



A. JAMES CLARK SCHOOL OF ENGINEERING

Toward Higher Levels of Excellence: A Five-Year Strategic Plan for Engineering 2001-2006 (Abridged version)

Prepared by

Glenn L. Martin Institute of Technology
and
A. James Clark School of Engineering
University of Maryland, College Park

Nariman Farvardin, Dean
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Executive Summary

This Strategic Plan summarizes a set of guidelines that chart the path for the Martin Institute of Technology and Clark School of Engineering in the next five years: 2001-2006. The Plan focuses on several key elements that are essential for the continued advancement of our college within the ranks of the best engineering programs. It places an extraordinary emphasis on the importance of quality and excellence in all aspects of our college and recognizes the importance of diversity at all levels. Further, the Plan focuses on education, research and outreach as the primary functions of the college and develops a strategy for strengthening the college in these three dimensions through an integrated approach.

The Plan includes six Strategic Initiatives. Strategic Initiative 1 aims at educating a high quality technology workforce for the state, region and the nation. Strategic Initiative 2 focuses on building an outstanding research program to propel forward the economy of the state, region and nation through creating new knowledge. Strategic Initiative 3 calls for a significant enhancement of the college's physical infrastructure to support the ambitious goals of Initiatives 1 and 2. Strategic Initiative 4 focuses on steps we must take to ensure an environment that promotes diversity and fosters a spirit of collegiality. Strategic Initiative 5 outlines our external relations plans aimed at increasing philanthropic support to generate the requisite resources for achieving the college's educational and research goals and significantly enhancing the college's communication and name building activities. And, Strategic Initiative 6 focuses on the college's outreach programs, including industrial partnerships, executive education, entrepreneurship programs and other activities to strengthen the college's role and effectiveness in technology transfer and economic development.

Through a successful implementation of this Plan, we aim to become a key player in fueling the economic engine of the state, region and nation by educating the needed high technology work force, advancing the state of knowledge through basic and applied research, and facilitating technology transfer through proactive establishment of partnerships with industry and government laboratories. By staying focused on the Plan and achieving its quantitative and qualitative goals, we aspire to consistently place the University of Maryland among the nation's top 15 engineering programs among all universities—public and private.

Our goal has been to make the Plan a summary of the shared values and objectives of the college community. Designed with specific attention to the needs of our constituencies--students, employers, corporate partners, government laboratories, funding agencies, alumni and state citizens, the Plan is developed and will continue to be revised in active consultation with the college community and our constituencies.

A. Introduction

In 1994, the Glenn L. Martin Institute of Technology and the A. James Clark School of Engineering developed a strategic plan, "Engineering in the Second Century: The Strategic Plan for Engineering at the University of Maryland." This Plan, that had many bold initiatives supported by specific action steps, became the basis for a five-year endeavor that put the Martin Institute on a path that resulted in extraordinary progress in the period 1995-2000.

The 1994 Plan served the college extremely well. Now, about six years after its adoption, we are embarking on a new strategic planning exercise that will chart the path for Engineering in the next five years: 2001-2006. This Strategic Plan builds on the successes of the past and takes advantage of the existing momentum to propel the college to higher levels of distinction. The Plan reflects significant changes that have occurred in the University of Maryland and in external communities relevant to engineering. This Plan reaffirms our commitment to excellence, sets forth main areas for attention and specifies action steps that are important for our continued progress as a premier college of engineering. The Plan serves as a guide for the college in focusing its resources. Throughout this document, we refer to the engineering programs at four peer institutions (hereafter referred to as Peers): University of California, Berkeley; University of Illinois at Urbana-Champaign, University of California, Los Angeles and University of Michigan. In many instances, our educational and research targets are set in terms relative to these Peers.

This Plan focuses on several key elements that we consider essential for the continued advancement of our college within the ranks of the best engineering programs. Specifically, the Plan places an extraordinary emphasis on the importance of quality and excellence in all aspects of our college. The Plan also recognizes the importance of diversity at all levels. As such, there are numerous references in the strategic initiatives and specific action steps in which the emphases on excellence and diversity are highlighted. Further, the Plan recognizes the importance of education, research and outreach as the primary functions of the college and focuses on strengthening the college in these three dimensions through an integrated approach. In Strategic Initiative 1, the Plan calls for developing programs aimed at educating a high quality technology workforce for the state, region and the nation. Strategic Initiative 2 outlines our plans for building an outstanding research program that would help propel forward the economy of the state, region and nation through creating new knowledge. This initiative calls for establishing a small number of major cross-disciplinary research programs with the aim of making the college a significant force in these areas on the national landscape. These programs include: Information Technology--Computing and Communications; Smart Small Systems; Intelligent Transportation Systems; Bioengineering; and Nanotechnology. Strategic Initiative 3 calls for a significant enhancement of the college's physical infrastructure to support the ambitious goals of Initiatives 1 and 2. Strategic Initiative 4 focuses on steps we must take to ensure an environment that promotes diversity and fosters a spirit of collegiality. Strategic Initiative 5 outlines our external relations activities aimed at increasing philanthropic support to generate the requisite resources for achieving the college's educational and research goals and significantly enhancing the college's efforts to communicate its accomplishments, thus enhancing its visibility and image. Finally, Strategic Initiative 6 focuses on the college's outreach programs, including industrial partnerships, executive education, entrepreneurship programs and other new activities that will strengthen the college's role and effectiveness in technology transfer and economic development.

