includes investments of over $100,000 in laboratory equipment.

- A proposal to the Howard Hughes foundation was submitted by Professor Wobbe requesting $2,168,000 over four years to do in part extensive laboratory renovation in Goddard Hall and to Salisbury labs.
Objective 2.1 Improve the quality and diversity of the student body.

Performance:

- The CBC Scholars program, a merit scholarship offered to incoming students, was implemented by Admissions to increase the number and quality of students selecting a major in chemistry or biochemistry. As a direct result of this program, we have attracted at least 18 CBC scholars over the last four years. Interestingly, the program is gaining in popularity. Thus, of the 18 CBC scholars, nine entered our program in the current year!

Objective 2.2 Support the faculty’s efforts in research and scholarship.

Performance:

- Over $1,000,000 in salary and set-up funds have been committed to new faculty in the department over the last four years.

- The graduate student population in the department has increased from 11 in 1997/98 to a current level of 26, and it rose to a level as high as 29 in 2000/01.

- This year only 60 percent of our graduate students are supported on teaching assistantships, which is close to our goal of 50 percent.

- For the first time in some 18 years, three different faculty members are supporting a total of four graduate students with external funds.

- The number of postdoctoral research associates in the department has risen from none in 1996 to at least three per year in the department for every year from 1998 to the present.

- The CBC department has graduated four Ph.D. students from 1999-2001 and anticipates three will graduate in the current year.

- The number of graduate students signed up for the Ph.D. program in the department is now at least half (10 students).

- The number of faculty in the department actively submitting proposals continues to be at a high level, with eight submitting in 2001. The number ranges from six to nine faculty members submitting in any given year from 1997-2001.

- From four to six faculty members received at least one grant for each year from 1997-2001.

- From six to ten faculty members published at least one paper for each year from 1997-2001.
The department continues to graduate a healthy number of M.S. students, with eight graduating in 1999 and seven in the year 2000. We anticipate at least five will graduate this year.

Research expenditures range from a low of $163,082 to a high of $632,000 for the period 1996-2001.

Notably, although the number of proposals submitted this year is down by about three from last year, the dollars requested was up over $500,000.

Awards received this year were up to $218,498 compared to only $57,000 last year.

Overall the number of proposals submitted by the department has increased greatly. Thus in the three year period 1996-1998 approximately 30 proposals were submitted compared to 77 in the three year period 1999-2001.

Objective 2.3 Develop creative partnerships with industry, organizations, and other universities.

Performance:

Over $340,000 in funding over the last four years from Bayer Business Group Diagnostics for support of research, graduate students, and postdoctoral research associates in Prof. McGimpsey’s laboratory.

Over $200,000 in funding from BASF Bioresearch for support of research in Professor Dittami’s lab.

Over $200,000 in funding since 1996 from Pfizer for the support of graduate students in chemistry (two which were in Professor Dittami’s lab).

Over $100,000 in funding from Pfizer and from Pharmacia & Upjohn since 1996 for the support of undergraduate research both in the summer and during the academic year.

An Organic Synthesis Symposium series was started in about the last three years with funding from both the American Chemical Society Petroleum Research Fund and Organic Syntheses (a professional publication).

Objective 2.6 Conduct a comprehensive image-building and marketing effort.

Performance:

Our biochemistry laboratory and Professor Kristin Wobbe were featured in the most recent WPI television advertisement.
Faculty in CBC and BBT hosted the Northeast Regional Meeting of the American Society for Plant Physiology here at WPI in May 2001. This was an excellent opportunity to display our research activity and the benefits of our campus. In addition, we invited several internationally known scientists to our campus to give the symposium addresses. We send a number of graduate and undergraduate students to this meeting every year. This year, two undergraduates and five graduate students from the CBC department attended presenting four posters.
5. Civil and Environmental Engineering

*Objective 1.1 Fully develop the WPI Plan for all students around an “honors college” metaphor at all levels.*

**Performance:**

- Faculty size: A chaired position (White Chair) was added to the CEE Department in 1999. The overall number of CEE tenure track positions, however, has remained constant due to the loss of one line (DeFalco retirement). A second faculty member has reduced his CEE Department involvement (Fitzgerald), which effectively further reduces the number of tenure track positions available for teaching and scholarship activities. Hopefully in the near future budget issues will allow us to recover from these losses.

- Impact of first year: CEE offers an introductory civil engineering course (CE1030 – Introduction to Civil Engineering and Computers), which has been very popular with our students and is proving to be most useful for introducing new topics, such as ethics, professional responsibility, writing and asphalt technology. Professors Salazar, Albano, and Mathisen have been heavily involved with freshman advising programs (first reach).

- Curriculum improvements: A reorganization of the undergraduate curriculum chart was accomplished during the spring of 2000 to aid students in planning their academic program. This chart clearly identifies a set of introductory courses that the faculty has designated to contain fundamental engineering science knowledge, and is directly related to materials covered in the Fundamentals of Engineering Examination.

- The freshman CEE course series (CE2000, 2001 and 2002 has been completely reorganized according to:
  - Integrate material across the three courses.
  - Reinforce key concepts, such as free-body diagrams, by repetition.
  - Introduce design experiences within each course, including a term-ending project.
  - Emphasize learning and applying concepts to new problems outside of the classroom and the textbook examples.
  - Improve student attitudes and satisfaction with the sophomore-level courses.
  - Increase exposure to the analysis and design of indeterminate structures without compromising the coverage of topics in other areas.

- The transportation engineering course sequence (CE3050, 3051) has been reorganized to focus on contemporary transportation issues, make better use of the text and the expertise of the faculty teaching the course. Two new
courses (CE 3054 – Asphalt Technology and CE305x – Impact Analysis) have also been added to the undergraduate transportation-engineering curriculum.

- Three civil engineering laboratory courses (CE3026, CE3054, and CE4060) have been substantially restructured to make use of the new state-of-the-art facilities available through the Keck Foundation equipment grant ($500,000) and the civil engineering department laboratory renovation project ($1,200,00).

- The ADLN program now offers a minimum of four environmental engineering courses per year, making it possible for a student to receive an MS completely through distance learning in less than three years. The complete CEE ADLN program is detailed at www.wpi.edu/+CEE/ADLN/.

- IQP quality: CEE faculty members play major roles as advisors in several off-campus project centers, including, Boston, Worcester, Costa Rica, London, and Venice.

- Learning outcomes: The civil engineering department developed a comprehensive outcomes assessment process that:
  - Monitors outcome achievements of individual students,
  - Analyzes the collective performance of undergraduate classes,
  - Involves the entire undergraduate teaching faculty in all stages of the process (development, data collection, analysis and corrective action), and
  - Is designed to be a sustainable process.

- The biennial MQP review also provides valuable data on a broad range of our program outcomes. Past MQP reviews as well as descriptions of past reports may be found at www.wpi.edu/+CEE/mqp_index.html/.

**Objective 1.2 Develop aligned incentives for faculty and staff to promote action plans.**

**Performance:**

- Faculty diversity: The CEE Department currently has one female faculty member.

- Faculty and staff salaries compared to benchmarks: Significant increases over the past several years have been realized. These increases have been very effective in making it possible for the CEE Department to attract highly productive faculty members. Faculty start-up along with new laboratory facilities has also proved to be effective in attracting new highly productive faculty members.

- Employee satisfaction: Faculty satisfaction among the more active members is good. Faculty members with evidence of low performance ratings are
certainly not happy with a metric system that is based on actual productivity rather than perceived productivity. Among the staff, there is a general feeling of confusion, as there appears to be little relation to the tightened assessment process and limited reward outcome.

- Effectiveness of reward system: The faculty assessment model, used by the CEE Department for the last four years is now well established and clearly understood by the department. The relationship between performance and reward, although not always graciously accepted, especially by faculty members with low performance records, is very clear.

*Objective 1.3 Provide increasing opportunities for student involvement in research.*

**Performance:**

- Number of students in summer research: Active research faculty members have routinely made efforts to obtain summer student support. Graduate student support has primarily been sought through external sources, while undergraduate student support has primarily been sought through internal sources. The success rate for internal requests has been about 50 percent. It would be very helpful if this percentage could be increased.

- Impact of graduate fellowships: Applications for institute-sponsored fellowships have not been high. There is and perceived disconnect between these awards and specific faculty focuses scholarship programs. In other words, faculty members do not see fellowship sponsorship as a clear benefit to scholarship programs. It is more of an individual student award system that will not necessarily benefit a scholarship program.

*Objective 1.4 Maintain contemporary teaching laboratories.*

**Performance:**

- Adequacy of funding for equipment and instrumentation maintenance and renewal: All laboratories in the civil engineering department (environmental, impact analysis, materials/structure analysis, asphalt technology, and computers) are considered teaching laboratories. The recent upgrade of these facilities has made tremendous improvements for these teaching facilities. The present operating budget allocation for maintenance and renewal, however, is very low and will certainly be felt in the future as this new equipment ages. The present high laboratory support demands places a strain on other operating budget needs.

- Average equipment age statistics: Most of the laboratory equipment in Kaven Hall is under three years old, due to the Keck equipment grant, start-up funds for new faculty, and other equipment grants received by individual faculty
members. The laboratory facilities have been recently upgraded. The geotechnical engineering laboratory, however, is in an extreme state of decline.

**Objective 2.1 Improve the quality and diversity of the student body.**

**Performance:**

- Undergraduate Student Recruitment: Professors Albano, Plummer and Mathisen have been actively involved with undergraduate recruitment and open house activities. Details on the undergraduate recruitment program may be found at [www.wpi.edu/+CEE/Undergrad/open_house.html](http://www.wpi.edu/+CEE/Undergrad/open_house.html)

**Objective 2.2 Support the faculty’s efforts in research and scholarship.**

**Performance:**

- 2000–2001 Scholarship Activities:
  - Eight Active Research Projects: ($ 390,520)
  - Refereed Publications: (28)
  - Non-refereed Publications (27)
  - Twenty Grant Applications

- 2001 – 2002 Scholarship Activities
  - Fourteen Active Research Projects: ($ 362,400)
  - Refereed Publications: (21)
  - Non-refereed Publications (5)
  - Twenty-eight Grant Applications

- Faculty and graduate student support levels: Substantially more RA support is needed; this must come from increased grant income generated by individual faculty members.

- Minimum and mean GRE scores: Few CEE applicants (particularly few US citizens) submit GRE scores.

- Annual number Ph.D. graduates: Historically, CEE has graduated very few Ph.D. students. Hopefully, this number will improve with increased scholarship activities noted in the last four years.

- Number full time graduate students: As shown in the table below, the number of graduate students has declined in recent years. This may be due partly to the increased opportunity for employment. A supply/demand situation is clearly being felt in the profession and increased job opportunities are drawing students away from advanced study options.
Objective 2.3 Develop creative partnerships with industry, organizations, and other universities.

Performance:

- Considerable outreach efforts have been suggested to the CEE Faculty through CEE Department Advisory Board Meetings. In the pavement research area, WPI has created partnerships with a number of industries, State Departments of Transportation (DOT) and universities for initiating and conducting research and for implementation of results of research. In partnership with Maine DOT, University of Massachusetts at Dartmouth (UMASS-D) and Massachusetts Highway Department (MHD), WPI had sent in problem statements to the New England Transportation Consortium (NETC), three of which have been selected in the last four years. WPI, in partnership with UMASS-D, has been successful in procuring all of these three projects, in addition to a fourth one, which was initiated by New Hampshire DOT. WPI has been working with UMASS-D in the initiation of a pooled fund project, funded jointly by MHD and Rhode Island Department of Transportation (RI DOT). The first of these projects has been approved, and is in the process of being awarded. WPI has been partnering with Maine DOT since 2000 in procuring research funds from the Federal Highway Administration (FHWA) sponsored Recycled Materials Resource Center (RMRC) at University of New Hampshire - Maine DOT has been cost sharing a considerable amounts of these funds. One of the bigger projects involved work with the National Center for Asphalt Technology at Auburn University and Albany (NY) based Gorman Brothers, Inc. WPI has been actively engaged in partnership with the private industry in conducting research and implementing research results. Notable examples are collaborative work with Massachusetts (MA) based Aggregate Industries (formerly Bardon Trimount) in conducting research on use of manufacture waste shingles in hot mix asphalt, procurement of accelerated pavement testing equipment with Palmer Paving Cooperation (MA), and research work on testing equipment with IntroTek. WPI also worked with Edwards and Kelcey (MA) and Bowker Consulting (MA) in submitting a proposal on development of better airfield pavement mix to Massachusetts Port Authority (MassPort). Recently, WPI has established a partnership with GeoTesting Express (MA) and Tufts University (MA) for conducting research on the use of recycled plastics in hot mix asphalt. With in-kind contribution of materials from Connecticut and New Hampshire DOTs, and equipment from North Carolina based InstroTek, Inc,
WPI is currently conducting research work on development of a test procedure for evaluation of stripping of aggregates.

Objective 2.4 Continue to develop a comprehensive base of programs through aligned resource allocations.

Performance:

- CEE Alumni Committee: An on-line alumni committee has been formed to receive feedback and to increase alumni awareness of the CEE Department operations. A complete description of this committee and its mission may be found at [www.wpi.edu/+CEE/Alumni_Committee/](http://www.wpi.edu/+CEE/Alumni_Committee/).

Objective 2.5 Expand opportunities for synchronous and asynchronous networked learning.

Performance:

- Considerable efforts have been expended to increase the CEE ADLN program Enrollments and courses offered are summarized in the below table. The standard method of instruction has been video taped with Web sites used to supplement lecture materials. During the summer of 2002, activities are planned to develop virtual laboratory tours and experiments.

<table>
<thead>
<tr>
<th></th>
<th>1999-00</th>
<th>2000-01</th>
<th>2001-02</th>
</tr>
</thead>
<tbody>
<tr>
<td>students</td>
<td>Fall</td>
<td>Spring</td>
<td>Fall</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>36</td>
<td>27</td>
</tr>
<tr>
<td>courses</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Objective 2.6 Conduct a comprehensive image-building and marketing effort.

