SCHOOL OF

SCIENCE

AND

MATHEMATICS

ANNUAL REPORT

2011 - 2012

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Dean, School of Science and Mathematics
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EXECUTIVE SUMMARY FOR THE SCHOOL OF SCIENCE AND MATHEMATICS 
ANNUAL REPORT

A. School Highlights for 2011-2012 (details follow)

Millersville continues to be a leader in the PA State System of Higher Education (PASSHE) and the Commonwealth in the education of students in computer science, mathematics, the sciences and nursing. The University continues to graduate among the highest number of science, mathematics and computer science students in PASSHE, with an emphasis on academic excellence. Further, the number of science and mathematics majors at Millersville continues to increase, with majors in the school now accounting for more than twenty percent of the student population. A sampling of the outstanding achievements of students and faculty include:

B. Student Achievements (selected detail)

Undergraduate and Graduate Research and Student Awards:

- Lindsay Havens was accepted into the summer research internship program at the Hershey Medical Center. She is one of only ten accepted from among 400 applicants. Nine Biology students presented research papers at the Commonwealth of Pennsylvania University Biologists (CPUB) Annual Meeting. These included eight posters and one platform presentation. Jason Snively and Dustin Sparr won 1st and 2nd place, respectively, in the Ecology, Evolution & Organismal division. Jonathan Kettering won 2nd place in the Cellular & Molecular Biology division.
- Four Biology students presented scientific presentations at the Annual Meeting of the PA Academy of Science. Jonathan Kettering and Michael Parker each gave a poster presentation. Philomena Behmer and Danielle Farnell co-presented an oral presentation.
- Kristin Sloyer presented a paper on the Development of a Dichotomous Blackfly Taxonomic Key to the Raritan River, Hunterton County, NJ at the Blackfly Research meeting in Lake Placid, FL.
- Jenn Slough (with Dr. John Wallace) published a paper in the Journal of American Mosquito Control entitled “First Record of Mansonia dyari (Diptera: Culcidae) in Baldwin County, Alabama”.
- Four Chemistry majors gave poster paper/presentations at the American Chemical Society National Meeting & Exposition in San Diego, CA.
- McArthur Jones (Meteorology, Graduate 2009) received the Ford Foundation Fellowship 2012 Predoctoral Competition Award. The Award is administered by The National Research Council. Jones is currently enrolled in the Ph.D. program in aerospace engineering at the University of Colorado – Boulder.
- Felicia Guarriello (Meteorology, sophomore) is a recipient of the 2012-13 NOAA Ernest Hollings Undergraduate Scholarship.
- Lindsay Blank and Eric Wendoloski (meteorology, juniors) were recipients of the 2011-12 NOAA Hollings Scholarship.
Joseph Moore (Meteorology, senior) was the recipient of the NOAA Student Career Experiences Program Award.

David Walton was the recipient of the very prestigious 2012 Ali-Zaidi Award for Academic Excellence, a state-wide award recognizing one student from among all 14 PASSHE universities.

Matthew Keefe attended the Summer Research Experience for Undergraduates program in biostatistics at The University of Pittsburgh.

Neil Obetz attended the Summer Research Experience for Undergraduates, “An Interdisciplinary Program in High Performance Computing”, at the University of Maryland, Baltimore County.

Linda Lee, Post Masters-FNP student, gave the presentation, “You have a tumor: Navigating the system”, at the National Association of Orthopedics Nurses conference.

Charlene Stein and Joshua Weiant, MU BSN students, along with coworkers Ann Melcher, R.N; Andrey Chuprin, R.N., O.C.N; Carol Tringali, and Judy Himes, received the 2012 Nancy R. Kruger Award from Penn State Hershey Medical Center for clinical scholarship of evidence-based practice.

Sarah Geiger has been accepted into the University of Florida’s Material Science REU (Research Experience for Undergraduates) program for the summer of 2012.

Daniel Heck (with Dr. Mehmet Goksu) presented the results of his research at the annual conference of the American Association of Physics Teachers – Central Pennsylvania Section (AAPT-CPS).

Matthew Lewis was accepted into the Research Experience for Undergraduates program at the University of Maryland.

Ryan Garchinsky presented “Millersville University Mobile Application,” at the PACISE 2012 Annual Conference, hosted by Millersville University.

Ryan Consylman, Edward Kimmel, and Wayne Treible received National Institute of Standards and Technology Research Fellowships for summer 2012 in Gaithersburg, MD.

The Computer Science Department’s Cyber Defense Team, consisting of Ryan Butler, Andrew Elliot, Robert Hennessey, Dylan Leakway, David Lu, Travis Romero, and Josh VanHine, placed second in the Mid-Atlantic Regional Collegiate Cyber Defense Competition.

Matthew Lewis presented a poster, “Electromagnetically induced transparency in a four-Level W scheme: effect of beam intensity and phase on propagation” at the American Physical Society meeting in Boston.

Matt Lewis, David Pede, and John Timlin (under the supervision of Dr. Mike Nolan) earned the rank of Accomplished Competitor in the 2011 University Physics Competition.

John Timlin (with Dr. Sean Hendrick) presented a poster, “X-ray analysis of Large Magellanic cloud supernova remnant DEM l71” at the Central Pennsylvania Consortium Astronomers’ Meeting at Dickinson College.

Heather Morgan (MSEM) received the 2012 Annual Florida Governor’s Scholarship.

Marianne Souders (MSEM) was elected as the President of the Maryland Emergency Management Association.

Robert Bailey (MSEM) received a National Police Award for 2011.

Troy Neville (MSEM) was named as a member of the Business, Industry and Infrastructure Subcommittee of the Pennsylvania South Central Task Force.

At the 2012 School of Science and Mathematics Research Recognition Symposium, 135 students were recognized for 150 student-faculty research projects, along with students who received internships, grants and awards. In addition, the Departments of
Biology, Earth Sciences and Mathematics all have their own departmental Honors and Awards ceremonies to recognize top academic achievers in their departments.

- The School of Science and Mathematics continued its emphasis on capstone research experiences, with the school’s Spring 2012 Research Poster Display, showcasing twenty-two posters with joint faculty/student authors; the Fall 2011 Homecoming Poster Display included eighteen posters with joint faculty/student authors.

- Fifteen (15) nursing graduate students completed Scholarly Projects in 2011-2012.

- Nineteen (19) SCMA students completed co-ops during 2011-2012.

- Twenty-three (23) SCMA students gave presentations on their research at regional, national or international professional meetings during 2011-2012. In addition, many students presented research papers at the Millersville Student Research Conference and at other venues on campus, including departmental colloquia.

- Twenty (20) SCMA students were selected for internships with various agencies in 2011-2012, including Hershey Medical Center, the University of Southern Missouri, WGAL-TV, NOAA Office of Oceanic and Atmospheric Research, the National Severe Storms Lab, Hampton University, Lamont-Doherty Earth Observatory of Columbia University, Lancaster Inter-Municipal Committee, the University of Alabama Huntsville/Marshall Space Flight Center, Universities Space Research Association, the National Weather Service’s Meteorological Development Lab, Accu-Weather Inc., GSA Geocorps – Mt. Rainier National Park, WNEP-TV, PA Geological Survey, the Cooperative Institute for Research in the Atmosphere, the University of Pittsburgh, the University of Maryland, Baltimore County, NASA Goddard Space Flight Center and Exelon Corporation.

**Graduate and Professional School Placements:**

**Graduate Schools:** In Fall 2012, SCMA graduates will be starting their graduate studies at the following universities: Harvard University, the California Institute of Technology (Cal Tech), Cornell University, Yale University, University of Kentucky, University of Alabama, University of Florida, State University of New York College of Environmental Science and Forestry, University of Bridgeport, University of Maryland at College Park, University of North Dakota, George Mason University, University of Arizona, Millersville University, University of Delaware, Virginia Tech, Lehigh University, University of Pittsburgh, Oklahoma State University and Drexel University.

**Professional Schools:** In Fall, 2012, SCMA graduates will be beginning their medical studies at Drexel University College of Medicine and Penn State College of Medicine. Four graduates were accepted to the Pennsylvania College of Optometry at Salus University.

**Testing Results**

External testing provides a measure of the quality of the School’s academic programs, and the School’s graduates have performed very well against national standards. There is a 100% pass rate on both the AACN Family Nurse Practitioner Certification Exam and the respiratory therapy licensure examinations. There is a 100% pass rate on the Praxis content exams for science and mathematics education majors. Graduating chemistry, computer science, and physics majors take the ETS Major Field Achievement Test to compare our graduates’ performance with a national audience. Over the past five years, Millersville students in these three programs have scored on average at the 69th, 62nd, and 54th percentile nationally, respectively.
C. Faculty Achievements (selected detail)

Millersville faculty and staff members are active scholars, and their scholarly endeavors help to make them better teachers. In 2011-2012, SCMA faculty members published 3 books, with 8 additional books currently in press and 41 articles, with 7 additional papers in press. SCMA faculty presented 80 papers at professional meetings and attended 107 professional conferences or seminars. It is noteworthy that much of the faculty research is conducted collaboratively with Millersville students.

External Grants

SCMA faculty and administration submitted twelve (12) external grant or contract proposals in 2011-2012, representing requests in excess of $1.2M. In addition, several grant applications submitted during 2010-2011 were funded during 2011-2012. Altogether, nine external grants were funded during 2011-2012, representing more than $1.2M in awards; several grant applications are still pending at this time. The above amounts do not include a number of grants carried over from previous years.

Selected new grants awarded in 2011-2012 include:

1. $1,200,000 awarded by NSF to Drs. Janet White (MATH), Delray Schultz (MATH), Robert Smith (SCMA Dean’s Office), John Ward (EDFN) and Jane Bray (SOE Dean’s Office) to develop a program for training mathematics teachers for high-need (rural or urban) school districts.
2. $36,828 awarded to Mr. Eric Horst (ESCI) by the Pennsylvania Department of Transportation, for winter storm forecasting.
3. $79,511 awarded by CACI Technologies, Inc. to Dr. Richard Clark to collect atmospheric data in the California desert, to be used in the development of military night vision equipment, as part of a DOD-funded contract.
4. $42,000 awarded to Dr. Pat Hill (CHEM), by NSF through Georgia State University, to develop and teach a series of chemistry workshops on the topic of chemistry and art.
5. $24,000 awarded by the US Department of Education through the Lancaster-Lebanon IU-13 to Dr. Robert Smith (SCMA Dean’s Office), to develop and present a pair of summer workshops (one in science and one in mathematics) to local middle and high school teachers.
6. $26,736 awarded by the NSF, through the Innovation Transfer Network to Dr. Jeremiah Mbindyo (CHEM), to develop aptabody nanopackaging of drugs targeting lung cancer.
7. $18,000 awarded by the NSF, through the Innovation Transfer Network to Dr. Stephanie Elzer (CSCI), to partially fund Cemboo: a collaboration between the MU Software Productization Center and Haydenfilms, Inc.
8. $9,000 awarded by the County of Hunterdon, New Jersey, to Dr. John Wallace (BIOL), for black fly surveillance along the South Branch of the Raritan River.
9. $6,630 awarded to Dr. M. James Cosentino (BIOL), by UNESCO, through the Organization for Chemical Sciences, to support the shipment of large volumes of donated books, journals and computers to universities in the developing countries of Morocco, Ethiopia, Liberia and Rwanda.

Continuing grant awards include:
10. $235,199 awarded by NSF to Dr. Gary Zoppetti (CSCI) for a collaborative research project to develop the SoCS - ExSciTech: an interactive, easy-to-use volunteer computing system to explore science, technology and health.
11. $52,349 awarded to Dr. Dominique Dagit (BIOL) by the NSF, to fund a five-year collaborative research project on jaws and backbones: chondrichthyan phylogeny and a spine for the tree of life. This was part of a larger $2.8M grant awarded to a consortium of faculty at a number of institutions.
12. $10,000 awarded to Dr. Jeremiah Mbindyo (CHEM) by Cephalon, Inc., to fund research on the development of a nanotechnology drug delivery system.
13. $13,010 awarded to Dr. John Wallace (BIOL), by the PA Department of Environmental Protection, to study the impacts of stream restoration on macroinvertebrate community structure in Big Spring Run.
14. $110,928 awarded to Dr. Richard Clark (ESCI) by NASA, to fund a research project involving a team of MU faculty and students in an air quality study.
- $104,857 awarded to Dr. Stephanie Elzer (CSCI) by the NSF, to fund a collaborative research project on exploiting information graphics in digital libraries.
- $585,000 NSF S-STEM grant awarded to Drs. Whisenton, Dagit, Shane, Smith, Dushkina, and Elzer, which continues to provide scholarship support to financially needy mathematics, computer science and science students.
- $350,000 NSF grant awarded to Drs. Gary Zoppetti (CSCI), Richard Clark (ESCI) and Sepi Yalda (ESCI), “GEOPOD: GEOscience Probe of Discovery”.
15. $123,134 awarded by the NSF to Dr. Jason Price (ESCI) for study of the influence on radiation damage on the solubility of epidote-group minerals during chemical weathering.
16. $62,435 awarded to Dr. Ajoy Kumar (ESCI) by East Stroudsburg University on the project: Projecting the Impacts of Climate Change and Identifying Adaptation Options at Chincoteague National Wildlife Refuge.
17. $134,951 awarded to a team of SCMA and SOE faculty and staff (Drs. Smith, Boal, Ambler, Dagit, Kumar, Bray, Dreon and Dietrich) to develop a program supporting education at the Marine Science Consortium.
- $52,580 from the PA Department of Environmental Protection awarded to Dr. Richard Clark (ESCI) for continuing work on the Millersville Acid Rain Monitoring Site Project.

Faculty Awards and Leadership Roles (selected):

- Dr. Dominique Dagit (BIOL) serves as the Chair of the Academic Advisory Council for the Marine Science Consortium.
- Dr. Ryan Wagner (BIOL) serves as President of the Commonwealth of Pennsylvania University Biologists (CPUB).
- Dr. Julie Ambler (BIOL) serves as the Newsletter Editor and will be the local host for Fall 2012 meeting of the Atlantic Estuarine Research Society.
- Dr. Yuan Zhong (BIOL) serves as the Deputy Director of the Tomato Branch of Chinese Horticultural Society.
- Dr. Steven Bonser serves as Millersville University’s Institutional Liaison to the Council on Undergraduate Research (CUR).
- Dr. Jeremiah Mbindyo (CHEM) is a member of the Academic Advisory Board of the Nanotechnology Institute. He also serves as a member and lead faculty for
the Program Design and Implementation Taskforce of the Pennsylvania Collaborative for Applied Nanotechnology and as a member of the Editorial Advisory Board for 2 journals: Proteus and Scientific Journals International.

- Dr. David Hutchens (CSCI) served as the Conference Chair for the 2012 PACISE Annual Conference, hosted by Millersville.
- Dr. Blaise Liffick (Computer Science) serves on the Computing Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).
- Dr. Stephanie Elzer was elected a member of the Diagrams Steering Committee.
- Dr. Richard Clark (ESCI) was elected to a second term on the Board of Trustees of the University Corporation for Atmospheric Research, for which he also serves on several committees, including the Executive Committee. Dr. Clark is also a member of the Advisory Board for the National Center for Atmospheric Research High Altitude Observatory and has been appointed to several advisory committees of the American Meteorological Society.
- Dr. Sam Earman (ESCI) is an Associate Editor for the peer-reviewed publication Hydrogeology Journal.
- Dr. Todd Sikora (ESCI) is an Associate Editor for the Journal of Applied Meteorology and Climatology. Dr. Sikora is also a member of two committees of the University Corporation for Atmospheric Research.
- Dr. Jason Price (ESCI) was a session co-convener at the Goldschmidt 2012 Conference, held in Montreal, Canada, 24-29 June 2012. Dr. Prices was also a Co-Guest Editor on a special volume of the journal, Aquatic Geochemistry, honoring Dr. Owen Bricker.
- Dr. Alex DeCaria (ESCI) is a member of the Science Standing Committee for the National Assessment of Education Progress. Dr. DeCaria was also a consultant for the Trends in International Mathematics and Sciences Study.
- Dr. Ajoy Kumar (ESCI) served on a Proposal Review Panel for the Consortium for Ocean Leadership.
- Dr. Robert Vaillancourt (ESCI) serves as chair of the sub-committee on primary productivity along the east coast continental shelf for the Virginia Institute of Marine Science, as part of the U.S. East Coast Carbon Cycle Synthesis Workshop.
- Dr. Sepideh Yalda (ESCI) was appointed as a member of the UCAR Advisory Committee on Governance, by the University Corporation for Atmospheric Research. Dr. Yalda was also appointed to the American Meteorological Society’s AMS Teaching Excellence Award Committee. She is also a member of the Eyes on the Environment Advisory Committee, for the National Environmental Education Foundation (NEEF) and is a UCAR Academic Affiliate Representative and is a member for the International Activities Committee of the Natural Hazard Mitigation Association.
- Dr. Dorothee Blum (MATH) served as a judge for the annual History of Mathematics Student Paper Contest sponsored by the HOMSIG of the Mathematical Association of America, for the seventh year in a row.
- Dr. J. Robert Buchanan (MATH) serves as an associate editor for the Journal of Applied Mathematics.
- Dr. Ximena Catepillán (MATH) serves as a Member-at-Large on the Executive Committee of the Eastern PA and Delaware Section of the Mathematical Association of America.
- Dr. Kevin Robinson (MATH) serves as the President of the Harrisburg Chapter of the American Statistical Association and as an Associate Editor for the
Journal of Statistics Education and for the Journal of Probability and Statistical Science. He also served as a proposal reviewer for courses to be offered at the annual Joint Statistics Meetings.

- Dr. Delray Schultz (MATH) serves as the Vice Chair for District 3 of the American Statistical Association’s Council of Chapters and as a Question Leader for the national AP Statistics exam reading. He reviewed course proposals for courses to be offered at the annual Joint Statistics Meetings.
- Dr. Lewis Shoemaker is serving as a consultant with Dr. Sam Earman (ESCI) on water monitoring of the North Fork of the Humboldt River in northern Nevada.
- Dr. Robert T. Smith (Dean’s Office) serves as Vice Chair of the Advisory Board for the Innovation Transfer Network (ITN) and serves as a member of the statewide Transfer Articulation Oversight Committee (TAOC).
- Dr. Cynthia Taylor (MATH) served as a proposal reviewer for the conference proceedings of the North American Chapter of the International Group for the Psychology of Mathematics Education.
- Dr. Janet White (MATH) is President of the Pennsylvania Association of Mathematics Teacher Educators. She was the coordinator and a scorer for the area MATH Counts competition held at Millersville and was a reader for the national AP Statistics exam. She also served as an NCATE NCTM SPA evaluator for 4 national reports.
- Dr. Kelly Kuhns (NURS) is the President of Region # 15 of the PA State Nurses Association and is on the Board of Directors of the PA State Nurses Association. Dr. Kuhns is also a Contributing Editor for A Century of Nursing Leadership for the Pennsylvania State Nurses Association.
- Dr. Barbara Zimmerman (NURS) is a manuscript reviewer for the Journal of School Nursing and the Rehabilitation Nursing Journal. She is also a member of the Advisory Board of Directors of the Temple University School of Nursing and Chair Elect of the Special Interest Group Consortium of School Nurse Faculty, National Association School Nurses.
- Dr. Natalia Dushkina (PHYS) is a consultant to the Educational Policy Improvement Committee of the College Board.
- Dr. Mehmet Goksu (PHYS) has served as Secretary of the Central PA Section of the American Association of Physics Teachers and was recently elected as Vice President. He also serves on the grant review committees for the Electrical, Electronics & Computer Technology and Construction divisions of the Association of Technology, Management, and Applied Engineering (ATMAE). Dr. Goksu also served as the Site-Director to organize the 5th Annual Central PA Regional Science Olympiad, hosted by Millersville and was a judge at the 2012 North Museum Science Engineering Fair.

**Special Activities of Note:**

With Millersville’s emphasis on undergraduate research, it is significant that four collaborative student/faculty research groups published papers in professional journals during the past year. Undergraduate Jenn Slough, together with Dr. John Wallace (BIOL), published a paper in the Journal of American Mosquito Control, entitled “First Record of Mansonia dyari (Diptera: Culcidae) in Baldwin County, Alabama.” Undergraduate student David P. Walton, together with Drs. Laura Anna and Edward Rajaseelan (CHEM) published the paper, “[2- Butyl-4-(4-tert-butyldenzyl)-1,2,4-trazol-3-


**School of Science and Mathematics Outreach Programs:**

A total of 645 students and 57 teachers from 43 middle schools and high schools attended the *Central PA Science Olympiad* that was held for the fifth time at Millersville University in spring 2012. Thanks to the efforts of Advancement staff, the Olympiad will be partially funded for the next few years through the generous support of Phoenix Contact, Inc. The *Brossman Science Lectureship* attracted approximately 950 elementary, middle school and high school students and members of the community to two presentations by marine biologist Dr. Edith Widder, related to her work studying bioluminescence. The *Women in Mathematics and Science Conference* was attended by a capacity crowd of 250 students from 50 middle and high schools, who attended the keynote address by MU alumna Dr. Linda Vona-Davis ’76 (Biology), Associate Professor in the Department of Surgery at West Virginia University; students also participated in a number of breakout sessions led by successful women in mathematics and science careers, including several led by MU faculty and others led by MU alumni. Ninety-nine students from twenty-five high schools in South-Central PA participated in the annual *High School Mathematics Contest*. The *AP Calculus* simulation offered by the Department of Mathematics in collaboration with IU-13 (including separate AB and BC simulations) grew significantly in 2012 and as a result, was moved back to the Millersville campus. This year’s program included a total of 512 students and 37 teachers, which represents a more than forty percent increase over the 2011 program, organized by Millersville, but run at the IU-13 headquarters. Likewise, the *AP Statistics* simulation nearly doubled in size over 2011, attracting 510 students and 22 teachers.
Another 275 students and 24 teachers participated in an AP Calculus simulation offered to Harford County, Maryland students by MU faculty, while 170 students and 20 teachers participated in an AP Statistics simulation there. A Nursing Lectureship was hosted at Millersville for area nurses, and the Department of Computer Science offered two public Computer Science ‘Social Issues’ lectures. A number of SCMA faculty members spoke at area elementary, middle, and high schools as part of the School’s Spotlight on Science (SOS) program. The annual Summer Science Training Program (SSTP) offered a series of science and mathematics workshops to 36 middle and high school students from around the region over 9 days in summer 2011; eleven of these students were supported by scholarships. The Department of Computer Science hosted the 27th annual spring conference of the Pennsylvania Association of Computer and Information Science Educators (PACISE), March 30-31, 2012.

D. Significant School Achievements

In the summer of 2011, the Department of Computer Science was awarded with the reaccreditation of its program by the Accrediting Board in Engineering and Technology (ABET). In June, 2011, the new Master of Science in Integrated Scientific Applications, developed by the Department of Earth Sciences, was approved by the PASSHE Board of Governors. This new, flexible program will admit its first cohort of students in August 2012. The Department of Nursing implemented a completely revised BSN curriculum in 2011-2012 and began to offer its BSN curriculum partially onsite to nurses at the Coatesville Veterans Administration Medical Center, with the balance of the program offered online. In Spring 2012, the department negotiated an articulation agreement with Reading Area Community College (RACC), which will allow students enrolled in the associate degree program in Nursing at RACC to transfer to Millersville for their BSN program. The department is also in the final stages of working out an agreement with Harrisburg Area Community College (HACC) for a dual-admission program in Nursing; under this program, HACC students would transition seamlessly into the MU BSN program, which is slated to be taught partially onsite at HACC’s Harrisburg campus. Through improved recruitment and thanks to the increased flexibility in the new BS in Allied Health Technologies program, the joint MU/Lancaster Regional Medical Center Respiratory Therapy program will reach its maximum capacity (maximum allowed under the accreditation guidelines) during 2012-2013. This is a significant change, after many years of cohorts well below capacity.

During the past year, the School of Science and Mathematics negotiated academic affiliation agreements with Lake Erie College of Medicine (LECOM) for “4+4” programs in Pharmacy, Osteopathic Medicine and Dental Medicine. Under these agreements, MU students who follow a prescribed program of study (expected to be primarily Biology and Chemistry majors) are eligible for early admission to one of the above three programs at LECOM. Under the terms of the agreements, LECOM will reserve up to five seats for MU students in each of their classes in each of the above three programs. Students who are granted early admission to LECOM will be guaranteed a seat, as long as they complete the required program and meet certain performance markers. We are currently in the process of developing “3+4” programs with LECOM, under which MU Biology or Chemistry majors would matriculate to LECOM after three years at MU, transferring back credits from LECOM to complete their MU undergraduate degree and thereby reducing the length of their total undergraduate/professional school programs by a full year. In Fall 2011, the School also renewed its prior “3+2” cooperative engineering
academic affiliation agreement with Penn State, which allows students to transfer to Penn State in Engineering, after three years at MU and at the end of five years, students receive both a BA degree in Physics from MU and a BS in Engineering degree from Penn State. Physics faculty are currently exploring a similar arrangement with the University of Delaware.

Now that the Center for Disaster Research and Education (CDRE), together with the MS program in Emergency Management have been moved to the School of Science and Mathematics, we moved to quickly solidify the budget and staffing situation for the Center and program. Specifically, we worked together with the Provost and the Vice President for Finance and Administration to develop a permanent operating budget for CDRE/MSEM. Having moved one faculty line from the Sociology/Anthropology Department to the School of Science and Mathematics, we hired the program’s first full-time faculty member, who will join us in August 2012. In order to do this, we needed to develop a local agreement with APSCUF to hire an interdisciplinary faculty member and have that person be nominally housed in a department (in this case, the Department of Earth Sciences), but be hired and evaluated by an interdisciplinary committee.

SCMA faculty and MU administration continue to be very involved in implementing reforms and new initiatives at the Marine Science Consortium, of which MU is a senior full member. In the past year, this included facilitating the development of a new online pre-registration system, which was developed to allow students to pre-register for MSC courses beginning in the late fall, instead of waiting until the various members’ online registration systems open up for summer courses (generally in March or April). The hope is that this will make it easier for marine biology and oceanography students to register well in advance for required courses, as well as to allow faculty to ensure that seniors get the required courses they need and to allow the MSC to respond well in advance of when additional sections of courses are needed, thereby improving the efficiency of the registration system. At the Board’s request, MU President McNairy continued as Chair of the MSC Board for 2011-2012; MU Provost Prabhu chairs the MSC Council of Academic Administrators and Dr. Dominique Dagit (BIOL) chairs the MSC’s Academic Advisory Committee. Changes proposed and pioneered by MU in 2010-2011 resulted in a nearly 100% increase in the number of students paying tuition for MU courses at the MSC and a 60% increase in the total number of students enrolled in MSC college courses in Summer 2011. The expectation is that the additional changes will yield increased enrollments again for Summer 2012. For Summer 2012, we added a general education, introductory laboratory course, ESCI 104/105 (The World Ocean), to the schedule, which will be taught partially online and partially on site at the MSC. Enrollment in this course has been initially restricted to incoming freshmen and in collaboration with Admissions, we marketed this course to all incoming freshman students. The objective is to offer students the chance to have their first college experience come before the fall semester begins and result in earning credit for a laboratory course, in a non-traditional setting, with the lecture portion of the course taught mostly online and the lab portion of the course taught on-site at the MSC. For summer 2012, we had two MSC courses scheduled for the same session, neither one of which drew adequate enrollments to run. As an out-of-the-box solution, we decided to combine the two courses into one team-taught course, which, with both classes together, will have adequate enrollment to run.

Recruitment of underrepresented students has significantly increased in the School of Science and Mathematics over the last four years. Notably, the total number of underrepresented students majoring in one of the school’s programs has increased from
175 in 2008 to 305 in 2011 (based on Fall official enrollments). Overall, this represents a 74% increase over this period of time. Specifically, during the past several years, enrollment of underrepresented students in SCMA majors increased by 19% from Fall 2008 to Fall 2009, by 24% from 2009 to 2010 and by 19% from 2010 to 2011. These increases significantly outpaced the overall growth in SCMA majors, which increased by 6.5% from Fall 2008 to Fall 2009, by 7.3% from 2009 to 2010 and by 7.7% from 2010 to 2011.

After initiating discussion with staff at the Lancaster-Lebanon Intermediate Unit 13 (IU-13) in Summer 2011, MU science faculty, supported by the dean's office, developed the curriculum to be used at a two-week intensive, hands-on workshop that is being offered in Summer 2012 at MU for about 30 area secondary science teachers. In previous years, this workshop, funded by a US Department of Education grant, had been held at area private colleges. Similarly, MU mathematics faculty developed the curriculum for one week of a corresponding two-week summer IU-13 workshop for area mathematics teachers. Both workshops will be taught by MU science and mathematics faculty and are being funded through contracts with IU-13 totaling approximately $24,000.

