



College of Science

Strategic Initiatives College of Science, August, 2004

MISSION: To graduate students who understand and appreciate the art of scholarship, who have an excellent grasp of the fundamental concepts in their principal areas of study, who are cognizant of the interrelationship of technology and the discovery of new knowledge and who are prepared to provide vision and leadership that combines intellectual inquiry with its application to social needs for the betterment of society.

STRATEGIES: To achieve its mission the College supports the early career development of scientists and mathematicians by providing high quality education which includes opportunities to pursue open ended research on basic and applied problems of significance to the disciplines represented in the College and society generally along with fellowships and other forms of support for graduate and undergraduate study. It encourages intra and extra-institutional partnerships for research on and development of improved models for the teaching, learning and cross-disciplinary integration of science, mathematics and technology and the understanding of their impact on society.

The College of Science facilitates transition from secondary school to higher education and from baccalaureate and master's degree programs to the workplace and advanced study; promotes the public understanding of science, mathematics, and technology and assists in providing stimulating science and mathematics learning environments in the community.

The College of Science seeks to strengthen the content and delivery of undergraduate science and mathematics education for all students, including majors in those fields, prospective teachers of grades pre-K to 14, students preparing for the technical workplace, and students in their role as citizens in a technological society.

The College of Science seeks to broaden the participation of groups underrepresented at the undergraduate and graduate levels in science, engineering, mathematics and technology degree programs, and to improve the pre-matriculation science and mathematics instruction at institutions that prepare students seeking acceptance into the College's undergraduate programs.

In achieving its mission and implementing its strategies over the next five years the College of Science will initiate the following:

STUDENT SUCCESS

- ◆ Establish a physical and organizational place in the College to focus on student advisement and retention.
- ◆ Set a goal and timeline to establish a policy of mandatory advising for all undergraduates.
- ◆ Establish a formal pre-health professional advisement center for the entire campus within CoS drawing on the expertise and experience of the College's faculty and staff in this area.
- ◆ Increase student financial support, especially for graduate students.

- ◆ Upgrade and expand facilities that support student research, especially laboratories but also external facilities such as a Marshall University large river research vessel, mooring facilities and shore site laboratory.
- ◆ Develop a University program (i.e. an office) for Science, Technology, Engineering and Mathematics (STEM) Education Advancement to encourage, support and coordinate STEM education and research at Marshall the purpose of which is to link pipeline programs such as the Health Science and Technology Academy, Upward Bound, West Virginia State Science and Engineering Fair, SCORES, Engineering Camp, etc. (i.e. pre-college programs) with SURE, SURF, REU, etc. (i.e. baccalaureate and graduate programs). By preventing leakage from the STEM Ed pipeline the recruitment and diversity goals of all these programs will be much better met.
- ◆ Develop an NSF funded Louis Stokes Alliance for Minority Participation Program consortium, in collaboration with Kentucky, to enhance STEM Ed recruitment and retention efforts, especially among groups underrepresented among STEM degree holders.
- ◆ Develop an NIH funded Health Careers Opportunity Program for Southern West Virginia and the Tri-State area to recruit and prepare disadvantaged and minority students for careers in the health professions and especially to recruit and train health professionals to practice in medically underserved rural areas such as Appalachia.

ACADEMIC PROGRAMS

- ◆ Based on recommendations of national panels such as the National Academy of Sciences BIO 2010, encourage interdisciplinary perspectives in all programs through the use of cross-listing, team teaching and development of new courses, majors and areas of emphasis that are inherently multi or interdisciplinary such as bioinformatics, biotechnology and environmental science.
- ◆ Enhance and increase quantitative perspectives in the curriculum for all disciplines and at both the undergraduate and graduate level.
- ◆ Develop lower and upper division undergraduate courses and content in instrumentation that are generic and multidisciplinary.
- ◆ Strengthen assessment of academic programs and develop policies and procedures that “close the loop” by ensuring assessment is used as the basis for identifying and addressing curricular problems and assuring continuous review and improvement of degree programs.
- ◆ Support and encourage applications for external funding to improve, expand and upgrade academic programs. Examples might include the Howard Hughes Medical Institute Institutional Grants for Biomedical Science, NSF STEM Talent Expansion Program, U.S. Department of Education Title III Institutional Strengthening Program and McNair Scholars Program, US Department of Health and Human Services Health Career Opportunity Program, etc.

RESEARCH AND CREATIVE ACTIVITY

- ◆ Increase incentives and support for development of nationally competitive applications for research funds, especially applications to funding programs which support multi-investigator, long term research (e.g. to establish centers such as a Freshwater Institute) and broad improvement across the disciplines.

- ◆ Encourage, facilitate and support faculty service on review panels, committees and as officers in professional societies, especially organizations with national and international membership.

TECHNOLOGY

- ◆ Increase and centralize at the College level support for acquisition, maintenance and upgrade of information technology and other instructional and research equipment.
- ◆ Create a long term vision for equipment acquisition, replacement and upgrade based on strategic planning for curriculum improvement and faculty recruitment. Encourage and facilitate acquisition of funds to meet equipment acquisition goals that are integral to such plans (e.g. to equip the Byrd Biotech Science Center and Biotech Development Center buildings and to encourage practical training in environmental science, natural resource management, forensic science, biotechnology and computer information technology).
- ◆ Build on experience with the wireless student response system in Physics to provide access to such systems by every discipline in every classroom in Science Hall.