Performance:

- Department Newsletter: is distributed to all CEE Alumni and is also available on the Web at [cee.wpi.edu/newsletter_01/](http://cee.wpi.edu/newsletter_01/).

- Department Annual report: is delivered to all advisory board members and is also available on the Web at [cee.wpi.edu/00_011/](http://cee.wpi.edu/00_011/).
Objective 3.1 Expand participation by students and faculty in the Global Perspective Program.

Performance:

- Faculty involvement: CEE faculty members are involved in the global program. Professors Salazar and Pietroforte have participated in the Costa Rica program. Professors Ray and Plummer will soon participate in the London program.
6. Chemical Engineering

*Objective 1.1 Fully develop the WPI Plan for all students around an “honors college” metaphor at all levels.*

**Performance:**

- Faculty size: One new line was added two years ago, and a Chaired position is likely to be filled this year, in addition to replacing a retired faculty member last year. However, we lost one faculty member this year, so that the net increase will be only one, with 11 total faculty members.

  **Aspirations:** The faculty size is still small, and the faculty is stretched. Long-term goal is to reach the average faculty size (14.91) of chemical engineering departments ranked by the NRC in the second quarter.

- First year: We have added a new first-year course this year to introduce CM majors and others interested to chemical engineering. A CM faculty member is also an Insight advisor. The AIChE chapter is becoming more active to provide a greater sense of community.

  **Aspirations:** It is hoped that this course would positively influence our image on campus and, hence, enrollment and introduce those interested to the discipline early on.

- Curriculum improvements: The major improvement in the UG program has been the introduction of the spiral curriculum at the sophomore level following a careful study for which three CM faculty members received the Corcoran award. New recent courses at the UG and graduate levels to maintain a contemporary curriculum include: CM 321X Introduction to Biochemical Engineering; CM 580 Transformation and Transport in Environment; CM 580 Fuel Cell Technology. Experiments have been added in some UG courses. The format of the Ph.D. Qualifying Exam has been improved.

  **Aspirations:** More experiments need to be added in some UG courses. Our discipline seems to be at cross-roads, with job opportunities shrinking in traditional areas and growing in others. What impact this has on the curriculum needs to be carefully evaluated and implemented.

- IQP quality: A number of CM faculty members are involved as director or advisor at off-campus project centers, including Venice, London, Washington, and Hong Kong.

  **Aspirations:** CM faculty members need to be more involved with on-campus IQPs. We would also like to develop a plan for working on humanitarian projects in less developed countries.
• Learning outcomes: By virtue of ABET’s Engineering Criteria, a program has been designed and implemented to evaluate student accomplishments vis-à-vis our stated program outcomes.

Aspirations: A plan needs to be developed for outcomes assessment to be done on a continuing basis.

Objective 1.2 Develop aligned incentives for faculty and staff to promote action plans.

Performance:

• Faculty diversity: For a short while, three out of the ten faculty members were women. With the departure of one female faculty, we are left with only two.

Aspirations: The issue of diversity in faculty hiring continues to be important.

• Faculty and staff salaries: Significant raises in the past few years have made the CM faculty salaries more competitive, but they are still short of those at peer institutions. We have been able to offer competitive salary and start-up packages to new faculty and have successfully hired two outstanding young faculty members, one of whom received the NSF CAREER award. An exceptional Chaired professor (NAE member) has accepted our offer. However, staff salaries are unattractive, and have caused us great difficulty in filling those positions.

Aspirations: Hopefully, progress will continue to be made on faculty salaries, and staff salaries will also be accorded serious attention.

• Employee satisfaction: The morale among faculty, graduate assistants, and staff is believed to be generally very good.

Aspirations: This requires continuous vigilance and effort to maintain a positive work environment.

• Effectiveness of reward system: The merit evaluation and reward system currently in place is believed to be effective. The faculty merit evaluation is conducted against specific performance metrics in teaching, scholarship, and service.

Aspirations: It is extremely important to improve merit raises for staff.
Objective 1.3 Provide increasing opportunities for student involvement in research.

Performance:

- Undergraduates in summer research: There are very few UG students involved in summer research, although the new UG Summer fellowships program helps. We applied for NSF-REU funding but were unsuccessful.

Aspirations: We should begin to get UGs involved in labs starting at the sophomore level, and not wait until their MQP in senior year. A combined BS/MS program should be promoted. We should reapply for REU program.

- Graduate fellowships: We have made an effort more recently to utilize the graduate fellowship (Institute, Goddard, GM) opportunities available in recruiting students with good results. We have also solicited two fellowships (Dr. Yoo fellowships) for three years from an alumnus ($90 K total). We campaigned for and are grateful for tuition support now offered by WPI to Ph.D. students on fully-funded grants.

Aspirations: The fellowship stipends are not competitive and should be raised. This year all fellowship awardees declined our offer. The procedure of asking the students to apply for fellowships is also unnecessary. They should be considered automatically.

Objective 1.4 Maintain contemporary teaching laboratories.

Performance:

- Equipment and instrumentation renewal: Our Unit Operations Lab, although with much equipment that is aging, is well-maintained, thanks to an excellent lab manager. The provost has provided adequate capital funding for this as well. Safety issues (hoods, neutralization system) in it have been addressed. The UG computers were upgraded last year, with department funds, however.

Aspirations: This needs constant vigilance. We would also like to develop new Process Control Lab experiments.

Objective 2.1 Improve the quality and diversity of the student body.

Performance:

- UG students: The quality and diversity (percent women) of our UGs is good, but the enrollment has declined by 50 percent following national trends plus local increased competition from CS, BME, and BB. In an effort to reverse this, we have greatly improved our Open House presentation, and have introduced a freshman course on Introduction to Chemical Engineering.
Aspirations: Our discipline suffers from a lack of an attractive, high-tech image of a profession that addresses crucial societal issues, e.g., pollution reduction, renewable energy, and biotechnology. Further, it is perceived by students to be a hard major with unreasonable work expectations. Retention at the sophomore level is also a serious issue that needs to be addressed immediately.

- Graduate students: At the graduate level, we have been more successful in improving the quality, diversity, and size of student body. The size is approaching about 30 full-time students, 2/3rds of whom are Ph.D.. We have been able to accomplish this by developing direct linkages to selected international schools.

Aspirations: We plan on increasing the graduate program to 40 full-time students. We plan to develop relationships with NE schools and the University of Puerto Rico (UPRM) for recruitment of more US graduate students.

Objective 2.2 Support the faculty’s efforts in research and scholarship.

Performance:

- Faculty and graduate student support: As mentioned above, even with the anticipated addition of a Chair, the faculty size of 11 is too small and the faculty resources are stretched. Even though the average annual teaching load per faculty is three courses, with MQP and graduate student advising and our active IGSD involvement, this is still too high. Sabbatical leaves encouraged for professional development further exacerbate this.

- The financial resources of department are inadequate to support all TAs over the summer, which is crucial to attracting good graduate students. However, we did institute a largely successful program for rotating TAships every two years to encourage external support for senior students and increase number of RAs. We need to recover a TA line lost last year due to low UG enrollment.

- Thanks to substantial university support, many of the laboratories (GH 017, GH 018, GH023, GH 116, GH 217, GH 218, GH 222, OH 014, OH 015, and OH 017) in the department have been partially or fully renovated and the general quality of laboratory space is improved dramatically. Further, some new lab space (~1,500 sq. ft.) has been added to the department (OH014, OH015, GH217). Machine and Electronics shops have been improved, and an SEM added to department facilities.

- The RDC seed grants are a good start at the university level, but the resources provided are modest.

Aspirations: We hope to be allowed this year to replace the faculty member who left recently, and grow by another two faculty members over the next
couple of years to reduce teaching loads further, to reduce dependence on adjuncts, and to allow sabbaticals. The recent cuts in the department’s operating budget need to be restored for adequate faculty travel and other support. Giving from industry and alumni to department needs to be increased. Research incentive returns to productive faculty need to be increased, e.g., greater proportion of indirect costs plus department contribution to their development account. WPI needs to provide better support for protection and exploitation of faculty and student IP.

Despite renovations and some modest growth in lab space, the space remains woefully inadequate. We long to acquire more laboratory and office space, although the best prospects so far seem to be through the Biotech Institute.

We also need funding to maintain the SEM and XRD owned by the department.

- **Research support:** The grant proposal activity has increased considerably in recent years, as has the department funding. The average annual funding is now at around $130K/faculty.

  **Aspirations:** The funding level needs to be further increased to be commensurate with that of schools in the NRC second quarter.

- **Scholarly productivity:** The average annual productivity figures are around three journal publications and five conference presentations per faculty member. These also need to be higher to be commensurate with that of schools in the NRC second quarter.

- **Graduate program:** Our program is approaching roughly 30 full-time, fully supported graduate students, with roughly 2/3rds in the Ph.D. program. The 9-5 work culture earlier prevalent among graduate students has changed, and our graduate program is on its way to becoming a strong program. CM Ph.D.s have received the Sigma Xi award for research excellence the last two years. Last year we graduated three Ph.D.s, while this year it is four.

  **Aspirations:** It is our objective to be a premiere program in the NE, ranked only behind MIT, and of a quality equivalent of UMASS, Amherst, and those programs in NRC second quarter. Our graduate student stipends are uncompetitive and need to be raised substantially. We plan on graduating 0.4-0.5 Ph.D.s/faculty/year, in accordance with characteristics of schools in NRC second quarter or five Ph.D.s per year with our current faculty size.

We would like to develop a distinctive Ph.D. program (an IGERT proposal has been submitted) with themes adapted from the WPI UG model including co-advisors from other disciplines and industry, an industrial internship, and Advisor Apprenticeship at a WPI international project site.
**Objective 2.3 Develop creative partnerships with industry, organizations, and other universities.**

**Performance:**

- Universities: For recruitment of high quality graduate students, we have developed ties with selected students in France, Jordan, India, and China. A particularly creative partnership in its second year is with ENSIC, Nancy, France, where we have signed an exchange agreement for getting two or three graduate students/year from ENSIC, in exchange for two or three MQP projects there.

  **Aspirations:** We would like to develop a relationship similar to that with ENSIC with the University of Puerto Rico (UPRM). We also need to develop ties with selected NE schools for graduate student recruitment.

- Industry and other organizations: Our active ties with industry are limited but growing. There currently is research funding in the department from Nuvera Fuel cells, W.L. Gore, Engelhard, Hyperion, Howmedia, UTC, and Shell. There also are a number of MQP sponsor relationships. We have started a Fuel Cell Center (FCC) and have recruited three or four dues-paying members ($30K/y) so far. FCC is also developing ties with Mass Renewable Energy Trust (M RET), a state agency.

  **Aspirations:** It is hoped that research ties with industry and especially the FCC industrial membership would grow substantially. We would also like to develop ties with process control and the biotechnology industry in NE. We need to get more industrial representation on our Advisory Board.

**Objective 2.4 Continue to develop a comprehensive base of programs through aligned resource allocations.**

**Performance:**

- Review of academic programs: While both our UG and graduate programs are of excellent quality, we need to evaluate them regularly.

  **Aspirations:** We would like to improve the external perception of our programs and continue innovativeness at both the UG and graduate levels.

- Alumni relations: We have a large number of successful and interested alumni, with whom we have only a limited relationship. A successful initiative was the start of the Bob Wagner fund, kicked-off at an event last fall, attended by 130 alumni. The fund has successfully raised $250K for student development activities.

  **Aspirations:** We need to engage our alumni better, including regular surveys for ABET evaluation of accomplishments of department objectives,
satisfaction with their preparation, and suggestions for improvements. A newsletter for the department needs to be developed. Other ideas include pairing UGs with alumni mentors, and making alumni awards.

Objective 2.5 Expand opportunities for synchronous and asynchronous networked learning.

Performance:

• We currently offer no courses in the evening or on the Web and have no students involved in distance learning.

Aspirations: Even though the traditional chemical industry within driving distance is limited, there are opportunities for evening courses in developing industries, e.g., biotechnology and fuel cell technology, which we should exploit. We also need to explore Web-based courses.

Objective 2.6 Conduct a comprehensive image-building and marketing effort.

Performance:

• Although we have not engaged in a comprehensive and sustained image building and marketing effort, a number of steps have been taken to enhance reputation. These include hosting a Hospitality Suite at a professional meeting, development of a Department Colloquium Series, a highly successful P&G Symposium (which needs to be resurrected following loss of its benefactor from Advisory Board), active faculty participation in professional society meetings and chairing sessions, increasing faculty participation on journal editorial boards. An article on the department was also recently published in *Chemical Engineering Education* in addition to a two-page description in Peterson’s Guide.

Aspirations: With the recent kick-off of a comprehensive and coordinated marketing effort at the university level, the department needs to follow suit. The activities should include substantially better Web page, graduate brochure, etc. We should develop hallway displays on faculty research activities.

Objective 3.1 Expand participation by students and faculty in the Global Perspective Program.

Performance:

• The department is substantially involved in the global program. Three different CM faculty members have been involved as director or advisor at off-campus project centers, including Venice, London, Washington, and Hong Kong. In addition, MQPs have recently been advised at off-campus sites including Hong Kong, France, and NASA. Although no data have been
gathered, it is believed that the proportion of CM students at off-campus sites is good.

**Aspirations:** Develop MQP opportunities at other international/off-campus sites.

**Objective 3.2 Make the transition from multinational sites to a global system.**

**Performance:**

- No current activity at the department level.

  **Aspirations:** We seek to establish a program to accomplish humanitarian objectives in less developed countries through the application of appropriate technologies. We would like to integrate the WPI global theme vertically into our graduate education as well, as proposed in our IGERT proposal to NSF, by including an Advisor Apprenticeship for doctoral students in the program at a WPI International Project Site, where the graduate student would advise IQP students under the tutelage of a resident faculty advisor.