E. Summary

Despite facing unprecedented budgetary challenges, 2011-2012 was another highly productive year for School of Science and Mathematics students and faculty. No doubt our greatest challenge this past academic year was implementing a significant reduction in our usage of faculty complement, despite steadily rising demand for science and mathematics courses. The increased demand for our courses has been driven by significant increases in the number of science and mathematics majors over the past several years, along with increased demand from non-majors, notably from students enrolled in the middle level teacher certification science and mathematics emphasis. For 2011-2012, the school reduced its faculty complement usage by approximately 90 semester hours (nearly 4 FTE faculty), beyond the 90 credit reduction that was in place for 2010-2011. This was accomplished through a combination of reductions in faculty alternate workload assignments, reduction in low-enrolled sections (mostly advanced electives for majors) and the elimination of a large number of general education laboratory sections. In addition, the large enrollment general education course, MATH 100 (Survey of Mathematical Ideas) was moved to a large lecture only format in our largest lecture hall, CAP 210. Further, although no reduction of complement was possible in the Department of Physics, Physics faculty taught several sections of introductory mathematics courses. The most significant reduction was accomplished through the elimination of most laboratory sections of BIOL 100 (General Biology) and several lab sections of ESCI 109 (The Atmosphere). In the case of BIOL 100, students registered in non-laboratory sections in 2011-2012 were given one additional hour of direct instruction (in large lecture format), which instructors used to attempt to meet most of the learning objectives of the eliminated labs.

Science and mathematics faculty members continued their active record of undergraduate student-faculty research, successful publication and presentation (often together with their students). Our students continue to experience success in gaining admission to top graduate and professional schools, upon graduation from MU. Faculty and staff continue to be very active in writing external grant proposals, including one very large NSF grant that was funded for $1.2M. SCMA faculty and students continue to earn recognition at the regional and national level for their scholarly accomplishments.
and for service to their professional communities. During 2011-2012, SCMA faculty pressed forward with numerous curricular developments, including the development of the first FYI courses intended for majors within the School; other new majors-based FYI courses are in development at the present time and are expected to be taught for the first time in Fall 2013. Faculty continued developing courses for the newly-approved MS program in Integrated Scientific Applications. The Nursing faculty completely revamped the BSN program, taught this program partly on-site at the Coatesville VA Medical Center and explored new remote sites for this program, including negotiating with HACC to teach our program in Harrisburg. We have also completed academic affiliation agreements with Lake Erie College of Medicine for post-graduate study in pharmacy, dentistry and osteopathic medicine and we are pursuing similar agreements with additional post-graduate programs. Millersville continues to lead changes at the Marine Science Consortium, most recently, by developing an online preregistration system for the MSC and by offering new courses using the facility. The School also increased its visibility and service to the community, by working in partnership with the IU-13 to develop a pair of federally-funded summer workshops for area science and mathematics teachers being taught at Millersville in Summer 2012.
A. Curricular Changes

During the 2011-2012 academic year, the Department of Biology approved three curriculum proposals. These have also been approved by the School Curriculum Committee and will be considered by the Undergraduate Course and Program Review Committee (UCPRC) during the upcoming fall semester.

1. **Principles of Ecology & Evolution (BIOL 343):** The proposed changes are to drop the prerequisite of ENG 110 and the W (Writing) component of the course, and to expand the number of courses that meet the Math prerequisite (MATH 151 or 160 or 161). Adoption of the changes will allow faculty to devote more effort teaching quantitative aspects of the subject and address procedural difficulties students have encountered in registering for the course.

2. **BS Allied Health Respiratory Therapy:** The proposal changes the “Retention in the Major” section of the blue sheet to inform students that admission into the professional (clinical) phase of the program is competitive and not guaranteed, clarify the requirements for admission to the professional program, and state that students not admitted to the professional program will be advised on how to strengthen their applications or complete a different degree. The proposal also requires a grade of B- or higher in General Biology (BIOL 100).

3. **BS Biology Respiratory Therapy:** The proposal changes the “Retention in the Major” section of the blue sheet to inform students that admission into professional phase of the program is competitive and not guaranteed, clarify the requirements for admission to the professional program, and state that students not admitted to the professional program will be advised on how to strengthen their applications or complete a different degree.

During the past year, the Department of Biology also worked with the Department of Chemistry and the Dean’s office to develop and finalize an articulation agreement with Lake Erie College of Osteopathic Medicine (LECOM). The new agreement will provide Millersville students with the opportunity to be accepted by early admission into LECOM’s professional programs in osteopathic medicine, dentistry, and pharmacy.

B. Faculty achievements – grants, research, sabbaticals

Members of the Department of Biology had a very productive year of scholarly activity. Our faculty published eighteen articles in scholarly journals and two books; an additional three books are currently in press. In addition, Biology faculty presented twenty papers at professional meetings, submitted twenty-seven grant applications (thirteen of which were funded), and engaged in eighteen consulting activities. Furthermore, our faculty engaged thirty-six students in independent study projects and sixty-one students in service-learning projects. Listed below are representative examples of individual faculty achievements.

**Dr. Julie Ambler** supervised undergraduate student Carissa Alza’s departmental honors thesis.
Dr. Jean Boal co-authored an article entitled “Extreme Aggression in Male Squid Induced by a β-microsemicinoprotein-like Pheromone” and was recognized for the article in several scientific journals. Along with R. Waldrop (MU ’10), she also co-authored a paper that was accepted for publication in PLoS One entitled “Sleep-like States in the Cuttlefish Sepia officinalis.” Dr. Boal was invited to give a platform presentation on her cephalopod research at the International Molluscan Neurobiology Conference in Florida. She also supervised undergraduate student Tyler Wilt’s departmental honors thesis.

Dr. Judith Cebra-Thomas received a Faculty Grants Committee (FGC) release time grant and two Scholars in the Classroom grants. Dr. Cebra-Thomas supervised undergraduate student Gulnar Mangat’s departmental honors thesis.

Dr. M. James Cosentino has been granted a sabbatical leave for Fall 2012 to continue his work to enhance science education in low and middle income counties in Sub-Sahara Africa. He won two awards from the MU chapter of the “National Society for Leadership & Success” - Outstanding Community Service in the International category and Excellence in Teaching.

Dr. Dominique Didier was invited by the National Museum in New Zealand to conduct research on three new Chimeroid species. The results will be published in The Fishes of New Zealand. She was lead author on Chapter 4 – Phylogeny & Biology of Chimeroid Fishes in the recently published Biology of Sharks and their Relatives 2nd Ed. Dr. Didier also received a Scholars in the Classroom grant.

Dr. Christopher Hardy was an invited speaker on his research at the Morris Arboretum of the University of Pennsylvania.

Dr. Carol Hepfer chaired the Genetics session at the PA Academy of Science Meeting. She also co-presented with two students. Dr. Hepfer supervised the departmental honors theses of two undergraduate students, Danielle Farnell and Janae Dombach.

Dr. John Hoover gave three “Spotlight-on-Science” presentations to students in the advanced Biology course at a local high school. Dr. Hoover supervised undergraduate student Jason Snavely’s departmental honors thesis.

Dr. Ryan Wagner officiated as President at the 2013 CPUB Annual Meeting at Slippery Rock University. He supervised undergraduate student William Serson’s departmental honors thesis.

Dr. John Wallace was selected Millersville University 2011-12 Educator of the Year. He also gave an invited presentation to the Pennsylvania See Grant Workshop on Invasive Aquatic Species and taught a Forensic Entomology workshop at the Philadelphia College of Osteopathic Medicine. Dr. Wallace received an FGC release time grant, was awarded continuation of his blackfly surveillance grant from the Hunterton County Vector Control Program in Hunterton County, NJ, and was awarded a grant from the American Academy of Forensic Sciences. In addition, Dr. Wallace co-authored a paper entitled, “Assessment of Decomposition Studies Indicates Need for Standardized and Repeatable Research Methods in Forensic Entomology”, which has been accepted for publication in the Journal of Forensic Research.

Dr. Yuan Zhong, with undergraduate student Jared Taylor, published an article, “The End: Cell Death and Senescence,” in the Plant Cell Online Teaching Tools of Plant Biology. She also received a Scholars in the Classroom grant. Dr. Zhong supervised undergraduate student Michael Parker’s departmental honors thesis.
2011-2012 Biology Faculty Leadership Positions

Dr. Julie Ambler:  Newsletter Editor; Local Host for Fall 2012 meeting for AERS (Atlantic Estuarine Research Society)

Dr. Dominique Didier:  Chair, Academic Advisory Council, Marine Science Consortium

Dr. Christopher Hardy:  Host for the Autumn meeting of the Vascular Plant Technical Committee of the Pennsylvania Biological Survey

Dr. Carol Hepfer:  Session Chairperson, PA Academy of Science Annual Meeting

Dr. Larry Reinking:  CPUB (Commonwealth of PA University Biologists) Grant Reviewer, MU Representative

Dr. Ryan Wagner:  President, CPUB (Commonwealth of PA University Biologists)

Dr. Yuan Zhong:  Deputy Director of the Tomato Branch of Chinese Society of Horticultural Society

C.  Student Achievements –

Students in the Department of Biology have achieved notable successes inside and outside the classroom. For example, many students have been actively involved in independent research projects. These have led to the development of honors theses, presentations at scientific meetings, publications in scholarly journals, successful applications to graduate and professional schools, and job placements. Listed below are some specific examples of individual student achievements.

Eight Biology students completed departmental honors theses.

Carissa Alza
Thesis Title:  Effects of Temperature and Temperature Variation on Fungicide Chlorothalonil Toxicity in Red-Eyed Tree Frog (Agalychnis calidryas) Tadpoles
Thesis Supervisor:  Dr. Julie Ambler

Janae Dombach
Thesis Title:  Optimization and Development of PCR-based Genetic Tests to Detect Androgen Receptor Mutations Associated with Complete Androgen Insensitivity Syndrome (CAIS) and the G1754A site
Thesis Supervisor:  Dr. Carol Hepfer

Danielle Farnell
Thesis Title:  Effectiveness of Randomly Amplified Polymorphic DNA (RAPD) and Amplified Fragment Length Polymorphism (AFLP) Analysis in Identifying Sex-specific DNA in Doryteuthis pealeii
Thesis Supervisor:  Dr. Carol Hepfer

Gulnar Mangat
Thesis Title:  Analysis of the Bone-Forming Cells of the Turtle Shell
Thesis Supervisor: Dr. Judith Cebra-Thomas

Michael Parker
Thesis Title: Comparative Genomic Analysis of Terpene Synthase Gene Family in Glandular Trichome-bearing *Medicago* and Non-glandular Trichome-bearing *Arabidopsis*
Thesis Supervisor: Dr. Yuan Zhong

William Serson
Thesis Title: Climatological and Ecological Factors Affecting Expression of Polyphenol Oxidase in *Ailanthus altissima*
Thesis Supervisor: Dr. Ryan Wagner

Jason Snavely
Thesis Title: The Effect of Hydrogen Sulfide on Recovery from Cardiac Arrhythmia in an Amphibian Model
Thesis Supervisor: Dr. John Hoover

Tyler Wilt
Thesis Title: Competition and Social Tolerance in the Naked Goby, *Gobiosoma bosc*
Thesis Supervisor: Dr. Jean Boal

Four Biology students were accepted to the Pennsylvania College of Optometry at Salus University. They are: Erika Beaver, Emily Jones, Nicole Stochla and Kristin Yandrich.

Two Biology students were accepted to medical school. Gulnar Mangat will attend at Drexel University and Jason Snavely will attend Penn State.

Four Biology students were accepted to Ph.D. programs. Michael Parker will attend Yale’s program in immunology; William Serson will attend the University of Kentucky’s program in plant physiology; Chelsea Thompson will attend the University of Alabama’s program in genetics and genomics; Jared Taylor will attend the University of Florida’s interdisciplinary program in biomedical sciences.

Other Biology students continuing to graduate school include: Carissa Alza, in the Master’s program in conservation biology at SUNY ESF and Suzanne Woomer in the naturopathic medicine program at the University of Bridgeport.

Lindsay Havens was accepted into the summer research internship program at the Hershey Medical Center. She is one of ten accepted from among 400 applicants.

Nine Biology students presented research papers at the Commonwealth of Pennsylvania University Biologists (CPUB) Annual Meeting. These included eight posters and one platform presentation. Jason Snavely and Dustin Sparr won 1st and 2nd place, respectively, in the Ecology, Evolution & Organismal division. Jonathan Kettering won 2nd place in the Cellular & Molecular Biology division.

Four Biology students presented scientific presentations at the Annual Meeting of the PA Academy of Science. Jonathan Kettering and Michael Parker each gave a poster presentation. Philomena Behmer and Danielle Farnell co-presented an oral presentation.
Kristin Sloyer presented a paper on the Development of a Dichotomous Blackfly Taxonomic Key to the Raritan River, Hunterton County, NJ at the Blackfly Research meeting in Lake Placid, FL.

Jenn Slough (with Dr. John Wallace) published a paper in the *Journal of American Mosquito Control* entitled “First Record of *Mansonia dyari* (Diptera: Culicidae) in Baldwin County, Alabama.”

David Schmidt was hired as a West Nile Virus technician for Lancaster County.

Jami Lascoksie (’11), Kristen Hinton (’10) and Rachel Cashman (’10) are working for Alaskan Observers.

Joshua Moyer (’10) has been accepted into the graduate program in evolutionary biology at Cornell University.

Kristin Sloyer (’11) and Andrew Watson (’11) are working as West Nile Virus technicians for Lancaster County and Lebanon County, respectively.

**D. Progress toward department goals/5 year review**

**Revision of Majors Curriculum**

1. The Department will offer a new entry-level course for majors, BIOL 101 (Fundamentals of Biology). This will be accompanied by a recasting of the core of the Biology major. Status: **Completed**
2. A new Nutrition course, BIOL 352 (Nutritional Science), will be developed for majors. [BIOL 256 (Nutrition) will be restricted to non-majors. No credit toward the major will be given for this course. It will have either BIOL 100 or BIOL 101 as a prerequisite.] Status: **Completed**
3. The Department will develop new sophomore-level courses in Cell and Developmental Biology, Genetics and Molecular Biology, and Ecology & Evolution. Status: **Completed**
4. The Department will monitor the effects of the implementation of the curriculum changes. The elective course selections of Biology majors will be monitored as well to ensure that they take a breadth of elective courses. One way to monitor this will be to compare student performance on the MFAT test after the implementation of the new curriculum with that obtained before its implementation. Assuming implementation of the new curriculum in Fall 2009, this comparison could not be made until Spring 2013 when the first group of freshmen enrolled in the new curriculum becomes seniors. In the meantime, for assessment purposes, we will develop embedded questions in classroom tests designed to measure student content knowledge and skill sets in specific areas. This will also be done in courses where the subject material is covered and also in later courses to assess retention and integration. Status: **Ongoing**

**Curriculum Revision – Non-Majors**

1. The Department will offer a new non-majors (G2) course, BIOL 140 (Introductory Ecology). It will satisfy the State (PDE) mandate for ecology and environment content for ELED majors. Status: **Completed**
2. Other versions of BIOL 100 will be developed to address the curricular needs of non-majors.
   Status: Ongoing

Graduate Program
1. If our decision is to continue with the graduate program, we will develop a web page for the graduate program and provide a link on the Department's web page to information about the graduate program on its own webpage.
2. The Department will take the recommendations of the reviewers and conduct a new and expanded survey to determine the market for thesis and non-thesis graduate programs. If the results of the survey are promising, we will develop a Business Plan for an expanded graduate program.
3. The Department will follow the steps suggested in point 16 under Section X, Recommendations. The answers to these questions will determine the fate of the graduate program. Obviously, if a new faculty position or positions is not forthcoming and ways cannot be found to recruit full-time or nearly full-time thesis students, we are limited to a primarily non-thesis option or no program at all.
   Status: The graduate program was placed in moratorium by the Chancellor's office.

E. New faculty, new facilities/equipment

New Faculty
1. During the Spring 2012 semester, the Department conducted a search for a conservation biologist to fill a vacancy left by the retirement of Dr. David Zegers. Four candidates were interviewed. Dr. Aaron Haines was offered the position. He accepted and will begin in August 2012.
2. The Department also conducted a search for new Temporary Part-Time Faculty (TPTFs) last year. Seven new TPTFs were approved. They are: Dr. Douglas Becker, Dr. Charles Ducker, Dr. Jacquelyn Maddox, Dr. Kristine Olson, Karen Russo, Dr. Sinha Raghu, and Dr. Donald VanBoskirk.

New Equipment
The following equipment was purchased during the past year from University funds:
1. Eight computers for faculty
2. Thirteen computers for the Ecology lab
3. Six stereomicroscopes for the Ecology lab
4. A water purification system for the Ecology prep room
5. Digital cameras and cards for the Zoology lab

F. Outcomes Assessment

During the past year, the Department of Biology formed an Assessment Committee and elected Dr. Joel Piperberg as its chair. This committee is charged with the development and adoption of assessment measures to fulfill the University’s goal of effective academic assessment, as well as the collection, analysis, and reporting of assessment data to the Department and other University entities as required. The Biology Assessment Committee is scheduled to begin meeting during the summer of 2012.

Detailed Assessment Report (entered into Weave Online by Dr. Joel Piperberg)

2011-2012 Department of Biology
Mission / Purpose
The primary mission of the Biology Department is to foster quality teaching and learning. The practitioner of a discipline must be a master of the subject. There is no method for achieving mastery of a discipline superior to learning with a practicing mentor. While diverse techniques are employed and the time one may spend in the Biology Department may vary, everyone who comes among us should experience a climate of learning and enjoying Biology together. We also seek to uphold the premise that an enduring, civilized society must contain members who are competent in their vocation and who understand their responsibility to advance the good of that society through their discipline. To advance our mission, we have constituted a diverse faculty whose members are trained in many sub-disciplines of Biology. This allows students with different interests and personalities to work with compatible mentors in the kind of Biology that interests them. Our goal is that, while different students will be well trained in one or a few fields of biology, all will be problem solvers who will continue to learn and advance the discipline and the good of society. Our second mission is to maintain an environment within which faculty and students learn together by conducting scholarly activities. The practice of scholarship is characteristic of a body of students and is a fundamental way to accomplish effective teaching, learning and mentoring. This endeavor can advance the body of knowledge, even while it provides the best forum for mentoring, for practicing the methods and thinking appropriate to learning new Biology, and for appreciating the discipline and those who strive for its advancement.

Goals

G 1: All Biology students will be conscientious problem solvers
Our goal is that, while different students will be well trained in one or a few fields of biology, all will be problem solvers who will continue to learn and advance the discipline and the good of society.
G 2: To maintain an environment in which faculty and students learn together by conducting scholarly activities
Our goal is to maintain an environment within which faculty and students learn together by conducting scholarly activities. The practice of scholarship is characteristic of a body of students and is a fundamental way to accomplish effective teaching, learning and mentoring. This endeavor can advance the body of knowledge, even while it provides the best forum for mentoring, for practicing the methods and thinking appropriate to learning new Biology, and for appreciating the discipline and those who strive for its advancement.

Student Learning Outcomes/Objectives, with Any Associations and Related Measure (may consider as Assessment Strategy), Achievement Target (may consider as Expected Outcome), Findings (consider as Actual Results), and Action Plan (consider as application of results -- closing the loop)

SLO 1: Graduates will be successful and competitive
Biology graduates will successfully compete for jobs, admission to graduate schools, and admission to professional schools.

Connected Document

- Biology Curriculum Map

Relevant Associations:
Connection to Univ/Dept Mission: MU embraces the conviction that all of its degree programs must maintain a strong liberal arts component while preparing students to engage in productive and contributive lives as professionals.
Strategic Plan Associations
- Millersville University of Pennsylvania
- 1.3 Strategic Direction: Fostering an Appreciation of the Liberal Arts
- 1.5 Strategic Direction: Developing Life and Leadership Skills that Promote the Greater Public Good

Related Measure (may consider as Assessment Strategy)
M 1: Alumni survey measures students' satisfaction and preparedness for work force/grad studies
An alumni survey has been used since 1998. A revised survey was first distributed in Fall 2005 and will continue to be used. We suspended distribution of the survey during the 2009 – 2010 academic year, since feedback has been consistently good and little new information is currently being learned. Our intent is to distribute the survey again during the 2010 – 2011 academic year, if time permits. If we cannot conduct the survey this year, we will reinstitute the survey after our new curriculum has been in effect for a couple of years to reestablish a baseline before students have begun to graduate having experienced the new curriculum.
Source of Evidence: Alumni survey or tracking of alumni achievements

SLO 2: Graduates will be satisfied with their education
Biology graduates will be satisfied with the education they received as biology majors.

Connected Document
- Biology Curriculum Map

Relevant Associations:
Connection to Univ/Dept Mission: The primary mission of MU is to promote intellectual development through an exemplary liberal arts-based education.
Strategic Plan Associations
- Millersville University of Pennsylvania
- 1.3 Strategic Direction: Fostering an Appreciation of the Liberal Arts

Related Measure (may consider as Assessment Strategy)
M 1: Alumni survey measures students' satisfaction and preparedness for work force/grad studies
An alumni survey has been used since 1998. A revised survey was first distributed in Fall 2005 and will continue to be used. We suspended distribution of the survey during the 2009 – 2010 academic year since feedback has been consistently good and little new information is currently being learned. Our intent is to distribute the survey again during the 2010 – 2011 academic year, if time permits. If we cannot do the survey this year, we will reinstitute the survey after our new curriculum has been in effect for a couple of years to reestablish a baseline before students have begun to graduate having experienced the new curriculum.
Source of Evidence: Alumni survey or tracking of alumni achievements

Achievement Target (may consider as Expected Outcome):
a. The majority of biology graduates will demonstrate their satisfaction after completing a recently revised alumni survey. b. The majority of senior biology students will demonstrate their satisfaction with their biology major after completion of a recently revised senior exit survey.

M 2: Revised senior exit survey will measure Biology students’ satisfaction with their education
This graduating senior survey was used during the 2006 – 2007 and 2007 - 2008 academic years. Our intent is to distribute the survey again during the 2010 – 2011 academic year, if time permits, given the 25-50% decrease in our secretarial support which took effect on July 1, 2010.
If we cannot do the survey this year, we will reinstitute the survey after our new curriculum has been in effect for a couple of years to reestablish a baseline before students have begun to graduate having had the new curriculum.
Source of Evidence: Exit interviews with grads/program completers

**Achievement Target (may consider as Expected Outcome):**
The majority of senior biology students will demonstrate satisfaction with their biology major after completion of a recently revised senior exit survey
SLO 3: Biology graduates understand and demonstrate analytical thinking.
Biology graduates understand and demonstrate analytical thinking with plant and animal biology, cell theory, genetics/molecular biology, evolution, systematics, environmental concepts, and scientific methods.

**Connected Document**
- [Biology Curriculum Map](#)

**Relevant Associations:**
Connection to Univ/Dept mission: MU is steadfastly committed to the proposition that a thorough, broad-based foundation in the arts and sciences is a necessary condition for the development of the whole person.
General Education/Core Curriculum Associations
  1 Critical Thinking
  6 Scientific Reasoning
Strategic Plan Associations
- Millersville University of Pennsylvania
- 1.3 Strategic Direction: Fostering an Appreciation of the Liberal Arts
- 1.5 Strategic Direction: Developing Life and Leadership Skills that Promote the Greater Public Good

**Related Measure (may consider as Assessment Strategy)**
M 3: Graduating seniors’ scores on national exit exams
Graduating seniors will complete nationally normed exit exams- GRE, MFAT, and Praxis comprehensive biology – and score at or above the national or state mean. The MFAT was administered to graduating seniors during Spring 2006, Fall 2006 and Spring 2007 semesters. We did not administer the MFAT during the 2009 – 2010 academic year; however, we have begun to administer it again for three semesters beginning with the Spring 2011 semester. We will be able to compare the results of this battery of tests with the earlier series and the series we will administer as the first students to enter the new Biology curriculum complete it. This will allow us to assess the results and tweak the curriculum, if necessary. The comprehensive biology Praxis is taken by all Biology BSE seniors; its results will be assessed to help in the evaluation of our program.
Source of Evidence: Standardized test of subject matter knowledge

**Achievement Target (may consider as Expected Outcome):**
Graduating seniors will complete nationally normed exit exams- GRE, MFAT, and Praxis comprehensive biology – and score at or above the national or state mean.
M 4: GRE analytical writing scores for Biology majors
Biology majors/graduates’ scores on the analytical writing section of the Graduate Record Exam (GRE).
Source of Evidence: Standardized test of subject matter knowledge

**Achievement Target (may consider as Expected Outcome):**
Biology majors/graduates will score a collective average of at least 5.0 on the analytical writing section of the Graduate Record Exam (GRE).

**M 5: Percent of Biology BSEs who pass the Biology content Praxis**
Percent of Biology BSEs who pass the Biology content Praxis exams.

Source of Evidence: Standardized test of subject matter knowledge

**Achievement Target (may consider as Expected Outcome):**
Ninety-five per cent of Biology BSEs will pass the Biology content Praxis exams. Biology BSEs who meet or exceed the Pennsylvania scores (in terms of the percentage of questions answered correctly) in all six Praxis subdiscipline scores (basic principles of science, molecular and cellular biology, classical genetics and evolution, diversity of life, plants and animals, ecology, science technology and society).

**M 6: Evaluation of Senior/Junior students with end of semester skills checklist**
To assess the skills of Biology Department seniors, the Biology Department has developed a skills checklist to appraise the analytical, writing and other quantitative skills of seniors and some juniors. At the end of the fall and spring semesters, Biology professors use the skills checklist to evaluate seniors in fifteen different advanced biology courses.

Source of Evidence: Academic direct measure of learning - other

**M 7: GRE scores for specific subject sections on GRE biology subject test**
Biology majors'/graduates' scores on the cell/molecular, organismal, and ecology sections of the GRE biology subject test.

Source of Evidence: Standardized test of subject matter knowledge
Achievement Target (may consider as Expected Outcome):
Biology majors/graduates will score a collective average of at least 65 individually on the
cell/molecular, organismal, and ecology sections of the GRE biology subject test.
M 8: Percent of Biology BSEs who meet or exceed Pennsylvania scores in all six subdisciplines
Percent of Biology BSEs who meet or exceed the Pennsylvania scores (in terms of the
percentage of questions answered correctly) in all six Praxis subdiscipline scores (basic
principles of science, molecular and cellular biology, classical genetics and evolution, diversity
of life, plants and animals, ecology, science technology and society).
Source of Evidence: Standardized test of subject matter knowledge

Connected Document

- PRAXIS Report 2009 - 2010 Academic Year

Achievement Target (may consider as Expected Outcome):
Biology BSEs will meet or exceed the Pennsylvania scores (in terms of the percentage of
questions answered correctly) in all six Praxis subdiscipline scores (basic principles of science,
molecular and cellular biology, classical genetics and evolution, diversity of life, plants and
animals, ecology, science technology and society).

Connected Document

- PRAXIS Report 2009 - 2010 Academic Year

Details of Action Plan (consider as application of results -- closing the loop) for This Cycle (by
Established cycle, then alpha)

Application of Results: Biology graduates understand and demonstrate analytical thinking
The Department will consider the use of embedded exam questions in some or all of our core
courses once the new curriculum has been passed and implemented in the Fall of 2009. We
should begin the embedding of questions during the current academic year. The results of
previous assessments and our five-year reviews have aided us in the planning and now
execution of the new curriculum. We will continue to assess the new curriculum and make
appropriate adjustments, as needed. The results of our surveys indicated that our students
believe that we need improved technology in our labs and classrooms. We have made progress
in the past year of accomplishing this goal and will continue to do so over the coming semesters
as funding allows. The establishment of the new curriculum, which came about as a result of
these assessment activities and our five-year reviews, has led us to establish a committee to
look into our curricular needs and offering for the next two years. The committee has completed
its work and the plan will soon be presented to the department.

Established in Cycle: 2009 - 2010
Implementation Status: In-Progress
Priority: High

Application of Results: Biology graduates understand and demonstrate analytical thinking
The Department will consider the use of embedded exam questions in some or all of our core
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**Established in Cycle:** 2009 - 2010  
**Implementation Status:** In-Progress  
**Priority:** High

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**Established in Cycle:** 2009 - 2010  
**Implementation Status:** In-Progress  
**Priority:** High

Application of Results: Biology graduates will be satisfied with the education.  
While the results of the alumni and senior exit surveys since 1998 have been quite good, we have just implemented a new curriculum that we believe will better prepare our students for their careers and lead to even more of them finding employment in their field and/or gaining admission to graduate or professional school. We also believe that the new curriculum has the potential to increase further student and alumni satisfaction with the Biology major at Millersville University. Written comments on the survey in the past have played a role in planning the new curriculum and influencing some of its elements. Relative to the comments about the technology
in our classrooms and labs, there has been significant progress in the last academic year. Many of our classrooms have received new computers with Interwrite panels, document cameras and projectors to aid in teaching. The computers in the Cell Biology/Plant Physiology and the Introductory Zoology teaching labs have recently been upgraded to carry the labs until new computers can be obtained during the Fall of 2010. (See below.) New student microscopes were recently purchased for the Anatomy and Physiology teaching lab as have student dissection microscopes for the Advanced Botany lab and digital video cameras to do time lapse photography in cell biology, plant physiology and animal behavior teaching laboratories. A new $25,000 equipment endowment was also established during the last academic year to help us purchase needed equipment; it will first be used this year. This semester, we are adding new computers in two of our teaching labs (C-204 and C-129) through funds coming from the Student Technology Fee and the Base Equipment Budget. We have also obtained equipment for some of our new courses (BIOL 101 and 343) from the Base Equipment Budget. Our intent is to distribute the survey again during the 2010 – 2011 academic year if time permits. If we cannot do the survey this year, we will reinstitute the survey after our new curriculum has been in effect for a couple of years to reestablish a baseline before students have begun to graduate having had the new curriculum.