The Plan is designed with specific attention to the needs of our many constituencies--students, employers, corporate partners, government laboratories, funding agencies, alumni and state citizens. This attention to customer needs is reflected throughout the Plan and includes enhancing educational programs with a focus on the needs of our students' employers, developing research programs in line with regional and national needs and priorities, developing partnerships with corporate and government laboratories, and tailoring our outreach activities in accordance with the needs of our regional customers.

This Plan was developed and will continue to be revised and refined in strong and active consultation with the college key administrators, faculty, staff and student representatives. The Initiatives described in Section C were developed with significant input from faculty and staff, both through electronic survey mechanisms and a retreat involving chairs, directors, assistant and associate deans, faculty and staff members. Further, the Initiatives and the accompanying action steps were reviewed and revised by the chairs, directors and associate deans in three off-site retreats. The Plan was presented to other constituencies such as the Engineering Board of Visitors, Engineering Council, Engineering Alumni Chapter, Engineering faculty and staff assembly, as well as the faculty assembly of each unit and various student organizations for input, criticism, and further improvement. Our goal has been to make this document a summary of the shared values and objectives of the college community so we can effectively and efficiently mobilize our people and resources for the successful implementation of the action steps outlined in the Plan.

This abridged version contains a brief statement of the college's mission and vision in Section B followed by Section C which focuses on six strategic initiatives and the specific action steps associated with these initiatives. Section D describes the implementation plan.

B. Our Mission and Vision

The mission of the Martin Institute and the Clark School at the University of Maryland is to educate students for careers in engineering and affiliated fields capable of serving the needs of Maryland and U.S. industries, to advance the state of knowledge through original research and scholarly work aimed at providing a technological edge for Maryland and U.S. industries, to facilitate technology transfer and play a key role in economic development for the State of Maryland and the region, and to benefit the public through service to the university, industry, government and the engineering profession.

The Martin Institute and the Clark School see their principal long-term goal to be the establishment of educational, research, and outreach programs of outstanding quality and sufficient breadth and size to fulfill the above-stated mission. Through a successful implementation of this Plan, we aim to become a key player in fueling the economic engine of the state, region and nation by educating the needed high technology work force, advancing the state of knowledge through basic and applied research, and facilitating technology transfer through proactive establishment of partnerships with industry and government laboratories. By staying focused on the Plan and achieving its quantitative and qualitative goals, we aspire to consistently place the University of Maryland among the nation's top 15 engineering programs among all universities –public and private. Based on a survey of engineering colleges in other universities, we believe the qualitative and quantitative goals set forth in this Plan are sufficient to meet this goal.

C. Strategic Initiatives

Having accomplished extraordinary progress in the past six years and eager to exploit the existing and anticipated opportunities, the Clark School is prepared to aggressively move forward to achieve higher levels of excellence with the aim of becoming one of the best engineering schools in publicly supported research universities in the nation. To help us focus our attention and energy, to create a sense of direction for the college community, and to accelerate our progress toward achieving the highest levels of excellence, this Strategic Plan includes six “strategic initiatives” that collectively describe the framework for action within the Clark School in the next five years (2001-2006). These initiatives are outlined below.

Initiative 1: Continue to strengthen our educational programs with the goal of providing an outstanding education to our students and attracting the finest students to our programs.

Initiative 2: Build a culture of excellence in research and scholarship while expanding the impact of the research program by emphasizing specialty topics of large potential.

Initiative 3: Establish and maintain a modern infrastructure conducive to achieving the high quality research and educational aspirations of the college.

Initiative 4: Ensure a college environment that promotes diversity and fosters a spirit of collegiality among the faculty staff and students.

Initiative 5: Establish a strong external relations program to significantly increase philanthropic support to fulfill the college’s educational and research goals.

Initiative 6: Expand the college's outreach and service programs in continuing and extended education, industrial partnerships, entrepreneurships, technology transfer and economic development.