  Note: The CM department has little direct role in the accomplishments of Goals 4 and 5, except indirectly through our contributions in maintaining ethnic and gender diversity in the community, fostering an atmosphere within the department that is conducive to learning and scholarship, some involvement in high schools, and maintaining good educational and research facilities within the department. These goals are very important to us.
7. **Computer Science**

*Objective 1.1 Fully develop the WPI Plan for all students around an “honors college” metaphor at all levels.*

**Performance:**

**Faculty size**

- The faculty size of CS was volatile recently.
- For AY00 two faculty members were hired, both are no longer with us (one left the same year).
- For AY01 we hired one faculty member.
- For AY02 we did not succeed in hiring any faculty member, and three left that year (IFC, GXS, MVS).
- For AY03 we succeeded in hiring three (probably four) new faculty members, and lost one (NIH) who has been on a leave for the last two years. In addition, we hired a Professor of the Practice, raised one adjunct employment level from 3/4-time to full time, and two from 1/2 time to full time.

**Impact of first-year**

- The department is preparing a sweeping reorganization of the first four software courses that will have a deep impact on the first-year experience of CS majors, and a more limited one on the programming experience of many of the students at WPI (albeit not necessarily in the first year).
- One faculty member served as Insight advisor.

**Curriculum improvements**

- CS has made several changes in its distribution requirements, in part due to accreditation issues, and in part to adapt to new perceptions of the required core skills of CS. We continue to increase our offerings at the 4000-level.

**Learning outcomes**

- A comprehensive mechanism has been set up by the CS accreditation committee to implement self-assessment, outcome evaluation, and a framework to induce feedback in this system.
Number of large classes

- Due to the large increase in CS major, small progress has been made in this area, beyond introducing parallel section when classes got to a size beyond 140, approximately. In a sense, this increases the number of large classes (over 35). However, all large classes are split into sections for the purpose of labs, recitations or assignments to TA office hours. In addition, we believe that the large amounts of time faculty devote to interaction with the students, in office hours, and more, through structured email forums, alleviate the hardship and alienation of the large classes to a significant extent.

Objective 1.2 Develop aligned incentives for faculty and staff to promote action plans.

Performance:

Faculty diversity

- The department has had for some time an unusually high proportion of women on the faculty. No change in this. Despite efforts over several years, last year was the first in which we succeeded in hiring an American-Chinese faculty member. And 2002 is the first year in which we advanced beyond this: we hired two faculty members with African (Nigeria) and Asian (India) background.

Close faculty salary gap

- Definite steps were made; the gap has narrowed noticeably, though we still have some ways to go, especially in the associate and full professor levels.

Objective 1.3 Provide increasing opportunities for student involvement in research.

Performance:

Undergraduate summer research

- A small number of CS students register for ISPs in the summer, usually advancing their knowledge more than the frontiers of research. In some cases, especially as continuation of MQPs, better results have been recorded, including papers in good conferences and the seeds of theses.
Graduate research fellowships

- CS has averaged over the last few years five to seven graduate fellowships from various sources (Industry, Goddard, Fulbright). While the numbers are going up, it is hard to discern or claim a trend.

*Objective 1.4 Maintain contemporary teaching laboratories.*

**Performance:**

Planning for equipment and instrumentation renewal

- The teaching labs used in the first programming courses we teach have recently migrated out of Fuller labs, due to expansion pressures of all the tenants of the building. This was no improvement. The equipment is provided and maintained by the CCC and is mostly adequate for the task; some courses require so many sections that the current labs require scheduling beyond Wednesday. For very few courses (two operating systems courses and computer animation) specific labs have been installed with NSF funding (and a significant WPI cost-sharing). The instructors and students find these laboratories a great improvement over using general labs for the courses.

- While a few additional courses could gain from dedicated teaching labs, and funding is in principle available via NSF instructional infrastructure programs, no further such labs are planned until the department gains additional space.

*Objective 2.1 Improve the quality and diversity of the student body.*

**Performance:**

Attract high quality undergraduate students

- The CS department has extremely limited influence there. We hope that some of our outreach activities help in attracting better quality candidates.

Attract high quality graduate students

- CS can afford now to be more selective in accepting foreign graduate students, and we expect to see the impact within a year. The number of students who choose the BS/MS track is increasing significantly, to the extent that this may require serious changes in the higher-division undergraduate courses. Few domestic students apply for doctoral studies. We have some plans to improve the situation, but they are problematical due to lack of staff. In the last two years the department sends each summer a poster advertising our graduate program to all major CS departments in the US, as well as selected universities overseas. We have
greatly enhanced the information available on the department Web site for prospective students.

Summer programs for minorities and women

- Every summer women faculty in CS obtain external funding, to sponsor two to four female undergraduates from around the nation in research projects, with the purpose of attracting them to graduate school.

Objective 2.2 Support the faculty’s efforts in research and scholarship.

Performance:

Research thrust areas

- Limited impact on the departmental research, but has helped in fostering cooperation between the CS and BBT departments.

Increase annual research expenditures

- The actual research expenditures in the department are hard to capture, and we do not consider implementing the mechanisms to tally them precisely. Grant awards administered through the Research Administration office have been increasing regularly, in spite of the volatility of the faculty, at a rate of 10 percent a year, but are still very low at less than $600,000. Adding expenditures through WPI budgets and industry support may raise this figure to $1M. No funds were obtained through the development office. We expect the gradual increase to continue, but no breakthrough is likely before a significant increase in space and faculty (to reduce teaching load, as well as increase the number of proposals) is obtained.

Increase number of full time graduate students

- This is an objective we have done great strides in. Our enrollments are up. From 1998-99 to 2001-02 the full-time graduate population increased from close to 60 to more than 115. The increase in doctoral students went at the same rate, from 12 to nearly 30.

Achieve a larger rate of Ph.D. production

- While the number of Ph.D.s completing their studies has somewhat increased, it is still small, with about two per year. The pipeline is primed, and we expect this rate to increase, possibly double within two to three years.
Peer reviewed Publications

- In the AY2000-01 CS faculty (exclusive of joint appointments) published 5 books/chapters, 12 journal papers and 47 conference papers. These small numbers are due, at least to some extent to the very high level of teaching/student interaction load on the faculty.

Objective 2.3 Develop creative partnerships with industry, organizations, and other universities.

Performance:

Create comprehensive project centers

- The director of the Silicon Valley project center, Professor David Finkel, has been raising sponsors for more than ten projects a year for three years.

- The Performance Evaluation and Distributed Systems Research Group of CS has conceived an interesting concept for an academic-university consortium (the Center for research in E-Commerce Technology), but it has yet to establish itself.

Objective 2.4 Continue to develop a comprehensive base of programs through aligned resource allocations.

Performance:

Review academic programs

- A constant activity, as the CS community continually revises its accepted wisdom on the fundamentals required by software engineers and computer scientists. At this time we are spear heading two activities. At the undergraduate level, a complete revision of the first year programming courses is underway. The intent is to increase the abstraction level of the programming activity from the initial involvement of the students in software creation. At the graduate level we are slowly ratcheting up the level of difficulty of the courses. This is a slow process, which is made possible by the larger fraction of courses taught by full-time faculty members, and by the improving quality of the graduate student population. In addition, we introduce new courses, both at the 4000 level and in the graduate program, to allow the students wider choice as the discipline expands and new directions are opened.

Nurture relationships with alumni

- This is a major portion of the Public relation committee activity, which for the present is limited to an occasional newsletter and a survey of learning outcomes.
Establish Program Advisory Board

- We have established such a board, and it meets regularly.

Objective 2.5 Expand opportunities for synchronous and asynchronous networked learning.

Performance:

- The department has a modest involvement in off-campus learning. Each summer professor Karen Lemone leads two networked courses, capped at 10 students (they generate large waiting lists, and typically 12 students end up registering).

Objective 4.4 Expand efforts to meet the needs of adult learners.

Performance:

- Several modest activities are germane: the above mentioned networked courses; an NSF-supported summer workshop for high-school CS teachers to convey to them the message of the DrScheme program (started Summer 2001, planned to be done annually); faculty members take part in outreach programs such as membership on boards of cultural institutions, participation in community activities (sports and charities) that promote WPI as an element of the community.

- The CS department contributes to this goal via obtaining grants that help purchase equipment, developing new academic programs and creating alliances with other universities (an activity which so far has only been done on a personal basis). We are now trying to create a more formal framework with the Politehnica University in Bucharest.
8. Electrical and Computer Engineering

Objective 1.1 Fully develop the WPI Plan for all students around an “honors college” metaphor at all levels.

Performance:

- Faculty size: The number of ECE tenure track positions was enlarged by one in the recent past. Hopefully in the near future the combination of budget issues and faculty candidate availability will allow us to reach the full complement of faculty.

- Impact of first year: ECE has taught two important and popular ECE courses in the first year for some time (EE 2011 and 2022). We believe these courses are a very positive component of our students’ first-year experience. Also, several ECE faculty members are Insight advisors.

- Curriculum improvements: A major recent curriculum improvement has been the introduction of the new undergraduate major in Electrical and Computer Engineering. Another significant innovation was the addition of a course in the process of ECE design, team-taught by faculty from several ECE sub-disciplines. Also, two new courses in state of the art areas (electro-optics and real-time digital signal processing have been added. At the graduate level, the major recent enhancements have been in our cryptography and information security offerings, and a certificate program offered via distance learning (ADLN) has been added.

- IQP quality: ECE faculty play major roles as director or advisor in several off-campus project centers, including Venice, Denmark, London, Boston, Bangkok, and Worcester

- Learning outcomes: Under the direction of Prof. Denise Nicoletti, ECE has implemented a fairly extensive program which relates student accomplishments in courses and other activities to our stated program outcomes. The biennial MQP review also provides valuable data on a broad range of our program outcomes.

- Number of large (>35) classes: A significant number of our classes have more than 35 students. For 2000-01, 19 of ECE’s undergraduate classes (approximately 35 percent) contained more than 35 students. Eight of these offerings had more than 80 students, and three had more than 100 students. These large lecture sizes are partially offset by the fact that many of our courses include laboratories, and some faculty members are VERY generous with their time in laboratory, as well as in help sessions. A large class would have at least 16 scheduled contact hours (lecture and lab) per week, and faculty cannot be expected to regularly be present for all of that.
Objective 1.2 Develop aligned incentives for faculty and staff to promote action plans.

Performance:

- Faculty diversity: With only one female and one minority faculty, much progress is still needed.

- Faculty and staff salaries compared to benchmarks: Significant increases over the past several years are appreciated, but have only slightly improved the relative standing of our faculty compensation with respect to peer institutions. While equity issues are important for all faculty members, the salary issue is particularly significant in hiring new faculty. Peer institutions and those to whom we aspire to compare ourselves with are raising faculty salaries rather rapidly. Faculty start-up support is as important as salary, and in some situations, it is more important.

- Employee satisfaction: This broad category is important, and difficult to measure. I believe that faculty satisfaction is generally quite good. Among the staff, there is no question that there is some continuing level of dissatisfaction with the compensation and merit reward system.

- Effectiveness of reward system: The merit reward system is reasonably effective for faculty, but essentially nonexistent for staff.

Objective 1.3 Provide increasing opportunities for student involvement in research.

Performance:

- Number of students in summer research: This presumably refers to undergraduate students, and we have few so involved.

- Impact of graduate fellowships: Graduate fellowships are very valuable, and we make use of both Institute fellowships and specific corporate fellowships. We believe the effectiveness of Institute fellowships could be improved, possibly by making clear that they are intended to operate more as research assistantships, and connecting the fellowship award process to the faculty with whom research will be conducted.

Objective 1.4 Maintain contemporary teaching laboratories.

Performance:

- Adequacy of funding for equipment and instrumentation maintenance and renewal: At a basic level, this is adequate. Our ECE teaching laboratories are equipped with reasonably modern, reasonably high quality equipment. However, it is important to note what is missing. We currently have no
teaching laboratories in important areas such as communications, optical communications, photonics, robotics, or solid state device characterization. All of these laboratories would require quite expensive equipment.

- Average equipment age statistics: These data are being developed.

*Objective 2.2 Support the faculty's efforts in research and scholarship.*

**Performance:**

- Impact of thrust areas on faculty and graduate student recruiting: There has not been a noticeable impact here.

- Annual research expenditures: Totals for research expenditures are not readily available to me. Data on new grants are much more accessible. For 2000-01, new grants received through the research office totaled $723,000. When graduate fellowships and other forms of support received through the development office are added, the total external support for 2000-01 was $1,901,000. The departmental goal is to raise awards received through the research office to $2M per year. See further comments below.

- Number of proposals and awards: The ECE faculty understands that the number of research proposals and the amount of awards have been low over the recent past. There has been a commitment to increasing the number of proposals and results to date for this year are encouraging. Through March, 2002 ECE has submitted 20 proposals worth $6.4M, vs. 16 proposals worth $2.7M at the same point in 2001. Awards are also ahead of last year, although modestly: $590,875 vs. $470,190.

- Number of publications: Complete data are only available for the past academic year. For 2000-01, ECE faculty published 19 journal papers, 4 books or book chapters, and 51 conference papers. Also, two patents were issued and five are pending.

- Faculty and graduate student support levels: Substantially more RA support is needed; this must come primarily from increased grant income.

- Minimum and mean GRE scores: Few ECE applicants (particularly few US citizens) submit GRE scores, unfortunately.

- Annual number Ph.D. graduates: For the past five years (1997-2001) the numbers of Ph.D. graduates have been: 1, 6, 3, 3, 3, respectively. ECE desires to double these numbers to about 6 or 7 per year. A major factor in accomplishing this will be the need to substantially increase research support, as well as to address student recruitment difficulties.
• Number full time graduate students: The most recent number that I have is 42 full-time and part-time, degree seeking ECE graduate students.