Application of Results: Biology graduates will successfully compete for jobs, admission to graduate schools or professional prog
A newly revised alumni survey was used during the 2005 – 2006 academic year to enhance data collection; its use has been continued during the 2007 – 2008 year; it was not distributed during the 2008 – 2009 or the 2009 – 2010 academic year. While the results of the alumni surveys since 1998 have been quite good, we are about to implement a new curriculum that we believe will better prepare our students for their careers and lead to even more of them finding employment in their field and/or gaining admission to graduate or professional school. Comments on the survey have played a role in planning the new curriculum. We have also taken steps to improve the technology in our labs and classrooms. This semester we are adding new computers in two of our teaching labs through funds coming from the Student Technology Fee and the Base Equipment Budget. We have also obtained equipment for some of our new courses (BIOL 101 and 343) from the Base Equipment Budget. The survey will be distributed again during the 2010 – 2011 academic year.

Established in Cycle: 2009 - 2010
Implementation Status: Planned
Priority: High

Application of Results: Graduating seniors will complete nationally normed exit exam (MFAT).
MFAT administered to graduating seniors during Spring 2006, Fall 2006 and Spring 2007 semesters. We did not administer the MFAT during the 2009 – 2010 academic year; however, we plan to administer it again for three semesters beginning with the Spring 2011 semester. We will be able to compare the results of this battery of tests with the earlier series and the series we will administer as the first students to enter the new Biology curriculum complete it. This will allow us to assess the results and tweak the curriculum, if necessary. The results of previous assessments and our five-year reviews have aided us in the planning and now execution of the new curriculum. We will continue to assess the new curriculum and make appropriate adjustments, as needed. The results of our surveys indicated that our students believe that we need improved technology in our labs and classrooms. We have made progress in the past year of accomplishing this goal and will continue to do so over the coming semesters as funding
allows. The establishment of the new curriculum, which came about as a result of these assessment activities and our five-year reviews, has led us to establish a committee to look into our curricular needs and offering for the next two years. The committee has completed its work and the plan will soon be presented to the department.

**Established in Cycle:** 2009 - 2010  
**Implementation Status:** In-Progress  
**Priority:** High

Application of Results: GRE analytical writing scores for Biology majors  
The Department will consider the use of embedded exam questions in some or all of our core courses once the new curriculum has been passed and implemented in the Fall of 2009. We should begin the embedding of questions during the current academic year. The results of previous assessments and our five-year reviews have aided us in the planning and now execution of the new curriculum. We will continue to assess the new curriculum and make appropriate adjustments, as needed. The results of our surveys indicated that our students believe that we need improved technology in our labs and classrooms. We have made progress in the past year of accomplishing this goal and will continue to do so over the coming semesters as funding allows. The establishment of the new curriculum, which came about as a result of these assessment activities and our five-year reviews, has led us to establish a committee to look into our curricular needs and offering for the next two years. The committee has completed its work and the plan will soon be presented to the department.

**Established in Cycle:** 2009 - 2010  
**Implementation Status:** In-Progress  
**Priority:** High

Writing throughout the Biology Curriculum  
The new Biology Curriculum, which was initiated in the Fall 2009 semester has renewed emphasis on writing skills beginning with the new majors introductory course (BIOL 101). Presently, two other courses in the core (BIOL 343 and BIOL 362) are Writing-Across-the-Curriculum (W) courses. The other courses in the core emphasize writing, although they are not W courses. The Department has also made an effort to use the same format for lab reports in all of the core courses and upper division courses that serve as electives in the major.

**Established in Cycle:** 2010 - 2011  
**Implementation Status:** Planned  
**Priority:** High

**Implementation Description:** Improved Writing by Majors  
**Projected Completion Date:** 05/2013  
**Responsible Person/Group:** Biology Department Faculty Members
DEPARTMENT OF CHEMISTRY

A. Curricular Changes

We changed the prerequisites for CHEM 111 (Introductory Chemistry I) to a “Prerequisite of MATH 101 or MPT of 160 or higher; or CHEM 110 with a grade of C- or better; or permission of Chair.” During the fall 2011 semester, of the 231 students enrolled in CHEM 111, 32% were simultaneously enrolled in MATH 101, meaning that these students were not competent in algebra. Of these students, 45% were unsuccessful in CHEM 111.

We developed a 4+4 Biochemistry/pre-pharmacy program as part of the official articulation agreement with LECOM. The new 3+4 Pre-pharmacy program in chemistry is in the preparation stage. This is the preferred program listed in the articulation agreement with LECOM.

As per last year’s annual report, we have implemented the following change: the prerequisite for CHEM 342 is “a minimum grade of “D” or permission of the instructor” in CHEM 341. In CHEM 113H, the prerequisite is pre- or co-requisite of CHEM 112. This decision was made so that this course would be available to all students and not just students in the honors program. Analytical Chemistry (CHEM 465) is now a writing course. Environmental Chemistry (CHEM 375) now has a “D” diversity designation. The History of Chemistry and Society now has both “P” and “D” designations. All of our “W”, “P” and “D” courses have been recertified.

We once again participated in the Learning Community program. During the fall 2011 semester, our majors took CHEM 188 (Freshman Seminar), CHEM 111 (Introductory Chemistry I), and COMM 100 (Communications) as a cohort. Students’ overall responses to this arrangement have been very positive. We will continue to participate in the program.

B. Faculty Achievements – grants, research, sabbatical (Refer to School Statistics section).

Steven Bonser  
Millersville University’s Team Leader:
1. PASSHE’s Institutionalizing Undergraduate Research to Enhance Student Success in STEM through a System-wide & Campus-Centered Project
2. Accepted for participation as a Council on Undergraduate Research CUR Councilor.

Co-Director: The 2012 Central Pennsylvania Regional Science Olympiad.

Millersville University’s Institutional Liaison: To the Council on Undergraduate Research (CUR)
Member-at-large: The Southeastern Section of the Pennsylvania American Chemical Society (SEPSACS)
**Patricia S. Hill**

**Book – Chapter Title:** Developing a Community of Science and Art Scholars, Patricia S. Hill and Deberah Simon

**Book Title:** Collaborative Endeavors in the Chemical Analysis of Art and Cultural Heritage Materials, Patricia L. Lange & Ruth Ann Armitage, Editors, to be published in spring 2012 by ACS Publications

**Presentations:**
- Pittsburgh Conference 2012, Orlando, Florida, March 11-15th – “cCWCS Fostering Chemistry in Art Community (CiA) of Scholars”

**Jeremiah Mbindiyo**

**Independent Study topics:**
- Sarah Rogers – Investigation of Electrochemical Processes FA 11
- Sarah Rogers – Development of sustainable methods for quality control testing of electroplating baths – SP12

**Leadership positions:**
1. Member, Program Advisory Council – Department of Applied Engineering, Safety and Technology
2. Member, Academic Advisory Board – The Nanotechnology Institute
3. Member and Lead Faculty – program design and implementation taskforce – Pennsylvania Collaborative for Applied Nanotechnology – (PA-CAN)
4. Member, Editorial Advisory Board – for two journals; (a) Proteus (b) Scientific Journals International

**Professional Seminars:**
- PA-NMT Partnership Meeting, University Park, PA, May, 2012

**Who’s Who Awardee:** Listed in the 65th Edition of Marques Who is Who in America, 2011

**Grants:** Aptabody™ Nanopackaging of Drugs Targeting Lung Cancer - $26,736 – NSF-PFI; Aptabody™ Nanopackaging of Drugs Targeting Lung Cancer - $26,736 – NSF-PFI-Funded

**Aimee L. Miller**

Grants:
1. Aimee L. Miller, *Symposium Co-Organizer at National BCCE Meeting*, Special Activities Faculty Grant, Millersville University, Summer, 2012. Submitted: $500
5. Jong-Chul ‘Charlie’ Kang and Aimee L. Miller, *Mg2+ and Inositides in Yeast*, Student Research Grant, Millersville University, Fall 2011. Awarded: $400

Professional Meeting: Symposium Co-Organizer, 22nd Biennial Conference on Chemistry Education, State College, PA, Summer, 2012

Maria Schiza
2012: Event Supervisor for the Central PA Regional Science Olympiad Competition, Millersville PA
2012: Spring – Reviewer for two NASA – Postdoctoral Fellow Proposals/Applications
2012: -Program External Reviewer/Consultant for the Chemistry Program at Alvernia University, Reading, PA

Edward Rajaseelan
1. Gary S. Nichol, David P. Walton, Laura J. Anna, and Edward Rajaseelan; “[2-Butyl-4-(4-tert-butylbenzyl)-1,2,4-trazol-3-ylidene]chloro(1,2,5,6-η)-Cycloocta-1,5-diene]iridium(I),” Acta Crystallographica, 2012, E68, m158-159.

Sandra Turchi
Emirates Journal of Food and Agriculture editor@ejfa.info

Robert Wismer
Editing of a photographic record of the 2011 Study Conference of the Scientific Instrument Society to Dublin, Ireland. The resulting CD was distributed to 23 members in 7 countries.
Review of two journal articles for the *Journal of Chemical Education*.

Nine chemistry faculty members supervised 22 undergraduate research projects this academic year.

Several faculty (Drs. Mbindingo, and Miller) have been engaged in outreach activities. They have sponsored Saturday workshops for grade school and high school students from various groups, such as home-schooling and church organizations.

**C. Student Achievements –**
The fall class enrollments for fall 2010 were 1436; spring 2011 enrollments were 1333. Currently, there are 79 chemistry majors. There are 55 paid admits for next year. Twelve chemistry majors were graduated in May 2012. Four majors attended the ACS national meeting in San Diego to present their research. We had 22 majors engaged in undergraduate research during this academic year; the majority of whom received Neimeyer-Hodgson Grants and Student Research Funding to support their research.

**Students Completing Department Honors Thesis or University Honors Thesis:**

- **Student name:** David Walton  
  **Thesis title:** [1-Butyl-4-(4-tert-butylbenzyl)-1,2,4-triazol-3-yliene]chloride[(1,2,5,6-n)-cycloocta-1,5-diene]iridium(1)  
  **Faculty Supervisor:** Dr. Edward Rajaseelan

- **Student name:** Justin Hurst  
  **Thesis title:** Fluorescence Studies of the Pyrene Molecular Receptor  
  **Faculty Supervisor:** Dr. Maria Schiza

**Internships Completed at Other Universities, e.g., NIST, REU:**

- **Internship title/site:** REU: University of Southern Missouri  
  **Date:** June 19 2010 – August 7, 2010  
  **Student name:** Justin Hurst

**Student Attendance at Regional or National Conferences:**

Eight students attended, four of whom presented their research in a poster session  
**Conference:** 241st ACS National Meeting & Exposition, March 2012, San Diego, CA

**Student Presentations at Regional or National Conferences:**

- **Student(s) name:** Hannah McWilliams  
  **Faculty mentor:** Dr. Steven Bonser  
  **Poster paper/presentation title:** Synthesis and Chemistry of Diaziridines  
  **Conference:** 241st ACS National Meeting & Exposition, March 2012, San Diego, CA

- **Student(s) name:** Daniel Fraccica  
  **Faculty mentor:** Dr. Steven Bonser
Poster paper/presentation title: progress Towards the Synthesis of Diaziridines
Conference: 241st ACS National Meeting & Exposition, March 2012, San Diego, CA

Student(s) name: Joe Pulchalsky
Faculty mentor: Dr. Aimee Miller

Poster paper/presentation title: Characterization of Wild and Commercial Yeast Strains
Conference: 241st ACS National Meeting & Exposition, March 2012, San Diego, CA

Student(s) name: David Walton
Faculty mentor: Drs. Rajaseelan and Anna

Poster paper/presentation title: “Synthesis and Characterization of Imidazole Based Iridium(I) Complexes”
Conference: 241st ACS National Meeting & Exposition, March 2012, San Diego, CA

Student(s) name: David Walton
Faculty mentor: Drs. Rajaseelan and Anna

Poster paper/presentation title: “Synthesis and Characterization of Imidazole Based Iridium(I) Complexes”
Conference: SEPSACS Education Night Spring 2012; LVC Annville, PA

Student Awards or Special Recognition, e.g., Hollings Scholarship, ACS Student Affiliate Award:

David Walton’s was the recipient of the prestigious Ali-Zaidi award.

The following students have been accepted into graduate school or have offers in industry:
1. David Walton will attend California Institute of Technology (CALTEC)
2. Joe McKenzie has accepted a position at Lancaster Labs
3. Daniel Fraccica will attend the University of Maryland at College Park
4. Brandy Baltzell has accepted a position at Lancaster Labs
5. Suzanne Woomer will attend the University of Bridgeport in Bridgeport CONN
6. Hannah McWilliams has accepted a position at Lancaster Labs

D. Progress Toward Department Goals Since the 2006 5-Year Review

Since our last program review in 2006, we continued to address a 12-point action plan listed below:
1. Develop new Pre-Pharmacy Program. We developed an A.S. Chemistry/pre-pharmacy degree. Four year programs will be encouraged and course selection for preparation in this area will be by advisement.
   ACCOMPLISHED
2. Develop an instrument repair, maintenance and replacement plan:
   GOAL ON GOING
3. Obtain internal and external funding for student summer research: The department has encouraged students to apply for summer REU’s.
   GOAL ON GOING
4. Promote general education courses to increase S/F ratio: 
   GOAL ACCOMPLISHED AND ON GOING

5. Keep both the environmental and polymer options and monitor their progress: We have seen a slight increase in enrollment in both options (4 in each). We will review both options during our five year program review next year. 
   GOAL ON GOING

6. Develop a more aggressive recruitment plan: we have seen a marked trend in the increase in the number of paid admits over the past five years. We have developed a new brochure that we sent out to about 150 science teachers to advertise our programs. 
   GOAL ACCOMPLISHED and ON GOING

7. Maintain and improve our successful assessment program: 
   GOAL ON GOING

8. Reconstruct our web page: Steve Peurifoy (our lab technician) and Dr. Maria Schiza are co-web masters. The web site is better organized and represents the department in a positive light. 
   GOAL ACCOMPLISHED AND ON GOING

9. Promote faculty involvement in grant writing: Drs. Mbindyo, Hill and Rickard have submitted grants for outside funding. 
   GOAL ON GOING

10. To hire an instrument technician on a consulting basis: This task has been in part assigned to our lab technician, Steve Peurifoy. 
   GOAL ACCOMPLISHED

11. Selective maintenance agreements: Money from the HPLC and AA service contracts have been transferred to the repair budget. The service contracts for the NMR and the new Agilent GCMS were not renewed. Instead, Steve Peurifoy has assumed the trouble shooting and repair of both instruments. 
   GOAL ACCOMPLISHED

12. Increase the operating budget: 
   GOAL NOT ACCOMPLISHED

During the spring and fall of 2012, we will conduct our next 5-year program review. 
We have selected 4 areas of focus: 
1. Curriculum 
2. Student Success 
3. Faculty Accomplishments 
4. Resources

Within those 4 areas of focus, we will address the following goals over the next 5 year period. Many of these goals are carried forward from our last program review, since many are ongoing. We will reassign these goals in the context of the 4 areas of our current 5-year program review.

CURRICULUM
1. Develop a new 3 + 4 program for the LECOM articulation program in Pre-Pharmacy. 
2. Investigate and/or develop an FYE seminar in the discipline. 
3. Increase enrollment in elective/specialty courses (especially in the options and the minors), to offer the courses and remain in compliance with the ACS guidelines for offering breadth and depth within the degree programs. 
4. Offer general education courses, two of which are currently being assigned to programs outside of general education (ALHT and OSHM)
5. Review both the environmental and polymer options and assess their progress since the last program review.

STUDENT SUCCESS
1. Review postgraduate success: employment and graduate school or professional school.
2. Provide meaningful tutoring experiences.
3. Develop an assessment program for the majors that will ensure success at the upper division level.
4. Monitor the student success rate in CHEM 111 in light of the new prerequisite for that course of MATH 101.
5. Explore new pedagogical methods to improve student success in the 100-level and 200-level courses both in the chemistry courses and the general education courses offered in the department. Assess those methods currently being used in chemistry courses for effectiveness.

FACULTY ACCOMPLISHMENTS
1. Obtain internal and external funding for student summer research: The department has encouraged students to apply for summer REU’s.
2. Promote faculty involvement in grant writing.
3. Encourage a more productive publication record.
4. Investigate a source of start-up funding for new hires.
5. Support initiatives for research opportunities.

RESOURCES
1. Develop an instrument repair, maintenance, replacement plan.
2. Investigate sources of funding to expand the current holdings of instruments.
3. Reinstate select service contracts with the minimum coverage of parts. Without any type of service contract, service and parts take weeks to procure. Customers with service contracts are preferred and are serviced first.
4. Investigate the possibility of hiring an instrument technician if only on a consulting basis. This would exclude the NMR, since Mr. Peurifoy has been trained to trouble shoot and maintain the NMR.
5. Increase the operating budget to accommodate the increase in enrollments in lab courses.
6. Return the Yeager complement, thereby decreasing the use of TPTFs and increasing the availability of introductory and general education courses, while still allowing us to teach upper level courses needed in the major.
7. Investigate increasing the chemistry area (space) to meet growing demands.
8. Provide adequate library services to support the minimum requirements for ACS approved programs.

E. New Faculty, New Facilities/Equipment

This academic year has seen a number of changes in our faculty complement. Dr. Laura Anna has resigned from the university and has relocated to Maryland. The vacancy will be filled with a fulltime temporary faculty member for 2012-2013. We anticipate the
return of the complement and hope to conduct a fulltime tenure-track search during the fall 2012. Dr. Mark Iannone announced his retirement effective June 2012. We have hired Dr. Michael Elioff to replace the vacancy left by Dr. Iannone’s retirement.

Mr. Steve Peurifoy has been promoted to the School Lab and Safety Technician, taking on more broad responsibilities for safety in the school, including supervision of the School’s Stock Clerk. Mrs. Jennifer Fisher, the secretary to the Departments of Chemistry and Physics retired in December 2011; Ms. Nancy Marchese has filled this vacancy.

We did investigate the possibility of expanding our space on the second floor over the south wing of Roddy. However, the cost was prohibitive and space is not suitable to accommodate the expansion.

With the base equipment money, we added several small pieces of equipment to the organic lab. These pieces included digital melting point units and gas chromatography accessories. With other sources of funding from the Provost we purchased 24 spectrophotometers to replace 20 year old non-repairable and unreliable spectrophotometers.

F. Outcomes Assessment

Mission / Purpose
The mission of the Chemistry Department is to provide quality undergraduate instruction and advisement to students, utilize research and scholarly activities to foster continued student development and to graduate majors with a MU baccalaureate degree in chemistry who will be able to function effectively as chemists.

Documents:
Chemistry Exit Interview Questions Chemistry MFAT Results
2006-2011 Chemistry Seminar Faculty Evaluation Form
Chemistry Seminar Student Evaluation Form Rubric for Analytical Chemistry Lab Reports Rubric for Physical Chemistry Lab Reports

Goals
G 1: To provide quality undergraduate instruction and advisement to students
To provide quality undergraduate instruction and advisement to students

Documents:
Chemistry Exit Interview Questions Chemistry MFAT Results
2006-2011 Chemistry Seminar Faculty Evaluation Form
Chemistry Seminar Student Evaluation Form Rubric for Analytical Chemistry Lab Reports Rubric for Physical Chemistry Lab Reports

G 2: To utilize research and scholarly activities to foster continued student development
To utilize research and scholarly activities to foster continued student development in the field of chemistry, and the community.
G 3: To graduate majors with a MU baccalaureate degree in chemistry who will be able to function effectively as chemists

To graduate majors with a MU baccalaureate degree in chemistry who will be able to function effectively as chemists, to communicate and favorably compete with others in their field and to continue to learn.

Documents:
Chemistry Exit Interview Questions Chemistry MFAT Results 2006-2011 Chemistry Seminar Faculty Evaluation Form Chemistry Seminar Student Evaluation Form Rubric for Analytical Chemistry Lab Reports

Student Learning Outcomes/Objectives, with Any Associations and Related Measures, Targets, Findings, and Action Plans

SLO 1: Chemistry students will be able to effectively communicate chemistry concepts both orally and in written form

Upon completion of the chemistry major, students will be able to communicate effectively both orally and in written form, using correct chemical nomenclature and mathematical representations of physical and chemical phenomena. Continued from 2007-08.

Documents:
Chemistry Seminar Faculty Evaluation Form Chemistry Seminar Student Evaluation Form Rubric for Analytical Chemistry Lab Reports Rubric for Physical Chemistry Lab Reports

Relevant Associations:

Connection to Univ/Dept Mission: The primary mission of MU is to promote intellectual development through an exemplary liberal arts-based education.

General Education/Core Curriculum
1 Critical Thinking 2 Information Literacy 3 Oral Communication 4 Written Communication 5 Quantitative Reasoning 6 Scientific Reasoning 7 Technological Competencies

Strategic Plans Division of Academic Affairs
1.1 Academic Affairs Goal 1: Transform the Curriculum and Educational Programs to Respond to the Changing Needs of a Dynamic Society

Millersville University of Pennsylvania
1.1 Strategic Direction: Creating Academic Programs of National Distinction 1.2 Strategic Direction: Nurturing a Passion for Learning 1.3 Strategic Direction: Fostering an Appreciation of the Liberal Arts
1.4 Strategic Direction: Cultivating a Community of Diverse People, Thoughts and Perspectives
1.5 Strategic Direction: Developing Life and Leadership Skills that Promote the Greater Public Good

School of Science and Math
1 SCMA Goal 1: Enhance Our Standing as the Premiere Science and Mathematics Institution Within the PASSHE 2 SCMA Goal 2: Maintain and Expand Facilities and Equipment to Meet the Growing Needs of the School 3 SCMA Goal 3: Improve Retention and Graduation Rates in the School Through an Emphasis on a Student-Centered Environment.

Related Measures

M 1: Written report for student undergraduate research
Students performing undergraduate research will prepare a written report based on their research. Source of Evidence: Written assignment(s), usually scored by a rubric

Target:
In senior seminar all students will prepare a written report on a chemistry topic or prepare a paper based on their research. 90% of the students enrolled will earn a B or better in their reports.

Findings (2010 - 2011) - Target: Partially Met
Of the 18 students engaged in research, 83% earned a B or better.

Findings (2009 - 2010) - Target: Not Reported This Cycle
None Reported

Related Action Plans (by Established cycle, then alpha):
For full information, see the Action Plan Detail section of this report.

Undergraduate Student Written Research Reports
Established in Cycle: 2010 - 2011 All students engaged in undergraduate research will submit a formal written report. Those reports should have a grade of "B" or ...

M 2: Oral presentation in senior seminar
In senior seminar all students will give an oral presentation on specific chemistry topic (research or literature)
The faculty will use the senior seminar evaluation tool with the list of departmental expectations for the students’ presentations. Each of the categories (demonstrated knowledge of material, expanded audiences knowledge, appropriate topic and level of presentation, communication skills, professional appearance, originality of materials, quality and accuracy of presentation materials, literature references, response to questions) will have expectations ranked from 1-5, with 5 being excellent.
Source of Evidence: Presentation, either individual or group

Documents:
Chemistry Seminar Faculty Evaluation Form Chemistry Seminar Student Evaluation Form

Target:
In senior seminar all students will give an oral presentation on the topic chosen for their written report. 90% of the students enrolled will earn a B or better.

Documents:
Chemistry Seminar Faculty Evaluation Form Chemistry Seminar Student Evaluation Form
Findings (2010 - 2011) - Target: Partially Met
Of the 18 students enrolled in the course, 85% earned a B or better.

Findings (2009 - 2010) - Target: Not Reported This Cycle
None Reported

Related Action Plans (by Established cycle, then alpha):
For full information, see the Action Plan Detail section of this report.

Oral Presentation in Senior Seminar
Established in Cycle: 2010 - 2011 All student presenters will earn a "B" or better in senior seminar based on the criteria as listed in the chemistry faculty and ...

M 3: Physical and Analytical Chemistry lab notebook
In both physical and analytical chemistry the faculty members teaching the courses will use a numerical scale to address the course expectations for the students’ effective scientific written data log.
Source of Evidence: Written assignment(s), usually scored by a rubric

Target:
All physical and analytical chemistry students will maintain accurate records of experimental work (lab notebooks). All students will present satisfactory lab books.

Findings (2010 - 2011) - Target: Partially Met
Of the 19 students enrolled in Physical Chemistry, 79% met the objective. Of the 17 students enrolled in Analytical Chemistry, 82% met the objective.

Findings (2009 - 2010) - Target: Not Reported This Cycle
Not Reported

Related Action Plans (by Established cycle, then alpha):
For full information, see the Action Plan Detail section of this report.

Physical and Analytical Chemistry Lab Notebooks
Established in Cycle: 2010 - 2011 All students submitting lab notebooks will be evaluated on the accuracy, validity, and presentation of their scientific result...

M 4: Physical and Analytical Chemistry scientific report
In both physical and analytical chemistry the faculty members teaching the courses will use the rubric developed with the list of departmental expectations for the students’ effective scientific written lab reports. The rubric includes organization of the report, spelling errors, grammar, quality and originality of figures, scientific accuracy, nomenclature and mathematical representations and references.
Source of Evidence: Written assignment(s), usually scored by a rubric

Documents:
Rubric for Analytical Chemistry Lab Reports Rubric for Physical Chemistry Lab Reports

Target:
Physical and Analytical chemistry students will write effective revised scientific reports. 85% of the Physical and Analytical chemistry students enrolled in each course will earn a B- or better grade in their reports.

Documents:
Rubric for Analytical Chemistry Lab Reports Rubric for Physical Chemistry Lab Reports

Findings (2010 - 2011) - Target: Partially Met
Of the 19 Physical chemistry students enrolled in the course, 47% achieved this objective. Of the 17 Analytical chemistry students enrolled in the course, 76% achieved this objective.
Findings (2009 - 2010) - Target: Not Reported This Cycle
None Reported
Related Action Plans (by Established cycle, then alpha):
For full information, see the Action Plan Detail section of this report.

Physical and Analytical Chemistry Scientific Reports
Established in Cycle: 2010 - 2011 All students are required to submit written scientific reports in Physical and Analytical chemistry. Draft and revised reports...

SLO 2: Upon completion of the chemistry major, students will be knowledgeable about the factual and theoretical basis of chemistry
Upon completion of the chemistry major, students will be knowledgeable about the factual and theoretical basis of chemistry.

Document:
Chemistry MFAT Results 2006-2011

Relevant Associations:
Connection to Univ/Dept Mission: The primary mission of MU is to promote intellectual development through an exemplary liberal arts-based education.

General Education/Core Curriculum
1 Critical Thinking 2 Information Literacy 3 Oral Communication 4 Written Communication 5 Quantitative Reasoning 6 Scientific Reasoning 7 Technological Competencies

Strategic Plans Division of Academic Affairs
1.1 Academic Affairs Goal 1: Transform the Curriculum and Educational Programs to Respond to the Changing Needs of a Dynamic Society

Millersville University of Pennsylvania
1.1 Strategic Direction: Creating Academic Programs of National Distinction
1.2 Strategic Direction: Nurturing a Passion for Learning
1.3 Strategic Direction: Fostering an Appreciation of the Liberal Arts
1.4 Strategic Direction: Cultivating a Community of Diverse People, Thoughts and Perspectives
1.5 Strategic Direction: Developing Life and Leadership Skills that Promote the Greater Public Good

School of Science and Math
1 SCMA Goal 1: Enhance Our Standing as the Premiere Science and Mathematics Institution Within the PASSHE 2 SCMA Goal 2: Maintain and Expand Facilities and Equipment to Meet the Growing Needs of the School 3 SCMA Goal 3: Improve Retention and Graduation Rates in the School Through an Emphasis on a Student-Centered Environment.

Related Measures
M 5: Graduating seniors' scores on the MFAT
MFATs will be administered during the senior year as part of the senior year seminar course
Source of Evidence: Standardized test of subject matter knowledge

Document:
Chemistry MFAT Results 2006-2011
Target: 75% of the graduating seniors will score at the 50th percentile or better in all areas of the MFAT

Document: Chemistry MFAT Results 2006-2011

Findings (2010 - 2011) - Target: Partially Met
Of the 16 graduating seniors who took the MFAT exam, 100% scored in the 50th percentile overall; however, they did not score above the 50th percentile in all subdisciplines.

Findings (2009 - 2010) - Target: Met
80% of the seniors who have been in the program at least two years achieved the 50% tile or above in the MFAT

Related Action Plans (by Established cycle, then alpha):
For full information, see the Action Plan Detail section of this report.

Evaluation of Chemistry Knowledge using MFATs
Established in Cycle: 2010 - 2011 In the spring semester of every year, all students registered for graduation will take the Major Field Assessment Test (MFAT). 75...

M 6: Graduating seniors’ scores on ACS subdiscipline exams
ACS (American Chemical Society) subdiscipline exams will be used in specific courses
Source of Evidence: Standardized test of subject matter knowledge

Target: 80% of the chemistry majors will score at or above the national norms on ACS subdiscipline exams

Findings (2010 - 2011) - Target: Partially Met
60% of the majors are at or above the 50% tile on the standard ACS subdiscipline exams

Findings (2009 - 2010) - Target: Partially Met
60% of the majors are at or above the 50% tile on the standard ACS subdiscipline exams

Related Action Plans (by Established cycle, then alpha):
For full information, see the Action Plan Detail section of this report.