These initiatives, carefully selected to impact every major aspect of the college, are aimed at spreading excellence across the college and at increasing the visibility and influence of our programs, both regionally and nationally. Decisions on allocation of resources--human, fiscal and capital--need to be carefully weighed to ensure a successful implementation of our Strategic Plan. Further, the success of this Plan is heavily dependent on our ability to engage the entire college community in helping us advance our goals and implement the action steps outlined in this section.

Playing a pivotal role in our Strategic Plan is an overarching theme that will be front and center in all activities of the college. This theme, emphasis on quality and excellence in all aspects of the college, will influence several initiatives and, as such, shows up in different forms in many of our action steps.

The Clark School’s mission is to educate students for careers in engineering and affiliated fields, to advance the state of knowledge through original research and scholarly work, to facilitate technology transfer and play a leadership role in economic development of the region, and to benefit the public through service to industry, government and the engineering profession. Initiatives 1 and 2 reaffirm the priority we assign to excellence in instruction and education related endeavors and excellence in research and scholarly activities. Initiatives 3 and 4 focus on creating an environment that is conducive to high quality instruction and research. Initiatives 5 and 6 focus on the relationship between the Clark School and its external constituencies, stressing the need to increase the impact of our programs on the society and to enhance our visibility.

The initiatives outlined below are chosen to specify the college’s priorities and to serve as a guide for the college in focusing its attention and energy. Needless to say, there are many other actions that need to be taken in order to build and maintain a first-rate college of engineering. Further, there is strong

interrelation between some of these initiatives. As such, there is some arbitrariness in separating the initiatives and categorizing the action steps.

In what follows, the strategic initiatives are presented. For each strategic initiative, there is a brief description and a number of actions steps. Section D provides some details on the implementation of the initiatives and the action steps.

Initiative 1: Continue to strengthen our educational programs with the goal of providing an outstanding education to our students and attracting the finest students to our programs.

To advance the Clark School to the rank of premier engineering colleges, we must continue to stress the importance of the educational experience we provide to our students. We must develop a better understanding of the needs of the employers of our graduates and tailor our curricula, through appropriate outcome assessment and feedback mechanisms, to reflect these needs in our educational offerings. We must continue to update and modernize our curricula, provide a stimulating intellectual atmosphere for our students, distribute the students more evenly among our academic programs, and engage undergraduates more fully in the research opportunities that exist mostly in our graduate programs. Also, we must elevate the importance of teaching and education in the Clark School and develop mechanisms to reward and recognize the faculty's excellence in their educational endeavors. Further, we must put more emphasis on the use of information technology--both as part of the curriculum and as a tool for improving the learning experience of the students, making certain that our students are highly literate in this very important area. We should aim to educate students who have received a solid grounding in fundamentals and an appropriate experience with modern tools and techniques as appropriate for their discipline. Further, we should aim to educate students who have strong communication skills and ability to work in cross-disciplinary teams, and have an understanding of the importance of engineering ethics and an appreciation of global issues.

We must significantly increase our student recruitment activities with the aim of attracting a highly talented and diverse student body to our programs. Special attention must be expended at recruiting talented female and minority students. At the graduate level, more effort should be directed at attracting domestic students. Emphasis must also be placed on nurturing and retaining students, both undergraduate and graduate. Especially at the undergraduate level, we must develop a multi-pronged approach to significantly increase student retention and graduation rates.

Specific steps:

1.1. Become the school of choice for the finest undergraduate students in Maryland and neighboring states.

- Maintain a freshmen class of 625-650 while keeping the total undergraduate enrollment in the 3000-3200 range. Focus recruitment efforts on improving the quality and diversity of the students.
- Develop aggressive and innovative student recruitment programs to
 - increase the number of female and minority students with the aim of increasing, by Fall 2006, the female and minority student population to at least 25% and 18% of the freshman class, respectively;
 - increase the population of highly academically talented students with the aim of raising the 25- and 75-percentile SAT score of entering freshmen to 1250 and 1420, respectively, by 2006.
- Establish additional scholarships to successfully compete in recruiting talented students.
- Work with the Admissions Office to enhance the visibility of the Clark School in select high schools in the region and neighboring states, especially in science and technology magnet schools as well as high schools with a high enrollment of female or minority students.
- Establish criteria for the admission of transfer students equivalent to those used in the admission of entering freshmen. Recruit and reward highly talented transfer students with scholarship opportunities.

1.2. Attract a highly qualified and diverse graduate student body.

- Modestly increase the number of research-oriented (not including Professional Master of Engineering and M.S. in Telecommunications) graduate students enrolled in the college, especially at the Ph.D. level, aiming at an enrollment of 1300 by 2006.
- Place special emphasis on recruiting a talented and diverse group of graduate students, especially domestic students. We should aim to
 - increase the average Quantitative plus Analytical GRE score (Q+A) of the students enrolling in engineering to at least 1480 by Fall 2006; the Q+A score for all graduate programs should reach at least 1440 by Fall 2006; and
 - increase the number of domestic students, especially females and minorities.
- Form a College Graduate Affairs Committee to work with the departments and develop creative ways to enhance the college's graduate student recruitment activities.
- Develop attractive fellowship and other financial aid packages to allow the college to compete for the best graduate students, especially domestic students.