• Annual research expenditures per faculty member: If only expenditures of funds received through the research office are counted, this value ranges from is approximately $40,000 per faculty member.

Objective 2.3 Develop creative partnerships with industry, organizations, and other universities.

Performance:

• Number of partnerships: In the broad sense industrial partnerships include: centers such as NECAMSID and CWINS, research support (currently including Raytheon, Allegro, Reticon, Nokia, Analog Devices, Texas Instruments, General Dynamics, Teradyne, Perkin-Elmer, Pirus Networks) and project support. Project support has been difficult in the current economy, particularly regarding the securing of significant financial support from corporations for projects. Industrial partnerships can be valuable, but I believe that we need to be more careful and realistic is considering these relationships

• Value added: The cost-benefit ratio for industrial partnerships must be carefully considered.

• Statistics associated with Silicon Valley center and other new ventures: ECE advised three of the Silicon Valley projects in 2002.

Objective 2.4 Continue to develop a comprehensive base of programs through aligned resource allocations.

Performance:

• Status of academic programs: While both our undergraduate and graduate programs are of good (or excellent) quality, the external reputations may not match the program quality.

• Alumni satisfaction with preparation: Alumni survey results have demonstrated high satisfaction with the ECE education, although returns have been very low.
Objective 3.1 Expand participation by students and faculty in the Global Perspective Program.

Performance:

• Faculty involvement: ECE faculty are extensively involved in the global program. Profs. Brown, Looft, McNeill, Orr, Pedersen, and Vaz have all advised and/or directed global (outside the continental US) projects in the recent past, or will be so engaged in 2002-03.

• Number of projects conducted at global sites: In 2001-2002 ECE faculty have advised 15 projects with 43 students located at three global sites (Denmark, Ireland, and Puerto Rico). In addition, ECE faculty have advised 16 more off-campus projects with 42 students at three U.S. sites (Worcester, Silicon Valley, NASA).

• Number of faculty and students involved with sister institutions: ECE students participate in exchange programs with ETH in Switzerland, the University of Darmstadt, and other schools.

Objective 4.4 Expand efforts to meet the needs of adult learners.

Performance:

• Numbers of faculty and students involved: ECE is very much involved (perhaps too involved) with various forms of adult learning: part-time graduate courses at Waltham, Metro-West and Worcester, the SIM Power Systems Management MS program, the Wireless Certificate via ADLN, non-credit short courses, and custom in-house courses (the Lucent information technology program). Some effort would be required to determine numbers of students. Approximately half of our regular graduate course registrations are by part-time students. Currently, 16 students are registered in the ADLN Wireless program and approximately 10 students are studying in the SIM Power Systems program.
9. Fire Protection Engineering

Objective 1.3 Provide increasing opportunities for student involvement in research.

Performance:

- Student involvement in research…we have at least 50 undergraduate students in a range of disciplines, headed for FPE graduate work, via the BS/MS program. Often undergrads work with grad students on fire research.

Objective 1.4 Maintain contemporary teaching laboratories.

Performance:

- Digital Library being developed under the leadership of Prof. Woycheese, to support all FPE courses, especially the ADLN courses. The project will serve as the “seed” for an NSF proposal on digital libraries, now being written by Woycheese and Turgeon. We are spending about $50K of ADLN resources on this initiative.

Objective 2.2 Support the faculty’s efforts in research and scholarship.

Performance:

- We do computational modeling in fire, in harmony with this thrust area.

Objective 2.3 Develop creative partnerships with industry, organizations, and other universities.

Performance:

- Partnerships with industry and other universities…we do graduate internships with many for-profit employers. More research-oriented relationships with FM Global and 3M. Partnerships with Seoul National University (SNU) and University of Costa Rica (UCR).

- Prof. Dembsey is working with the composites industry to form a collaborative effort on the evaluation and use of composites in buildings.

Objective 2.5 Expand opportunities for synchronous and asynchronous networked learning.

Performance:

- Expanding synchronous and asynchronous networked learning…we have been expanding significantly. I don’t think any other department has the
international reach as does FPE. We have delivered to Europe, Asia, Middle East, and Pacific Rim. The Digital Library also expands our distance learning program.

- We are also working with Industrial Risk Insurers, to develop non-credit continuing education courses via distance, for their worldwide engineering staff. End result could be packaged and marketed outside IRI, by WPI and IRI in partnership.

- We are working with SFPE to develop a self-standing continuing ed course based on the study guide for the FPE PE Exam, to be marketed nationally.

- On the topic of “image building and marketing”, FPE probably receives more national media attention for its niche expertise than any other department. The World Trade Center topic is the most recent example.

- The upcoming 7th International Symposium on Fire Safety Science” (June) is a big feather in our cap. We competed to be selected as the host site. This is the premier fire research symposium worldwide, only held every 3 years, only once before in the USA. This adds to the WPI image of prestige, nationally and internationally. Will be attracting 300 of the world leading scholars/researchers.

Objective 2.6 Conduct a comprehensive image-building and marketing effort.

Performance:

- On the topic of “image building and marketing”, FPE probably receives more national media attention for its niche expertise than any other department. The World Trade Center topic is the most recent example.

- The upcoming 7th International Symposium on Fire Safety Science” (June) is a big feather in our cap. We competed to be selected as the host site. This is the premier fire research symposium worldwide, only held every 3 years, only once before in the USA. This adds to the WPI image of prestige, nationally and internationally. Will be attracting 300 of the world leading scholars/researchers.

Objective 3.1 Expand participation by students and faculty in the Global Perspective Program.

Performance:

- See above re global outreach of ADLN and MOU’s with SNU and UCR.

- Melbourne Project Center: lots of fire-related projects, with Barnett being the spark plug. Some of the projects in fire research, with the undergrads going on for MS via the BS/MS.
Objective 4.4 Expand efforts to meet the needs of adult learners.

Performance:

• Mention is made in the Strategic Plan regarding continuing ed. Our continuing ed efforts are ADLN based, e.g. above reference to PE Exam study course and IRI partnership.

Objective 5.3 Create and maintain sufficient electronic classrooms to support on- and off-campus programs.

Performance:

• See above re Digital Library.

• The Computational Fire Modeling Lab is unique and is an important resource to our grad students interested in the topic.
10. Interdisciplinary and Global Studies

The current strategic priorities for IGSD are insuring the
• Quality of the IQP, on- and off-campus,
• Availability of adequate numbers of well-qualified advisors for off-campus, residential IQPs, MQPs, and Sufficiencies,
• Availability of adequate numbers of well-qualified advisors for on-campus IQPs.
The primary actions in response to these priorities are
• Continuous recruiting, mentoring, and training of new global advisors;
• Mentoring and training of new members of the faculty as IQP advisors, primarily through co-advising of projects in the Worcester Community Project Center;
• Formal evaluation of written IQP reports, now focused on specific corrective tactics.
• Development of an outcomes-based assessment process to help advisors improve and to recognize those who are the best.
A related, secondary effort is advocacy of evaluation processes for all forms of teaching that are comparable to those used for disciplinary research.

Metrics

Numerical measures of progress are given below in the context of various objectives of the WPI strategic plan. Some overall metrics are summarized here.

Additional global and on-campus IQP advisors

<table>
<thead>
<tr>
<th>Advisors recruited in …</th>
<th>AY99-00</th>
<th>AY00-01</th>
<th>AY01-02</th>
<th>AY02-03</th>
</tr>
</thead>
<tbody>
<tr>
<td>For the global program</td>
<td>6</td>
<td>9</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>As WCPC co-advisors</td>
<td>0</td>
<td>4</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Pool of qualified global advisors</td>
<td>31</td>
<td>37</td>
<td>45</td>
<td>55</td>
</tr>
</tbody>
</table>

Global IQP Centers

<table>
<thead>
<tr>
<th>IQP</th>
<th>10.1.1.1.1.1.1. Began full-time</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangkok Thailand</td>
<td>1989</td>
<td></td>
</tr>
<tr>
<td>Boston, MA</td>
<td>1999</td>
<td></td>
</tr>
<tr>
<td>Copenhagen, Denmark</td>
<td>1996</td>
<td></td>
</tr>
<tr>
<td>Darmstadt, Germany</td>
<td>1993</td>
<td>Ended in 1999</td>
</tr>
<tr>
<td>Hong Kong, PRC</td>
<td>2001</td>
<td>Re-started</td>
</tr>
<tr>
<td>London, England</td>
<td>1987</td>
<td>City University exchange IQPs</td>
</tr>
</tbody>
</table>
Global MQP Centers

<table>
<thead>
<tr>
<th>MQP</th>
<th>Date began</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goddard Space Flight Center</td>
<td>1997</td>
<td>Partial funding by grant</td>
</tr>
<tr>
<td>Limerick, Ireland</td>
<td>1995</td>
<td></td>
</tr>
<tr>
<td>Lincoln Labs, MA</td>
<td>2002</td>
<td>Full funding by grant</td>
</tr>
<tr>
<td>Melbourne, Australia</td>
<td>1997</td>
<td>1st completed MQP, Sydney</td>
</tr>
<tr>
<td>Nancy, France</td>
<td>2001</td>
<td></td>
</tr>
<tr>
<td>Pratt &amp; Whitney, CT</td>
<td>1994</td>
<td></td>
</tr>
<tr>
<td>Silicon Valley, CA</td>
<td>2000</td>
<td>C-term</td>
</tr>
<tr>
<td>Wall Street, NY</td>
<td>2001</td>
<td>Fully supported by fees</td>
</tr>
</tbody>
</table>

Global Sufficiency Centers

<table>
<thead>
<tr>
<th>Sufficiency</th>
<th>Date began</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darmstadt, Germany</td>
<td>2001</td>
<td>Suspended due to faculty shortage</td>
</tr>
<tr>
<td>Madrid, Spain</td>
<td>2001</td>
<td></td>
</tr>
</tbody>
</table>

Recent expansion and reallocation of project centers

IQP:
- Worcester Community Project Center supported by foundation gifts
- Zurich moved from Darmstadt
• Namibia opening in place of Zimbabwe with start-up costs funded by alumni gifts

MQP:
• Copenhagen MQPs at the Engineering College of Copenhagen using IQP infrastructure offered 1999-2002
• Limerick expansion tested 2001; need fee support to continue
• Silicon Valley aiming to be self-supporting but falling short
• Wall St. supported by project fees
• Nancy based upon research relationships and at low cost; graduate students recruited for Chemical Engineering.
• Johnson reopening
• Lincoln Labs providing full-time, off-campus experience without off-campus residence; supported by grant; nurturing research relationships

Sufficiency:
• London B term interdisciplinary Sufficiencies (oversubscribed for B02)
• Madrid language and related themes (e.g., Spanish art and architecture)
• Darmstadt language and related; hope to resume when German faculty vacancy filled

Enrollment Summary – current academic year (E02-D03)

<table>
<thead>
<tr>
<th></th>
<th>A02 – D03</th>
<th>E02</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Students</td>
<td>Advisors</td>
</tr>
<tr>
<td>IQP</td>
<td>295</td>
<td>28</td>
</tr>
<tr>
<td>MQP</td>
<td>64</td>
<td>1 + 16*</td>
</tr>
<tr>
<td>Suff.</td>
<td>36</td>
<td>2</td>
</tr>
</tbody>
</table>

*part-time
### Enrollment summary – current year detail (E02 – D03)

<table>
<thead>
<tr>
<th>IQP</th>
<th>Students</th>
<th>Advisors</th>
<th>Units</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangkok Thailand</td>
<td>25</td>
<td>2</td>
<td>37.5</td>
<td></td>
</tr>
<tr>
<td>Boston, MA</td>
<td>21</td>
<td>1</td>
<td>31.5</td>
<td></td>
</tr>
<tr>
<td>Copenhagen, Denmark</td>
<td>16</td>
<td>1</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Hong Kong, People’s Republic of China</td>
<td>23</td>
<td>2</td>
<td>34.5</td>
<td></td>
</tr>
<tr>
<td>London, England</td>
<td>62</td>
<td>6</td>
<td>93</td>
<td>3 terms E, C, D</td>
</tr>
<tr>
<td>Melbourne, Australia</td>
<td>26</td>
<td>2</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Windhoek, Namibia,</td>
<td>16</td>
<td>2</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>San Jose, Costa Rica</td>
<td>22</td>
<td>2</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>San Juan, Puerto Rico</td>
<td>27</td>
<td>2</td>
<td>40.5</td>
<td></td>
</tr>
<tr>
<td>Venice, Italy</td>
<td>23</td>
<td>2</td>
<td>34.5</td>
<td></td>
</tr>
<tr>
<td>Washington, D.C.</td>
<td>26</td>
<td>2</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Worcester, MA</td>
<td>39</td>
<td>3</td>
<td>58.5</td>
<td>3 terms, B, C, D, 6 co-advisors</td>
</tr>
<tr>
<td>Zurich, Switzerland</td>
<td>24</td>
<td>2</td>
<td>36</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MQP</th>
<th>Students</th>
<th>Advisors</th>
<th>Units</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copenhagen, Denmark</td>
<td>6</td>
<td>1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Goddard Space Flight Center</td>
<td>25</td>
<td>1</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Limerick, Ireland</td>
<td>6</td>
<td>1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Melbourne, Australia</td>
<td>6</td>
<td>1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Nancy, France</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Pratt &amp; Whitney, CT</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Silicon Valley, CA</td>
<td>15</td>
<td>1</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Wall Street, NY</td>
<td>9</td>
<td>1</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>
Other metrics that warrant attention include total IQP units advised and participation in global advising by individual departments.

**Progress toward plan objectives**

*Objective 1.1: Fully develop the WPI Plan around an "honors college" metaphor at all levels.*

**Metrics:** In terms E01-D02, global projects involved
- 455 students
- 33 full-time faculty advisors
- 7 part-time faculty advisors

On-campus IQPs involved about 250 students.