ACS Subdiscipline Exams
Established in Cycle: 2010 - 2011 The American Chemical Society subdiscipline exams will be used in specific courses to measure the students’ knowledge of the fac...

SLO 3: Students will report satisfaction with the chemistry major
Using the Senior exit survey, students will report satisfaction with the chemistry curriculum, coherence with general education, effectiveness of the chemistry freshman and senior seminars, and retention in the major policy.

Document: Chemistry Exit Interview Questions

Relevant Associations:
Connection to Univ/Dept mission: The primary mission of MU is to promote intellectual development through an exemplary liberal arts-based education.

General Education/Core Curriculum
1 Critical Thinking 2 Information Literacy 3 Oral Communication 4 Written Communication 5
Quantitative Reasoning 6 Scientific Reasoning 7 Technological Competencies

Strategic Plans Division of Academic Affairs
1.1 Academic Affairs Goal 1: Transform the Curriculum and Educational Programs to Respond to the Changing Needs of a Dynamic Society

Millersville University of Pennsylvania
1.1 Strategic Direction: Creating Academic Programs of National Distinction
1.2 Strategic Direction: Nurturing a Passion for Learning
1.3 Strategic Direction: Fostering an Appreciation of the Liberal Arts
1.4 Strategic Direction: Cultivating a Community of Diverse People, Thoughts and Perspectives
1.5 Strategic Direction: Developing Life and Leadership Skills that Promote the Greater Public Good

School of Science and Math
1 SCMA Goal 1: Enhance Our Standing as the Premiere Science and Mathematics Institution Within the PASSHE 2 SCMA Goal 2: Maintain and Expand Facilities and Equipment to Meet the Growing Needs of the School 3 SCMA Goal 3: Improve Retention and Graduation Rates in the School Through an Emphasis on a Student-Centered Environment.

Related Measures

M 7: Senior exit survey measures satisfaction with the major and chemistry curricula
The department will use the exit interview tool to monitor satisfaction with the chemistry curriculum, coherence with general education, effectiveness of the chemistry freshman and senior seminars, and retention in the major policy.
Source of Evidence: Student satisfaction survey at end of the program

Document: Chemistry Exit Interview Questions

Target:
Survey of graduates will show that 80% or more are satisfied with the major, recognize coherence with general education, and believe the freshman seminar is effective

Document: Chemistry Exit Interview Questions

Findings (2010 - 2011) - Target: Partially Met
50 % of our seniors who took the chemistry freshman seminar found it invaluable. 100% of our seniors are satisfied with the chemistry curriculum. Survey reflects coherence with general education at 3.5/4.0.

Findings (2009 - 2010) - Target: Not Reported This Cycle
None Reported

Related Action Plans (by Established cycle, then alpha):
For full information, see the Action Plan Detail section of this report.

Senior Exit Interview
Established in Cycle: 2010 - 2011 The department uses the senior exit interview as a tool to monitor satisfaction with the major, coherence with general education...

Action Plan Detail for This Cycle (by Established cycle, then alpha)
ACS Subdiscipline Exams
The American Chemical Society subdiscipline exams will be used in specific courses to measure the students' knowledge of the factual and theoretical basis of chemistry. 60% of chemistry majors will score at the 50th percentile or better in the respective subdiscipline tests

Established in Cycle: 2010 – 2011
Implementation Status: In-Progress
Priority: High
Relationships (Measure | Outcome/Objective): Measure: Graduating seniors' scores on ACS subdiscipline exams | Outcome/Objective: Upon completion of the chemistry major, students will be knowledgeable about the factual and theoretical basis of chemistry

Implementation Description: At the end of each course the faculty member will administer the ACS subdiscipline exam

Projected Completion Date: 05/2014
Responsible Person/Group: Chemistry faculty in each of the subdisciplines
Additional Resources: None
Budget Amount Requested: 500

Evaluation of Chemistry Knowledge using MFATs
In the spring semester of every year, all students registered for graduation will take the Major Field Assessment Test (MFAT). 75% of the graduating seniors will score at the 50th percentile or better in all areas.

Established in Cycle: 2010 - 2011
Implementation Status: In-Progress
Priority: High
Relationships (Measure | Outcome/Objective): Measure: Graduating seniors' scores on the MFAT | Outcome/Objective: Upon completion of the chemistry major, students will be knowledgeable about the factual and theoretical basis of chemistry

Implementation Description: MFATs will be administered to graduating seniors as part of the senior seminar course

Projected Completion Date: 05/2014
Responsible Person/Group: Chemistry faculty teaching senior seminar
Additional Resources: None
Budget Amount Requested: 500
Document: Chemistry MFAT Results 2006-2011

Oral Presentation in Senior Seminar
All student presenters will earn a “B” or better in senior seminar based on the criteria as listed in the chemistry faculty and chemistry students evaluation rubrics

Established in Cycle: 2010 - 2011
Implementation Status: In-Progress
Priority: High
Relationships (Measure | Outcome/Objective): Measure: Oral presentation in senior seminar | Outcome/Objective: Chemistry students will be able to effectively communicate chemistry concepts both orally and in written form

Implementation Description: Chemistry faculty and students will evaluate the student presenter using the designed rubrics

Projected Completion Date: 05/2014
Responsible Person/Group: Chemistry Faculty
Additional Resources: None
Budget Amount Requested: 0
Documents: Chemistry Seminar Faculty Evaluation Form Chemistry Seminar Student Evaluation Form
Physical and Analytical Chemistry Lab Notebooks
All students submitting lab notebooks will be evaluated on the accuracy, validity, and presentation of their scientific results
**Established in Cycle:** 2010 – 2011
**Implementation Status:** In-Progress
**Priority:** High
**Relationships (Measure | Outcome/Objective): Measure:** Physical and Analytical Chemistry lab notebook | **Outcome/Objective:** Chemistry students will be able to effectively communicate chemistry concepts both orally and in written form
**Implementation Description:** Physical and analytical chemistry lab notebooks will be evaluated based on the accuracy, validity, and presentation of their scientific results
**Projected Completion Date:** 05/2014
**Responsible Person/Group:** Chemistry faculty teaching the physical and analytical chemistry courses
**Additional Resources:** None
**Budget Amount Requested:** 0

Physical and Analytical Chemistry Scientific Reports
All students are required to submit written scientific reports in Physical and Analytical chemistry. Draft and revised reports are evaluated by the faculty teaching the courses. The faculty use a designed rubric. Based on this rubric 90% of the students will earn a "C" or better grade in each written report.
**Established in Cycle:** 2010 - 2011
**Implementation Status:** In-Progress
**Priority:** High
**Relationships (Measure | Outcome/Objective): Measure:** Physical and Analytical Chemistry scientific report | **Outcome/Objective:** Chemistry students will be able to effectively communicate chemistry concepts both orally and in written form
**Implementation Description:** Chemistry faculty teaching physical and analytical chemistry will evaluate the draft and revised written scientific reports based a developed rubric
**Projected Completion Date:** 05/2014
**Responsible Person/Group:** Chemistry faculty teaching the physical and analytical courses
**Additional Resources:** None
**Budget Amount Requested:** 0
**Documents:**
Rubric for Analytical Chemistry Lab Reports Rubric for Physical Chemistry Lab Reports

Senior Exit Interview
The department uses the senior exit interview as a tool to monitor satisfaction with the major, coherence with general education, effectiveness of the freshmen seminar, and retention in the major
**Established in Cycle:** 2010 - 2011
**Implementation Status:** In-Progress
**Priority:** High
**Relationships (Measure | Outcome/Objective): Measure:** Senior exit survey measures satisfaction with the major and chemistry curricula | **Outcome/Objective:** Students will report satisfaction with the chemistry major
**Implementation Description:** The chemistry faculty teaching senior seminar administers the exit interview which is then evaluated by the chair
**Projected Completion Date:** 05/2014
**Responsible Person/Group:** Chemistry faculty teaching the senior seminar course Additional Resources: None **Budget Amount Requested:** 0 **Document:** Chemistry Exit Interview Questions

Undergraduate Student Written Research Reports
All students engaged in undergraduate research will submit a formal written report. Those reports should have a grade of “B” or better based on the quality of the written report, and their ability to communicate the scientific findings.

**Established in Cycle:** 2010 - 2011  
**Implementation Status:** In-Progress  
**Priority:** High  
**Relationships (Measure | Outcome/Objective):**  
- **Measure:** Written report for student undergraduate research  
- **Outcome/Objective:** Chemistry students will be able to effectively communicate chemistry concepts both orally and in written form  

**Implementation Description:** Upon completion of research, the students will submit a written report which will be evaluated by the faculty member with whom they worked.

**Projected Completion Date:** 05/2014  
**Responsible Person/Group:** Individual Faculty  
**Additional Resources:** Student and faculty will write internal and external grants to support their research  
**Budget Amount Requested:** 500
<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Academic Year(s) Assessed</th>
<th>Strategy (ies) Used (Source(s) of Evidence)</th>
<th>How Results were Shared</th>
<th>How Results were Used (Action Plan)</th>
</tr>
</thead>
</table>
| Be knowledgeable about the factual and theoretical basis of chemistry. | 2006-2011 | • Standardized test of subject matter knowledge | • Learning Outcomes Assessment Report  
• Faculty teaching the courses in which assessment strategy is used | Faculty created action plans to:  
a) Enhance the assessment practice in the Senior Seminar  
b) Administer the ACS sub discipline exam at the end of each course |
| Students will report satisfaction with the chemistry major. | 2010-11 | • Student satisfaction survey at end of the program | • Learning Outcomes Assessment Report  
• Faculty teaching senior seminar administers exit interview | Faculty created action plans to:  
• Measure senior satisfaction with major and chemistry curricula through use of Senior Exit Survey |
| Chemistry students will be able to effectively communicate chemistry concepts both orally and in written form. | 2007-08-2008-09; 2010-11 | • Written assignment(s), usually scored by a rubric  
• Presentation, either individual or group | • Learning Outcomes Assessment Report  
• Faculty will share results with students  
The faculty will use the senior seminar evaluation tool with the list of departmental expectations for the students' presentations. | Faculty created action plans to:  
a) Write internal and external grants to support student and faculty research  
b) Improve teaching and learning by providing feedback through rubric to students  
c) Use similar rubrics and evaluation forms across respective courses |
DEPARTMENT OF COMPUTER SCIENCE

A. Curricular Changes
We continue to evaluate the contents of our required courses for majors. We have made several minor updates and changes to the syllabi.

B. Faculty Achievements
A summary of faculty professional activities such as publications and presentations can be found in the School Statistics section of this Annual Report.

Dr. Elzer was elected a member of the Diagrams Steering Committee.

Dr. Liffick was appointed a Commissioner of the Computing Accreditation Commission of ABET, the international accreditation society for computer science.

We hosted the 27th annual spring conference of the Pennsylvania Association of Computer and Information Science Educators (PACISE), March 30-31, 2012. Dr. Hutchens was conference chair. All faculty and staff of the department participated in the organization of the conference and participated in the activities.

We have published 2 papers, and presented 5 papers or seminars to professional groups. We have received over $256,000 in contracts and grants this year (shared with other departments and universities), in addition to several grants that are ongoing from previous years. These grants are detailed below.

Grants:
Dr. Elzer has an extension to the PASSHE University/Business Infrastructure Grant for to continue a Millersville University Computer Software Productization Center for another year. Part of the extension is an $18,060 grant from ITN.

Dr. Elzer coordinated a NIST (National Institute of Standards and Technology) grant for $24,843 that allows three Millersville students to do a Summer Undergraduate Research Fellowship at NIST in Summer 2012.

Dr. Elzer, in collaboration with the University of Delaware, is completing work on a National Institute of Disability and Rehab Research grant for $54,745 on Multimodal Access to Information Graphics.

Dr. Elzer is working on a $104,857 grant on “Exploiting Information Graphics in a Digital Library”, in collaboration with the University of Delaware.

Dr. Webster received a $213,550 grant for “Ocular Trauma Microsurgery Simulator” from DOD-TATRC, in collaboration with Penn State’s college of Medicine’s Department of Ophthalmology.

Dr. Zoppetti is finishing work with Drs. Clark and Yaldi in Earth Sciences on “GEOPOD: GEOscience Probe of Discovery”, as NSF funding expires.
Dr. Zoppetti continues work on a $235,200 collaborative grant with the University of Delaware and University of Virginia on “Computing System to Explore Science, Technology and Health.

Publications:


Presentations:


C. Student Achievements
Ryan Garchinsky presented *Millersville University Mobile Application*, at the 27th Annual Conference of the Pennsylvania Computer and Information Science Educators (PACISE), Millersville, PA, April 2011.

A total of 43 students attended the PACISE conference held at Millersville and nine participated in the programming contest.

Lindsey Young won the Computer Science Award for outstanding senior computer science major. She also received a renewal of the Beth Ann Barry award for a student with 30 to 70 credits who has demonstrated community service and great potential in computer science.

Lindsey Young won the Boyer Award for a computer science major excelling in mathematics and Neil Obetz won for a mathematics major excelling in computer science.

Ryan Consylman, Edward Kimmel, and Wayne Treible received National Institute of Standards and Technology Research Fellowships for summer 2012 in Gaithersburg, MD.
Our cyber defense team, consisting of Ryan Butler, Andrew Elliot, Robert Hennessey, Dylan Leakway, David Lu, Travis Romero, and Josh VanHine, placed second in the Mid-Atlantic Regional Collegiate Cyber Defense Competition.

Computer science students worked on six independent studies with faculty members on undergraduate research projects. Six students participated in COOP opportunities.

The job market is strong with salaries high nationally despite the overall sluggish economy. Our students are therefore finding employment.

D. Progress Toward Department Goals / Five Year Program Review
Our latest list of goals is outdated. We expect to establish a new list. The department has dropped long completed goals from this list.

1. Permanent part time faculty member:
The administration has not acted on the request. Changing enrollments and budget considerations have affected its viability.

2. Maintain appropriate staffing:
We are adequately staffed for current demands.

3. Alternate service assignment:
The request for a rotating alternate assignment has not yet been made. This is unlikely in the current budget climate.

4. Equipment and Software line items in budget:
This fundamental change would require changes in the University’s budget process.

E. New Faculty, New Facilities / Equipment
We received funding through the Student Technology Fee to replace one of our teaching labs and its server. These upgrades should be ready for the Fall 2012 semester.

F. Outcomes Assessment
The department met after the end of the spring term to analyze the data collected over the year.

We introduced a test run of a new skills test for our majors. The students did well on some questions, but overall did not meet our expectations. We will modify some questions where the students may have been confused. In other cases, we suspect lack of recent study of the topics resulted in lower performance. We will be pushing those questions into the respective courses next year to see if that improves results.

Other measures show we are substantially achieving our targets.

A copy of our Weave-online analysis is provided.

Detailed Assessment Report
2011-2012 Department of Computer Science
Mission / Purpose

The goal of the B.S. degree is to prepare students for entry into general professional life. This degree is flexible so that it is consistent with the University mission of providing a program with a strong liberal arts component. It provides students with a strong liberal arts background that will allow graduates to use and/or apply computers within their professional lives, to pursue computer-related careers, or to pursue graduate study in the major areas of knowledge within the arts and sciences. The primary mission of the MU CS program is to provide a well-rounded, high-quality educational environment in computer science, providing graduates with a comprehensive foundation on which to build a successful computing career. Critical thinking, problem solving, and conceptualization skills are vital parts of that foundation. Graduates will be expected to demonstrate the abilities to analyze a problem, design a solution, implement that solution in software, and evaluate the results. The expectation is that all graduates will be able to successfully continue to advance their knowledge of computing (through specialized training or graduate course work) and continuously adapt to the demands of ongoing changes in the field. An important component of this mission is the liberal arts nature of the Millersville degree. Courses within the general education requirements are used to supplement and support the skills developed within the major, and clearly contribute to the overall adaptability of our CS graduates. Oral and written communication skills are a vital part of the overall abilities of CS graduates, and are developed through direct application within the CS curriculum. In addition, an appreciation for the social, ethical, and legal implications of computing technology is fostered through the integration of such topics within the core curriculum. Click here to view the Millersville University Mission Statement Click here to view the current Computer Science Mission Statement

Goals

G 1: To provide a well-rounded, high-quality educational environment in computer science

To provide a well-rounded, high-quality educational environment in computer science, providing graduates with a comprehensive foundation on which to build a successful computing career. Critical thinking, problem solving, and conceptualization skills are vital parts of that foundation.

G 2: To provide students with a strong liberal arts background that will accommodate a wide range of student needs

To provide students with a strong liberal arts background that will allow graduates to use and/or apply computers within their professional lives, to pursue computer-related careers, or to pursue graduate study in the major areas of knowledge within the arts and sciences.

Student Learning Outcomes/Objectives, with Any Associations and Related Measure (may consider as Assessment Strategy), Achievement Target (may consider as Expected Outcome), Findings (consider as Actual Results), and Action Plan (consider as application of results --closing the loop)

SLO 1: CS graduates have an in-depth understanding of computer science, forming a foundation for competence in the computing profession

CS graduates have an in-depth understanding of computer science, forming a foundation for
competence in the computing profession.

**Related Measure (may consider as Assessment Strategy)**

**M 1: Faculty established skills tests and projects.**

Faculty established skills tests and projects.

Source of Evidence: Academic direct measure of learning - other

**Achievement Target (may consider as Expected Outcome):**

a. 75% of CS majors will demonstrate competence in fundamental and advanced programming skills by correctly answering questions on the Skills test.  

b. 75% of CS graduating seniors will demonstrate in-depth knowledge of core areas of computer science by correctly answering questions on the Skills test.

**Findings (consider as Actual Results) (2011-2012) - Achievement Target (may consider as Expected Outcome):** Partially Met

This was a first trial run of this extended test. Results on the 24 questions ranged from 11% correct to 100% correct. For programming languages, 70% of answers were correct. For theory 73% of answers were correct. For data structures, 52% of answers were correct. For architecture, 37% of answers were correct. For operating systems, 25% of answers were correct. and for software engineering, 61% of answers were correct. Some of the questions seem to have confused the students and will be reworked. We will also give the questions in the respective classes rather than in a big test toward the end of the program.

**M 2: Major Field Test [MFT]**

Major Field Test [MFT]

Source of Evidence: Standardized test of subject matter knowledge

**Achievement Target (may consider as Expected Outcome):**

A majority of CS graduating seniors will demonstrate in-depth knowledge of core areas of computer science by scoring above the 30th percentile on the Major Field Test.

**Findings (consider as Actual Results) (2011-2012) - Achievement Target (may consider as Expected Outcome): Not Reported This Cycle**

MFT not given in 2011-2012.

**Findings (consider as Actual Results) (2011-2012) - Achievement Target (may consider as Expected Outcome): Not Reported This Cycle**

MFT not given in 2011-2012.

**M 4: COOP Employer Survey**

COOP Employer Survey

Source of Evidence: Employer survey, incl. perceptions of the program

**Achievement Target (may consider as Expected Outcome):**

75% of CS majors will demonstrate competence in fundamental and advanced programming skills by receiving good or better scores on the COOP employer survey on questions of technical ability.

**Findings (consider as Actual Results) (2011-2012) - Achievement Target (may consider as Expected Outcome): Met**

All responses to questions 5 and 6 related to technical skills were good or excellent.
M 11: Senior Survey
  Graduating Senior Survey
  Source of Evidence: Student satisfaction survey at end of the program

Achievement Target (may consider as Expected Outcome):
75% of students will give a positive response agreeing that their understand computer science fundamentals.

Findings (consider as Actual Results) (2011-2012) - Achievement Target (may consider as Expected Outcome): Met
About 77% of students agree or strongly agree that the CS program was satisfactory and prepared them for their career.

SLO 2: CS graduates have the analytical, conceptual and problem-solving skills necessary for success after graduation
  CS graduates have the analytical, conceptual and problem-solving skills necessary for computer professionals in business, industry, government and education.

Relevant Associations:
  General Education/Core Curriculum Associations
  1 Critical Thinking 2 Information Literacy 6 Scientific Reasoning

Related Measure (may consider as Assessment Strategy)

M 2: Major Field Test [MFT]
  Major Field Test [MFT]
  Source of Evidence: Standardized test of subject matter knowledge

Achievement Target (may consider as Expected Outcome):
A majority of CS majors will demonstrate skill in problem solving by scoring above the 30th percentile on the Major Field Test.

Findings (consider as Actual Results) (2011-2012) - Achievement Target (may consider as Expected Outcome): Not Reported This Cycle
MFT not given in 2011-2012

M 4: COOP Employer Survey
  COOP Employer Survey
  Source of Evidence: Employer survey, incl. perceptions of the program

Achievement Target (may consider as Expected Outcome): 75% of CS majors will demonstrate skill in problem solving by scoring good or better on the associated questions on the COOP employer survey. 75% of CS majors will be able to effectively integrate theory and practical knowledge on an application project as shown on the related questions on the COOP employer survey.

Findings (consider as Actual Results) (2011-2012) - Achievement Target (may consider as Expected Outcome): Met
All responses to questions 5 and 6 related to problem solving were good or excellent.
M 5: Evaluation of student performance in required-related Math/Science courses
   Evaluation of student performance in required-related Math/Science courses
   Source of Evidence: Academic direct measure of learning - other

Achievement Target (may consider as Expected Outcome):
75% of CS majors will demonstrate skill in problem solving by scoring a C average (2.0) or better in required related Math and Science courses.

M 6: Faculty established project in CSCI 420
   Faculty established project in CSCI 420
   Source of Evidence: Project, either individual or group

Achievement Target (may consider as Expected Outcome):
75% of CS majors will demonstrate skill in problem solving and integrating theory and practical knowledge on an application project by successfully building a project with their team in CSCI 420.

Findings (consider as Actual Results) (2011-2012) - Achievement Target (may consider as Expected Outcome): Met
All five teams successfully applied their theoretical and practical knowledge to build a usable product.

M 7: Employer survey
   Employer Survey
   Source of Evidence: Employer survey, incl. perceptions of the program

Achievement Target (may consider as Expected Outcome):
75% of employers will respond positively to questions about graduates analytical, conceptual, and problem solving skills.

Findings (consider as Actual Results) (2011-2012) - Achievement Target (may consider as Expected Outcome): Not Reported This Cycle
Not reported this cycle.

M 12: Faculty-established alumni survey
   Faculty-established alumni survey
   Source of Evidence: Alumni survey or tracking of alumni achievements

Achievement Target (may consider as Expected Outcome):
75% of graduates will answer positively on questions about their analytical, conceptual, and problem solving skills.

Findings (consider as Actual Results) (2011-2012) - Achievement Target (may consider as Expected Outcome): Not Reported This Cycle
Not reported this cycle.

SLO 3: CS graduates are able to think critically, communicate technical information effectively and learn independently
   CS graduates are able to think critically, communicate technical information effectively and learn independently.
Relevant Associations:

General Education/Core Curriculum Associations
  1 Critical Thinking 3 Oral Communication 4 Written Communication

Related Measure (may consider as Assessment Strategy)

M 1: Faculty established skills tests and projects.
  Faculty established skills tests and projects.
  Source of Evidence: Academic direct measure of learning -other

Achievement Target (may consider as Expected Outcome):
  a. 75% of CS majors demonstrate effective critical thinking by selecting appropriate data structures, developing algorithms and analyzing their characteristics, and selecting design options on associated questions on the Skills Test.

Findings (consider as Actual Results) (2011-2012) -Achievement Target (may consider as Expected Outcome): Partially Met
  85% of students selected the appropriate data structure for a simple problem. Only 29% selected the correct structure for a more complex problem; we conclude this problem had confusing wording and will reword it for next time.

M 4: COOP Employer Survey
  COOP Employer Survey
  Source of Evidence: Employer survey, incl. perceptions of the program

Achievement Target (may consider as Expected Outcome):
  75% of CS majors will demonstrate effective technical communication skills through positive feedback from employer interviews and from receiving good or better on associated questions on the COOP Employer Survey.

Findings (consider as Actual Results) (2011-2012) -Achievement Target (may consider as Expected Outcome): Met
  All but one of the responses to questions 5 and 6 related to communication skills were good or excellent. For writing skills, one response was fair, giving 75% success for that question. Oral communication skills were 100% at good or excellent.

M 9: Faculty-established written exercise in CSCI 330 and 420
  Faculty-established written exercise in CSCI 330 and 420.
  Source of Evidence: Written assignment(s), usually scored by a rubric

Achievement Target (may consider as Expected Outcome):
  80% of CS majors will demonstrate effective technical communication skills in a written exercise and a presentation in a computer science course by scoring 70% or better on the rubric in CSCI 330 and CSCI 420.

Findings (consider as Actual Results) (2011-2012) -Achievement Target (may consider as Expected Outcome): Met
  100% of students achieved 70% or better on the written paper in CSCI 330. 100% of teams achieved 70% or better on the documentation of their projects in CSCI 420. 100% of students
received 70% or better on the writing of their ethical scenario in CSCI 420.

**M 10: Faculty-established presentation in CSCI 330 and 420**
Faculty-established presentation in CSCI 330 and 420
Source of Evidence: Presentation, either individual or group

**Achievement Target (may consider as Expected Outcome):**
80% of CS majors will demonstrate effective technical communication skills in a written exercise and a presentation in a computer science course by scoring 70% or better on the presentation rubric in CSCI 330 and CSCI 420.

**Findings (consider as Actual Results) (2011-2012) -Achievement Target (may consider as Expected Outcome): Met**
100% of students achieved 70% or better on the oral presentation in CSCI 330. 93% of students achieved 70% or better on the first oral presentation, and 100% achieved that level on the second presentation in CSCI 420.

**M 11: Senior Survey**
Graduating Senior Survey
Source of Evidence: Student satisfaction survey at end of the program

**Achievement Target (may consider as Expected Outcome):**
75% of CS majors will indicate confidence in their technical writing and presentation skills by giving positive answers to those questions on the senior survey.

**Findings (consider as Actual Results) (2011-2012) -Achievement Target (may consider as Expected Outcome): Partially Met**
59% of students expressed confidence in their writing skills, and 84% of students expressed confidence in their presentation skills.

**M 12: Faculty-established alumni survey**
Faculty-established alumni survey
Source of Evidence: Alumni survey or tracking of alumni achievements

**Achievement Target (may consider as Expected Outcome):**
75% of graduates will answer positively on questions about their ability to think critically, communicate technical information and learn independently.

**Findings (consider as Actual Results) (2011-2012) -Achievement Target (may consider as Expected Outcome): Not Reported This Cycle**
Not reported this cycle.

**SLO 4: CS graduates demonstrate knowledge of ethical, social and legal issues related to the computing field.**

CS graduates demonstrate knowledge of ethical, social and legal issues related to the computing field.

**Relevant Associations:**
Connection to Univ/Dept Mission MU . . . develops the capacity for leadership and decision-making in order to make the fullest possible contribution to society.
Strategic Plan Associations

Millersville University of Pennsylvania

1.5 Strategic Direction: Developing Life and Leadership Skills that Promote the Greater Public Good

Related Measure (may consider as Assessment Strategy)

M 13: Faculty established special assignments and established tests in CSCI 161, 162, 362, 380, and 420.

Faculty established special assignments and established tests in CSCI 161, 162, 362, 380, and 420.
Source of Evidence: Academic direct measure of learning -other

Achievement Target (may consider as Expected Outcome):
75% of CS majors will demonstrate knowledge of professional codes of ethics, security, and intellectual property issues by adequate answers to test questions and assignments in CSCI 161, 162, 362, 380, and 420.

Findings (consider as Actual Results) (2011-2012) -Achievement Target (may consider as Expected Outcome): Met
81%, 82%, and 88% of students gave adequate responses to three Intellectual Property questions on CSCI 162 exams. 100% of students answered adequately on a CSCI 362 exam question on the ACM Code of Ethics and Professional Conduct. 74% of students scored adequately on security questions on a CSCI 380 exam. 100% of students gave an adequate evaluation of an ethical situation applying the ACM/IEEE Software Engineering Code of Ethics and Professional Conduct in a written paper for CSCI 420.

Details of Action Plan (consider as application of results --closing the loop) for This Cycle (by Established cycle, then alpha)

Develop specific targets for each question in the survey
We will develop a specific target for each question in the survey.
Established in Cycle: 2010 -2011
Implementation Status: Finished
Priority: Medium
Projected Completion Date: 09/2012

Revise Skills Test
We will revise the skills test to target adequate performance using multiple choice questions. Retarget to CSCI 362 and CSCI 420.
Established in Cycle: 2010 -2011
Implementation Status: Planned
Priority: High
Projected Completion Date: 10/2012
Responsible Person/Group: Assessment Committee
Budget Amount Requested: $0.00 (no request)

We will add questions to the survey about our Outcomes and Objectives.
We will add questions to our survey asking our alumni about additions, modifications,
or deletions from our Outcomes and Objectives.
Established in Cycle: 2010-2011
Implementation Status: Planned
Priority: Medium
Projected Completion Date: 09/2012

We will redesign our skills test to give easier to analyze results
This problem seemed to be too complex. Students missed it for many different reasons. We will modify the skills test to provide more clarity about what they can and cannot do.
Established in Cycle: 2010-2011
Implementation Status: Finished
Priority: Medium
Projected Completion Date: 09/2012

Distribute skills test questions across the respective core courses
Distribute skills test questions across the respective core courses.
Established in Cycle: 2011-2012
Implementation Status: Planned
Priority: Medium

Move some questions from Senior Survey to Alumni and/or Employer Surveys.
Move questions related to writing and presentations from the Senior Survey to other surveys to get more direct evidence.
Established in Cycle: 2011-2012
Implementation Status: Planned
Priority: Medium

Review Course Outcomes and their mapping to Program Outcomes
Establish mapping that covers all ABET required program outcomes. Review course outcomes for appropriateness.
Established in Cycle: 2011-2012
Implementation Status: Planned
Priority: Medium
Responsible Person/Group: Assessment Committee.
DEPARTMENT OF EARTH SCIENCES

Mission Statement
The mission of the Department of Earth Sciences is to provide a rich, authentic, and challenging learning experience in the areas of geology, meteorology, ocean science and coastal studies, Earth science education, and general earth sciences, for every student, both major and non-major. We strive to achieve this through enlightened and comprehensive curricula, modern facilities and equipment, meaningful opportunities for students to engage in extra-curricular activities, and by attentiveness to inter- and cross-disciplinary trends and opportunities for student engagement.