1.3. Provide enriching and motivating educational opportunities to all of our students.

- In response to data gathered from periodic assessments, regularly and systematically modify and update existing programs or add programs and services as necessary to maintain educational programs that are responsive to changing technologies and student needs.
- Develop new mechanisms to reward and appreciate faculty effort and excellence in educational activities.
- To best utilize our faculty resources, make every effort to reduce the variability in student/faculty ratio among the programs. An undergraduate student/faculty ratio of 15-16 is our target for the college; this ratio for individual programs should stay within the 10-18 range.
- Significantly enhance the freshman year experience by
 - modifying the structure and content of ENES 100, Introduction to Engineering Design, to ensure that it provides an exciting and meaningful introduction to engineering;
 - assigning the best faculty in the college to all ENES courses; and
 - systematically reviewing the entire freshman year, for all disciplines, with the goal of establishing a common first year curriculum for all students. As part of this effort, develop a year long Introduction to Engineering course sequence which would incorporate ENES 100 and additional topics such as IT, overview of the disciplines of engineering, and fundamentals of computational analysis.
- Work with departments that offer mathematics and basic science courses for engineering students to coordinate the course contents with the needs of the students in follow-on courses.
- Take advantage of information technology tools to improve the quality of instruction and the learning experiences of the students.
- Align course offerings and minimize duplication across the departments to optimize the use of faculty time and instructional laboratories and enhance the educational experience of the students.
- Significantly increase opportunities for our talented undergraduates to engage in meaningful research opportunities on or off campus and provide travel grants to allow the students to present their findings in national conferences.
- Develop innovative engineering-specific programs that would differentiate the educational programs of the Clark School from other universities (e.g., ENES100, Hinman CEOs Program, or Gemstone).
- Increase the emphasis on teamwork, communication skills, engineering ethics, engineering management and economics, international relations and entrepreneurship by inserting components of these activities throughout the curriculum.
- Increase the scope of our international programs and establish a larger number of international exchange programs with prestigious universities abroad.

1.4. Improve the academic advising and mentoring programs and the collegiate environment for the students with the aim of enhancing both their academic performance and their total experience in the university.

- Enhance academic advising throughout the college:
 - Clarify and communicate to the students the advising roles of the Office of Student Affairs and academic units.
 - Establish peer and faculty mentoring programs for all students.
 - Devise mechanisms for our students to develop a better understanding of different engineering disciplines.
- Maintain a college environment that promotes community involvement, enhances the total educational experience, and fosters a lifelong affiliation with the university.
- Establish additional exciting and innovative pre-college summer programs for high school students, especially women and minorities, as a means to attract them to and prepare them for an engineering education.
- Support and provide funding for major team-based student projects that involve national competitions.

1.5. Develop policies and programs to significantly improve students' retention and graduation rates.

- Conduct a study to determine the causes of our low retention rates and devise programs to improve our retention rates with the aim of achieving, by 2006, a one-year retention rate of 85% for students who start as freshman in engineering and stay in engineering. The target for one-year retention rate of transfer students should also be 85%.
- Establish innovative programs aimed at developing a tighter bond between the students (particularly freshmen and sophomores) and the college and keeping them motivated about an engineering career.
- Proactively promote a culture among the faculty, staff and students that full-time undergraduate students are expected to complete 30-32 credit hours per year and that they are expected to graduate within four years. Monitoring the annual progress of students toward degree and giving them feedback must become an integral part of the academic advising program.
- Develop mechanisms to significantly improve graduation rates with the aim of achieving, by 2006, a projected 5-year graduation rate of 50% for full-time students who start as freshman in engineering and receive a degree in engineering.
- Ensure that students are able to register for required courses in a timely manner and with few scheduling conflicts. If necessary, offer more summer courses to allow students to take the courses they could not complete during the academic year.

Initiative 2: Build a culture of excellence in research and scholarship while expanding the impact of the research program by emphasizing specialty topics of large potential.

First-rate academic institutions are made up of first-rate faculty. In building an even stronger research program and promoting a culture of excellence, one of our top priorities is to recruit and retain faculty whose accomplishments, particularly by way of impact of their work, place them among the top ranks of their peers. Some of our programs and departments have achieved national distinction through the efforts of their outstanding faculty; it is essential that we nurture our current successes and raise the expectations for excellence in all departments. We anticipate recruiting 40-50 new faculty members during 2001-2006. Therefore, by intensifying our recruitment efforts and applying the highest standards in selecting the new faculty, we will have a significant impact on the focus and quality of our research programs.