A typical student-faculty ratio for global projects is 24 students in six to eight teams working with two faculty advisors, both of whom are assigned full-time for the term in which the project is completed. A typical ratio for an on-campus IQP is one to three students working with one or two faculty advisors who mix that advising in with their other on-campus teaching, scholarship, and service duties.

**Actions:** Preparation for global IQPs is being revised to enhance achievement of the following outcomes: grasp project context, including culture; define achievable goals; work in a team; commit to excellence; structure and write a professional report; draw upon prior research; present results orally; live in a new environment; use language of the site, as appropriate; confront ambiguity; run a professional project meeting. An instrument to assess quality of IQP advising has been tested this year in Venice and Washington; it will measure achievement of those outcomes that are subject to advisor intervention.

**Undergraduate Program Ranking**

**Metrics:** The AAC&U recognition of WPI as a Greater Expectations Leadership Institution is a direct consequence of a visit to campus by AAC&U consultant (and former University of Maryland Dean) Robert Schoenberg. He first learned of WPI’s projects and global programs through a presentation by Rick Vaz and Natalie Mello at a conference of global engineering educators. Schoenberg continues to be strongly drawn by WPI’s projects; e.g., he invited Peter Hansen and Paul Davis to a regional conference he organized on experiential education.
The Global Program has been selected as one of ten national program exemplars by NAFSA: Association of International Educators, and it has been awarded a TIAA-CREF Hesburgh Certificate of Excellence.

Publications and presentations in past year by IGSD faculty and staff:

- Journal and conference papers, book chapters, etc. 25
- Presentations 34
- Grant applications 4

**Enhance the value of the IQP and establish it as a major capstone experience.**

- Weekend and day-long retreats for global advisors operate annually. Topics addressed included risk management and the personal, interpersonal, and professional development of students. The approach and programs are under continuous review; the current active learning format has been exceptionally well received by participants. Workshops during the academic year address core academic matters for all project advisors, on- and off-campus; regular topics include written and oral communications.

**Metric:** 47 current and prospective global advisors and supporting members of the faculty and staff have attended the May ’02 global advisor retreat.

- The Worcester Community Project Center, supported by gifts, brings the values and intensity of off-campus IQPs to students who can not leave campus while providing WPI a unique and extraordinary powerful way to assist its home community. It is also the focus of advisor mentoring and training for new on-campus IQP advisors.

**Metric:** 14 new on-campus IQP advisors have been mentored through the WCPC in its first five terms of operation (B00, B01-D02). Students completed WCPC IQPs during this period.

- In search of higher quality projects, the former Darmstadt project center was closed and replaced by one in Zurich. A new project center in Zimbabwe was cancelled due to political unrest. A replacement in Namibia, partially supported by gifts, will open in E03.

- The President’s IQP Award selection process has been restructured to better identify IQPs exemplifying best practice. The nature of the awards have been recast to recognize high achievement as a
goal that many can achieve, replacing the less useful notion of a single “best” IQP.

- Recognizing the role of the IQP as an interdisciplinary capstone experience, the annual summer reading and quality review of all IQPs was revised to incorporate assessment of aspects specifically related to such ABET criteria as understanding of professional and ethical responsibility and appreciation of global and contemporary issues.

**Metric:** 28 new global advisors have been added to the pool of qualified advisors since AY99-00.

**Metric:** Journal papers, conference presentations, and other public notice accorded to the results of IQPs (data under collection).

*Leverage project centers to create test bed for graduate engineering and management programs.*

There is little concrete progress to report but several promising prospects. MQPs have been completed at National Central University, Taiwan, and Institut National Polytechnique de Lorraine, Nancy, France. These are direct consequences of research relationships. The Taiwan connection should bring graduate students to WPI; three graduate students are already on their way from Nancy. (There is also a long-standing exchange with Chulalongkorn University in Bangkok which brings one well-qualified Thai graduate student to Chemical Engineering or Chemistry and Biochemistry each year. Sporadically, graduate students from King's College London, come to Electrical and Computer Engineering through the agreement that supports the London Project Center.)

IGSD is supporting efforts by Ravindra Datta, David DiBiasio, Stephen Matson, and Gretar Tryggvason in Chemical Engineering and Malcolm Ray in Civil and Environmental Engineering to foster additional such graduate relationships.

Students in the Financial Mathematics M.S. program may be able to complete projects at the Wall Street Project Center; possibilities are being explored.

An alternate strategy is to send our undergraduates out and use the resulting partnerships to attract the highest quality graduate students back to WPI.

**Metric:** 1 productive program in place; 2-4 nascent programs.

**Metric:** 4 graduate students working on-campus as a result of global project Center activity; 0 graduate students working off-campus at project centers.
Objective 1.2: Develop aligned incentives for faculty and staff to promote action plans.

Review promotion and tenure criteria

IGSD faculty have been active in collaborations that advocate formal teaching evaluation processes, primarily through WPI’s relationship with AAC&U. IGSD itself is developing tools for assessing advising that could become part of revised tenure and promotion review processes.

Metric: 0 revised criteria in place; 1 process tool (for off-campus project advising) under development

Expand recognition programs for outstanding performance

See the preceding comments about promotion and tenure criteria.

Objective 1.3: Provide increasing opportunities for student involvement in research.

The MQP centers in Nancy, France and at Goddard and Johnson Space Flight Centers and Lincoln Labs offer student projects based on cutting-edge technology and research programs. Some of the projects sponsored by SRI through the Silicon Valley Center have similar characteristics.

Metrics:

- During AY01-02, 46 students completed global MQPs at Institut National Polytechnique de Lorraine in Nancy, France, at Goddard Space Flight Center, and at SRI in Silicon Valley, all centers of cutting-edge research and technology. In term B02, as many as 18 students will have a similar opportunity at the new Lincoln Labs MQP Center.
- Number of student co-authors of papers, presenters at professional meetings, and participants in research conferences (data not available)
- Number of student authors, presenters, or participants in student research journals and conferences (data not available)

Objective 2.3: Develop creative partnerships with industry, organizations and other universities.

Metric: External sponsorship of projects at project centers

MQPs: Industrial, government laboratory, corporate, and university research laboratory sponsors at off-campus MQP centers include: 9 in Silicon Valley, 3 in Limerick, 3 in Copenhagen (through the Engineering College of Denmark), 1 (NASA) in Goddard and Johnson Space Flight Centers (as latter center reopens), 4 in Wall Street, 1 (United Technologies) in Hartford, 1 in Nancy, France.
IQPs: Approximately 50 different governmental organizations (from the UN to local governments), NGOs, and corporations sponsor projects each year at global IQP centers.

Create comprehensive project centers

- The Silicon Valley MQP project center was launched in C00 with four funded projects. Eight were completed in C01 and another eight in C02.

- The Wall Street MQP Center began operation in B01 with eight students completing three funded MQPs.

- In term A01, the existing Limerick MQP operation was upgraded to a full-scale center and doubled in size to accommodate twelve students completing four projects. However, funding to sustain this level of effort was not obtained.

- In term B02 Wall Street MQP Center operated with 8 students completing four funded MQPs.

- During its brief existence, the Center for the Globalization of Technology helped to find sponsored MQPs in Silicon Valley and elsewhere. Overall, this model appears not to have been as successful financially as we had hoped.

- The Hong Kong IQP Center re-opened in C02 with twenty students and two resident advisors after a preliminary ISRP with 9 students in C01. The Zurich IQP Center replaced the former Darmstadt operation in C01. Zurich began its first regular term of operation in B01 with sixteen students selected from nearly one hundred applicants.

- Off-campus residential Sufficiency programs have expanded as well: Spanish and related topics in Madrid in D01 and D02, German in Darmstadt in E01, Shakespeare and Dickens in London in E01 (regularizing the existing but sporadic E term London Sufficiency program), and interdisciplinary Sufficiencies for the first time in London in B01.

Develop and implement MOUs with universities near project centers

Metric: 12 MOUs, most of which involve student project activity in at least one component of the interaction, have been executed over the last two years with:
• Faculty Of Mining, Metallurgy and Earth Science of the Rheinisch-Westfälische Technische Hochschule Aachen, Germany and WPI
• Engineering College of Copenhagen and WPI
• Technische Universiteit Delft and WPI
• Institut National Polytechnique de Lorraine, Nancy, France and WPI
• Fukui University and WPI
• University of Greenwich, UK and WPI
• University of Zimbabwe and WPI
• National Central University, Taiwan and WPI
• National Tsing Hua University and WPI
• University of Costa Rica and WPI
• Temasek Polytechnic, Singapore, and WPI
• St. Croix Country Day School and WPI
• Eidgenössischen Institut für Schnee- und Lawinenforschung (SLF) in Davos, Switzerland, and WPI

Objective 2.4: Continue to develop a comprehensive base of programs through aligned resource allocations.

Increase opportunities in humanities and arts

Although Sufficiencies are not a direct responsibility of IGSD, we have added three off-campus Sufficiency programs (one interdisciplinary in London as well as language-based programs in Madrid and Darmstadt) as well as attempted to regularize the one existing, sporadic offering (discipline-specific in London). Unfortunately, the offering in German has been suspended until a vacant faculty position is filled.

Metric: A total of three terms of global Sufficiencies sites are currently available. They annually involve three advisors and have a total capacity of forty-five students.

Objective 3.1: Expand participation by students and faculty in Global Perspective Program.

Metrics: student and advisor participation; increase in advisors and mentoring

• Of a typical graduating class, approximately 50 percent will have had an overseas project experience, about 70 percent an experience at a foreign or domestic (including Puerto Rico) project center.

• Among doctoral granting universities, WPI is second in the proportion of its graduates in all majors, technical and otherwise, who have had an overseas experience.
• WPI sends more students of science and engineering abroad than any other American university.

• 28 global faculty advisors have been recruited and trained since AY99-00.

Seek endowment funds to support Global Perspective Program Fund

Metrics: Gifts have been received for partial support of an IQP center in Worcester and for the founding of a center in Africa. One anniversary class gift has been designated to support global operations, another for scholarships for global students.

Faculty Development Fund

Metric: Small faculty development grants have supported initiation of ECE MQPs in Denmark, exploration of MG MQPs in London, development of faculty expertise relevant to the Worcester Community Project Center and other on-campus IQPs. However, no significant additional funds have been allocated for this purpose.

Fully leverage global project sites

Metric: No funds have been allocated and nothing of significance has been spent for scholarship or other professional development arising from global advising.

• The IGSD FY01 budget request included professional development funds for global advisors to use with their off-campus advising. However, no additional operating funds have yet been authorized.

• Beginning with AY01-02, global IQP advisors were to receive a small professional development grant from project fees to assist them in taking full scholarly advantage of their off-campus advising assignment. This program was suspended in response to reductions in IGSD’s operating budget totaling about 8 percent.

Conduct study of undergraduate program components

As documented elsewhere, opportunities for global IQPs, MQPs, and Sufficiencies have been expanded over the past three years.

International Studies is ripe for review and expansion; lack of funding has prevented additional course offerings in this area.
**Metric:** International Studies majors, minors, and course and project enrollments. (Data being collected)

Similar comments apply to the Technical Communications program.

IGSD faculty members continue to collaborate with the Center for Communication Across the Curriculum in using the IQP as a vehicle for teaching report writing. Training in a rhetoric-based approach to teaching writing is now being offered to all global IQP advisors.

*Evaluate international studies enhancement*

Action has been postponed for lack of funding.

*Evaluate potential Center for Global Technology and Culture*

In its incarnation as the Center for the Globalization of Technology, this concept appears to have been less productive than envisioned. Involvement with global technology continues to grow through other avenues. Cultural matters remain to be explored.

*Objective 3.2: Make the transition from multinational sites to a global system.*

*Pilot project team from multiple sites*

The following prior initiatives have not proved particularly successful:

- Having project teams in Worcester and London communicate via email and BlackBoard.

- Having writing tutors from the Center for Communication Across the Curriculum continue via the Internet their relationships with several London project teams working there during C00.

- Arrangements for virtual teams of students from WPI and the University of Zimbabwe to collaborate during D00 in preparation for on-site work in E00 were cancelled along with the center itself.

- During AY01-02, a “tethered consulting” model was used to provide assistance from WPI’s Center for Assistive Technology to all global teams (and to any on-campus teams that can be identified) that are completing projects involving disability issues. The intent was to identify common themes in order to form connections among teams attacking similar problems in various locations during the
subsequent academic year. Response to regular solicitations of off-campus advisors has been disappointing.

**Develop plan for global system using themes**

- The previous priority theme involved projects in the general area of support for disabled people and research in rehabilitation engineering. Lack of funding has inhibited significant progress. The current thematic emphasis is sustainable development; the first centers to be involved are Worcester, London, and Boston. Representatives of all three attended this fall’s Envisioning Worcester conference. The collaboration has found financial support from the Worcester Community Foundation and the City of Worcester.

- USAID and World Bank haven been approached to build relationships that would eventually support themes in either support for the disabled or sustainable development.

**Objective 4.7: Enhance support for K-12 system and the local community.**

**Worcester Community Project Center**

In its inaugural year the WCPC began partnerships with four municipal organizations—the City of Worcester Marketing Department (Susan Black); the Worcester Business Development Corporation (David Forsberg); the Worcester Public Schools Engineering Pipeline Collaborative (Dennis Ferrante) and the Worcester InfoTech Project (Tom Wharton). These partnerships resulted in five IQPs.

Many of these partnerships continued in the 2001-02 academic year with an additional five partners being added to accommodate the three-fold increase in project activity in the WCPC and Worcester’s diverse community. New partners include: The Executive Office of Economic Development (Philip Niddrie); Department of Public Works (Robert Moylan); Department of Parks, Recreation and Cemetery (Michael O’Brien), Worcester Regional Research Bureau (Roberta Schaefer); Santiago’s Market (Ediberto Santiago). These new relationships resulted in nine IQPs.