Vision Statement
Provide a learning experience in the Earth Sciences that is second to none

A. Curricular Changes
The Department of Earth Sciences continues to take a progressive stance on curricular revisions to accommodate emerging trends, workforce demands, and student access. The table below provides a list of courses and programmatic changes that were proposed and approved during the 2011-2012 academic year, including the re-certifications of D/P/W designations. Key elements of these changes are:

1. New Master’s of Science Program in Integrated Scientific Applications (MSISA) was approved by the PASSHE Board of Governors on 29 June 2011. Five students have been accepted to the program for Fall 2012. The MSISA will include four specializations that are designed to coalesce with existing and emerging trends in the field. Each of these specializations will train students in integrative disciplines that should remain at the forefront throughout their careers. These specializations include:
   - Environmental Systems Management (ESM)
   - Geoinformatics (GI)
   - Weather Intelligence and Risk Management (WIRM)
   - Climate Science Application (CSA)

2. New graduate and undergraduate courses for emerging trends and workforce development:
   b. ESCI 369: Physical Oceanography, a complete revision and merging of two courses in a single required course for the Ocean Sciences and Coastal Studies majors.
   c. ESCI 468: Ocean Data Analysis & Presentation was approved as a new major field requirement in OSCS.

3. Distance Learning Courses to provide greater student access and flexibility:
   a. ESCI 390, Topics in Earth and Space Sciences was approved as a fully online course, and later changed to ESCI 202, Earth in Space. This change is designed primarily to accommodate MDLV education majors and BSE in Earth Sciences majors.
b. ESCI 347, Satellite Meteorology, an elective for meteorology, was converted from face-to-face to a fully online DL format.

4. Curriculum Changes were approved that better align programs with emerging trends and workforce needs:
   a. ESCI 421 was approved as a capstone advanced geology course in 2010 and was approved in 2011-12 as a major field requirement.
   b. Major curriculum changes in Ocean Sciences and Coastal Studies include changes to the curriculum in OSCS and the option in Physical Oceanography.
   c. ESCI 386 was approved for a title, catalog description, and prerequisite change to expand the option for students to choose between two programming languages: IDL and Python. The new title for ESCI 386 is “Scientific Programming, analysis, and Visualization with "variable language".
   d. ESCI 464 and 468 were approved as major field requirements in OSCS
   e. Prerequisite changes were approved for ESCI 386, ESCI 347, and ESCI 380 to allow for easier course sequencing and student access, and to better reflect course content.

5. Re-Certifications were approved for all the D, P, W courses offered by the department. The department does not offer, as yet, a D course, but offers two P courses and seven W courses.

<table>
<thead>
<tr>
<th>Category</th>
<th>Schl</th>
<th>Acad Dept</th>
<th>Curric Action Type</th>
<th>Curriculum Action Description</th>
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<td>new grad course</td>
<td>SCMA</td>
<td>CDRE</td>
<td>Major Change</td>
<td>EMGT 633 – GIS Applications for Emergency Management, 3 crs, elective course for the M.S. Emergency Management and M.S. Integrated Scientific Applications programs, DISTANCE LEARNING FORMAT</td>
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<td>SCMA</td>
<td>ESCI</td>
<td>Major Change</td>
<td>ESCI 380 - Remote Sensing and Image Interpretation (pre-req change)</td>
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</table>
curricular change | SCMA | ESCI | Minor Change | TITLE change, catalog description and pre-req changes: ESCI 386 - IDL Programming for Adv ESCI TO Scientific Programming, analysis, and Visualization with "variable language"

curricular change | SCMA | ESCI | Minor Change | ESCI 349 - Chemistry of Atmosphere (P)

curricular change | SCMA | ESCI | Minor Change | ESCI 350 - History of Meteorology (P)

curricular change | SCMA | ESCI | Minor Change | ESCI 328 - Petrography/Igneous and Metamorphic Petrology (W)

curricular change | SCMA | ESCI | Minor Change | ESCI 329 - Aqueous Geochemistry (W)

curricular change | SCMA | ESCI | Minor Change | ESCI 385 - Global Change (W)

curricular change | SCMA | ESCI | Minor Change | ESCI 421 - Advanced Geology (W)

curricular change | SCMA | ESCI | Minor Change | ESCI 428 - Planetary Geology (W)

curricular change | SCMA | ESCI | Minor Change | ESCI 443 - Climate Dynamics (W)

curricular change | SCMA | ESCI | Minor Change | ESCI 447 - Meteorological Instruments, Measurement and observing systems (W)

Faculty achievements – grants, research, sabbatical

Sabbatical:
One ESCI faculty member (J. Price) applied for sabbatical in 2011-12. It was awarded for fall 2012.

Refereed Publications:


Non-refereed Publications:


Publications in Review:


Ambler, J. and A. Kumar, “Seasonal nearshore distributions of tunicates and the cladoceran Penilia avirostris in the southern Mid-Atlantic Bight”, in review Continental Shelf Research.


Publications in Preparation:
One ESCI faculty member (A. DeCaria) is preparing a textbook A First Course in Atmospheric Numerical Modeling, which will be published by Sundog Publishing.


Manuscripts/Proposals Reviewed: (number are in the parentheses)
Earth Sciences faculty reviewed 42 manuscripts/proposals in 2011-12.

Clark, R. D., National Science Foundation Proposal Reviews (4), Bull. Amer. Meteor. Soc. (2), Jour. Of Appl. Meteoroloy and Climatology (1)

Earman, S., Applied Water Science manuscript review (1), Kuwait Foundation for the Advancement of Sciences proposal review (1)

Price, J.R., Chemical Geology (1); Applied Geochemistry (1); Geology (1); Geochimica et Cosmochimica Acta (1); National Science Foundation peer review (1); Swiss National Science Foundation peer review (1).

Kumar, A., Journal of Marine Systems (1); Remote sensing of Environment (1)


Vaillancourt, R. D. Deep-Sea Research (2); Geophy. Res. Letters (1)

Yalda, S., National Science Foundation Invited Panel Reviews (22).

Presentations at Professional Meetings:


Kumar, A., 2011, “Coastal Observation and Sea Level Rise off Wallops Island, VA”, invited talk presented at Coastal Carolina University, Cornwall, SC, August 26, 2011.


Kumar, A. N. Murray and M. Miziorko, 2011, “Projecting the impacts of Climate Change and Identifying Adaption Options at the Chincoteague National Wildlife Refuge”, presented at the Coastal Zone Research Symposium, Marine Science Consortium, Wallops Island, VA, May 13-14, 2011. 6


Grants and Contracts Received:

External Grants and Contracts:

Faculty member: Richard Clark (and 8 Millersville undergraduate students)
Title of grant: DISCOVER-AQ: Millersville University Collaboration
Grant amount: $ 110,928
Awarding agency: NASA

Faculty member: Richard Clark (and 7 Millersville undergraduate students)
Title of grant: Measurements of the Atmospheric Boundary Layer in Support of Galactica.
Grant amount: $ 79,323
Awarding agency: CACI/DARPA

Faculty member: Richard Clark (with S. Yalda and G. Zoppetti and four Millersville undergraduate students)
Title of grant: GEOPOD: Geosciences Probe of Discovery
Grant amount: $ 349,995 (total); $109,995 year 3 (2011-2012)
Awarding agency: NSF - IIS

Faculty member: Ajoy Kumar
Title of grant: Projecting the Impacts of Climate Change and Identifying adaption options at Chincoteague National Wildlife Refuge
Grant amount: $ 344,300.15
Awarding agency: NASA

Faculty member: Ajoy Kumar and others
Title of grant: Marine Science Consortium Programs for Secondary Science Students
Grant amount: $ 139,000.00
Awarding agency: PASSHE

Faculty member: Jason Price
Title of grant: The influence of radiation damage on the solubility of epidote-group minerals during chemical weathering
Grant amount: $115,000; 2nd year of a three-year grant  
Awarding agency: National Science Foundation (Geobiology and Low-Temperature Geochemistry Program)

Faculty member: Todd D. Sikora  
Title of grant: Applications of Synthetic Aperture Radar to Meteorology and Oceanography Command Operations  
Grant amount: $136,500, FY 07-12, 5th year of 5-year grant  
Awarding agency: Office of Naval Research

Faculty member: Todd D. Sikora  
Title of contract: Spaceborne Ocean Intelligence Network  
Contract amount: $48,000 FY 07/08-12/13, 6th year of a 6-year contract  
Awarding agency: Bedford Institute of Oceanography

Faculty member: Sepideh Yalda (with R. Clark and G. Zoppetti and four Millersville undergraduate students)  
Title of grant: GEOPOD: Geosciences Probe of Discovery  
Grant amount: $349,995 (total); $109,995 year 3 (2011-2012)  
Awarding agency: NSF - IIS

Staff Member: Eric Hörst and four Millersville University undergraduate students  
Title of Grant: PennDOT Winter Weather Forecasts for District 8.  
Grant amount: $41,328 (2011-12)  
Awarding agency: Pennsylvania Dept. of transportation.

Grants Received (Internal)

ESCI faculty has received $4,135.00 in MU Faculty Grants in 2011-2012. In addition:

- Ajoy Kumar received ¼ load reduction in support of his released-time grant proposal: The Impacts of Climate Change and Identifying Adaption Options at Chincoteague National Wildlife Refuge.

- Jason Price received ¼ load reduction in support of his released-time grant proposal: The Influence of Radiation Damage on the Solubility of Epidote-Group Minerals during Chemical Weathering.

- Sam Earman received Robertson New Faculty Release time grant.

Grants and Contracts pending:

Clark, R. D. (and 12 Millersville undergraduate students), DISCOVER-AQ/California: Millersville University Collaboration, NASA, $158,000, Jan-Feb 2013.

Clark, R. D. and T. D. Sikora (and 20 Millersville undergraduate students): Plains Elevated Convection at Night (PECAN): Characterizing the transition to and maintenance of the Stable Boundary layer.

Clark, R. D. and T. D. Sikora (and 12 Millersville students): Ontario Winter Lake-effect Systems (OWLeS), with PIs from three other universities.

Professional Development:

- Clark, R. D., 92nd Annual Meeting of the American Meteorological Society, New Orleans, LA, 20 – 27 January 2012. (With 27 Millersville students.)
- Clark, R. D., Space Weather Workshop, Boulder, CO, 23-27 April 2012. (With 11 Millersville students.)
- DeCaria, A.H., Basic Hazus-Multihazard software training course, September 19-22, 2011, Emergency Management Institute, Emmitsburg, MD
- Marquez, L.L. Chautauqua Short Course Energy and Sustainability: What Every Faculty member Should Know.
- Price J.R., Goldschmidt 2012 Conference, Montreal, Canada, 24-29 June 2012.
- Sikora, T. D., Spaceborne Ocean Intelligence Network (SOIN) Workshop, Halifax, NS, Canada, 8-9 May 2012
- Sikora, T. D., SOIN Workshop, Victoria, BC, Canada, 14-15 December 2011
- Sikora, T. D., SOIN Workshop, Halifax, NS, Canada, 21-22 June 2011
- Vaillancourt: Ocean Sciences Meeting, Salt Lake City, UT, Feb 20-24, 2012
- Vaillancourt: Ocean Carbon & Biogeochemistry Workshop, Woods Hole, MA, July 2012
Faculty Travel:

In 2011-12, Department support for travel for professional development and presentations at conference totaled $21,058, of which $6,760 (32%) came from the Department operating budget with the remainder coming from grants.

Major Service to Scientific and Science Education Communities:

Faculty member: Richard D. Clark
Organization: University Corporation for Atmospheric Research (UCAR)
Status: Member (elected to second term), Board of Trustees (BOT)

Faculty member: Richard D. Clark
Organization: UCAR - BOT
Status: Member (appointed), UCAR- BOT Executive Committee

Faculty member: Richard D. Clark
Organization: UCAR- BOT
Status: Member (appointed), UCAR-BOT Budget and Programs Committee

Faculty member: Richard D. Clark
Organization: UCAR-BOT
Status: Member (appointed) UCAR-BOT Nominating Committee

Faculty member: Richard D. Clark
Organization: UCAR-President’s Advisory Committee on University Relations
Status: Member and Liaison to the UCAR Board of Trustees

Faculty member: Richard D. Clark
Organization: National Science Foundation
Status: Observer/Provocateur (invited), EarthCube Charrette (June 2012)

Faculty member: Richard D. Clark
Organization: UCAR October Meetings (Oct 2011)
Status: Presenter and Panelist on Building Community Alliances

Faculty member: Richard D. Clark
Organization: National Center for Atmospheric Research High Altitude Observatory
Status: Member (invited) HAO Advisory Board

Faculty member: Richard D. Clark
Organization: American Meteorological Society
Status: Member (appointed) Committee on Environmental Responsibility

Faculty member: Richard D. Clark
Organization: American Meteorological Society
Status: Member (appointed) Scientific and Technical Advisory Committee (STAC) on Space Weather
Faculty member: **Richard D. Clark**  
Organization: American Meteorological Society  
Status: Presenter and Panelist at the AMS Washington Forum on Educational Transformation in universities.

Faculty member: **Sam Earman**  
Organization: International Association of Hydrogeologists  
Status: Associate Editor for peer-reviewed publication *Hydrogeology Journal*

Faculty member: **Todd D. Sikora**  
Organization: Pennsylvania Department of Education State-wide Physical Sciences Program Articulation Agreement Committee  
Status: Member (2011)

Faculty member: **Todd D. Sikora**  
Organization: University Corporation for Atmospheric Research Membership Committee  
Status: Member (2011-2013)

Faculty member: **Todd D. Sikora**  
Organization: University Corporation for Atmospheric Research, COMET Dynamic Meteorology Learning Objects Working Group  
Status: Member (2011-present)

Faculty member: **Todd D. Sikora**  
Organization: American Meteorological Society  
Status: Associate Editor for peer-reviewed publication *Journal of Applied Meteorology and Climatology* (2012-present)

Faculty member: **Jason R. Price**  
Organization: The Geochemical Society  
Status: Session co-convener at the Goldschmidt 2012 Conference, Montreal, Canada, 24-29 June 2012.

Faculty member: **Jason R. Price**  
Organization: *Journal Aquatic Geochemistry*  
Status: Co-guest editor on a special volume honoring Dr. Owen Bricker.

Faculty member: **Alex DeCaria**  
Organization: National Assessment of Education Progress  
Status: Member of Science Standing Committee, attended 3-day meeting in Washington, DC, January 18-20, 2012.

Faculty member: **Alex DeCaria**  
Organization: Trends in International Mathematics and Sciences Study  
Status: Consultant, attended 2-day meeting in Washington, DC, December 15-16, 2011.

Faculty member: **Ajoy Kumar**  
Organization: Consortium for Ocean Leadership  
Faculty member: Robert Vaillancourt  
Organization: Virginia Institute of Marine Science  
Status: Chair of sub-committee on primary productivity along the east coast continental shelf as part of the U.S. East Coast Carbon Cycle Synthesis Workshop.

Faculty member: Sepideh Yalda  
Organization: University Corporation for Atmospheric Research  
Status: Appointed Member for UCAR Academic Affiliate Representative (2009-Present).

Faculty member: Sepideh Yalda  
Organization: University Corporation for Atmospheric Research  
Status: Appointed Member for UCAR Academic Affiliate Representative (2009-Present).

Faculty member: Sepideh Yalda  
Organization: University Corporation for Atmospheric Research  
Status: Appointed Member for UCAR Advisory Committee on Governance (2012).

Faculty member: Sepideh Yalda  
Organization: University Corporation for Atmospheric Research  
Status: Appointed Member for UCAR Advisory Committee on Governance (2012).

External Graduate Committees:

Faculty member: Todd D. Sikora  
Brian Kerschner: M.S. Thesis Committee, University of Delaware Department of Geography, Newark, DL (2011).

Faculty member: Sepideh Yalda  
Geoffrey Baum: M.S. Thesis Committee, University of Delaware, Department of Geography, Research advisor: David Legates.

Student Research Activities:

<table>
<thead>
<tr>
<th>STUDENT FIRST NAME</th>
<th>STUDENT LAST NAME</th>
<th>ADVISOR FIRST NAME</th>
<th>ADVISOR LAST NAME</th>
<th>RESEARCH TITLE</th>
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<td>Eric</td>
<td>Wendoloski</td>
<td>Todd</td>
<td>Sikora</td>
<td>SAR remote sensing of open cell convection</td>
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<td>Robert</td>
<td>Marter</td>
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<td>Katherine Peresolek</td>
<td>Jason Price</td>
<td>Heavy minerals of the Yangtze and Nile River deltas</td>
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<td>Katherine Peresolek</td>
<td>Jason Price</td>
<td>Heavy minerals of the Loch Vale Watershed</td>
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<td>Christopher Funk</td>
<td>Sam Earman</td>
<td>Flood inundation mapping near Middletown, PA</td>
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<td>Rebecca Pauly</td>
<td>Richard Clark</td>
<td>NASA DISCOVER-AQ (Air chemistry study in Maryland)</td>
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<td>Inter-annual Variation of Temperature and Salinity off Delmarva</td>
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<td>Michael Charnick</td>
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<td>Discover-AQ Analysis</td>
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<td>Classification of Wetlands off Delmarva</td>
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<td>Ajoy Kumar</td>
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<td>Carrie Bamper</td>
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<td>Lynn Marquez</td>
<td>Gasland Screening – Faculty Panel</td>
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<td>Lynn Marquez</td>
<td>How Ore Deposits Came to Be? Heritage and Horizons Adult Learning Opportunities</td>
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<td>World Water Wars Screening – Faculty Panel</td>
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<td>Lynn Marquez</td>
<td>Talk presented at IUP Geoscience Department - Nature of Science Instruction in the General Education Course: Can we convey the nature of science without doing science?</td>
<td>3/30/2012</td>
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<td>Jason Price</td>
<td>Developing a new hands-on exhibit at the Lancaster Science Factory entitled, “Radiation in the Environment.”</td>
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<tr>
<td>Jason Price</td>
<td>Assisted an Eshelmann Elementary School 4th grader with a science fair project addressing mineral hardness.</td>
<td>April 2012</td>
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<tr>
<td>Sam Earman</td>
<td>Presentation of talk “Tectonic Influences on groundwater quality” to Harrisburg Area Geological Society, Harrisburg, PA, February 2012.</td>
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<tr>
<td>Alex DeCaria</td>
<td>Presentation to three 2nd grade classes at Union Canal Elementary School, Lebanon, PA</td>
<td>March 20, 2012</td>
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<tr>
<td>Ajoy Kumar</td>
<td>Guest Speaker at a S.T.E.M. Career Night hosted at Manheim Township High School.</td>
<td>2/25,2011</td>
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<td>Sepideh Yalda</td>
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<td>Richard Clark</td>
<td>Great Eastern Balloon Association</td>
<td>3/10/2012</td>
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**Present faculty/staff community service**

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<tr>
<td>Lynn Marquez</td>
<td>Gasland Screening – Faculty Panel</td>
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<td>Lynn Marquez</td>
<td>How Ore Deposits Came to Be? Heritage and Horizons Adult Learning Opportunities</td>
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<td>Lynn Marquez</td>
<td>Sierra Club – Chickies Rock</td>
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<td>Lynn Marquez</td>
<td>Science Olympiad – Rocks and Minerals Supervisor</td>
<td>3/24/2012</td>
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<td>Lynn Marquez</td>
<td>World Water Wars Screening – Faculty Panel</td>
<td>3/29/2012</td>
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<td>3/10/2012</td>
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<tr>
<td>Richard Clark</td>
<td>Lancaster Public Health Partnership</td>
<td>Ongoing</td>
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</table>
C. Student Achievements –

National Awards:
- McArthur Jones (Meteorology, Graduate 2009) received the Ford Foundation Fellowship 2012 Predoctoral Competition Award. The Award is administered by The National Research Council. Jones is currently enrolled in the Ph.D. program in aerospace engineering at the University of Colorado – Boulder.
- Felicia Guarriello (Meteorology, sophomore) is a recipient of the 2012-13 NOAA Ernest Hollings Undergraduate Scholarship.
- Lindsay Blank and Eric Wendoloski (meteorology, juniors) were recipients of the 2011-12 NOAA Hollings Scholarship.
- Joseph Moore (Meteorology, senior) was the recipient of the NOAA Student Career Experiences Program Award.

Earth Sciences Students’ Awards:
- Robert E. Marter: Dr. William B. McIlwaine Scholarship
- Sean P. Little: William Malcolm Jordan Earth Sciences Scholarship
- Nicholas J. Strickland: Clark-Yalda Cirrus Scholarship in Atmospheric Sciences
- Rebecca M. Pauly: Paul H. Nichols Scholarship
- Matthew R. Yoder: Rettew Associates Scholarship in Geology
- Jordan M. McCormick: Clark-Yalda Scholarship in Atmospheric Science
- Earth Sciences Award for Academic Excellence
  - Adam R. Gonsiewski – Liberal Arts
  - Jeremy E. Latimer - Secondary Education

Other University Awards Received by ESCI students:
- Eric B. Wendoloski: Students of Academic Distinction
- Everette T. R. Eschbach: Michael K. and Neysa M. Callahan Scholarship
- Sean P. Little: Honors College Scholarship
- Erik R. Cunningham: Search for Excellence Scholarship
- James P. Fowler: Blanche Henninger Snyder ’18 Scholarship

2011-2012 Graduates

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<tr>
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<td>Socoloski, Gwen Rose</td>
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### Spring 2012 Graduates

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<td>Laboy, Kristina Lynn</td>
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<td>Latimer, Jeremy Eugene</td>
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<td>Meute, Caleb Noble</td>
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<td>Stelma, Sigourney Anne</td>
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<td>Stump, Kevin Clayton</td>
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<td>Thomas, Colin Scott</td>
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<td>Trego, Christine</td>
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<td>Zimmerman, James Bradley</td>
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**Student Job Placement and Advanced Studies (partial list):**
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<th>Name</th>
<th>Employment/Graduate Studies</th>
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<tr>
<td>Charnick, Michael</td>
<td>Employment: AccuWeather, State College, PA</td>
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<td>Dolinar, Erica</td>
<td>Graduate Studies, University of North Dakota</td>
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<tr>
<td>Eckhoff, Matthew</td>
<td>Graduate Studies, University of North Dakota</td>
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<tr>
<td>Floggou, Phillip</td>
<td>Employment: Field Service Engineer, Vaisala, Inc.</td>
</tr>
<tr>
<td>Hoffman, Donald</td>
<td>Employment: AccuWeather, State College, PA</td>
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<td>Gehman, Bradley</td>
<td>Employment: ARM Group, Inc., Columbia, MD</td>
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<tr>
<td>Jacobs, Adam</td>
<td>Graduate Studies, George Mason University</td>
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<tr>
<td>King, Matthew A.</td>
<td>Graduate Studies, University of Arizona, Tucson, AZ</td>
</tr>
<tr>
<td>Laboy, Kristina</td>
<td>Graduate Studies, Millersville University (MSEM)</td>
</tr>
<tr>
<td>Moore, Joseph</td>
<td>Employment: National Weather Service, Goodland, KS</td>
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<tr>
<td>Seshan, Ajay</td>
<td>Graduate Studies, Millersville University (MSISA)</td>
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<tr>
<td>Socoloski, Gwen</td>
<td>Employment: New Jersey Analytical Laboratories</td>
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<tr>
<td>Stelma, Sigourney</td>
<td>Graduate Studies, University of Delaware</td>
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<td>Stoflet, Robert</td>
<td>Internship in New Mexico</td>
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</tbody>
</table>

**Student Internships:**

Student name: Gail Altieri  
Internship title/site: Meteorology Intern, WGAL-TV, Lancaster, PA  
Student name: Christopher Bernard  
Internship title/site: Meteorology Intern, WGAL-TV, Lancaster, PA  
Student name: Lindsay Blank  
Internship title/site: Thunderstorm Predictability over the Southwestern US, NOAA Office of Oceanic and Atmospheric Research, National Severe Storms Lab, Norman, OK, **Hollings Scholarship**  
Student name: Felicia Guarriello  
Internship title/site: CREST REU Intern, Hampton University.  
Student name: Adam Jacobs  
Internship title/site: NASA GSFC, sponsored by Catholic University of America (Summer 2012)  
Student name: Robert Marter  
Internship title/site: Decadal variability of the Southern Hemisphere, Lamont Doherty Summer Intern Program at the Lamont-Doherty Earth Observatory of Columbia University
Student name: Jesse Manzi
  Internship title/site: Outfall Reconnaissance Inventory (ORI) team leader, MU partnership with Lancaster Inter-Municipal Committee, Lancaster, PA

Student name: Gina Mazzuca
  Internship title/site: University of Alabama-Huntsville REU, Gamma-Ray Astronomy (GLAST spaceborne telescope), UAH/ Marshall Space Flight Center, Huntsville, AL.

Student name: Gregg McCambley
  Internship title/site: CEP-AFRL Intern, Universities Space Research Association, New Mexico

Student name: Joseph Moore
  Internship title/site: National Weather Service’s Meteorological Development Lab in Silver Spring, MD (January 2011 – January 2012)

Student name: Peter Mullinax
  Internship title/site: Forecasting Intern, Accu-Weather Inc., State College, PA.

Student name: Rebecca Pauly
  Internship title/site: Boundary Layer Remote Sensing, NASA REU, Hampton University, Hampton, VA.

Student name: Nikole Rutters
  Internship title/site: GSA Geocorps Internship – Mt. Rainier National Park – Summer 2011

Student name: Sigourney Stelma
  Internship title/site: Weather Intern, WNEP-TV, Moosic, PA

Student name: Robert Stoflet
  Internship title/site: CEP-AFRL Intern, Universities Space Research Association, New Mexico

Student name: Taylor Suskie
  Internship title/site: PA Geological Survey – Summer 2012

Student name: Jessica Taheri
  Internship title/site: Forecasting Intern, Accu-Weather Inc., State College, PA.

Student name: Eric Wendoloski
  Internship title/site: Lightning Observations and Tropical Cyclone Formation: Cooperative Institute for Research in the Atmosphere (CIRA), Hollings Scholarship

**Student Research Grants Received:**

**National Student Grants:**
The National Oceanic and Atmospheric Administration (NOAA) Ernest F. Hollings (Hollings) scholarship provides $8,000 for academic support (tuition scholarship) and $650/week for a 10-week summer internship. 2011-12 Hollings recipients are:
  - Lindsay Blank
  - Eric Wendoloski

**Student Research Grants:**

**David Burcicki**
  Project: “Inter-Annual Variations in Temperature, Salinity and Oxygen off Wallops Island, VA” to be presented at the Ocean Sciences Meeting 2012. $400

**Russell Cool**
  Project: “Classification of Wetlands off Delmarva” $300

**Sigourney Stelma**
Project: “Study of Stratification Effects on Mid-shelf Waters off Delmarva” to be presented at the Ocean Sciences Meeting 2012. $300

Noonan Grants Received:
- 27 Students: MU AMS to AMS Conference, New Orleans, LA, $310.00
- Nate Murray to Ocean Sciences Meeting 2012, $198.00
- David Burcicki and Sigourney Stelma to Ocean Sciences Meeting 2012, $375.00

Student attendance at regional or national conferences:
  - Number of Students: 27
    - Conference: 92nd Annual AMS Meeting, New Orleans, LA
  - Number of Students: 11
    - Conference: Space Weather Workshop, Boulder, CO
  - Number of Students: 4
    - Conference: Ocean Sciences Meeting 2012, Salt Lake City, UT

Student Travel:
The Department of Earth Sciences supports student travel to conferences and other extracurricular educational experiences. In 2011-2012, $12,577 was directed toward student travel. Of this amount, $2,425 (19%) came directly from the Department operating budget, with the remainder coming from research grants, the MU Chapter of the American Meteorological Society, and Noonan Grants.

D. Progress Toward Department Goals/5 Year Review

In 2007, the members of the Department of Earth Sciences approved the following strategic goals/actions for the period 2007-2012.

1. Improve facilities and expand the equipment inventory and educational resources for education and research: A broad spectrum of initiatives is planned including a new facility for Earth Sciences; a 10th faculty position; pursuit of grants for equipment; expanding endowments for equipment.

2. Preparation and Preparedness for Lifelong Careers in Earth Sciences: Emphasis on Curriculum, Creative thinking, Problem-solving/computational skills across the disciplines, with a special emphasis on strengthening the BSE program.