Our resources will be limited. Therefore, in hiring new faculty we must target our resources strategically. We must identify areas for faculty hiring to (i) enable us to build a number of major areas of research in which we will be recognized as a significant force on the national scene, (ii) maintain the breadth needed in a comprehensive research program, and (iii) take advantage of our special strengths and opportunities, including those that contribute significantly to the economic growth of the region. In recruiting new faculty, we must try to hire a combination of promising junior faculty as well as internationally recognized, highly accomplished senior faculty. Such high caliber individuals are in high demand. As such, we must allocate resources so that we can offer extremely competitive salary and start-up packages to attract them.

Building a set of research programs stronger than what we already have requires more than hiring outstanding faculty. Strong programs must revolve around groups of faculty with synergistic but complementary interests (possibly from different disciplines), first-rate laboratories and computing facilities, competent technical support personnel, high quality students, and externally supported research funding, among other things. In building up the new research programs and strengthening existing programs, we must make an effort to maintain synergy between these programs and the technical needs of industry and government laboratories, as well as priorities of funding agencies. In this manner, we ensure that our programs and expertise remain in line with national trends and customer needs. We must remain cognizant of the fact that all these components must be in place and work together in order for the overall program to reach its highest goals.

In the next National Research Council survey of doctoral programs, using the “scholarly quality of program faculty” (SQPF) score as a measure of quality, we aim to have at least one doctoral program listed in the "distinguished" category and all other rated doctoral programs in the “strong” category. Further, by 2006, we aim to have the Clark School of Engineering consistently in the top 15 engineering colleges in the nation (top eight among publicly supported universities), as measured by the annual rankings of the graduate programs in *US News and World Report*.

Specific steps:

2.1. Recruit and retain outstanding faculty who are regarded as being among the best in their disciplines.

- Continue to elevate the standards for faculty appointment and promotion to the level of our Peers.
- Increase our faculty compensation and start-up packages to the level of our Peers.
- Increase the number of faculty in endowed chairs and professorships to at least 20 by 2006.
- Increase the number of faculty who hold membership in national academies to at least 10 by 2006.

- Building on the recent success of our junior faculty, further increase the number of recipients of prestigious awards for junior faculty such as the NSF CAREER Award, ONR Young Investigator Award, Packard Fellowship and the like.
- Develop recruitment and retention plans for women and minority faculty with the aim of increasing the number of female faculty to 25 and the number of minority faculty to 20 by 2006.
- Coordinate faculty recruiting activities within the college as well as between the college and other colleges to build interdisciplinary research strength.

2.2. Continue to improve the excellence of our best research programs while increasing the number of programs in this category.

- Invest a significant part of new college resources on strengthening or building up specialty areas of large potential with the aim of making the college a significant force in these areas on the national landscape. Five such areas that have been identified so far are: (i) Information Technology: Computing and Communications, (ii) Smart Small Systems, (iii) Intelligent Transportation Systems, (iv) Bioengineering and (v) Nanotechnology.
- Emphasize quality and impact of research when measuring and rewarding the performance of faculty.
- Proactively support ongoing and future faculty initiatives that address large, team-oriented research projects and increase the number of major block grants.
- Increase externally supported research expenditures of the college by at least 8% per year in the next five years, with the aim of exceeding \$100,000,000 by 2006.
- Encourage placement of our Ph.D. students in prestigious positions in academe, industry and government.
- Increase Ph.D. degree productivity to the level of our Peers.
- Review the junior faculty workload policy in the college to ensure that the junior faculty enjoys sufficient opportunity to establish strong research programs.

2.3 Communicate and celebrate the achievements and research excellence of the college.

- Develop systematic college-wide programs for nominating the faculty for prestigious national awards, prizes and fellowships.
- Celebrate and reward faculty for their scholarly achievements, including the receipt of prestigious fellowships, honors and awards, election to membership in national academies or fellowship in professional organizations, appointment as editors of prestigious publications, and placement of their graduate students in the very best positions.

Develop strategies to maximize the external perception of the quality and impact of our graduate and research programs, as measured by national surveys of program excellence.

Initiative 3: Establish and maintain a modern infrastructure conducive to achieving the high quality research and educational aspirations of the college.

To achieve the ambitious goals set forth in this Strategic Plan, it is essential that the college have a first-class infrastructure to support the work of our faculty, staff, and students. This includes both the physical infrastructure (classrooms, teaching and research laboratories, offices, and computer networks) and technical support infrastructure (laboratory technicians, teaching assistants, and computer support personnel).