**K-12 Education 01/02:**

In 2001/02 the WCPC dedicated over 1/3 of its project resources to K-12 education or into five of the Center’s fourteen projects.

- Analysis of the Massachusetts Comprehensive Assessment Test Data, sponsored by the Worcester Public Schools, Patricia Mostue, liaison.
• Attracting Pre-College Students to Engineering: A focus on women and minorities, sponsored by the Worcester Public Schools, Dennis Ferrante, Tony Camoreyt, and Bob Krikorian liaisons.

• Developing a Grade 12 Curriculum for Engineering Students, sponsored by the Worcester Public Schools, Dennis Ferrante, Tony Camoreyt, and Bob Krikorian liaisons.

• Influences on the Recruiting and Retention of Middle School Students into Technology/Engineering Programs, sponsored by the Worcester Public Schools, Dennis Ferrante and Donald Kelly liaisons.

• Designing an Information Technology Program, sponsored by the Worcester Public Schools, Dennis Ferrante and Mary Harrington liaisons.

Metrics: 5 community-oriented IQPs completed through the WCPC, several specifically focused on education. Additional IQPs have been completed over the past five years either sponsored by or directly serving organizations in the city or county of Worcester.

*Develop program for primary and secondary students and teachers*

IGSD provides the home for a new course, ID 3100, Teaching Methods in Mathematics and Science, enrolling 17 students in D02 (taught by John Goulet and developed jointly by him and Lance Schachterle). About half of the teacher preparation students use the IQP for their practice teaching experience. (The others simply complete the practicum as an additional project since they want their IQP to be global.)

**Metric:** 17 WPI students enrolled in WPI’s teacher preparation course.

*Objective 5.3: Create and maintain sufficient electronic classrooms to support on- and off-campus programs.*

*Maintain notebook inventory for off-campus use*

The supply of laptops for off-campus project students has been augmented by cell phones for emergency contact with students at overseas sites. The cost of these phones is incorporated into housing charges rather than the operating budget.

**Metric:** 189 students using laptops, 310 students using cell phones at off-campus project centers during E02 – D03.
11. Mathematical Sciences

Objective 1.1 Fully develop the WPI Plan for all students around an “honors college” metaphor at all levels.

Performance:

• We introduced introductory analysis courses at the freshman level as an alternative to the standard calculus sequence. These provide a deeper mathematical experience than the standard calculus sequence.

• Several faculty participated in the Bridge Projects initiative. This was originally supported by an NSF Institute-Wide Reform grant and later by the Davis Foundation.

Objective 1.2 Develop aligned incentives for faculty and staff to promote action plans.

Performance:

• These included one faculty member who subsequently received an NSF CAREER award and another with an NSF postdoctoral fellowship.

Objective 1.3 Provide increasing opportunities for student involvement in research.

Performance:

• We provided opportunities for student involvement in research through MQPs. Two recent examples in which student MQP work was directly related to faculty research are Matthew Shaw, "Matlab Codes for the Material Point Method" (2000, advised by M. Sarkis) and Yakov Kronrod and Megan Lally, "Pattern Formation in Biological Systems" (2001, advised by R. Jordan and S. Weekes).

• We facilitated student involvement in industrial research through our Center for Industrial Mathematics and Statistics (CIMS), which has served very effectively as a means of interfacing with industry.

• We "exported" the industrial research experience to students from other universities through our NSF-sponsored Research Experience for Undergraduates in Industrial Mathematics and Statistics. In each summer since 1998, this program has brought about ten talented undergraduates from around the country to spend eight weeks in residence at WPI working on industrial projects. Now entering its fifth year, this program was unique in the country until UCLA announced a similar program to begin this summer.
Objective 1.4 Maintain contemporary teaching laboratories.

Performance:

- We maintained and improved both the hardware and course-related content of computer labs associated with our calculus and introductory statistics courses.

- We used the 32-CPU IBM RS/6000 SP parallel supercomputer for state-of-the-art lab work in a new course on parallel computing. The course (spring 2001) had both undergraduate and graduate student enrollment.

Objective 2.1 Improve the quality and diversity of the student body.

Performance:

- Although it is not clear that departmental efforts have directly resulted in improvements at this time, we have undertaken efforts that may bring improvements in the future, as follows:
  - We hired one female African-American and two Hispanic male faculty members since 1997.
  - We formulated a Memorandum of Understanding with the Mathematics Department, University of Puerto Rico at Mayaguez, that would allow their students to come to WPI to finish their last year of undergraduate school in our Actuarial Mathematics program.
  - With support from the GE Fund, we are initiating a Workshop in Industrial Mathematics for High School Teachers. This will bring about 80 high-school teachers to campus in each of the next three summers to experience the excitement of industrial mathematics and learn about the broad range of contemporary careers in the mathematical sciences. A special effort will be made to attract minority and female participants. This activity is likely to reap significant dividends in future mathematics majors, especially minority and female students.
  - We nominated Mathematical Sciences major Yakov Kronrod for a Goldwater Scholarship in fall 2000. Yakov subsequently became WPI's second Goldwater Scholarship winner in the 12-year history of the program. Such highly visible success of one of our students should make WPI more attractive to top prospective students.

Objective 2.2 Support the faculty’s efforts in research and scholarship.

Performance:

- We led the effort to acquire the 32-CPU IBM RS/6000 SP supercomputer through a grant from IBM and additional external support from NSF and
United Technologies Corporation. This has been heavily used for faculty and graduate student research and has directly supported the Computational Modeling Thrust Area.

- We increased departmental external research support through the Office of Research Administration to a total of $1,851,904 ($617,301 per year) for the three-year period 1998-2001. This does not include either the IBM Shared University Research Grant of the RS/6000 SP supercomputer, valued at $1,084,832, or the grant from the GE Fund in excess of $300,000 for the Workshop in Industrial Mathematics for High School Teachers. The amount for the previous three-year period (1995-1998) was $932,154 ($310,718 per year).

- We established a departmental report series. This has been used by faculty for preliminary writeups of research in progress and to register research results prior to publication.

*Objective 2.3 Develop creative partnerships with industry, organizations, and other universities.*

**Performance:**

- We established the Center for Industrial Mathematics and Statistics (CIMS) in January, 1997 to provide a mathematical resource to industry. This has since become our department's "flagship institution" and has been invaluable in facilitating faculty interactions and student projects with industry.

- We established the Industrial Microwave Modeling Group (IMMG) within CIMS, the goal of which is to bridge the gap between academic research and industrial microwave problems. The IMMG has hosted several international conferences at WPI and other locations and has facilitated sponsorship of research and graduate students by several microwave companies.

- With support from the Sloan Foundation, we introduced new "professional" Master's degree programs in industrial mathematics and financial mathematics. Each of these has an advisory board with membership drawn from local business and industry.

- Formulated the abovementioned Memorandum of Understanding with the Mathematics Department, University of Puerto Rico at Mayaguez, that would allow their students to come to WPI to finish their last year of undergraduate school in our Actuarial Mathematics program.
Objective 4.2 Improve ethnic and gender diversity in our community.

Performance:

- See the items above under Goal 2, Objective 2.1.

Objective 4.4 Expand efforts to meet the needs of adult learners.

Performance:

- Our Masters in Mathematics for Educators program caters to secondary school teachers who want to return for an advanced degree.

- The new Sloan-sponsored "professional" Master's degree programs in industrial mathematics and financial mathematics are expected to appeal to personnel in business and industry who desire further professional training.

Objective 4.7 Enhance support for K-12 system and the local community.

Performance:

- We obtained support from the GE Fund to initiate a Workshop in Industrial Mathematics for High School Teachers, described above.

Objective 5.2 Establish state-of-the-art computing resources and network performance.

Performance:

- We led the effort to acquire the 32-CPU IBM RS/6000 SP supercomputer, as described above.
12. Mechanical Engineering

Objective 1.1 Fully develop the WPI Plan for all students around an “honors college” metaphor at all levels.

Performance:

- Faculty size: The Department currently has 31 full time faculty members (including our newest hire and people on leaves) and while we would certainly welcome the opportunity to increase the size slightly, the current numbers is sufficient to meet most of our instructional needs. The quality of the faculty is already high. We have a number of fellows of professional societies (ten), several editors/associate editors of professional journals, and many who are leaders in their professional societies. Over half the faculty is actively engaged in research and it is probably a conservative estimate that about a quarter of the faculty members currently in ME could be at any top ranked institution. Several retirements are likely to take place over the next few years and filling these positions offers an exciting opportunity to further improve the quality of the department. Our last two hires support an optimistic view of new hiring. In both cases we had several excellent candidates and our top candidates accepted our offer.

- Freshman year: The ME Department currently offers four popular 1000 level introductory courses (ES1020, ES1310, ME1800, and ME1520). ME 1800, Material Selection and Manufacturing, and ES 1310, Introduction to CAD, are each taken by over 200 students each year, including a large number of non-ME students. We have currently started discussing the role of these courses and how they might be modified. These courses offer the opportunity to introduce students to real engineering early and lay a firm foundation for the practical aspects of engineering. Members of the ME faculty have also served as insight advisors.

- Masters Program: Last year, the ME and MFE M.S. programs were revised to include a non-thesis option. The non-thesis option was designed for maximum flexibility – allowing up to 30 percent of academic credit be devoted to directed research at the student’s discretion, and permitting that another 30 percent be devoted to electives that could be from outside of mechanical engineering. At the same time, the thesis option of the program was improved by increasing from 20 percent to 40 percent the fraction of total credits devoted to thesis research, while still allowing 30 percent of credits to be taken outside of mechanical engineering. We are currently not engaged in any distance learning, but hope to make a major push in that direction next year. The department plans to emphasize the BS/MS program, but also to carve out a niche by offering creative and flexible programs to part-time students and students with unconventional background.
• Ph.D. Program: This year we have introduced a direct B.S.-to-Ph.D. program, which will allow students direct admission into the Ph.D. program without first needing to obtain a masters degree. Until now, the Mechanical Engineering Department has offered admission to its Ph.D. program only to applicants who have already earned master’s degrees. However, interest in pursuing a Ph.D. is oftentimes developed by outstanding students while they are undergraduates. When these outstanding students choose graduate schools, they are naturally led toward those programs that allow them to begin their doctoral studies directly. The existence of a B.S.-to-Ph.D. program will permit the Mechanical Engineering Department to more effectively recruit prospective students with strong research interests directly into our Ph.D. program. To reflect our emphasis on research, students in the B.S.-to-Ph.D. program can devote two-thirds of their academic credit toward dissertation research.

Objective 1.2 Develop aligned incentives for faculty and staff to promote action plans.

Performance:

• Increasing the number of women and minority faculty members is an important goal. The Department currently has three female members and our addition last year (Blandino) is from an underrepresented minority (Hispanic).

• The faculty are very active in nominating their colleagues for various awards and fellowship in professional societies. Nearly a third of the ME faculty already are fellows and several have received major awards and recognitions.

• The staff in ME is given every opportunity to attend development courses. The technical staff attended a week-long training session in the use and development of the Haas machines. The computer manager attended Microsoft courses at WPI Continuing Education. Administrative staff has made use of the software training courses available at CCC. The staff has been encouraged to develop their skills and look out for opportunities to advance their positions. Although there is naturally some dissatisfaction with the compensation and funds available for raises, the staff morale in the Department appears to be high and the staff is very dedicated to serving our students in the best possible manner. Providing a supportive environment to our students is an important priority in the Department that the staff has enthusiastically embraced.
Objective 1.3 Provide increasing opportunities for student involvement in research.

Performance:

- The ME faculty—including many of the most eminent members of the Department—draw undergraduate students into their research through the MQP program. In several cases the projects have resulted in journal articles. The department has also participated in the NSF-REU program where the National Science Foundation makes possible a number of opportunities for undergraduates to join research projects each summer. This allows students to experience first-hand how basic research is carried out, and to contribute consequentialy. Professor J. Rencis and Professor M. Fofana received a three-year grant to participate in this award.

- While the department does not sponsor their own graduate fellowships they do participate in the graduate fellowships, which are available to the whole college, i.e., R. Goddard Fellowship, Backlin Scholarship, and the Anderson Fellowship. The ever increasing research funding of the ME faculty provides them with the opportunity to recruit outstanding graduate students and enables them to support graduate research assistants with fully paid tuition and stipend.

Objective 1.4 Maintain contemporary teaching laboratories.

Performance:

- Over the last few years the department has been able to renovate several teaching laboratories. The Institute provided funding to expand ME 3901, Engineering Experimentation to accommodate 72 students per term with computer workstations to develop analytical and experimental skills in modern engineering measurements methods, based on electronic instrumentation and computer-based data acquisitions systems. The Discovery Classroom and the Controls Laboratory have been established with external funding.

- Through a grant from the Lufkin Foundation and the Haas Corporation the Washburn Shop has been renovated and the Haas Center for Computer-controlled Machining established. This center accommodates ME1800, Materials Selection and Manufacturing Processes, a very popular freshmen course (over 200 mechanical engineering and non-mechanical engineering students per year). The course is designed to introduce the student to the engineering fundamentals of the most commonly encountered manufacturing processes. Several MQP projects have already taken advantage of the new facility and we expect other courses to do so also.
Objective 2.1 Improve the quality and diversity of the student body.

Performance:

- The main Departmental effort in the recruiting of undergraduate students has been a redesign of the presentations to prospective students at the “open house” events. The emphasis is on the broad appeal of an ME degree, the unique opportunities at WPI, and the quality of the faculty. Student presentations are a major part of the event. We also hope to work closely with the admission office to contact admitted students. This year our only contacts were one e-mail message to admitted students and several one-on-one contacts between students and the faculty.

- Every year for the past several years we have exposed our undergraduates to the advantages of our B.S./M.S. program. We have done so through mailings to all junior mechanical engineering majors, and by hosting an annual information session at which a formal presentation of the workings of the program is given, and at which current B.S./M.S. students describe their own experiences in the program.