3. Ocean Sciences and Coastal Studies Program Enhancement – Recruitment/Retention in Program, Connections with regional and national research and educational initiatives, in addition to the Marine Science Consortium at Wallop’s Island, VA

We are in our last year of the current 5-year strategic plan and are in the process of developing the draft of our 2013-2018 plan, with external reviewers due to visit in fall 2012. As we reflect on the current 5-year plan we can take pride in achieving certain goals even as we remain challenged to bring others to fruition. Below is a list summarizing our progress on the three 2007-2012 goals.

1. The department has expanded its equipment inventory for education and research by a considerable amount through funding from the base equipment budget, Student Technology Fee, one-time allocations, and through grants and contracts. The distribution of equipment/instrument allocations has been equitable across the three primary
disciplines: geology, meteorology, and ocean sciences and coastal studies. In 2012, we completed a search that resulting in the hiring of a 10th faculty position in Earth Sciences, Dr. Duane Hagelgans (JD, CSP). His responsibilities will be to the M.S. in Emergency Management and this addition will affect the broadening of initiatives offered by the Department. The challenge remains to secure funding to begin the construction of a new building for the Earth Sciences and its associated programs. While we are encouraged that plans for the new facility is formally contained in the University Master Plan – stage 2, and that stage 1 is nearly complete, we remained challenged by the simultaneous diversification and broadening of our disciplines and addition of programs such as the M.S. in Emergency Management (MSEM) and the recently approved M.S. in Integrated Scientific Applications (MSISA). This will undoubtedly remain one of the most important goals threading through our next strategic plan.

2. We have made significant changes to the curriculum in each of the three major disciplines, including developing new courses, retiring courses that have been subsumed by others, and changing prerequisites to strengthen student preparedness. We have introduced skills courses for student development of specific proficiencies (e.g. GIS, Python, Perl and shell scripting). We have targeted the BSE program for strengthening and recruitment and were very successful early in our 5-year plan. But more recently, mainly due to the political environment nationally and statewide, we are experiencing a decline in enrollments as prospective students are choosing careers other than teaching. We believe this to be largely beyond our control at this point, but plan to revisit the BSE program in the next 5-year plan.

3. The Ocean Science and Coastal Studies program has undergone a major overhaul with several new courses and courses that better align with trends, workforce needs, and faculty expertise. The relationship between Millersville University and the Marine Science Consortium is robust, with MU as a senior full partner in the MSC. Our connection with regional and national initiatives has strengthened through our membership in the Mid-Atlantic Regional Coastal Ocean Observing System (MARCOOS) and our potential participation in the NSF-funded Ocean Observatories Initiative, which is managed and coordinated through the Consortium for Ocean Leadership. These partnerships promote, enhance, and sustain long-term relationships with the ocean sciences communities.

Even though Millersville University has the only ocean sciences/oceanography program in the PA State System of Higher Education, due to our landlocked location, recruitment remains a challenge. One major success is the number of meteorology majors who choose ocean sciences as their second major, which tends to significantly enhance and broaden their skill sets. Several of these students choose an oceanography career path upon graduation and some have been accepted to top-ranked graduate programs in ocean sciences or oceanography. Still, recruitment remains an ongoing challenge and we cannot rely solely on the double major pathway to build enrollment in OSCS. Our implicit goal was to raise enrollments in OSCS to ~ 20, and we seem to be approaching, albeit slowly, that number. (See Figure below.) An
interesting observation is the increase in the enrollment in the OSCS with an option in Physical Oceanography, a manifestation of well-prepared meteorology majors opting for the more rigorous and graduate-school-aligned option.

Marketing efforts tout our relationship with MSC and NASA Wallop's Island, and courses brings students to the MSC for a “hands-on, feet-wet” authentic experience. This year (summer 2012), Dr. Ajoy Kumar offered a section of ESCI 104, *The World Ocean*, at the MSC, in part, as a means of recruitment. We do not yet know the outcome of this effort on recruitment.

![Graph](image)

**New Faculty, New Facilities/Equipment**

**New Faculty:**
The Department of Earth Sciences completed a successful search resulting in the hiring of Dr. Duane Hagelgans, JD, CSP. Dr. Hagelgans' responsibilities will be to the MSEM program. Dr. Hagelgans has over thirty years' experience as a professional in the emergency services field. He earned his JD from Widener University and his Bachelor of Science in Occupational Safety and Hygiene Management from Millersville University. He is a Certified Safety Professional and has taught in both the Occupational Safety undergrad program and the Masters of Emergency Management Program. Additionally, he is on the leadership team for the South Central Task Force (SCTF) regional emergency management organization. He is an active volunteer with Lancaster County Emergency Management, Millersville Borough and Manor Township as their Emergency Management Coordinator. Dr. Hagelgans has taught courses at the local, state and federal levels on various aspects of emergency management, with a specialty in Public Information. He was a career fire chief for the City of Lancaster for almost thirty years and most recently was the Fire Commissioner for Blue Rock Regional Fire District. In his role with the SCTF, he has responded to numerous high impact events such as the 2006 Nickel Mines Amish schoolhouse shooting. His main areas of research interest are

Equipment:
- $17,942.65 From Provost for purchase of research trailer
- $1,003.60 – Summer Revenue Sharing; replacement chairs for Weather Center
- Carpet was replaced in Weather Center at no cost to department
- $2,522.00 – Two Ricoh printers purchased with balance of Summer Revenue Sharing funds with balance from department budget ($353)
- $5,028.50 – Purchase of a PCCS System with Sea Cable ($3,000 Provost, $2,028 Dr. Vaillancourt’s start-up fund)
- $21,000.00 – Purchase of a WeatherPAK 2000 from Base Equipment Budget
- $23,725 – from NASA DISCOVER-AQ grant for the purchase of tethered balloon (aerostat) and meteorological sensors.
- $4,775 – from DARPA Project Galactica for the purchase of 15,000 Watt generator and meteorological sensors

F. Outcomes Assessment

Detailed Assessment Report
2011-2012 Department of Earth Sciences
(Includes those Action Plans with Budget Amounts marked One-Time, Recurring, No Request.)

Mission / Purpose

The mission of the Department of Earth Sciences is to provide a rich, authentic, and challenging learning experience in the areas of geology, meteorology, ocean science and coastal studies, Earth science education, and general earth sciences, for every student, both major and non-major. We strive to achieve this through enlightened and comprehensive curricula, modern facilities and equipment, meaningful opportunities for students to engage in extra-curricular activities, and by attentiveness to inter- and cross-disciplinary trends and opportunities for student engagement. Click here to view the Millersville University Mission Statement

Goals without Objective(s) or Learning Outcome(s) (objectives:part of planning; outcomes:learning-oriented) Relationships Specified

G 2:To provide enlightened and comprehensive curricula for every student, both major and non-major
  To provide enlightened and comprehensive curricula for every student, both major and non-major

G 3:To provide a learning experience in the Earth Sciences that is second to none
  To provide a learning experience in the Earth Sciences that is second to none
Goals and Student Learning Outcomes/Objectives, with Any Associations and Related Measure (may consider as Assessment Strategy), Achievement Target (may consider as Expected Outcome), Findings (consider as Actual Results), and Action Plan (consider as application of results -- closing the loop)

G 1: To provide a rich, authentic, and challenging learning experience in the areas of Earth Science

To provide a rich, authentic, and challenging learning experience in the areas of geology, meteorology, ocean science and coastal studies, Earth science education, and general earth sciences

SLO 1: All Earth Sciences graduates exhibit knowledge and understanding of the Earth system specific to their discipline

All Earth Sciences graduates exhibit knowledge and understanding of the Earth system specific to their discipline

Relevant Associations:
Connection to Univ/Dept Mission: MU resolutely embraces the conviction that all of its degree programs must maintain a strong liberal arts component while preparing students to engage in productive and contributive lives as professionals.

General Education/Core Curriculum Associations:
6 Scientific Reasoning

Strategic Plan Associations:

Millersville University of Pennsylvania
1.3 Strategic Direction: Fostering an Appreciation of the Liberal Arts
1.5 Strategic Direction: Developing Life and Leadership Skills that Promote the Greater Public Good

Related Measure (may consider as Assessment Strategy):

M 1: Senior exit survey question on problem solving
The number of ESCI graduating seniors who indicate that they are able to apply basic scientific principles of Earth science to solve problems (Q1 on exit survey).

Source of Evidence: Exit interviews with grads/program completers

Achievement Target (may consider as Expected Outcome):
None Listed

M 2: Senior exit survey question on the scientific method
The number of ESCI graduating seniors who believe that their experiences in the laboratory and/or in the field through the Earth sciences has given them a broader understanding of the scientific method - how to take steps to solve, or address, a scientific problem (Q2 on exit survey)

Source of Evidence: Exit interviews with grads/program completers
Achievement Target (may consider as Expected Outcome):
None Listed

M 3: Senior exit survey question on critical thinking and argument development
The number of graduating seniors that believe they can think critically and develop sound scientifically based arguments on topics related to their Earth Sciences discipline (Q6 on exit survey).

Source of Evidence: Exit interviews with grads/program completers

Achievement Target (may consider as Expected Outcome):
None listed

M 4: Students’ grades in required major courses
Number of students earning a C- or greater in their sophomore, junior, and senior level required courses in their major.

Source of Evidence: Academic indirect indicator of learning - other

Achievement Target (may consider as Expected Outcome):
None Listed

M 5: Grade-level assessment exams
The number of students achieving satisfactory scores on grade-level assessment exams.

Source of Evidence: Standardized test of subject matter knowledge

M 6: Graduate school acceptance/job placement rate within 6 months after graduation
The number of seniors finding employment within six months of graduation, or acceptance to graduate school, taken from alumni information updates

Source of Evidence: Job placement data, esp. for career/tech areas

Achievement Target (may consider as Expected Outcome):
None Listed

M 7: Online alumni survey
Online alumni survey

Source of Evidence: Alumni survey or tracking of alumni achievements

Achievement Target (may consider as Expected Outcome):
On the online alumni survey, two-thirds of alumni report that their current employment utilizes at least some of their degree or certification from the Department of Earth Sciences; At least half report significant or extensive use of their degree or certification from the Department of Earth Sciences. On the online alumni survey, at least half of the alumni rate the appropriate balance between the number of General Education courses and the number of courses in the major. On the online alumni survey, at least two-thirds of alumni probably or certainly would pursue a degree or certification from the Department of Earth Sciences if they had to do it over again.
Student Learning Outcomes/Objectives, without Goals, along with Any Associations and Related Measure (may consider as Assessment Strategy), Achievement Target (may consider as Expected Outcome), Findings (consider as Actual Results), and Action Plan (consider as application of results -- closing the loop)

SLO 2: All Earth Sciences graduates demonstrate quantitative skills appropriate to their Earth Sciences discipline.

All Earth Sciences graduates demonstrate quantitative skills appropriate to their Earth Sciences discipline.

Relevant Associations:
Connection to Univ/Dept mission: MU is steadfastly committed to the proposition that a thorough, broad-based foundation in the arts and sciences is a necessary condition for the development of the whole person.

General Education/Core Curriculum Associations:
6 Scientific Reasoning

Strategic Plan Associations:
Millersville University of Pennsylvania
1.5 Strategic Direction: Developing Life and Leadership Skills that Promote the Greater Public Good

Related Measure (may consider as Assessment Strategy):

M 1: Senior exit survey question on problem solving
The number of ESCI graduating seniors who indicate that they are able to apply basic scientific principles of Earth science to solve problems (Q1 on exit survey).

Source of Evidence: Exit interviews with grads/program completers

Achievement Target (may consider as Expected Outcome):
None Listed

M 2: Senior exit survey question on the scientific method
The number of ESCI graduating seniors who believe that their experiences in the laboratory and/or in the field through the Earth sciences has given them a broader understanding of the scientific method - how to take steps to solve, or address, a scientific problem (Q2 on exit survey)

Source of Evidence: Exit interviews with grads/program completers

Achievement Target (may consider as Expected Outcome):
None Listed

M 3: Senior exit survey question on critical thinking and argument development
The number of graduating seniors that believe they can think critically and develop sound scientifically based arguments on topics related to their Earth Sciences discipline (Q6 on
exit survey).

Source of Evidence: Exit interviews with grads/program completers

**Achievement Target (may consider as Expected Outcome):**
None Listed

**M 5: Grade-level assessment exams**
The number of students achieving satisfactory scores on grade-level assessment exams.

Source of Evidence: Standardized test of subject matter knowledge

**M 6: Graduate school acceptance/job placement rate within 6 months after graduation**
The number of seniors finding employment within six months of graduation, or acceptance to graduate school, taken from alumni information updates.

Source of Evidence: Job placement data, esp. for career/tech areas

**Achievement Target (may consider as Expected Outcome):**
None Listed

**M 7: Online alumni survey**
Online alumni survey

Source of Evidence: Alumni survey or tracking of alumni achievements

**Achievement Target (may consider as Expected Outcome):**
On the online alumni survey, two-thirds of alumni report that their current employment utilizes at least some of their degree or certification from the Department of Earth Sciences; At least half report significant or extensive use of their degree or certification from the Department of Earth Sciences. On the online alumni survey, at least half of the alumni rate the appropriate balance between the number of General Education courses and the number of courses in the major. On the online alumni survey, at least two-thirds of alumni probably or certainly would pursue a degree or certification from the Department of Earth Sciences if they had to do it over again.

**M 8: Number of internships/undergraduate research awards for ESCI majors**
The number of internships and undergraduate research awarded is evidence of quantitative skills. Data from the annual report on internships.

Source of Evidence: Academic indirect indicator of learning - other

**Achievement Target (may consider as Expected Outcome):**
None Listed

**SLO 3: All Earth Sciences graduates demonstrate proficiency in the application of tools and skills appropriate to their discipline.**
All Earth Sciences graduates demonstrate proficiency in the application of tools and skills appropriate to their discipline.
Relevant Associations:
Connection to Univ/Dept mission: MU is steadfastly committed to the proposition that a thorough, broad-based foundation in the arts and sciences is a necessary condition for the development of the whole person.

General Education/Core Curriculum Associations:
6 Scientific Reasoning

Strategic Plan Associations:
Millersville University of Pennsylvania
1.5 Strategic Direction: Developing Life and Leadership Skills that Promote the Greater Public Good

Related Measure (may consider as Assessment Strategy):

M 7: Online alumni survey
Online alumni survey

Source of Evidence: Alumni survey or tracking of alumni achievements

Achievement Target (may consider as Expected Outcome):
On the online alumni survey, two-thirds of alumni report that their current employment utilizes at least some of their degree or certification from the Department of Earth Sciences; At least half report significant or extensive use of their degree or certification from the Department of Earth Sciences. On the online alumni survey, at least half of the alumni rate the appropriate balance between the number of General Education courses and the number of courses in the major. On the online alumni survey, at least two-thirds of alumni probably or certainly would pursue a degree or certification from the Department of Earth Sciences if they had to do it over again.

M 9: Senior exit survey question on skills in Earth Science writing
The number of students that agree or strongly agree in Q4 in the senior exit survey Q4: I'm confident that I'm able to write intelligibly incorporating methodology appropriate to the discipline of the Earth sciences

Source of Evidence: Exit interviews with grads/program completers

Achievement Target (may consider as Expected Outcome):
None Listed

M 10: Senior exit survey question on computer skills
The number of students that agree or strongly agree in Q5 in the senior exit survey Q5: I'm able to use computer technology to effectively complete tasks appropriate to the discipline of the Earth sciences

Source of Evidence: Exit interviews with grads/program completers

Achievement Target (may consider as Expected Outcome):
None Listed
SLO 4: All Earth Sciences graduates demonstrate effective oral and written communication skills appropriate to their discipline.

All Earth Sciences graduates demonstrate effective oral and written communication skills appropriate to their discipline.

Relevant Associations:
Connection to Univ/Dept mission: MU seeks to prepare students for the workforce while promoting intellectual development through an exemplary liberal arts-based education.

General Education/Core Curriculum Associations:
3 Oral Communication
4 Written Communication
6 Scientific Reasoning

Strategic Plan Associations:
Millersville University of Pennsylvania
1.5 Strategic Direction: Developing Life and Leadership Skills that Promote the Greater Public Good

Related Measure (may consider as Assessment Strategy):

M 7: Online alumni survey
Online alumni survey
Source of Evidence: Alumni survey or tracking of alumni achievements

Achievement Target (may consider as Expected Outcome):
On the online alumni survey, two-thirds of alumni report that their current employment utilizes at least some of their degree or certification from the Department of Earth Sciences; At least half report significant or extensive use of their degree or certification from the Department of Earth Sciences. On the online alumni survey, at least half of the alumni rate the appropriate balance between the number of General Education courses and the number of courses in the major. On the online alumni survey, at least two-thirds of alumni probably or certainly would pursue a degree or certification from the Department of Earth Sciences if they had to do it over again.

M 9: Senior exit survey question on skills in Earth Science writing
The number of students that agree or strongly agree in Q4 in the senior exit survey Q4: I'm confident that I'm able to write intelligibly incorporating methodology appropriate to the discipline of the Earth sciences
Source of Evidence: Exit interviews with grads/program completers

Achievement Target (may consider as Expected Outcome):
None Listed

M 11: Senior exit survey question on technical communication skills
The number of graduating seniors that agree or strongly agree to Q7 in the senior exit survey: Q7: I'm confident that I can communicate (both orally and in written form) technical
information related to the Earth sciences

Source of Evidence: Exit interviews with grads/program completers

**Achievement Target (may consider as Expected Outcome):**
None Listed

**M 12: Number of students performing above average in “W” courses in the major**
The number of students performing above average in "W" courses in the major.

Source of Evidence: Academic indirect indicator of learning - other

**Achievement Target (may consider as Expected Outcome):**
None Listed

**M 13: Presentations of research in classroom and at conferences**
The number of students giving presentations in the classroom and at conferences where they present their research results.

Source of Evidence: Presentation, either individual or group

**Achievement Target (may consider as Expected Outcome):**
None listed

**SLO 5: Earth sciences graduates demonstrate a broad understanding of the scientific method to address and solve problems.**
Earth sciences graduates demonstrate a broad understanding of the scientific method to address and solve problems.
Annual Summary – MU Weather Information Center  
(July 1, 2011 – June 30, 2012)  

Eric J. Hörst, Director

The Weather Information Center (WIC) continues to flourish in its mission of enhancing the education of meteorology majors and serving the University and local community. Recognized as a top source of quality weather information and expert analysis, the WIC has this year issued to the public hundreds of local forecasts, weather discussions, and videos, as well as dozens of targeted threat assessments to MU Administrators, local and state agencies, and a variety of local media outlets. Given this broad purview, the WIC remains one of the most visible and active Millersville University organizations in terms of media exposure, civic engagement, and service to the citizens of Pennsylvania.

Streaming video (SV) continues as the marquee product of the WIC. Now in its ninth year, the SV initiative provides cutting-edge, engaging content to a local—and global—audience interested in high quality forecasts and expert analysis. More than a dozen meteorology students participate in the production and broadcast of daily short-term forecast videos. As Director of the WIC, Mr. Hörst broadcasts Extended Outlooks up to three days per week and he co-hosts, along with Dr. Sepi Yalda, a monthly Climate Review segment.

The stalwart activity of the WIC is the student-operated Campus Weather Service (CWS). Each week, more than fifty meteorology majors participate in creating over twenty-five local forecasts and weather videos. These forecasts are disseminated via the telephonic MU Weatherline, the Snapper newspaper, MU-TV channel 99, and the University’s Internet site. An exciting outgrowth of CWS is the new student-produced Weather Watch show, broadcast twice monthly on MU-TV and also available on-demand via Internet download.

The Director of the Weather Information Center takes responsibility for fulfilling the many requests for value-added forecasts and “threat assessments” from a variety of MU administrators and coaches, in addition to a growing number of government agencies, local corporations and other community groups. In particular, WIC forecasts and storm analysis frequently appear in Lancaster’s Intelligencer Journal and Sunday News, as well as in the York Dispatch and Harrisburg Patriot News, providing exceptional exposure and further building our program’s superlative reputation.

Also notable is a three-year extension ($115,000 grant) of the “Winter Weather Forecasting” MOU with the Pennsylvania Department of Transportation (PaDOT). For a fourth winter season, the WIC provided targeted forecasts for the eight counties in PaDOT District 8-0. Managed by Director Hörst, this forecasting service employed six meteorology students and brought outside funding and additional recognition to Millersville Meteorology.

Finally, the WIC remains active in outreach and service to the local community. Over the past year, Mr. Hörst has given more than two dozen weather talks, Weather Center tours, and “shadowing” days. Additionally, the WIC held three Open House events, including the Annual Science Lectureship, the Women in Science & Math Conference, and the Earth Sciences Department’s 12th Annual Weather Center Open House for the general public.
Charles K Scharnberger

Volunteer in Service
Activities: June 1, 2011 to May 31, 2012

Throughout this period I monitored the operation of the Department’s seismic station (MVL), fixing problems as they arose, or seeing to it that they were fixed by others. I also responded to numerous inquiries from the press and public regarding seismic activity.

Specific activities:

2011
6/20: Participated by phone in a graduate seminar for the Emergency Management program.

9/10: Participated with Sam Earman in an educational program for the public about the Marcellus Shale at the North Museum of Natural History and Science.

9/12: Lectured in the ESCI 110 class about earthquakes and the operation of the seismic station.

9/21 and 9/22: Presented programs on earthquakes and rocks for students at Oakland Terrace Elementary School, Montgomery County, Maryland.

9/27, 10/4, 10/11, 10/25: Lectured on “Some Big Questions about the Earth” (topics in solid-earth geophysics) for Heritage and Horizons Adult Learning Opportunities at Church of the Apostles UCC.

10/7 and 10/14: Lectured on earthquakes and volcanic eruptions at the Pathways Institute for Adult Learning at Landis Homes.

10/16 – 10/18: Attended annual meeting of the Eastern Section of the Seismological Society of America (of which I am a member of the Executive Committee), and gave a talk on “The Lancaster Seismic Zone and the Method of Multiple Working Hypotheses.” Little Rock, Arkansas.

10/26: Conducted a tour of the seismograph station for a group of middle school students.

2012
2/16: With Jeri Jones of Jones Geological Services, presented a program about the Dillsburg earthquake swarm and the 8/18/11 central Virginia earthquake at the Dillsburg Public Library.

3/18: Attended the annual meeting of the Northeastern Section of the Geological Society of America and gave a talk on “Controversies over Overthrusts in the Pennsylvania Piedmont” in the History and Philosophy of Geology session. Hartford, Connecticut.

3/18: Served as lead judge in the Senior Earth and Space Science division of the North Museum Science and Engineering Fair.

4/11 and 4/12: Lectured to introductory geology classes at York College about earthquakes in stable continental regions.
5/1: Co-presented, with a bridge engineer from PennDOT, a webinar on seismic events and bridge safety in Pennsylvania, for the Pennsylvania Department of Transportation.

5/14: Lectured on earthquakes in the eastern U.S. for 6th grade classes at Wilson West and Wilson Southern Middle Schools.

5/15: Gave same presentation for 5th graders at Central Manor Elementary School.
DEPARTMENT OF MATHEMATICS

A. Curricular Changes

This year, we proposed and received approval for a First Year Inquiry course for incoming freshmen Mathematics Majors. Two sections of the course are planned to be taught during fall 2012 semester; one section for students in MATH 160 (Precalculus) and one section for students in MATH 161 (Calculus I). The course will be co-taught by five faculty members (Drs. J. White, D. Blum, R. Buchanan, Z. Han and J. Fenwick).

Proposed changes to the Masters in Mathematics Education program were successfully guided through curricular process and approved. The changes require a capstone experience and a field-based experience. The changes were made to meet NCATE and PDE accreditation requirements and to satisfy PASSHE program requirements. The changes are effective beginning Fall 2012.

A new option for some students who place into MATH 101 was implemented. If at least one of the student’s scores on the math placement is close to the next level and the student had previously taken courses which covered material in Precalculus or higher, they were offered the option to review material in MATH 101 on their own and complete approximately sixty software based assignments. Upon successful completion of the assignments, they were permitted take another assessment and if successful, placed into the next course (Math 151 or MATH 160).

To add accountability to students to complete assigned homework problems, the department adopted textbooks with software based homework systems for MATH 090, MATH 101 and MATH 151 in 2010. During spring semester, the department approved a change to use Enhanced Web Assign, an online homework system, for MATH 090, MATH 101, MATH 110, MATH 151, and MATH 160. Using one system for all these courses only requires a student to learn a single homework system and eases the transition while taking a sequence of these MATH courses. As with the previous system, there is immediate feedback and the opportunity for input as students are working on homework problems.

During this year, some sections of MATH 130 and MATH 235 also required students to use an online homework system, MyStatLab. Again, this was included to add accountability to students to complete homework assignments. Preliminary analysis of the data for sections of both of these courses indicated similar or slightly higher exam scores for the sections using the homework system. However, the withdrawal rate from the courses appears to have been reduced significantly for those sections requiring the use of MyStatLab.

B. Faculty Achievements - Grants, Research, Sabbatical

The Mathematics Department’s most notable success this year was receiving the $1.2 million NSF Noyce Scholarship grant. A similar grant proposal had been submitted the previous year but was not funded. The grant was resubmitted and Millersville received funding to provide scholarships up to the cost of attendance for students who commit to teach mathematics in high-need school districts after they graduate. Dr. Janet White is the Principal Investigator for the grant.
Mathematics Department faculty had a productive year of scholarly activity. Our faculty published eight papers in scholarly journals, have another five papers in press, four more have been submitted and additional papers are in preparation for publication. In addition, mathematics faculty also reviewed eleven papers for professional journals and mathematical reviews. MU mathematics faculty presented sixteen papers at professional meetings, in addition to giving a number of presentations to university groups, many through our continuing sponsorship of the Joint MU/F&M Mathematics Colloquium series. Faculty also published one book and have two others in preparation.

Mathematics faculty won numerous travel grants from the MU Faculty Grants Committee and used the funds to travel to regional, national and international conferences. Mathematics faculty traveled to forty-one professional conferences, seminars and workshops.

Mathematics faculty continued their long support of the local high school mathematics community by hosting the annual MU High School Mathematics Contest. This year’s contest attracted 99 students from 25 schools throughout the region. Our faculty also facilitated the annual IU-13 AP Calculus and AP Statistics simulations, where students from IU-13 schools were invited to take a practice AP exam, which was then graded by their teachers and MU mathematics faculty, under the supervision of MU mathematics faculty who have graded the AP exam. Again, this year the AP Calculus simulation included a BC simulation in addition to the AB simulation. The AP Calculus AB simulation attracted 372 students and 21 teachers, while the BC simulation attracted 140 students and 16 teachers. The AP Statistics simulation attracted 510 students and 22 teachers. In addition, MU mathematics faculty facilitated corresponding AP Calculus (AB and BC combined) and AP Statistics simulations for students attending Harford County, Maryland schools. This AP Calculus combined simulation attracted 275 students and 24 teachers, while the AP Statistics simulation attracted approximately 170 students and 20 teachers.

Individual faculty achievements are listed below.

**Dr. Dorothee Blum** served as a judge for the annual History of Mathematics Student Paper Contest sponsored by the HOMSIG of the Mathematical Association of America, for the seventh year in a row. She is directing two students, Patrick Owens and Chelsea Leber, doing their honors theses and is the advisor for one graduate student, Joseph Miller, working on his Master’s thesis in graph theory. She also reviewed three chapters for a new edition of an applied calculus book.

**Dr. J. Robert Buchanan**: served as an associate editor for the *Journal of Applied Mathematics*. The third edition of his textbook, *An Undergraduate Introduction to Financial Mathematics*, was published by World Scientific Publishing. Another book on partial differential equations, co-authored together with Dr. Zhoude Shao is in preparation. He also served as a judge for Moody’s Mega Math Challenge.

**Dr. Antonia Cardwell** presented a paper entitled, “Use of a Connections Journal in an Undergraduate Real Analysis Course” at the Joint Mathematics Meetings and has a paper, entitled “A constructive Proof of the Bishop-Phelps Theorem for the space c0”, in preparation.

**Dr. Ximena Catepillan** was awarded a sabbatical for the Spring 2012 semester. During her sabbatical, she continued collaborative research with Dr. Waclaw Szymanski, a colleague from
West Chester University. She wrote two chapters of a book whose drafts she has been using in MATH 102 and the FYI (First Year Inquiry) course: “Culture, Science, and Mathematics in the Pre-Columbian Americas,” and in EDW 757, “Mathematics Around the World.” This year she presented three papers at conferences. She presented “Women in Mathematics & Science Conference at Millersville University” at the Joint Mathematics Meetings and “Culture, Science, and Mathematics in the Pre-Columbian Americas” at MathFest. She also presented “An Ethnomathematics Course for Non-Mathematics Majors” and “Women in Mathematics and Science course at Millersville University” at the AMATYC Conference and these papers were published in the conference proceedings. She is also co-supervising a biology student whose research investigation is entitled “Ethnobotany of the Potato in the Andean Highlands: a journey into the center of origin, diversity, and conservation of the world’s third-most important crop species.” Additionally, Dr. Catepillan refereed one paper for the Journal of Mathematics and Culture and one paper for Revista Latinoamericana de Etnomatemáticas. Dr. Catepillan also serves as a Member-at-Large of the Executive Committee of the Eastern Pennsylvania and Delaware Section of the Mathematical Association of America.