The college must develop a plan and launch a concerted effort to systematically improve the quality and functionality of its classrooms and laboratories, advance and modernize its computer networks, and increase the number of its technical support staff.

Specific steps:

3.1. Improve the college's physical infrastructure so that it meets the needs of a first-rate engineering college.

- Conduct a college-wide space audit to assess the quality and utilization of space in the college. Complete a comparative evaluation of our space assets against our Peers and develop a long-term facilities plan.
- Form a college-wide Facilities Committee to work in collaboration with the Associate Dean for Facilities to make annual recommendations on (i) renovating and upgrading classrooms, laboratories and offices and (ii) reallocating underutilized space to growing activities that are short of space.
- Allocate resources at the college level, from existing funds and intensified external fund-raising activities (company sponsorships or individual gifts), for annual renovation of
 - at least 2 classrooms; the renovation will include installing high-quality audio-visual equipment and Internet access as well as improved lighting and a more attractive physical appearance.
 - a small number of laboratories that need upgrading, both in terms of the physical structure and the equipment; and
 - a number of graduate student offices, including renovation of space and installation of professional furniture.
- Make certain that the construction of the Kim Engineering and Applied Science Building remains on schedule and that the assignment of laboratory and office space in the building is in harmony with the strategic goals set forth in the Plan.
- Make certain that the funding for the renovation of the Chemical and Nuclear Engineering Building is supplemented by additional funds for “red flag” items and external funds to significantly improve the functionality and physical appearance of the building.
- Strongly encourage consolidation of single-faculty laboratories into major, high quality, well maintained and professionally supported shared laboratories and provide funds for renovation of space, purchase of equipment and technical support.
- Continue to improve the college's computer network and develop a plan for systematically upgrading and modernizing the computing infrastructure so as to provide state-of-the-art computer and networking tools and services to the faculty, staff and students.

- Make certain that the recommendations for the construction of the Information Technology Building and renovation of the Engineering Laboratory Building are followed through.
- Develop better quality space for student lounges and student support services.

3.2. Develop a technical support infrastructure commensurate with our high quality research and education aspirations.

- Obtain additional funds from the upper administration to increase the number of technical support staff throughout the college. If necessary, convert vacant faculty lines to staff lines to accelerate this. We must aim at adding at least 15 staff members to our existing laboratory technical staff personnel by 2006.
- Explore the possibility of allocating a certain percentage of the DRIF return (to the college, academic departments or institutes and the faculty) to hiring technical staff in support of our research programs.
- Increase the number of computer support personnel throughout the college, with the goal of adding at least 7 more by 2006.
- As the technical complexity of our laboratories increase, place more emphasis on safety in our laboratories and provide systematic safety training to our faculty and students.

Initiative 4: Ensure a college environment that promotes diversity and fosters a spirit of collegiality among the faculty, staff and students.

The college, along with the rest of the university, has made significant progress in the past decade in attracting a large number of underrepresented minorities to its student population. Also, the college has made much progress in attracting female and underrepresented faculty. In spite of this progress, there remains much room for further work in the area of diversity. The numbers of female and underrepresented minority faculty and graduate students are still far smaller than they should be. Further, following a university-wide trend, the number of African American undergraduates has been declining in the past two years. And, the student retention rates remain low for many ethnic minority groups.

Achieving the ambitious goals set forth in this Plan requires that we maintain significant emphasis on diversity.

Further, we must continue to build a scholarly, collegial and supportive environment within the college, in which our people interact as teams in a community, work efficiently, and respond to the challenges and opportunities of a fast-moving environment in a way which makes the most of their diverse and individual skills and styles. This environment should encourage strong social relations, stronger faculty-staff-student interactions, more opportunities for the college community to celebrate the achievements of its members, and more programs that create a supportive environment for women and minorities.

Specific steps:

4.1. Continue to strengthen diversity in the college.

- As outlined in action steps in Initiatives 1 and 2, increase the number of female and minority faculty, graduate students and undergraduate students through aggressive recruitment and retention programs.
- Expand programs to create a supportive environment for female and minority faculty and students.
- Expand outreach programs aimed at female and minority high school students.

4.2. Continue to build an atmosphere that strengthens the sense of community and belonging among all college citizens and promotes shared values and goals.

- Encourage chairs and directors to be more proactive in keeping the faculty, staff and students in their units apprised of the college and unit goals and accomplishments and in engaging them in making important decisions.
- Create more opportunities to celebrate and reward the success and excellence of faculty, staff and students.
- Expand mentoring programs for junior faculty throughout the college.
- Create new opportunities and support ongoing activities that promote a social environment: Faculty and staff lunches, various award ceremonies, coffee hours, picnics, and athletic activities.
- Provide opportunities for freshmen and sophomores to interact more closely with the faculty so as to better integrate them into the college.
- Support student organizations and encourage more student organizations at the graduate level.