- For the past few years, we have also identified outstanding seniors in mechanical engineering at WPI and have formally contacted them to encourage them to apply to our graduate program. In addition, we hold an open house for all interested applicants to the graduate program at which we present the program, tour our laboratories, and encourage prospective students to interact with our current graduate students.

While the size of our graduate program has been nearly steady for several years, this year the numbers of graduates has gone up.

<table>
<thead>
<tr>
<th></th>
<th>96-97</th>
<th>97-98</th>
<th>98-99</th>
<th>99-00</th>
<th>00-01</th>
<th>01-02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grad. Enrollment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masters degrees (ME/MTE/MFE)</td>
<td>27</td>
<td>21</td>
<td>32</td>
<td>44</td>
<td>36</td>
<td>50</td>
</tr>
<tr>
<td>Ph.D degrees (ME/MTE/MFE)</td>
<td>4</td>
<td>6</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>9</td>
</tr>
</tbody>
</table>

- I would like to see our Ph.D. production rise to ten or so per year. That would be about half of what it is at the top research universities (at MIT 54 faculty graduated 33 Ph.D. students and at the University of Michigan 52 faculty graduated 39 Ph.D. students in 2000—or 0.7 Ph.D. per faculty per year on the average). Ten graduates per year seems very attainable, given our funding level and the interest in our program. The main difficulty is the high cost for incoming (and untested) students.
• At the moment, we make essentially no effort to market our MS program to part time students. Given the low marginal cost of adding graduate students to our classes, particularly now when we no longer require a Masters Dissertation and the relatively large industrial base in the area, this seems like a revenue source waiting to be tapped. Although the Department has no specific goal for MS degrees per year, we would like to see the number increase.

Objective 2.2 Support the faculty’s efforts in research and scholarship.

Performance:

• The total research income from grants and contracts over the last few years are shown in the table below. While the current year is not over, there is every indication that the total number will exceed three million dollars.

<table>
<thead>
<tr>
<th></th>
<th>96-97</th>
<th>97-98</th>
<th>98-99</th>
<th>99-00</th>
<th>00-01</th>
<th>01-02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>1,718,319</td>
<td>1,075,319</td>
<td>1,622,662</td>
<td>2,112,560</td>
<td>2,555,739</td>
<td>2,649,444*</td>
</tr>
</tbody>
</table>

*for the first 9 months only

In addition, membership fees to MPI amounted to $1,506,000.00 last year and total gifts totaled $905,003 of which $631,745 was for the establishment of the Haas technical center. The total for last year was therefore about five million dollars. We do not track research expenditure explicitly, but based on the numbers above the average research expenditure per faculty member is conservatively estimated to be in the $100,000 to $150,000 range. I would like to see the funding rise to a stable six or seven million dollars per year, with a larger number coming directly from grants and contracts.

• Last year, the ME faculty published over 50 articles in peer reviewed journals, 4 book chapters, and over 70 conference papers. Several members of the Department gave invited seminars, invited conference talks, and plenary lectures last year.

Objective 2.3 Develop creative partnerships with industry, organizations, and other universities.

Performance:

• The Department has several partnerships with corporations and government agencies centered on the MQP program (Gillette, UTC, NASA, for example) and we hope to continue to build such high-quality relationship. The ME faculty also have close contacts with their peers at many academic institutions both in the US and abroad. In some case the contacts have been formalized.

• We are also currently working on a proposal to establish joint graduate degrees with one or two Universities in China. Other universities in the US
have already started forging relationship with Chinese universities, but at the moment opportunities far outnumber the players. With its thrust on diverse and global education, WPI is well positioned to take a leadership role in such programs.

**Objective 2.4 Continue to develop a comprehensive base of programs through aligned resource allocations.**

**Performance:**

- The ME Department currently offers two undergraduate programs (in Mechanical and Manufacturing Engineering) and three graduate programs (Mechanical, Manufacturing, and Material Science). A proposal to establish an undergraduate degree in Aerospace Engineering has also been approved by the WPI faculty. All programs take extensive advantage of the similarity and overlap of the degrees and the goal is to offer the widest possible choice of degree programs with minimum investment. At the moment we do not have a formal process to evaluating the success of each degree, but we should expect that it may become necessary to abandon degrees that are not attracting sufficient number of candidates. The Department has, for example, recently eliminated its Nuclear Engineering Concentration.

- In addition, we hope to develop Masters level programs for adult learners and form partnership with other institutions at the graduate level (see response to objectives 2.3 and 4.4)

**Objective 2.5 Expand opportunities for synchronous and asynchronous networked learning.**

**Performance:**

- The Mechanical Engineering has not participated in the ADLN or the Continuing Education program so far. I hope that will change and we are currently discussing certificate programs in MEMS and Nanotechnology, for example. I also hope that we will be able to establish online Masters courses, possibly offering a complete masters degree through ADLN. Our Manufacturing Masters Program has a significant number of part time students and we should be able to expand it significantly.

**Objective 2.6 Conduct a comprehensive image-building and marketing effort.**

**Performance:**

- I believe that marketing WPI must be done at all levels, including to parents, students, alumni, and to our fellow academicians. The Department is in a particularly good position to contribute to marketing to our alumni and to our peers.
• The department sent out a newsletter to its alumni last year and another newsletter is planned this summer. We also produced a graduate poster that has been mailed to all mechanical and aerospace departments in the US twice. The purpose of the poster is to draw attention to our graduate program (posters are generally regarded as rather ineffective recruiting tools) and increase our visibility. The plan is to develop a mailing program where we mail something to all mechanical and aerospace departments heads four times a year. The mailing will consist of the graduate poster, the newsletter, a faculty advertisement, and scholarly papers about our program.

• The lack of easily available scholarly articles about our program, the WPI plan, and our global program are an issue that should perhaps be addressed at the Institute level. I have already had several opportunities to discuss our program with colleagues at other institutions and I would have multiplied the impact if I could have followed-up by mailing recent articles by our colleagues. If such papers exist, it would help greatly if they were easily available (our marketing literature—great as it is—is not suitable for this particular purpose).

• The Department is also participating in developing the Institute wide Research Brochure.

• The Department Web page was completely redesigned over a year ago by the WPI Web Development Group and we anticipate further redesign to take place this summer to align our pages with the new Institute image. The number of laboratories and research groups with Web pages has increased significantly in the last year, but many active groups are still without a Web page.

**Objective 3.1 Expand participation by students and faculty in the Global Perspective Program.**

**Performance:**

• The ME faculty are active participants in the Global Perspectives Program. Alexandrou, Ault, Demetry, and Sisson have already served at project sites and Biederman will participate next year.

**Objective 4.4 Expand efforts to meet the needs of adult learners.**

**Performance:**

• The Department offers a number of graduate courses in the evening, specifically to attract non-traditional students. A number of part time graduate students are also enrolled in the MS program, particularly in the Manufacturing Program. While there are plans to offer online courses, nothing is currently available.
13. Management

**Objective 1.1** Fully develop the WPI Plan for all students around an “honors college” metaphor at all levels.

**Performance:**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Full-time Faculty</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time, Tenured</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Full-time, Tenure Track</td>
<td>8</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Full-time, Professor of Practice</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Full-time, Visitor</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Number of Part-time Faculty</td>
<td>13</td>
<td>15</td>
<td>23</td>
</tr>
<tr>
<td>Undergraduate Program Ranking</td>
<td>not eligible until accredited</td>
<td>not eligible until accredited</td>
<td>not eligible until accredited</td>
</tr>
<tr>
<td>Graduate Program Ranking</td>
<td>Listed among Best Online Business Programs, USNWR, 10/01</td>
<td>not eligible until accredited</td>
<td>not eligible until accredited</td>
</tr>
<tr>
<td>Number of Large Classes (&gt; 35)</td>
<td>24.1% (20/83)</td>
<td>30.6% (26/85)</td>
<td>25.9% (21/81)</td>
</tr>
<tr>
<td>Number of Entrepreneurship Minors</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Number of Organizational Leadership Minors</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Management Minors</td>
<td>29</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of MIS Minors</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Engineering Registrations in Management UG Courses</td>
<td>375</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Science Registrations in Management UG Courses</td>
<td>203</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Humanities and Social Science Registrations in Management UG Courses</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Management and Other Registrations in Management UG Courses (MG, MGE, MIS, ND)</td>
<td>829</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Objective 1.2** Develop aligned incentives for faculty and staff to promote action plans.

**Performance:**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty Diversity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Asian American</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Hispanic American | 0 | 0 | 0
White | 15 | 17 | 12
Foreign (non-citizen or non-resident alien) | 2 | 0 | 2
Female | 8 | 8 | 6
Male | 13 | 13 | 13

Faculty and Staff Salaries Compared to AACSB Data

| Assistant Professors | average 7% below the mean salary for their rank | average 7% below the mean salary for the rank | average 3.7% below the mean salary for the rank |
| Associate Professors | average 2.5% below the mean salary for their rank | average 2.7% below the mean salary for their rank | average 4.2% below the mean salary for the rank |
| Professors | average 24.3% below the mean salary for their rank | average 24.3% below the mean salary for their rank | average 23.9% below the mean salary for the rank |

Objective 1.3 Provide increasing opportunities for student involvement in research.

Performance:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact of Graduate Fellowships</td>
<td>None</td>
<td>None - last year of Xerox Fellowship</td>
<td>Xerox Fellowship permitted us to recruit one Hispanic-American MBA student</td>
</tr>
</tbody>
</table>

Objective 1.4 Maintain contemporary teaching laboratories.

Performance:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average age of laboratories</td>
<td>WB216 4 years old; WB228 new</td>
<td>WB216 3 years old</td>
<td>WB 216 2 years old</td>
</tr>
</tbody>
</table>

Objective 2.1 Improve the quality and diversity of the student body.

Performance:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution of Majors - UG (Obj: 8% from MG, MGE, and MIS by 2010)</td>
<td>5.06% (+1.18% IE)</td>
<td>5.22% (+1.3% IE)</td>
<td>4.97% (+1.46% IE)</td>
</tr>
<tr>
<td>Distribution of Majors - G (% of all WPI)</td>
<td>22%</td>
<td>22%</td>
<td>22%</td>
</tr>
<tr>
<td>Percentage of Minorities - UG (Obj: 15% by 2010)</td>
<td>12% (+0% IE)</td>
<td>15% (+9% IE)</td>
<td>11% (+18% IE)</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Percentage of Minorities - G</td>
<td>7%</td>
<td>6%</td>
<td>8%</td>
</tr>
<tr>
<td>Percentage of Non-resident Aliens - UG</td>
<td>7% (+53% IE)</td>
<td>7% (+46% IE)</td>
<td>10% (+41% IE)</td>
</tr>
<tr>
<td>Percentage of Non-resident Aliens - G</td>
<td>20%</td>
<td>18%</td>
<td>15%</td>
</tr>
<tr>
<td>Percentage of Women - UG (Obj: 30% by 2010)</td>
<td>16% (+28% IE)</td>
<td>21% (+20% IE)</td>
<td>22% (+13% IE)</td>
</tr>
<tr>
<td>Percentage of Women - G</td>
<td>33%</td>
<td>28%</td>
<td>25%</td>
</tr>
</tbody>
</table>

**Objective 2.2 Support the faculty’s efforts in research and scholarship.**

**Performance:**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Course Load for TT Faculty</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Average Course Load for Tenured Faculty</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Average Course Enrollment per Faculty Member</td>
<td>26.4</td>
<td>27.7</td>
<td>28</td>
</tr>
<tr>
<td>Average Course Enrollment for TT Faculty - UG</td>
<td>31.8</td>
<td>32.7</td>
<td>34.2</td>
</tr>
<tr>
<td>Average Course Enrollment for TT Faculty - G</td>
<td>21.5</td>
<td>23.2</td>
<td>21.8</td>
</tr>
<tr>
<td>Average Course Enrollment for Tenured Faculty - UG</td>
<td>30.3</td>
<td>33.7</td>
<td>36.6</td>
</tr>
<tr>
<td>Average Course Enrollment for Tenured Faculty - G</td>
<td>23.3</td>
<td>22.5</td>
<td>31.6</td>
</tr>
<tr>
<td>Average Course Enrollment for Professors of Practice - UG</td>
<td>18.7</td>
<td>32.5</td>
<td>0</td>
</tr>
<tr>
<td>Average Course Enrollment for Professors of Practice - G</td>
<td>39</td>
<td>35</td>
<td>0</td>
</tr>
<tr>
<td>Average Course Enrollment for Visiting Professors - UG</td>
<td>28.8</td>
<td>24.8</td>
<td>36.8</td>
</tr>
<tr>
<td>Average Course Enrollment for Visiting Professors - G</td>
<td>16.7</td>
<td>20.5</td>
<td>16.2</td>
</tr>
<tr>
<td>Average Course Enrollment for Adjunct Faculty - UG</td>
<td>32.5</td>
<td>29.3</td>
<td>24.5</td>
</tr>
<tr>
<td>Average Course Enrollment for Adjunct Faculty - G</td>
<td>17.9</td>
<td>23.2</td>
<td>14.5</td>
</tr>
<tr>
<td>Total Course Credit Hours Delivered (A-D)</td>
<td>6286</td>
<td>6908</td>
<td></td>
</tr>
<tr>
<td>Total Undergraduate Course Credit Hours Delivered</td>
<td>4362</td>
<td>4640</td>
<td></td>
</tr>
<tr>
<td>Total Graduate Course Credit Hours Delivered</td>
<td>2041</td>
<td>2268</td>
<td></td>
</tr>
<tr>
<td>Number of IQPs Advised (A-D)</td>
<td>23</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Total IQP Students</td>
<td>58</td>
<td>45</td>
<td>36</td>
</tr>
<tr>
<td>Total IQP Credit Hours Delivered</td>
<td>492</td>
<td>387</td>
<td>253.5</td>
</tr>
<tr>
<td>Number of MQPs Advised (A-D)</td>
<td>28</td>
<td>31</td>
<td>30</td>
</tr>
<tr>
<td>Total MQP Students</td>
<td>70</td>
<td>73</td>
<td>66</td>
</tr>
<tr>
<td>Total MQP Credit Hours Delivered</td>
<td>583.5</td>
<td>675</td>
<td>583.5</td>
</tr>
<tr>
<td>Total PQP’s Advised (A-D)</td>
<td>42</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Total PQP Students</td>
<td>44</td>
<td>43</td>
<td>80</td>
</tr>
<tr>
<td>Total PQP Credit Hours Delivered</td>
<td>67.5</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>Total Other Non-course Credit Hours Delivered - UG (A-D)</td>
<td>9</td>
<td>16.5</td>
<td>9</td>
</tr>
<tr>
<td>Total Non-course Credit Hours Delivered</td>
<td>45</td>
<td>38</td>
<td>31</td>
</tr>
</tbody>
</table>
Objective 2.3 Develop creative partnerships with industry, organizations, and other universities.

