## MA Strategic Plan Report - May 02

### Table 2-4. 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 &quot;honors college&quot; 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>

**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.

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<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</td>
<td>Student participation in humanities and arts programs; status of academic</td>
<td>Provost’s Office; Faculty Governance;</td>
</tr>
</tbody>
</table>
### 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 2.4** Continue to develop a comprehensive base of programs through aligned resource allocations.

Performance: None

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

Performance: None.

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

Performance: None.

**Table 2-6. 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>
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<tbody>
<tr>
<td>3.1 Expand participation by students and faculty in the Global Perspective Program.</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>
</tbody>
</table>
3.2 Make the transition from multinational sites to a global system.  

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

Performance: None.

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

Performance: None.

Table 2-7. Goal 4: Improve WPI’s Campus Culture and Community Presences

<table>
<thead>
<tr>
<th>Outcome Objectives</th>
<th>Performance Measures</th>
<th>Responsible Parties</th>
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</thead>
<tbody>
<tr>
<td>4.1 Construct and renovate facilities to accommodate social and academic activities and solve the parking problem.</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 Improve ethnic and gender diversity in our community.</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 Provide a safe environment for our community that fosters learning and development with appropriate alternatives to alcohol and drug abuse.</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 Expand efforts to meet the needs of adult</td>
<td>Net revenue; numbers of faculty and students involved.</td>
<td>Dean, Division of Continuing Studies;</td>
</tr>
<tr>
<td>Objective 4.1</td>
<td>Construct and renovate facilities to accommodate social and academic activities and solve the parking problem.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Performance:</td>
<td>None.</td>
<td></td>
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**Objective 4.2**  
*Improve ethnic and gender diversity in our community.*  
**Performance:**  
See the items above under Goal 2, Objective 2.1.

**Objective 4.3**  
*Provide a safe environment for our community that fosters learning and development with appropriate alternatives to alcohol and drug abuse.*  
**Performance:**  
None.

**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 4.5  
Enhance the Career Development Center.

Performance:  
None.

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

Performance:  
None.

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

Performance:  
- Enhancement of support for K-12 system and the local community.
- We obtained support from the GE Fund to initiate a Workshop in Industrial Mathematics for High School Teachers, described above.

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<tr>
<th>Table 2-8. Goal 5: Expand WPI's Educational Resources</th>
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<tbody>
<tr>
<td><strong>Outcome Objectives</strong></td>
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<tr>
<td>------------------------</td>
</tr>
<tr>
<td>5.1 Improve library resources, services, and facilities</td>
</tr>
<tr>
<td>5.2 Establish state-of-the-art computing resources and network</td>
</tr>
</tbody>
</table>
**Objective 5.1**  
*Improve library resources, services, and facilities.*

**Performance:**  
None

**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.

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

**Performance:**  
None