FACULTY

- ◆ Encourage and support a flexible workload policy that both facilitates and rewards continuous professional development of faculty.
- ◆ Encourage and support risk taking by faculty willing and able to develop new approaches to delivery of the curriculum, new content to better meet the needs of students with a variety of learning styles and varied career goals and to better prepare graduates for rapid evolution of technical disciplines (e.g. in the use of information technology).
- ◆ Encourage and support regular dissemination of knowledge, which is an essential feature of scholarship, through faculty and student publication in major peer reviewed periodicals, presentation of invited and contributed talks, especially at national and international meetings, conferences and workshops sponsored by professional societies and by faculty service on professional committees and as officers in professional organizations.

STAFF

- ◆ Encourage and support staff professional development, especially where disciplinary and program development has created need for new and/or enhanced skills such as in the use and maintenance of technology.
- ◆ Ensure respect for staff and acknowledge their contributions to the University and its programs.
- ◆ Add key academic program support staff in information technology support, equipment maintenance, student advisement and safety/risk management.
- ◆ In consultation with departments develop centralized staff support where appropriate (e.g. information technology).

FACILITIES

- ◆ Review and plan for expansion and refurbishment of facilities that support key academic functions such as laboratories (e.g. refurbish the upper division chemistry laboratories; refurbish the exhaust hood system in the addition to Science Hall).
- ◆ Protect employees, students and visitors by ensuring that facilities and their utility systems meet federal and state standards for safety, are kept in proper operating condition and that all who use College facilities are aware of, trained in and practice safe operating procedures and protocols. Develop written multihazard response policies and procedures.
- ◆ Work towards a proposed North Campus Science and Technology cluster extending north of Third Ave over the flood wall to the river. This cluster will include Science Hall, the BBSC and BDC buildings as well as facilities for CITE, space to bring the Mathematics faculty together and an Ohio River Observatory with shore site labs, research vessel mooring facilities and space for RTI offices and research projects.

WORKFORCE & ECONOMIC DEVELOPMENT

- ◆ Develop and expand Integrated Science and Technology as a model to address economic and workforce needs in West Virginia. Encourage development of practical and applied aspects of the curriculum at both the undergraduate and graduate levels for all disciplines in order to better prepare graduates to compete for employment and contribute to workforce and economic development while continuing to provide the breadth and depth of preparation essential for student success in advanced study and in adapting to disciplinary changes and job conditions over their working lifetimes.
- ◆ Develop curricula for entrepreneurship training such as IST 350: Technology and Commerce, and expand such offerings to include additional disciplines.
- ◆ Develop professional science master's degree programs which combine advanced technical education and practical business training to shorten the time and cost necessary to graduate an individual who can contribute to producing a marketable product or service.
- ◆ Develop alternatives to the assembly line, one size fits all, approach to scheduling classes, especially in the graduate program, to accommodate working students and those with family responsibilities.
- ◆ Develop programs that provide career management support, including continuing education and retraining, over a student's entire working lifetime. Develop more powerful planning, monitoring and advisement systems to support more complex career pathways.

DIVERSITY

- ◆ Develop programs that target groups underrepresented among science and math degree holders that are first generation college-going, low socio-economic or educationally disadvantaged. Examples of such programs are the Health Sciences and Technology Academy, Upward Bound Math/Science, Louis Stokes Alliance for Minority Participation, Health Careers Opportunity Program and Minority Biomedical Research Support program.
- ◆ Strengthen academic advisement and retention programs through activities that enhance student success such as tutoring, mandatory advisement and undergraduate research.

- ◆ Enhance opportunities for international experience such as student presentations at international meetings, study abroad, international research collaborations, etc.

OUTREACH AND PARTNERSHIPS

- ◆ Reach out to K-12 through school and campus visitations, participation in K-12 curriculum development and teacher training and pre-college student camps and workshops. Examples include ACCLAIM, MERIT, Health Sciences and Technology Academy, West Virginia State Science and Engineering Fair, etc.
- ◆ Encourage and support service learning through internships and Capstone projects.
- ◆ Develop collaborations with government agencies and local business such as West Virginia Division of Natural Resources, Ohio River Sanitation Commission, U. S. Army Corps of Engineers, Strictly Business, etc.

MARKETING AND RECRUITMENT

- ◆ Use pre-college programs such as the Health Science and Technology Academy (HSTA) to publicize the College and its programs and link to baccalaureate programs such as SURE, SURF, REU etc. HSTA serves counties which supply more than 2/3 of Marshall's undergraduates thereby providing a broad base for recruitment in Marshall's primary service area.
- ◆ Send faculty into the community to discuss the College's programs at schools, business and fraternal organizations, local governing bodies, state agencies, etc.
- ◆ Bring key members of the community to campus to experience the College and its academic programs first hand (e.g. visits by the University Board of Governors, statewide EPSCoR Director, principal/counselors day, RCBI Director, etc.)

RESOURCE DEVELOPMENT

- ◆ Encourage proposals for external support of academic programs.
- ◆ Cultivate alumni relations.
- ◆ Be involved in annual and capital campaigns
- ◆ Develop College and University reputation by publicizing achievements of faculty and students.