Performance:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MBI; CAFA</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Objective 2.4 Continue to develop a comprehensive base of programs through aligned resource allocations.

Performance:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Alumni Satisfaction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Satisfaction - UG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBI Instruction &amp; Faculty: Required Courses</td>
<td>1/6; 14/All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBI Instruction &amp; Faculty: Business Courses</td>
<td>1/6; 36/All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBI Quality of Teaching</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBI Real World Experiences</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBI Social Responsibility/Ethical/Technical</td>
<td>1/6; 57/All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBI Team Experiences</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBI Class Size and Availability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2/6; 55/All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBI Value of Skill Development Experiences</td>
<td>3/6; 36/All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>-------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBI Overall Satisfaction</td>
<td>2/6; 36/All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Satisfaction - G</td>
<td>2/6; 38/All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBI Responsiveness</td>
<td>85% v 45%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBI Amount of Information</td>
<td>90% v 62%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBI Timeliness of Information</td>
<td>90% v 63%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBI Instruction &amp; Faculty: Required Courses</td>
<td>1/6; 3/All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBI Instruction &amp; Faculty: Business Courses</td>
<td>1/6; 8/All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBI Quality of Teaching</td>
<td>1/6; 13/All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBI Real World Concepts</td>
<td>1/6; 6/All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBI Team Experiences</td>
<td>1/6; 6/All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBI Class Size and Availability</td>
<td>1/6; 7/All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBI Value of Skill Development Experiences</td>
<td>2/6; 26/All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBI Overall Satisfaction</td>
<td>1/6; 13/All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall Satisfaction with Program (GMP Exit Survey)</td>
<td>4.1/5.0 4.0/5.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Objective 2.5 Expand opportunities for synchronous and asynchronous networked learning.

Performance:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of ADLN Courses</td>
<td>20</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Number of ADLN Registrations</td>
<td>290 (744 CH) 2</td>
<td>226 (526 CH) 2</td>
<td>227 (578 CH) 2</td>
</tr>
</tbody>
</table>

Objective 2.6 Conduct a comprehensive image-building and marketing effort.

Performance:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Graduate Inquiries</td>
<td>2454</td>
<td>2477</td>
<td>2477</td>
</tr>
<tr>
<td>Number of Graduate Applications - FT</td>
<td>47</td>
<td>77</td>
<td>53</td>
</tr>
<tr>
<td>Number of Graduate Applications - PT</td>
<td>67</td>
<td>68</td>
<td>64</td>
</tr>
<tr>
<td>Number of Graduate Applicants Admitted - FT</td>
<td>29</td>
<td>54</td>
<td>43</td>
</tr>
<tr>
<td>Number of Graduate Applicants Admitted - PT</td>
<td>62</td>
<td>63</td>
<td>51</td>
</tr>
</tbody>
</table>

Objective 3.1 Expand participation by students and faculty in the Global Perspective Program.

Performance:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Faculty Involved as GPP Advisors (excl. E-01 advising)</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Number of GPP PQPs Advised (incl. D01 PQP's for E-01 GPP)</td>
<td>30</td>
<td>40</td>
<td>11</td>
</tr>
</tbody>
</table>
Objective 4.5 Enhance the Career Development Center.

Performance:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Placement Rates</td>
<td>29/44 (65.9%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean Starting Salary</td>
<td>$53,991</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Objective 4.7 Enhance support for K-12 system and the local community.

Performance:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of K-12 Outreach Programs</td>
<td>WPI Dinner With Entrepreneurs</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Entrepreneurial Programs for the Local Community</td>
<td>WPI Venture Forum</td>
<td>WPI Venture Forum</td>
<td>WPI Venture Forum</td>
</tr>
</tbody>
</table>

Objective 5.3 Create and maintain sufficient electronic classrooms to support on- and off-campus programs.

Performance:

<table>
<thead>
<tr>
<th>Assessment Metric</th>
<th>2001-02 (98.8%)</th>
<th>2000-01 (97.7%)</th>
<th>1999-2000 (90.1%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courses Offered in Electronic Classrooms</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes

1. Not yet based on accreditation status.

2. Number is artificially low because of course caps and cancellations related to AACSB accreditation.

3. Number will continue to be small until such time as we have stability in the entrepreneurship faculty position from year-to-year.
14. Physics

Objective 1.1 Fully develop the WPI Plan for all students around an “honors college” metaphor at all levels.

Performance:

• Impact of first year: One faculty member is a member of the First-Year Tutorial project team (sponsored by the Davis Foundations). One faculty member is an Insight advisor.

• Curriculum improvements:
  ▪ A new undergraduate laboratory course (PH 2601 Photonics Laboratory) is now available, associated with the IPG Lab and outfitted with state-of-the-art photonics equipment.
  ▪ A new course on Atomic Force Microscopy has been offered to undergraduates for the past two years and will continue to be offered.

• Number of large classes: During this past year, as a typical year, Physics offered 14 courses that had enrollments of less than 35 students, and 10 courses that had enrollments of more than 35. Physics has always had a high proportion of small classes, which includes all of the intermediate and advanced courses along with occasional introductory offerings. All of the large-enrollment courses (two of which are invariably above 360 students) are divided into 30-student conference sections, and several faculty members, including some of the newest members of the department, are actively experimenting with and implementing active-learning techniques to improve student involvement in these courses taken by many students to fulfill a requirement.

Objective 1.2 Develop aligned incentives for faculty and staff to promote action plans.

Performance:

• Faculty Diversity: Two of the 12 tenured/tenure-track members of the department are women, which is a first-ever occurrence for this department and finally puts us in line with American Physical Society best-practice advice that states that any physics department with female faculty members should never have fewer than two women on the faculty for long-term well-being of the female faculty members. (Although this is not addressing the popular meaning of diversity undoubtedly intended under this item, we note that four of the 12 members of this department are not native-born Americans: two are from India, one is from Mauritius, and one is from Russia. Physics is a diverse group, indeed!)
Objective 1.3 Provide increasing opportunities for student involvement in research.

Performance:

- Number of students in summer research: The Physics Department has a long history of involving undergraduates in research during the summer. During the past few years, the record has even improved, rising from an average of three to an average of five.

- Impact of graduate fellowships: For Physics, the focus is not fellowships but research assistantships. During the past decade as funded research activities have increased, Physics seems to have reached a stable level where in this next year there will be a minimum of three students supported on Ras, with the potential for this number going as high as four or five. This is a high-water mark for the era of the past 30 years.

Objective 1.4 Maintain contemporary teaching laboratories.

Performance:

- As a result of an initiative undertaken with IPG, the Physics Department now has a state-of-the-art photonics laboratory, which this year was used in conjunction with a laser physics course and an optics course. As mentioned above, this lab will be the site of a photonics laboratory course starting this next year.

Objective 2.2 Support the faculty’s efforts in research and scholarship.

Performance:

- In the last ten years, the Physics Department has hired six new, tenure-track faculty (and two hires are pending)—all as a result of retirements or resignations. With a total number of tenured and tenure-track faculty equal to 13, this means that a majority of physics department faculty are relatively new to the WPI campus. All of the new hires have a significantly higher commitment to research and scholarship than the individuals they replaced. As a result, external research grant support has increased. As of March 2002, the physics department has $759K of committed external funding (most are multi-year grants—so this is not equal to income for this Fiscal Year). The comparable number three years ago was $400K. There are also two other proposals which are likely to be funded this Spring. Two of the new grants are prestigious NSF Career Awards. Two are NSF MURA grants, which have the added benefit of enhancing WPI's research reputation at the multiple universities involved. Increased grant support allows larger participation of WPI faculty in professional society meetings, increases the number of
graduate students who can be financially supported, and provides funds for new research laboratory equipment.

- Other forms of external recognition have also increased. Professor L. R. Ram-Mohan was recently elected as a Fellow of the American Physical Society (and of the Australian Physical Society). Faculty members in the physics department are very much in demand as speakers at other universities and at various meetings—to the point where coordination of absences is becoming difficult.

*Objective 3.1 Expand participation by students and faculty in the Global Perspective Program.*

**Performance:**

- Faculty involvement: During the past three years, three faculty members have served at project sites outside of the continental United States, and three faculty members have served at the Goddard Space Flight Center. It is also worth noting that because physics major courses are only offered once per year, there are occasionally scheduling conflicts created by students who want to go to a particular site that is available only in conflict with a mainline major course. In such cases, students are encouraged to participate in the IQP program of their choice, with the department making every effort to accommodate missed courses through independent studies scheduled for another term when the student is on campus.
15. Social Science and Policy Studies

Objective 1.1 Fully develop the WPI Plan for all students around an “honors college” metaphor at all levels.

Performance:

• A collegial culture is important to meeting this objective. It is hard to quantify the process or its results, but we talk more often about our work and program in the corridors and revise our courses more often. The number of publications and presentations from the department are rising steadily and a few recognition awards have appeared.

Objective 1.3 Provide increasing opportunities for student involvement in research.

• We have worked with colleagues in the other departments to develop grant proposals for interdisciplinary research on energy systems. A recent grant proposal involves colleagues from ME, ECE and SSPS.

Objective 2.1 Improve the quality and diversity of the student body.

Performance:

• We have implemented an interdisciplinary doctoral program with collaboration from civil, mechanical and electrical engineering departments.

Objective 2.2 Support the faculty’s efforts in research and scholarship.

Performance:

• We have started a working paper series that can be accessed at our Website to create a record of our ongoing work. Working papers contain both teaching-and research-related documents.

• We have introduced once a week faculty brown bag seminar series in which faculty share their ongoing work, covering both teaching and research, with their colleagues. We have additionally encouraged frequent course revisions so our teaching is constantly updated.

Objective 2.3 Develop creative partnerships with industry, organizations, and other universities.

Performance:

• We have created a productive research partnership with Nihon University in Japan. Nihon University has sponsored Khalid Saeed to develop models of
implementation for environmental policy and present them in a Symposium in Tokyo. This partnership is expected to continue.

- We have introduced a visiting scholars program that invites selected scholars to spend their sabbaticals and other sojourns at WPI collaborating with SSPS faculty on their research. Scholars visiting this program so far have come from Japan, Malaysia, Russia, and UK. All visits so far have been externally supported.

- SSPS department has hosted numerous meetings of the system dynamics society policy council and will collaborate with Columbia University in hosting the 21st conference of the society to be held in New York City in 2003.

*Objective 2.4 Continue to develop a comprehensive base of programs through aligned resource allocations.*

*Performance:*

- In modern times, technologies must also include social innovations, which the SSPS department has attempted to promote through establishment of new programs. A program in system dynamics is already in place. Programs in economic and psychological sciences are on the drawing board.

*Objective 2.6 Conduct a comprehensive image-building and marketing effort.*

*Performance:*

- Our effort must go into backing up the image with real work, which is listed under other performance notes.

*Objective 3.1 Expand participation by students and faculty in the Global Perspective Program.*

*Performance:*

- Khalid Saeed and Kent Rissmiller participated in a research project on Global Public Policy carried out at Tellus Institute last year. Khalid Saeed also developed a Website for the research group involved with global public policy of which he is one of the founders. This can be seen at: [http://www.gppnresearch.org/index.html](http://www.gppnresearch.org/index.html).

- We have created a dedicated advisory board for our new program in system dynamics bringing senior members among other organizations from MIT, Gakushuin University in Japan, International Finance Corporation and World Bank, which should greatly enhance WPI’s recognition on those fronts.
• Communications are in progress with UN University in Tokyo and Zhejiang University in China to seek possible research collaborations.

*Objective 4.1 Construct and renovate facilities to accommodate social and academic activities and solve the parking problem.*

**Performance:**

• Renovations to consolidate SSPS department’s office space have been planned to enhance professional and collegial interaction. These are expected to be carried out over the summer.

*Objective 4.5 Enhance the Career Development Center.*

**Performance:**

• We have worked closely with CDC to develop a network of potential employers for system dynamics majors. Work on this front continues.

*Objective 4.7 Enhance support for K-12 system and the local community.*

**Performance:**

• We have attempted to establish collegial links with Mass Academy and with k-12 teacher networks sharing common interests in system dynamics. We have hosted activities for Dynamiquest – a Junior modeling contest and have participated in workshops organized for K-12 teachers. We have also sent our students to give presentations about WPI and its programs at Mass Academy and Symbowl—a senior modeling contest.

*Objective 5.1 Improve library resources, services, and facilities.*

**Performance:**

• We have attempted to take a more vigilant approach to book ordering for the library and have worked hard to upgrade department’s equipment.

*Objective 5.2 Establish state-of-the-art computing resources and network performance.*

**Performance:**

• Several laptops computers and computer projectors have been acquired for presentation work and are used heavily.

• A number of software donation have been obtained by the department for use by students and faculty.