- Invest in facilities and activities that promote collegiality and social traditions that will be valued by faculty, staff, and students.

4.3 Provide for the professional growth and development of people in the college.

- Develop mechanisms to identify and nurture emerging leaders in research, education, and administration, including both young faculty and experienced faculty who take on new roles.
- Provide opportunities for professional development of these leaders so they can manage the new types of challenges they face as leaders (e.g., executive management workshops).
- Use PRD and related processes as tools to emphasize the professional development of staff and of faculty administrators, including leaders of centers and large groups as well as chairs and directors.

Initiative 5: Establish a strong external relations program to significantly increase philanthropic support to fulfill the college's educational and research goals.

The dramatic positive changes witnessed in the University and the Clark School in the past decade necessitate the establishment of a sophisticated and professional external relations program to coordinate and enhance the building of strong relationships with our key constituencies: alumni, friends, corporations, foundations and engineering academicians. This external relations program must be developed with the aim of (i) significantly increasing philanthropic support, possibly in the form of a comprehensive campaign for engineering to fulfill the educational and research aspirations set forth in this Strategic Plan and (ii) enhancing the image of the Clark School among its key constituencies.

Specific steps:

5.1. Intensify the college's development activities to support the ambitious goals of our research and educational programs.

- Establish an External Relations Office, headed by an assistant dean, to oversee and coordinate all development, alumni relations, corporate and foundation relations, and communications activities of the college.
- Strengthen the college's development staff and infrastructure to significantly increase funding for the college's strategic initiatives with the goal of securing at least \$25 million in philanthropic support per year by 2006.
- Increase emphasis on individual major gifts (\$100,000+) development efforts through the identification, cultivation and solicitation of prospects. The Director of Development for Individual Giving will focus on developing and increasing giving from alumni and friends.
- Create a Director of Development for Strategic Initiatives position to increase philanthropic support for projects identified in the college's strategic planning process. Emphasis will be placed on securing support from corporations and foundations, while also managing the college's overall relationships with corporations.
- Develop programs for strengthening existing ties and establishing new relationships with corporations.
- In partnership with the leadership of the college, develop a Case for Support identifying the funding opportunities and priorities of the college, establishing specific financial goals.
- Maximize the Board of Visitors as an intellectual and practical resource to achieve the goals and aspirations of the college, emphasizing their leadership role in development.
- Design and initiate a comprehensive campaign specifically for engineering to fund the aspirations of the college's strategic plan.

5.2 Develop a professional communications program to enhance the image and reputation of the college, commensurate with its true strengths and accomplishments.

- Create a Director of Communications position at the college level to coordinate the college's communications and public relations activities.
- Develop and implement a comprehensive communications plan that addresses the key constituencies of the college.
- Establish a public information infrastructure that systematically advances the college's image among its key constituencies by effectively communicating the college's mission, aspirations, and successes.

- Identify the college's internal and external constituencies and develop a sophisticated database of current addresses and contact information.
- As the main portal to the college, work to ensure that the college and departmental web presence is current, innovative and effective.
- In collaboration with the Director of Development for Strategic Initiatives and the Office of Engineering Co-op and Career Services, develop a program to build enhanced relationships with our major corporate recruiters and to apprise them of the college's strengths and achievements.

5.3 Enhance the college's alumni relations programs and significantly increase the membership of alumni in the Engineering Chapter of the Alumni Association.

- Expand alumni relations programs by organizing a larger number of alumni-focused activities and engaging the alumni in college related matters, with the aim of creating a stronger sense of community and pride.
- Create regional engineering alumni activities, including engineering executive clubs consisting of engineering alumni in leadership executive positions, and regularly communicate to them the college's successes and aspirations.
- Closely track alumni success stories and, in collaboration with the Director of Communications, publicize them through multiple media sources.
- Engage academic departments/programs and research units in alumni related activities; assess current efforts by departments/programs and develop a suggested model for them to implement.
- Evaluate the mission and structure of the Engineering Chapter of the Alumni Association Board of Directors to support the national and international aspirations of the college.
- Develop innovative strategies to increase Alumni Association membership to 20% by 2006.

Initiative 6: Expand the college's outreach and service programs in continuing and extended education, industrial partnerships, entrepreneurships, technology transfer and economic development.

Being the largest and most visible engineering college in the Maryland-Washington-Northern Virginia region--a region that is rapidly becoming one of the most vibrant high technology areas in the nation--we have both an opportunity and an obligation to (i) provide targeted educational programs for practicing engineers and (ii) play a leadership role in economic development of the region by creating programs that encourage and promote entrepreneurship and technology transfer.