Dr. James Fenwick’s paper, co-authored with two Millersville students and physicians from the Family Eye Group of Lancaster, entitled “A clinical look at the AAPOS pediatric vision screening referral criteria to predict amblyopia”, is in-press in the Journal of the American Association for Pediatric Ophthalmology and Strabismus. He also was the advisor for Matthew Keefe’s honors thesis in statistics entitled “Multidimensional Scaling: Mathematics Course Comparison and Zooplankton Abundance.”

Dr. Zhigang Han co-directed (with Dr. Ron Umble) a non-credit mathematics research project with four students, Benjamin Baer, David Brown, Faheem Gilani, and Joshua Pavoncello. Their research led to poster presentations in the Millersville University Annual Student Research Conference and in the School of Mathematics and Science Undergraduate Research Poster Display. The students also presented their results at the 2012 EPADEL Spring Meeting at Shippensburg University. Dr. Han also served as one of the faculty advisors for the Math Club.

Dr. Noel Heitmann is the honor thesis advisor for Neil Obetz. He has an undergraduate textbook, “Dynamic Mathematical Modeling” (co-authored with a colleague from the University of Pittsburgh) in preparation. He also served as a judge for Moody’s Mega Math Challenge national competition and has a paper in preparation.

Dr. Bruce Ikenaga was the advisor for David Paules’ honors thesis, entitled “Fibonacci Numbers”. He also has a paper, “Almost cyclic groups” in preparation for publication.

Dr. Erin Moss presented a seminar, “Strategies for Increasing Students’ Reasoning Capabilities and Mathematical Independence,” at the National Council of Teachers of Mathematics (NCTM) Annual Meeting and Exposition. She also presented to area teachers at the AP Calculus BC Simulation sponsored by IU 13.

Dr. Kevin Robinson presented a paper, “Teaching Statistics – A Joint Endeavor: Construct, Collect, Calculate, Communicate,” at the Spring 2012 EPADEL/PASSHEMA conference. He is serving as the president of the Harrisburg Chapter of the American Statistical Association and serves as an Associate Editor for the Journal of Statistics Education and for the Journal of Probability and Statistical Science. He also served as a proposal reviewer for courses to be offered at the annual Joint Statistics Meetings and served as a judge for Moody’s Mega Math Challenge national competition.
Dr. Delray Schultz serves as the Vice Chair for District 3 of the American Statistical Association’s Council of Chapters, as a question leader for the AP Statistics exam reading and was a triage and second round judge for Moody’s Mega Math Challenge national competition. He reviewed course proposals for courses to be offered at the annual Joint Statistics Meetings. He was a reviewer of chapters for a new edition of an applied calculus book. He also incorporated the use of MyStatLab, an online homework system, into his section of Math 130.

Dr. Elizabeth Sell had two papers published. One in Mathematische Nachrichten, entitled “On Splice Quotients of the Form \(z^n=f(x,y)\)” and one in the International Journal of Mathematics, entitled “Some Splice Quotient Double Points.” She also gave an invited talk at the American Mathematical Society Central Section Meeting in Kansas, entitled “Splice Quotients of the Form \(z^n=f(x,y)\).” She also reviewed an article for Zentralblatt Math.

Dr. Zhoude Shao has his paper, entitled “Existence and continuity of strong solutions of partly dissipative reaction-diffusion systems” published in Discrete and Continuous Dynamical Systems and has an additional paper in preparation: “Global Attractor and Determining Modes for Partly Dissipative Reaction Diffusion Equations”. Additionally, Dr. Shao is working on the manuscript for a new book on partial differential equations with Dr. J. Robert Buchanan. He also served as a judge for the Moody’s Mega Math Challenge national competition.

Dr. Lewis Shoemaker is serving as a consultant with Dr. Sam Earman on water monitoring of the North Fork of the Humboldt River in northern Nevada. He incorporated the use of MyStatLab, an online homework system, into his sections of Math 130 and Math 235 and is teaching Math 130 and Math 235 as a technology enhanced course this summer.

Dr. Cynthia Taylor presented four papers at conferences. She presented “Examining expert secondary mathematics teachers’ thinking about mathematics instruction” and “The development of beginning mathematics teacher pedagogical content knowledge” at the annual meeting of the American Educational Research Association and “Actions a mathematics teacher educator uses to develop prospective teachers’ pedagogical content knowledge” and “Supporting generative teacher learning by cultivating productive sociomathematical norms in mathematics teacher education” at the annual meeting of the Association of Mathematics Teacher Educators Annual Meeting (AMTE). She has three papers, two of them co-authored, submitted to journals and two more in preparation. She reviewed a manuscript for the journal Teaching Children Mathematics and served as a proposal reviewer for the conference proceedings of the North American Chapter of the International Group for the Psychology of Mathematics Education. She is also serving as a professional development facilitator for the ARRMS (Achieving Rigor and Relevance in Math and Science) 2012 Summer Mathematics Institute sponsored by IU13 and hosted partly at Millersville.

Dr. Ronald Umble submitted his textbook, Transformational Euclidean Geometry to a publisher. He also published “Edge Tessellations and Stamp Folding Puzzles”, with student M. Kirby as a co-author, to Mathematics Magazine, and has two additional papers accepted for publication. Additionally he has two other papers submitted and two others in preparation. He presented his paper “Non-operadic Operations on Loop Cohomology”, at two conferences, one at MIT and the other at the International Conference on Modern Algebra and its Applications, at U. Batumi, in the Republic of Georgia. He also was an invited speaker at the MAA Eastern PA and Delaware Section Meeting, where he gave a talk entitled “Mathematical Research Experiences for Undergraduates at Millersville University.” He also presented three seminars:
“A Topologically Induced (2,2) Cohomology Operation” at Penn State’s Topology/Geometry Seminar, “Non-operadic Operations on Loop Cohomology” at the local Tetrahedral Topology/Geometry Seminar and “Matradic Operations on Loop Cohomology” at the University of Pennsylvania Deformation Theory Seminar. He also co-directed (with Dr. Zhigang Han) a non-credit mathematical research project for four students, Benjamin Baer, David Brown, Faheem Gilani, and Joshua Pavoncello. Their research led to poster presentations in the Millersville University Annual Student Research Conference and in the School of Mathematics and Science Undergraduate Research Poster Display. The students also presented their results at the 2012 EPADEL Spring Meeting at Shippensburg University.

Dr. Janet White is the Principal Investigator on the $1.2 million Noyce grant funded by the National Science Foundation, one of the largest grants ever received by Millersville University. She is serving as President of the Pennsylvania Association of Mathematics Teacher Educators. She is also the Master’s thesis advisor for Joseph DiNapoli and Karen Zwanch and the honors thesis advisor for Katelyn Coleman and Stephanie Coleman. She was the coordinator and a scorer for the MATH Counts competition held at Millersville. She was a reader for the AP Statistics exam and coordinated the AP Calculus and AP Statistics simulations held for IU-13 in Lancaster, as well as the AP calculus simulations for Harford County, Maryland teachers and students. She also served as an NCATE NCTM SPA evaluator for 4 national reports. She coordinated the development of the FYI course for mathematics majors and ushered it through the curriculum approval process and she proposed the changes to the Masters in Mathematics Education program and successfully guided them through curricular approval process.

Dr. Michael Wismer is part of the faculty planning team responsible for planning content and developing presentations for the ARRMS 2012 Summer Mathematics Institute sponsored by IU13 and partly offered at Millersville. He also serves as the MU Mathematics Education “Point of Contact” with the IU13.

Dr. Mingquan Zhan had his co-authored paper “Z_3-connectivity of 4-edge-connected 2-triangular graphs” published in the European Journal of Combinatorics and his paper “Spanning cycles in regular matroids without small cocircuits” has been accepted for publication in the same journal. He presented his paper “Z_3-connectivity in Abelian Cayley graphs” at the 4th International Symposium on graph theory and combinatorial algorithms and his paper “Pancyclicity in 4-connected claw-free Z_8-free graphs” at the 25th Cumberland Conference on Combinatorics, Graph Theory, & Computing. He also gave a colloquium entitled “Pancyclicity of Claw-free Graphs” at the Joint Colloquium of Millersville University and Franklin & Marshall College. Additionally, he refereed six papers for three different journals (Discrete Applied Mathematics, Applied Mathematics Letters and Graphs and Combinatorics).

C. Student Achievements - Awards, Graduate and Professional School, Job Placement

Edna Meyers scholarships were renewed for seven upperclassmen who remained in good standing. The Edna Butler Cohen Scholarship was renewed to a junior mathematics major. The Rutter/Seiverling Scholarship was not renewed to a junior mathematics major and will be awarded to an incoming freshman mathematics major. Three incoming freshmen have accepted our offer of an Edna Meyers scholarship.
Mathematics graduates who will be attending graduate school in the fall are Matthew Keefe, and James Patunous. Matthew will be studying statistics at Virginia Tech, and James will be studying mathematics at Lehigh University.

Four students wrote senior honors theses and received departmental honors. They are:

Katelyn Coleman  
Thesis title: Math Teaching Strategies for Algebra  
Thesis Advisor: Dr. Janet White

Stephanie Coleman  
Thesis title: The Dependency of Students and Teachers on Calculators in the Classroom  
Thesis Advisor: Dr. Janet White

Matthew Keefe  
Thesis Title: “Multidimensional Scaling: Mathematics Course Comparison and Zooplankton Abundance.”  
Thesis Advisor: Dr. James Fenwick

David Paules  
Thesis title: Fibonacci Numbers  
Thesis Advisor: Dr. Bruce Ikenaga

Summer Research Experience for Undergraduates/Internships:

Kimberly Greene – Summer 2012  
Kim has an internship in the Washington D.C. area with Summit.

Matthew Keefe -- Summer 2011  
Matthew was attended the Summer Research Experience for Undergraduates at The University of Pittsburgh in biostatistics.

Neil Obetz –Summer 2011  
Neil attended the Summer Research Experience for Undergraduates at the University of Maryland, Baltimore County. The title of the REU is “Interdisciplinary Program in High Performance Computing”.

Employment:

Dan Moyer – Associate actuary at Buck Consultants, March 2012

D. Progress Toward Department Goals / 5-Year Review  
2010-2011 Departmental Goals:
1) To strengthen our Mathematics Education program by...

   a. Working cooperatively with faculty in the School of Education to arrange supervision of mathematics student teachers by mathematics faculty members.  
      **Ongoing.** For the past seven years, mathematics faculty members have been supervising most all mathematics student teachers, through an agreement with the Department of Educational Foundations. In particular, during the past year, all but a few mathematics student teachers were supervised by a mathematics faculty member. Drs. Janet White, Michael Wismer, Erin Moss and Cynthia Taylor supervised the majority of our students. Dr. John Ward, Chair of the
Educational Foundations Department, as the only faculty member in EDFN with a background in mathematics, is the only person outside of MATH qualified to supervise mathematics student teachers, since the state regulations for the certification of secondary mathematics teachers specifically require that student teacher supervisors be "well-trained in mathematics". However, for purely historical reasons, the complement for student teacher supervision continues to reside in the Department of Educational Foundations. Consequently, although MATH faculty make the recommendations for the student teaching assignments and conduct the vast majority of the supervision, we must wait for the EDFN Department to make the assignments official and to then move the complement from EDFN to MATH. This is an awkward process, at best, and it would streamline our planning and simplify the entire process if the Department of Mathematics were to hold the complement for the supervision of our own student teachers.

b. Continuing to develop and offer pedagogy seminars in conjunction with mathematics content courses and developing a strategy for choosing which courses to pair with a PG seminar in any given semester. **Ongoing.** The department continues to offer PG seminars together with appropriate mathematics content courses whenever possible.

c. Support the development and implementation of the Middle Level Mathematics Specialist program.  **Ongoing.** The department worked closely with faculty in the School of Education to design the new curricula for the new middle level certification programs, including one for middle level mathematics specialists. Most notably, this involved the design of three new courses in mathematics. The first course for middle level education majors, MATH 205 (Geometry for the Middle Level Teacher), was taught during the Spring 2011 semester. MATH 204 (Algebraic Foundations for the Middle Level Teacher) was first taught during the Fall 2011 semester and MATH 230 (Data Analysis and Probability for the Middle Level Teacher) was first taught during the Spring 2012 semester. Very soon, the department will need to adjust course offerings to allow for sufficient sections of the new courses. The sections of each of these courses have closed and have been close to room capacity. There are 40 incoming freshmen middle level education majors listed on the most recent report from the Registrar’s Office that have paid deposits.

2) To strengthen our program in Applied Mathematics by...

a. Continuing the development of the Center for Applied Science and Mathematics. **Ongoing.**

b. Increasing the opportunities for COOPS, internships, and applied mathematics projects. **Ongoing.**

c. Offering new and innovative courses in applied mathematics. **Ongoing.** MATH 472: Financial Mathematics was taught during the Fall 2011 semester. MATH 471 (Mathematical Modeling) and MATH 370 (Operations Research) were taught during the Spring 2012 semester.

3) To strengthen our graduate program in mathematics education by...

a. Developing additional mathematics content courses of interest to returning teachers.
**Ongoing.** During the summer of 2011, in addition to the standard introductory graduate mathematics courses, we continued to offer more advanced graduate classes in several areas of mathematics and mathematics education. In addition, during the regular academic year we offered a graduate mathematics education course and a cross-listed graduate mathematics course in the evening at MU Lancaster, giving teachers an opportunity to take graduate coursework. The mathematics education course drew an enrollment of 10 graduate students, likely due to the topical nature of the course, as well as the convenient time and location of the course. The mathematics content course attracted 7 graduate students. In view of the success of these offerings for the past three years, we plan to continue to offer a number of advanced mathematics courses in the late afternoon/early evening timeframe in both Fall 2012 and Spring 2013 semesters, in the hope of better accommodating our graduate students without significantly inconveniencing our full-time undergraduate students.

b. Investigating the needs of mid-career mathematics teachers, who are required to take additional courses under Act 48. **Ongoing.** The department continues to regularly offer a range of summer EDW courses in mathematics and mathematics education, geared for the needs of current teachers.

4) To continue the annual cycle of outcomes assessment by...

a. Reviewing the results of the 2010-11 assessment. **Accomplished.** See the department’s Degree Specification Matrix (Appendix A).

b. Continuing an exit survey for graduating seniors to get their perspective on the education they received at Millersville.

c. Survey alumni who have graduated 4 – 6 years ago to assess their perspective on the education they received at Millersville.

d. Reviewing the coordination among different sections of each course in the calculus sequence, now that the department has discontinued common testing in the calculus sequence. **Ongoing.**

5) To support the Chapter 354 requirements for teacher preparation programs by...

a. Clearly communicating to mathematics majors the 3.00 QPA requirement for admission to APS (Advanced Professional Studies) and also communicate the newly implemented option of a 2.80 QPA combined with a higher score on the Praxis II exam and to find ways of helping students to achieve this level of performance without giving in to the pressure to inflate grades. **Ongoing.** Students in our BSEd program continue to struggle with the 3.00 QPA requirement. This persuades many students to switch out of the BSEd program (sometimes to our BA program and sometimes to a major other than mathematics). Some of these students then return to the university for post-Baccalaureate teacher certification. We have also seen a small number of BSEd majors who struggle, repeating course after course, only to get close to the end of their program, without the minimum QPA for admission to APS. An even
smaller number struggle, scrape through barely at the 3.00 level overall (but significantly lower in their major) and then experience difficulty during student teaching. In an effort to improve this situation, during the 2007-2008 academic year, the department began systematically reviewing majors who are struggling and repeating courses, with the intent of advising them to take corrective steps or even leave the major before they have gone too far along, when this is warranted. We routinely communicate our high expectations to our majors and are hoping that earlier intervention will lead to improved student performance. Finally, we continue to see some certification students, whose initial mathematical training was obtained elsewhere, who encounter difficulties with the mathematics content of their program. We expect that the 2.80 QPA with a higher Praxis II score option will increase the number of BSE Mathematics majors that meet requirements for APS.

b. Study the impact on the department of the PDE Chapter 354 requirement that all pre-service teachers must have "six semester hours of college-level mathematics" prior to their admission to APS. 

   Accomplished.

c. Prepare for the impact of the PDE Chapter 49-2 changes to teacher certification programs. 

   Ongoing. At this time, the number of students who are entering the various middle level certification programs is growing. Along with the elimination of a stand-alone Special Education program and re-configuration of the former elementary education program into an early childhood program, the need is great for flexibility of course offerings in courses appropriate for these various programs. Based on enrollments, we cancelled two sections of MATH 104 and opened an additional section of MATH 105. Based on these results, we have designated one section of MATH 104 as a contingency section for the Fall 2012 semester. The increased number of middle level majors may require additional sections of MATH 104 and/or one or more of the middle level math courses (204, 205 and 230) during the next year. We also have added MATH 204 to the summer session schedule in order to help reduce the demand without using additional complement.

6) To increase recruitment efforts by…

   a. Using our endowed (Meyers, Rutter and Cohen) scholarship funds and the new NSF-funded S-STEM scholarship awards and other scholarship funds to attract promising new students to the mathematics major, particularly targeting minority and financially disadvantaged students. 

      Accomplished and ongoing. Over the past nine years, the number of mathematics majors had increased (by roughly ten percent each year), and numbered in excess of 270. The number of incoming mathematics majors had leveled off to approximately 70 each year. Based on paid deposits, we expect the number of new majors to fall close to 50 in Fall 2012. We have used our endowed scholarships to help us recruit academically talented students. For the coming 2012-2013 academic year, we offered five students Edna Myers scholarships; however, only three were accepted. The amounts of the offers ranged from $1000 to $4000 per year. The ongoing challenge is to best use our available scholarship funds to help attract top students.
b. More aggressively recruiting majors from our region.  
**Ongoing.** While the Admissions Office changed the format of recruiting students last year for the University, we have continued our efforts at University Open House programs. Where appropriate, we have been involving additional faculty and students at each Open House event. The number of incoming mathematics majors with paid deposits (47) for fall 2012 is significantly below the number at the same point in time last year (71). As part of our ongoing efforts, we have revised and frequently update the department's web pages, providing more targeted information for prospective students. The current pages include more information for current and prospective graduate students and are updated regularly. In addition, information is more easily accessible from the department’s home page.

The number of prospective mathematics majors attending this year’s STEM Visitation Days was much lower than in previous years. Two possible reasons for this may be the less positive outlook for available secondary mathematics teaching positions or it may be due to the format of recruiting the Admissions Office is encouraging. We plan to offer visiting students and their families an opportunity to meet with the chair or assistant chair when they schedule an appointment with the Admissions Office. No one in the Admissions Office has sufficient understanding of mathematics or the Department of Mathematics to give a clear presentation of the quality of our programs. However, with the current format employed by the Admissions Office, most visiting potential students and their families do not receive a clear presentation of our programs, unless they visit during one of the STEM Visitation Days.

7) To improve the level of student achievement and retention of knowledge by...

a. Maintaining high academic standards. It may benefit us to begin a departmental discussion of common standards of performance in courses commonly taught by multiple faculty members.  
**Ongoing.** We continue to review the results of course imbedded assessments in critical courses, such as MATH 211 (Calculus II).

b. Encouraging (and supporting) students to do mathematics beyond their course work by attending conferences and participating in projects that extend or apply their knowledge.  
**Ongoing.** The department continues to encourage mathematics majors completing independent research projects to attend regional or national mathematics conferences to present the results of their projects. Dr. Cardwell escorted a number of her students in MATH 310 to the fall EPADEL conference this year, to give them an understanding of undergraduate research projects. At the spring EPADEL meeting, three students presented results from a non-credit independent study directed by Drs. Han and Umble.

c. Recognizing and rewarding outstanding student performance.  
**Ongoing.** As part of the department's Honors and Awards Convocation held annually in April, we publicly recognize the accomplishments of our students. In order to increase student participation, starting three years ago, we moved the convocation to a mid-week evening (from a Friday evening) and held the event...
earlier in the semester. The attendance at the convocation has maintained a higher level than attendance previous to these modifications. Another factor was continuing the practice of having an outside speaker who would address a more general audience.

d. Maintaining active two-way communications with students.
   **Ongoing.** Through the use of the majors’ e-mail list-serve and the department’s website, we keep our majors aware of important issues, particularly those involving graduate school opportunities and summer research experiences. We have also used this to remind majors of important policies, such as the requirements for admission to Advanced Professional Studies courses and key deadlines. We have tried to use such communication proactively, to inform all majors of an issue before we have a larger problem. The Math Club has remained active this year and has increased communication with our majors. Additionally the Math Club members are looking forward to meeting freshmen at orientation to encourage their participation.

e. Continuing to support Millersville Pre-Scholars program (formerly the Aim for Success program) and other remedial programs.
   **Ongoing.** For the sixth year in a row, with support from the dean and the provost, we provided supplemental instruction for students in two extended sections of MATH 090. We continue to work closely with the MU Scholars program staff to coordinate this. The results are encouraging, as out of the 65 MU Scholars program students who began the extended MATH 090 course in the fall of 2011, 58 (89%) had successfully completed MATH 090 with a grade of at least C-, by the end of the Spring 2012 semester. This is above recent years’ success rates of 81%, 64%, 70% and 52%. This result supports our belief that offering MATH 090 spread over two semesters, together with weekly supplemental instruction, is efficacious for this group of students. As in past years, we used scores from more extensive placement tests to target students for this placement. In addition, during the summer of 2011, for the fourth year in a row, mathematics faculty provided non-credit mathematics workshops to all MU Scholars program students who placed in MATH 090. The workshops were given at different levels, depending on placement results. The content of the workshops was drawn from the first several chapters of the MATH 090 textbook, with the aim of easing MU Scholars program students’ transition to college and improving the performance of these students during the academic year. One notable point was that the instructor for the two summer workshop sessions for those students expected to enroll in the extended sections of MATH 090 was the same as the instructor for the extended sections during the academic year. We believe that this consistency maintained the improved performance of this group that we observed, compared to earlier years. Additionally, we had the department’s GA involved in assisting the instructor for the extended MATH 090 sections answering questions in the classroom and holding office hours exclusively for these students.

10) To prepare for future directions for the department, by...

a. Planning for anticipated retirements.
**Ongoing.** During 2007-08, the department received authorization to increase our permanent complement from 20.5 FTE to 21.5 FTE. Dr. R. Kit Kittappa retired in June 2009. Our search during the Fall 2010 semester to fill his position was successful. Dr. Cynthia Taylor was hired and joined the department in August 2011. During the Spring 2011 semester, Dr. Travis Miller submitted his resignation to accept a position at his undergraduate institution. We were given permission to search and successfully completed the search to fill his position during the fall 2012 semester. Dr. H. Tyrone Washington will join us in August 2012.

In addition, with Dr. Robert T. Smith’s appointment as Dean of the School of Science and Mathematics, effective July 1, 2009, the department has one additional position to fill. This leaves us with one faculty position currently unfilled.

b. Opening a discussion of our department’s mission and how this impacts staffing.

**Ongoing.** As we have considered each open position, we have begun with a careful assessment of our most critical curricular needs, to determine how to target our searches to fill these needs. This analysis resulted in us increasing the number of mathematics educators to four two years ago and now with the hiring of Dr. H. Tyrone Washington to five.

**E. New Faculty, New Facilities / Equipment**

We successfully completed the search to fill the position vacated by Dr. Travis Miller. Dr. H. Tyrone Washington will join us in August 2012.

In the past year, the department purchased four personal computers to replace aging faculty computers. The computers were purchased with funds from the school’s base equipment budget. The department also acquired a new color Ricoh copier. The toner is supplied and a service contract is provided without cost to the department. The department has been given an annual allocation of copies. Once the allocation is exceeded, the department will be charged for each additional copy.

**F. Outcomes Assessment**

The department engages in department-wide outcomes assessment through a range of measures that are detailed in our Assessment Matrix. (See Attachment A.) Also, as part of our requirements for NCATE and PDE accreditation, we use additional assessments, specifically targeted at students in our BSEd program. These are discussed together below.

Course-embedded assessments were performed in MATH 464 during this academic year. An exit survey given to graduating seniors was continued during Spring 2012. An alumni survey was sent to alumni who graduated between 2004 and 2007.

During the Fall 2010 semester, twenty-three BSEd mathematics majors enrolled in MATH 405 were assessed with an instrument intended to measure number sense, measurement and other basic skills. Although 48% were initially judged to be proficient, with minor remediation, 100% achieved proficiency. During Spring 2011, thirteen BSEd mathematics majors in MATH 405 were assessed with a corresponding instrument and 38% were judged to be proficient initially,
however with minor remediation, 100% achieved proficiency. This represents an improvement over previous years and we attribute this improvement to changes made in the MATH 405 curriculum beginning in the Spring 2007 semester, giving students some limited direct instruction in these areas.

All BSEd mathematics majors are required to submit material (samples of their best work) for their Mathematics Content Portfolio, beginning with the semester in which they take MATH 310 and MATH 311 (Calculus III). In the Fall 2010 semester, thirty six students made a total of 98 separate submissions to their portfolios for MATH 310, 311, 322, 333, 345, 353/355, 464 and various electives. All of these submissions were judged to be satisfactory. In the Spring 2011 semester, thirty-three students made 72 separate submissions to their Mathematics Content Portfolios, corresponding to the same required courses as in Fall 2010, plus various electives. Spring 2011 portfolio submissions are still being evaluated at this time. A number of students failed to submit their portfolio materials in the required timeframe. During the summer, 2011, all these students will be contacted and asked to comply prior to the beginning of the Fall 2011 semester. At that time, those students who have not submitted portfolio items for successfully completed courses will receive dispositional concern ratings as part of the Professional Education Unit Assessments. Students not fulfilling these requirements will receive a dispositional block on their admittance to MATH 405.

Attachment A

Department of Mathematics Learning Outcomes Assessment Matrix 2008-2009

Department: Mathematics

Mission Statement: The mission of the Department of Mathematics is to provide programs of the highest quality leading to bachelor’s degrees in mathematics and secondary mathematics education and master’s degrees in secondary mathematics education. The department has a strong commitment to excellence in teaching and offers a wide range of courses in pure and applied mathematics, statistics and mathematics education. We focus on preparing our students for careers or graduate study in mathematical fields, including secondary mathematics teaching, pure and applied mathematics, statistics and actuarial science. We also serve the broader university community by providing a full range of introductory through advanced mathematics courses supporting students at all levels and with all majors.

Vision: The Department of Mathematics will continue to provide undergraduate and graduate degree programs of distinction in mathematics and mathematics education and provide strong support to the broader university community by offering a full range of introductory through advanced mathematics courses. We are dedicated to excellence in teaching and scholarship in the mathematical sciences. We are committed to preparing graduates who have strong mathematical skills, broad mathematical knowledge and who can apply their knowledge and communicate their understanding to others. The department further desires to serve as a resource to our region in mathematics, mathematics education and statistics.

Faculty Member Completing this Form: Dr. Delray J. Schultz, Chairperson, Department of Mathematics

Update on prior years’ application of results:
Intended Student Outcome 1
Mathematics graduates will be able to apply principles of logical reasoning to solve mathematical problems.

Connection to Univ/Dept Mission
The primary mission of MU is to promote intellectual development through an exemplary liberal arts education.

Coherence Considerations
- **Gen Ed Component:** G1, G2, G3, G4
  General education courses elected by MU mathematics majors build fundamental critical reasoning skills. Advanced mathematics courses build upon this foundation by specifically focusing on quantitative type problems.
- **Related Courses**
  Mathematics majors may elect courses that build their logic and critical reasoning skills.

Measurable Criteria
a. All mathematics majors will submit a written analysis and solution of some mathematical problem, 85% of which will be judged satisfactory.

Data Source/Results
a. **Final examinations in the following courses will contain at least one problem whose solution requires application of the principles of logical reasoning. Student responses will be judged according to a rubric created by the mathematics faculty.**
  Results of embedded final examination questions showed that:
  b. A sample of graduating students will participate in a clinical exit interview focused on logical reasoning and problem solving skills.
  This step has not yet been implemented.

Intended Student Outcome 2
Mathematics graduates will be able to present coherent solutions and explain mathematical concepts in layman’s terms.

Connection to Univ/Dept Mission
MU seeks to prepare students to live in an increasingly diverse, multicultural and technologically complex society.

Coherence Considerations
- **Gen Ed Component:** G1, G2, G3, G4
  Exposure to other perspectives through a well-rounded liberal arts curriculum will increase the student’s ability to present mathematical results to non-mathematical audiences.
- **Related Courses**
  All mathematics majors take required related courses either from a specified list of science courses or four courses from the same department. This focused requirement will assist them in thinking about mathematics in a specific area outside their mathematics courses.

Measurable Criteria
a. 80% of mathematics majors will give a satisfactory oral presentation of mathematical content.
b. 80% of BSE mathematics majors will provide satisfactory evidence of mathematical understanding and connections.

**Data Source/Results**

a. When practical, oral presentations will be judged by two (2) mathematical professionals such as a mathematics faculty person or a student-teacher supervisor. Oral presentations – During the 2010-2011 academic year thirty-nine mathematics majors gave public presentations and all were judged by the faculty present to be satisfactory.

b. All BSE students will submit content portfolios with samples of their best work and incorporate a written reflection connecting it to their work as teachers. In fall 2010, 36 students submitted 98 portfolio items for evaluation and all 98 were found to be acceptable. In spring 2011, 29 students made 53 submissions, which are still being evaluated.

A number of students failed to submit their portfolio materials in the required timeframe. During the summer of 2011, all these students will be contacted and asked to comply prior to the beginning of the Fall 2011 semester.