Specific steps:

6.1 Structure a continuing and extended education program within the Clark School to provide a variety of degree and non-degree education opportunities for practicing engineering.

- Establish an Office of Continuing and Extended Education, headed by an assistant dean, that builds a new distance and continuing education program, especially employing web-based technologies, and drawing from appropriate elements of the current activities in instructional television, instructional technologies, and the Professional Masters of Engineering program.
- Base the operation of the Office of Continuing and Extended Education on a business model that would (i) incentivize those who participate in teaching and (ii) generate new revenue for the college to support our ongoing research and educational activities.
- Tailor the Professional Master of Engineering Program and the Graduate Certificate Program to focus on niche areas of particular need for practicing engineers in the region.
- Increase the enrollment of active students in the Professional Master of Engineering and Graduate Certificate Programs to 500 by 2006.
- Increase the college's activities in offering non-degree, short courses in areas in which we have faculty expertise and there is market demand.
- Develop plans for web-based extension of appropriate components of the Professional Master of Engineering, the Graduate Certificate Program and other programs.

6.2 Encourage faculty and student entrepreneurship activities and strongly pursue collaborative research programs with industry as well as programs that lead to technology transfer and economic development of the region.

- Initiate programs aimed at building new companies based on technologies developed in the university by our faculty and students.
- Strongly support and facilitate entrepreneurship activities by our faculty and students.
- Establish creative ways to link up the undergraduate students enrolled in the Hinman Campus Entrepreneurship Opportunities (CEOs) Program with the faculty and graduate students who generate intellectual property of commercial value.
- Increase the number of seminars and lectures that focus on entrepreneurship, engineering management and economics and the venture capital process.
- Develop new programs for establishing strong and lasting partnerships with industry and government laboratories, and at the same time encourage the transfer of technology to industry from research carried out by faculty and students through existing programs such as the Maryland Industrial Partnerships (MIPS) Program.

E. Implementation of the Plan

Successful implementation of this Plan requires that

- a) there be broad and enthusiastic support for its spirit and goals by the college administrators, faculty, staff and external constituencies;
- b) strategies be developed for resource allocation in support of the initiatives;
- c) specific responsibilities and timetables be assigned for implementing the initiatives and steps; and
- d) a process for measuring and communicating progress be established.

a) Achieving Community Support

This Strategic Plan was developed as a result of a multi-stage process that began by discussions among the college leaders, involved a web-based opinion survey and a retreat with strong participation by the faculty and staff. The plan has been made available in draft form to the Engineering Council, all faculty and staff, representatives of various student groups, and the Engineering Board of Visitors. The draft has been modified in response to input from these constituencies. The final version of the Plan will be a college community product representing our shared goals and our best estimate of the strategies needed to achieve them. The Plan will be distributed widely, made available on the Clark School's web site, and discussed in college and departmental meetings. Periodic reports on progress toward achieving the goals will be provided to the college community.

b) Resource Allocations

We anticipate that new resources will be available to allow the college to make substantial progress over the next several years toward achieving many of the goals set forth in this Plan. In addition to increases in our base budget through the university, we anticipate increases in external grant funding, increases in gifts from individuals, corporate partners, and foundations, and an expansion of revenue-generating instructional programs. Further, the College has made an important decision to revert all faculty lines and salaries that are freed up as a result of faculty retirements and resignations to the college level. These resources will be returned back to the units to support the Strategic Plan's initiatives and action steps.

c) Assignment of Implementation Responsibilities and Timetables

Each of the action steps will be assigned to a particular individual who will be responsible for overseeing its implementation. Those individuals charged with oversight will be asked to identify needed resources and to propose an implementation plan and a timetable for action. Where appropriate, the implementation plans will identify specific measures for monitoring progress towards the stated goal. Additional planning activities have taken place in Fall 2001 which have identified certain priorities in the Plan.

d) Measuring and Communicating Progress

While some of the Plan's action steps list measurable targets, progress in others cannot be easily quantified. We will do our best to develop meaningful ways to measure our progress toward our goals. For example, the quality of our graduate and research programs will be assessed through evidence of faculty recognition, student placements, research awards, national comparative studies, and the judgments of recognized experts during periodic program reviews. Likewise,

success in improving our educational programs will be measured by the qualifications and diversity of the students we enroll, by our ability to keep them motivated about their experience in the Clark School and the University, by the rate at which they graduate, and the feedback we receive from their employers.

Every year, the Dean's Office will prepare a brief report summarizing progress toward achieving our strategic goals. This report will be broadly communicated to the college community as well as its key external constituencies. This process will enable the college community to remain informed of our collective progress and provide an opportunity for corrective action if necessary. To the extent possible, we will gather data about our Peers and make appropriate comparisons to validate our progress vis-à-vis the status of programs in Peer institutions.