During the Fall 2010 semester, 23 BSEd mathematics majors enrolled in MATH 405 and were assessed with an instrument intended to measure number sense, measurement and other basic skills. Forty three percent were initially judged to be proficient, however with minor remediation, 100% achieved proficiency. During spring 2011, thirteen BSEd mathematics majors in MATH 405 were assessed with a corresponding instrument and 38.5% were initially judged to be proficient, however with minor remediation, 100% achieved proficiency.

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**Intended Student Outcome 3**

Mathematics graduates will be able to express mathematical ideas in writing using correct syntax and symbolism.

**Connection to Univ/Dept Mission**

MU accepts responsibility to provide opportunities for research, artistic and scholarly effort, and other creative endeavors in a manner consistent with its primary mission as a teaching institution.

**Coherence Considerations**

- *Gen Ed Component: G4, W Courses*

Expressing mathematical ideas in writing requires an understanding of the mathematical syntax and symbolism as well as the ability to use grammatically correct English.

- *Related Courses*

All university courses that have graded writing assignments will contribute to a student’s confidence and competence in their writing skills.
Measurable Criteria
All mathematics majors will submit an advanced mathematical writing sample, 85% of which will be judged satisfactory.

Data Source/Results
Final examinations in the following courses will contain at least one problem whose solution requires correct use of mathematical syntax and symbolism. Student responses will be judged according to a rubric created by the mathematics faculty.

Intended Student Outcome 4
Mathematics graduates will be able to employ algorithmic processes within an area of mathematics.

Connection to Univ/Dept Mission
MU seeks to prepare students to live in an increasingly diverse, multicultural and technologically complex society.

Coherence Considerations
- *Gen Ed Component: G2*
  Some of the non-mathematics courses from the G2 block employ algorithmic processes to solve problems.

- *Related Courses*
  Computer Science 161 is required of all mathematics majors. This programming course requires the students to use algorithmic processes and complements their work in mathematics.

Measurable Criteria
All mathematics majors will submit a sample of written work demonstrating an ability to employ algorithmic processes, 85% of which will be judged satisfactory.

Data Source/Results
Final examinations in MATH 211 will include two questions requiring the use of an algorithmic process. For the past few years, the embedded questions have been one from the categories of:

18. use of the ratio test to determine the interval of convergence of a power series,
19. use of partial fractions to evaluate an indefinite integral, and
20. use of integration by parts (two times) to evaluate an indefinite integral.

Student responses were assessed using a rubric created by a mathematics faculty member who was not currently teaching one of the sections. Results of the embedded assessment showed that:

This represents more detailed assessment than that conducted in previous years, where samples of only one type of problem was supplied in a given semester. Aggregating the data from this assessment for 2008-2009 shows that 106 students were assessed and 78% were judged to be proficient. This result is consistent with the less detailed results from 2007-2008, which was a significant improvement over previous years and followed changes in the syllabi of
MATH 161 (Calculus I) and MATH 211, which were intended to improve student understanding of key material, including those concepts assessed.

**Intended Student Outcome 5**
Mathematics graduates will be satisfied with their mathematical education and prepared to enter the job market.

**Connection to Univ/Dept Mission**
MU resolutely embraces the conviction that all of its degree programs must maintain a strong liberal arts component while preparing students to engage in productive and contributive lives as professionals.

**Coherence Considerations**
- **Gen Ed Component:** G1, G2, G3 and G4
  A well-balanced liberal arts curriculum will enhance our majors’ preparation to enter the job market.

- **Related Courses**
  All courses in and out of the Mathematics Department have the potential to be important in obtaining future employment as well as success and satisfaction with current employment.

**Measurable Criteria**
Five years after graduating from our program, 90% of mathematics graduates will express satisfaction with their mathematical education, including their preparation to enter the job market.

**Data Source/Results**
Every year a survey will be sent to each alumnus who graduated from our program 5 years ago. These data will be collected and then collated and analyzed every 5 years.

Survey of 5-year graduates – to be implemented.

**Intended Student Outcome 6**
Graduating senior mathematics majors will be satisfied with their mathematical education and feel prepared to enter the job market.

**Connection to Univ/Dept Mission**
MU resolutely embraces the conviction that all of its degree programs must maintain a strong liberal arts component while preparing students to engage in productive and contributive lives as professionals.

**Coherence Considerations**
- **Gen Ed Component:** G1, G2, G3 and G4
  A well-balanced liberal arts curriculum will enhance our majors’ preparation to enter the job market.
Related Courses
All courses in and out of the Mathematics Department have the potential to be important in obtaining future employment as well as success and satisfaction with current employment.

Measurable Criteria
Senior graduating from our program: 90% of graduating senior mathematics majors will express satisfaction with their mathematical education, including their preparation to enter the job market.

Data Source/Results
Each semester graduating seniors from our program will be interviewed or given a survey. These data will be collected, collated and analyzed.

Implemented – Results are being collated and summarized

Other assessment evaluations:

ACTION PLAN FOR 2009-10

I. Algorithmic processes outcome (Outcome #4)

   • Fall 2009, Spring 2010

      A. Math 211 assessment committee
         1. 2 members appointed by the department
         2. Membership may change each semester
         3. Preferably, at least 1 member continues from one semester to the next
         4. All members will have had experience teaching Math 211
         5. No committee member may concurrently teach Math 211

      B. Responsibilities
         1. Create Math 211 final exam problem(s) that assess ability to perform algorithmic processes.
         2. Apply the assessment rubric

II. Applying logical principles outcome (Outcome #1)

   • Math 333, 353: Fall 2009
   • Math 310, 333, 355: Spring 2010

   Math 310, 333, 353/355 assessment committees

      Structure for each committee
      1. 2 members appointed by the department
      2. Membership may change each semester
      3. Preferably, at least 1 member continues from one semester to the next
4. Preferably, all members will have had experience teaching the identified course.

Responsibilities for each committee
1. Create Math final exam problem(s) that assess ability to perform algorithmic processes
2. Apply the assessment rubric

III. Expression of mathematical ideas outcome (Outcome #3)

- Math 345, 464: Fall 2009 and Spring 2010

Math 345, 464 assessment committees

Structure for each committee
1. 2 members appointed by the department
2. Membership may change each semester
3. Preferably, at least 1 member continues from one semester to the next
4. Preferably, all members will have had experience teaching the identified course.

Responsibilities for each committee
1. Create Math final exam problem(s) that assess ability to perform algorithmic processes
2. Apply the assessment rubric
3. Submit a written report to the department by May 15, 2010

IV. Continuous improvement

- In order to have more uniform interpretation of assessment data, the Assessment Committee will create a uniform assessment rubric, which will then be applied to all of the department’s individual exam-embedded assessments.
- The Departmental Assessment Committee will review the data and recommend programmatic changes to the department if appropriate.

Fall 2009 semester in each of MATH 211, 310, 333, 353 and 405. In particular, twenty-two mathematics majors submitted samples of written work in MATH 211 (Calculus II), intended to demonstrate students’ ability to employ algorithmic processes. Comparable to our expected outcome that 85% would be judged to be proficient, 73% were judged proficient, compared to 83% in Fall 2008, 63% in Fall 2007 and 31% in fall 2006. This result follows changes that the department made in the syllabi for both MATH 161 (Calculus I) and MATH 211 intended to improve this situation. These changes were implemented in MATH 211 during the Fall 2007 semester. Similarly, in Spring 2010, fifty-six majors’ work was evaluated in a similar assessment to that conducted in Fall 2009. In this case, 89% were judged to be proficient. It is notable that these results show a marked improvement compared to 2006 and 2007.

Thirty-five mathematics majors in MATH 333 (Introduction to Probability and Statistics) in 2008-2009 submitted a written analysis and solution of a mathematical problem and 60% of these
were judged proficient, compared to the 68% in 2007-2008 and compared to the 85% standard set in our intended outcomes. Fifteen mathematics majors in Fall 2009 were assessed in MATH 464 (Real Analysis) through a problem embedded in the final exam whose solution requires the correct use of mathematical syntax and symbolism and 67% of these were deemed proficient, compared to 79% in 2008-2009 and compared to the target standard of 85%.

Fifty-two mathematics majors were assessed in MATH 310 (Introduction to Mathematical Proof) in 2008-2009, of whom 75% were judged to be proficient on a measure of logical reasoning, compared with 88% in 2007-2008 (with a much smaller sample of seventeen students). Thirty-one mathematics majors were assessed in MATH 353 (Modern Geometry), of whom 71% were judged to be proficient. Eighteen mathematics majors were assessed in MATH 355 (Transformational Geometry), of whom 67% were judged to be proficient.
DEPARTMENT OF NURSING

A. Curricular Changes
- Reviewing and updating MSN curriculum according to the AACN, NLNAC, and NONPF standards recently approved. One new course developed – Informatics.
- NURS 698 was changed from pass/fail grading system to now incorporate letter grades.
- Made inactive: NURS 515, post Baccalaureate Nursing Education Certificate.
- Revising outcomes and philosophy of program according to the new NLN criteria.
- Negotiating an additional site to teach RN-BSN program at HACC-Harrisburg campus to open Spring 2013 offering 2 courses.

B. Faculty Achievements

Deborah Castellucci: (DC)

Supervised Scholarly Project (N698)
- Kara Fisher– Family Nurse Practitioner- Novice vs. expert registered nurses in mock code scenario.
- Stacey Brennan - Family Nurse Practitioner- Evaluating Nurses’ knowledge and attitudes in initiating continuous ST segment monitoring.
- Wendy Winokur - Family Nurse Practitioner- A needs assessment: Hospice emergency medication kit availability upon admission of the home hospice patient.

Clinical Practice:
- Center for Urologic Care of Berks County, as Certified Geriatric Nurse Practitioner specializing in evaluation and treatment of urinary incontinence.

Ruth Davis: (RD)

Supervised Scholarly Project (N698)
- Justin Smith- Family Nurse Practitioner- Evaluation of portable health records.
- Carol Snyder-Family Nurse Practitioner- Evaluation of the characteristics of online support for management of chronic illness and guidelines for choosing appropriate online support.

Consultant: Refereed 4 Manuscripts
Papers Refereed:

Seminars to Non-professional Groups:

Clinical Practice:
- August, 1998-present: Family Health Nurse Practitioner/Women’s Health Nurse Practitioner, Domestic Violence Services of Lancaster County, Lancaster, PA. Responsible for the total operation of the clinic. Health care services include: Primary care, immunizations, health assessments, well-woman health care, pediatric assessments, and minor acute illness care as well as continued psycho-social assessment of residents. Major role includes health education of residents and staff. Advocates and networks with other health care facilities to facilitate main-streaming of clients into appropriate primary care services as needed.


Kelly Kuhns: (KK)
Scholarly:
Publications:
- Contributing Editor, A Century of Nursing Leadership, Pennsylvania State Nurses Association

Clinical Practice: Care Coordinator, Penn State Hershey Medical Center, Hershey, PA

Presentations:
International – June, 2012
- Nursing Faculty’s Awareness and use of Web 2.0 and Perceptions of Facilitating Online Presence, Sigma Theta Tau International and National League for Nursing; Nursing Education Research Conference 2012, Indianapolis, IN.

International – October 2011
- Nursing Faculty Members’ Use of Web 2.0 Technology and Perceptions of Importance of Online Faculty Presence, NLN Technology Conference, The HIT Parade: Showcasing Health Information Technologies, Durham, NC, peer-reviewed, invited.

National – July 2011
- College Health 2.0, Maryland College Health Association Annual Conference, invited

Local – 2011
- Use of Web 2.0 Tools to Engage Students in a Fully Online Environmental Health Course, Millersville University Technology Showcase, Millersville, PA, December 2011, invited
- Using Skype to Deliver Learning at a Distance: A Collaboration Between the Library and Nursing, Millersville University Technology Showcase, Millersville, PA, December, 2011, invited

Leadership Positions:
- Board of Directors, PA State Nurses Assoc (PSNA)
- District 15 President, PSNA
- DON Curriculum Committee, Chair
- Serves actively on MU Community of Digital Innovators (CODI)

Consultant:
- Coordinated and offered Continuing Education Programs for five events (2011 Assessment CE; 2011 Xi Chi Distinguished Lectureship; 2012 Xi Chi at-Large Chapter, STTI, Annual meeting; 2012 Spring Evidence Based Practice Scholarship Symposium, and 2012 Pharm Update for Nurse Practitioners).

Supervision Scholarly Projects: (N698):
- Doreen Houck – Nurse Educator: Helping nurses cope with professional grief.
- Christine Ardell - Family Nurse Practitioner: The use of simulation and web resource to support staff education and clinical practice.
- Ann Proctor –Nurse Educator: Developing an oncology nurse fellowship program.

Conferences Attended:
- June, 2012, Innovations in Nursing Education Research; Sigma Theta Tau, International and National League for Nursing, Indianapolis, IN
- December 2011, Technology Showcase, Millersville University, Millersville, PA
- November 2011, NLN Technology Conference, The HIT Parade: Showcasing Innovative Health Information Technologies; Durham, NC
- October 2011, Marcellus Shale: Unearting Environmental Health Issues for Nurses; PSNA Environmental Health Task Force Conference, Wilkes-Barre, PA
- September 2011, PSNA Town Hall Meeting: Legislative Issues Critical to Nursing, PA State Nurses Association, Gettysburg, PA

Barbara Zimmerman: (BZ)

Publications:

Leadership Activities:
- Advisory Board of Directors Temple University School of Nursing.
- Chair Elect, Special Interest Group (SIG) Consortium of School Nurse Faculty, National Association School Nurses (NASN)
- Faculty Advisor, Xi Chi Chapter, Sigma Theta Tau, International (STTI)
- Hempfield School Board Director –through December, 2011

Awards:
- Xi Chi Chapter Mentor Award, Sigma Theta Tau, International, October 27

Consultant:
- Manuscripted Manuscripts
  - Manuscript review panel Journal School Nursing (4 manuscripts)
Examining the acceptability, attractiveness and effects of a school based validating interview for adolescents who self-injure, May 8, 2012.

- Health Teachers’ Perception on Curriculum Health Education Offered to Primary and Secondary School Students in Korea, February 14, 2012.
- The Effect of Training Program which is about Schizophrenia to Social Distance and Attitudes Among High School Students: In Turkey. October 7, 2011

- Manuscript review panel Rehabilitation Nursing Journal (2 manuscripts)
  - Effect of Education on Rehabilitation Nursing Staff Knowledge, March 2, 2012.

**Supervised Scholarly Projects (N698):**

- Lisa Leitzell - Family Nurse Practitioner – Bereavement debriefing sessions: An intervention to support advanced practice nurses in managing post traumatic stress disorder symptoms after caring for families that experience perinatal loss.
- Hawar Sayed – Family Nurse Practitioner - Cardiovascular disease among Kurdish immigrants: Developing a culturally sensitive health promotion.

**Grants:**

- U.S. Department of Health & Human Services, HRSA Nurse Traineeship Grants for MSN students, $8852.
- Lancaster Regional Medical Center Gift $12,900 for MSN – FNP & BSN students
  - Total scholarship money for 2011-12 - $21,752 for student scholarships.

**Conferences attended:**

- Scholarly Symposium 2012, MU Graduate Program
- Dimensions of Evidence-Based practice across spectrum, Xi Chi Chapter, March 27, 2012, Millersville University.
- Are you ready for implementation of the consensus model? Xi Chi Chapter, Distinguished Lectureship: Dr. Anne O’Sullivan, October 27, 2012, Millersville University.

**C. Student Achievements**

- 100% passage AACN Family Nurse Practitioner Certification Exam – 2011 MSN, FNP option students; all students have FNP positions within 6 months of graduation.
- Lisa Leitzell, MSN-FNP student (April 24, 2012). Bereavement Debriefing Sessions: An Intervention to support APN in managing PTSD symptoms after caring for families that experience perinatal loss. MU Department of Nursing Advisory Committee Meeting.
- Linda Lee, Post Masters-FNP student. You have a tumor: Navigating the system. Podium presentation, National Association Orthopedics nurses conference.
- Ann Proctor, MSN-NUED student, Developing Oncology Nurse Fellowship Program, Oncology Nursing Society.
- Charlene Stein and Joshua Weiant, MU BSN students along with coworkers Ann Melcher, R.N; Andrey Chuprin, R.N., O.C.N; Carol Tringali, and Judy Himes received the
2012 Nancy R. Kruger Award from Penn State Hershey Medical Center for clinical scholarship of evidence-based practice.

- Dr. Kuhns took 18 BSN students to PA Capital for Lobby Day where students met with legislators about the health bills.

- Student awards:
  - Lt. Col. Jo Ann Cashman Scholarship Endowment- Rebecca Modene (FNP-NUED)
  - Antone K. Fontes Health Professions Award – Cheng Ly (BSN)
  - The Forty et Eight (Voiture 42) Endowment for Nursing Education-Kathryn Treaster (MSN-NUED); Leslie Zimmerman (BSN)
  - Luelle Hamilton Scholarship in Nursing- Jennifer Katz (MSN-FNP)
  - Liselotte R. Wehrheim Scholarship in Nursing- Alison Hiser
  - Margaret K. Shenk Nursing Scholarship- Sarah McKee (BSN); John Modene (MSN-FNP); Gale Thomason (MSN-FNP)
  - D. Joan Godfrey Nursing Award- Christine Ardell (MSN-FNP); Lisa Leitzell (MSN-FNP); Stephanie R. Kulp (BSN)

D. Progress Toward Department of Nursing (DON) Goals/5 Year Review:
Department of Nursing Goals for 2011-2012

- 1. Continue recruitment plan to grow RN-BSN and MSN program enrollments.
  - On-going: Enrollment in the RN-BSN has dramatically increased; the MSN enrollment has increased, although the Nurse Educator option numbers have remained steady. The Department of Nursing has negotiated a new site at HACC-Wildwood campus. The department is completing efforts to gain NLNAC approval with submission of self study in September, 2012. Currently, the recruiting for HACC BSN site has begun with over 25 interested individuals applying to MU in addition to the HACC graduates from fall 2012 in the Harrisburg area. The department continues to support the VA Coatesville site for the BSN.

- 2. Outreach efforts have promoted strong enrollments in both BSN and MSN programs through grass root efforts and working closely with collaborating hospitals and community colleges (HACC & RACC). Articulation agreements are being signed with both community colleges.
  - On-going: The Outreach efforts will continue, to pursue collaboration and networking with neighboring hospitals and community colleges. The Nursing Department will hold an Open House (MU) in fall and spring, as well as attend professional development invitations from LG Health, Ephrata, and Pinnacle Hospitals this past spring. Dr. Zimmerman continues to have appointments monthly on two of the HACC campuses and visits the York HACC campus once each semester. Dr. Kuhns collaborates with all Harrisburg hospitals to advise students or potential students.

- 3. Develop a Center for Continuing Education in Nursing.
  - Ongoing: With the Department of Nursing having CE provider status with the PSNA, the department has provided Xi Chi Chapter of Sigma Theta Tau International CE for their programs.
  - Efforts to collaborate with Lancaster Regional Medical Center for bedside research and offering of a Research Day as a CE project 2012-2013.
  - Thanks to Dr. Victor DeSantis, the department has been able to provide a six-hour CE for all MU FNP preceptors entitled, "Pharmacology Update", held on
June 9, 2012 at MU, in appreciation for all of the hours spent serving as a FNP preceptor.
  o Dr. Kuhns is instrumental for developing and coordinating all CE programs.

4. Continue to maintain and enhance current online offerings for the MSN Nurse Educator option, as well as web-enhanced course content in both BSN and MSN courses.
  o Ongoing: Two of the nine BSN courses are totally online. All remaining BSN courses are blended in varying amounts (30-60%). The new BSN Informatics course, NURS 470, was taught for the first time in Summer 2012, with overwhelming enrollments. A new graduate-level informatics course is being developed for the MSN program. The faculty continues to improve in online capability. The students are very positive about the changes in the curriculum providing more flexibility to the RN-BSN & MSN working students.

5. Continue to evaluate outcome measures in both programs.
  o On-going: Revisions to program outcomes based on new 2013 NLNAC Standards and Accreditation criteria. These new program outcomes require a revision to the current philosophy and curriculum strands. In addition to change in program outcome criteria, the faculty are critically reviewing and updating MSN curriculum according to the recently approved AACN, NLNAC, and NONPF standards. One new course has been developed to meet the informatics/technology requirement in Advanced Practice. Both programs will have the courses based on outcomes/competencies.

E. New Faculty, New Facilities/Equipment
  • The 2010 Lancaster Regional Medical Center Gift continues to support program needs.

F. Outcomes Assessment – Include the Learning Outcomes Assessment 2011-2012

<table>
<thead>
<tr>
<th>MU Department of Nursing Program Outcomes (2009 – 2010)</th>
<th>BSN</th>
<th>MSN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certification Exams</td>
<td>N/A</td>
<td>FNP – 100% (first attempt)</td>
</tr>
<tr>
<td>Graduation Rate</td>
<td>69% completion rate; 93% in 2 years</td>
<td>80% 5 years (benchmark)</td>
</tr>
<tr>
<td>Job Placement (within one year of graduation)</td>
<td>90% employed-in part due to the economic climate and new ADNs</td>
<td>FNP – 100% APN practice within 1 year graduation.</td>
</tr>
<tr>
<td>Advancement to graduate study</td>
<td>42%</td>
<td>N/A</td>
</tr>
<tr>
<td>Employer Evaluation Of Program Graduates **</td>
<td>Agree to strongly agree that alumni achieve the identified outcomes</td>
<td>Agree to strongly agree that alumni achieve the identified outcomes</td>
</tr>
<tr>
<td>(80%) Benchmark</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Employer evaluation of program graduates

Rationale: The employers of MU graduates serve as an important evaluative indicator for these programs. Inherent in both programs, BSN and MSN, is the preparation for practice and meeting the demands of the health care delivery system, including patients.
DEPARTMENT OF PHYSICS

A. Curricular Changes

1) The Physics Department renewed its Dual Degree Program (previously known as the 3/2 Co-operative Engineering Program) with Penn State.

   2) The minimum number of MU credits for the dual Degree Program with Penn State was changed from 100 semester hours to 95 semester hours. This curricular change was approved in December of 2011.

3) The Physics Department also has a 3/2 Co-operative Program with the University of Southern California (USC). However, attempts to communicate with USC concerning this program have not been successful. As a result, we are unilaterally terminating the program.

4) Dr. Gilani, with his contacts at the University of Delaware, is exploring the possibility of 3/2 and 4/2 programs with the University.

B. Faculty Achievements

Dr. Pat Cooney (emeritus faculty) continues his involvement in a $400,000 NSF Grant (over three years): “Dissemination of LivePhoto Curricular Materials”. During the 2011-2012 AY Dr. Cooney served as an instructor at a grant funded, five-day teacher workshop at the Rochester Institute of Technology in June, 2011.

Dr. John Dooley (emeritus faculty in collaboration with Dr. Gilani) developed a simple periodic structure consisting of coffee cans that illuminates the properties of a Brillouin zone. This is a new experiment in our Advanced Lab (PHYS 451, 452).

Dr. Natalia Dushkina reviewed and edited a number of books and proposals listed below:

   b) Two proposals by potential new co-authors for Cutnell and Johnson’s text Physics , J. Wiley & Sons, 2011.

Dr. Natalia Dushkina contributed a book chapter (in press):


Dr. Natalia Dushkina contributed papers at conferences:

National:
37th Annual Conference of The American Mathematical Association of Two-Year Colleges (AMATYC), November 10-13, 2011, Austin, TX, “Women in Mathematics and Science Course at Millersville University” N. Dushkina and X. Catepillan (poster presentation).

Dr. Natalia Dushkina, teaching our PHYS 205 Musical Acoustics course, continues to upgrade and revamp the laboratories for this course. In academic year 2011-2012, she added new lab: “Fourier Analysis and Synthesis”. (See Progress Toward Departmental Goals/5 Year review, New Faculty, New Facilities/Equipment.)

Dr. Natalia Dushkina continued her consulting activities with the College Board, Consultant to Educational Policy Improvement.

Dr. Tariq Gilani refereed two PhD theses:

Dr. Mehmet Goksu continues his development of new experiments in PHYS 132 and 232 labs. Under his guidance, a new and sophisticated measurement of the electron e/m ratio was added to the PHYS 132 and 232 laboratories. (See Progress Toward Departmental Goals/5 Year review, New Faculty, New Facilities/Equipment.)

Dr. Mehmet Goksu served on an honors thesis committee in the Department of Applied Engineering, Safety, and Technology: Bradley Sensenig “Optimizing Image Characteristics for Mobile Sensory Perception”.

Dr. Mehmet Goksu has served on grant review committee for the Electrical, Electronics & Computer Technology (EECT) division of the Association of Technology, Management, and Applied Engineering (ATMAE) since 2009.

Dr. Mehmet Goksu served as the Secretary of the American Association of Physics Teachers – Central Pennsylvania Section (AAPT –CPS), 2011-2012. As the secretary of the AAPT-CPS, he organized “Application of Waves to Sound, and Music” Physics Teaching Resource Agents (PTRA) Workshop, December 02, 2011, Millersville University. He also hosted the Executive Board meeting of the AAPT-CPS, December 3, 2011, at Millersville University.

Dr. Mehmet Goksu was elected as the Vice President at the annual meeting of the American Association of Physics Teachers – Central Pennsylvania Section (AAPT –CPS), March 23-24, 2012, Penn State, State College, PA. His primary responsibilities as Vice President of the AAPT-CPS will be to organize and host the spring 2013 annual conference at Millersville University and also to organize and host the PTRA workshop in spring 2013 at Millersville University.

Dr. Mehmet Goksu served as the Site-Director to organize the 5th Annual Central PA Regional Science Olympiad competition on Saturday, March 24, 2012 at Millersville.
Dr. Mehmet Goksu, with Drs. Patricia Hill, Christopher Hardy, Jeremiah Mbindyo, and Robert Smith, have been working together to facilitate a 2-week long summer science institute for high school teachers at Millersville University. During the 2012 ARRMS Science Institute program, Dr. Goksu will present three workshops (June 28-29, July 9,10,11).

Dr. Mehmet Goksu served as a judge at the NMSEF (North Museum Science and Engineering Fair), March 28, at F&M College.

Dr. Mehmet Goksu gave a talk entitled “Energy Efficiency” on Oct 2, 2011 at Red Rose Intercultural and Education Foundation in Leola, PA.

Dr. Mehmet Goksu has served as faculty advisor for University Rugby Club and also for the Society of Physics Students (SPS) Physics Demonstration Team.

Dr. Sean Hendrick continues his research on observations of supernova remnants (SNRs) in the Large Magellanic Clouds with the Spitzer Space Telescope and the Chandra X-ray observatory in collaboration with colleagues at seven other institutions. He also is continuing work on an X-ray catalog of SNRs in the LMC using archival Chandra data.

Dr. Sean Hendrick and Society of Physics Students (SPS) continue their many activities. The Society will participate in the annual Hershey Park Physics Day. A team of several students will be assisting Dr. Hendrick with demonstrations during a series of lectures for hundreds of high school students in attendance. (See Student Achievements.)

Dr. Hendrick’s community outreach included Farmdale Elementary School’s Family Read-In Night, a lecture on stellar evolution at Elizabethtown Area High School, two presentations on space exploration at Eshleman Elementary School, Hershey Park Physics Day, and a talk on building a city in space at Warwick Middle School.

Dr. Hendrick established a "telescope team" among several physics majors who were interesting in learning how to use the department's 10.5" telescopes. The goal is to make this team available for local schools and organizations for public observing nights.

Dr. Hendrick attended the Central Pennsylvania Consortium Astronomers’ Meeting at Dickinson College with students John Timlin, Joshua Jones, and David Pede. (See Student Achievements.)

Dr. Hendrick and Dr. Richard Clark from Earth Sciences are developing a Space Weather minor.

Dr. Hendrick continues to develop a possible Astronomy minor.

Dr. Chris Nelson (a one year temporary replacement, see New Faculty, New Facilities/Equipment) attended the American Physical Society March meeting in Boston, where he gave a presentation: "N.Q.R. measurements of low energy chiral structures in powered glassy As$_2$Se$_3$."

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Dr. Chris Nelson also presented a poster at the Boston March meeting (with student Matt Lewis – see Student Achievements): “Electromagnetically induced transparency in a four-Level W scheme: effect of beam intensity and phase on propagation”.

Dr. Chris Nelson intends to submit three papers to the peer reviewed journal Surface Science in June 2012:


“Asymmetric resistivity measures of chiral sculptured thin films”, with Tariq Gilani and Cody Johnson. (See Student Achievements.)

Under the supervision of Dr. Mike Nolan, students Matt Lewis, David Pede, and John Timlin (see Student Achievements) earned the rank of Accomplished Competitor in the 2011 University Physics Competition.

Dr. Mike Nolan developed a poster with student David Pede, (see Student Achievements): “Discrete Markovian dynamics of a finite system”.

C. Student Achievements

The SPS Demo Team continues to be active making presentations at local high schools and middle schools. (See Faculty Achievements, Progress Toward Departmental Goals/5 Year Review.)

Jason Beisel (with Dr. Mehmet Goksu, see Faculty Achievements) received a $600 Neimeyer – Hodgson Research Grant and a $400 Student research Grant to fund his senior research: “Construction and Analysis of a Small Scale Wind Turbine”.

Steven Bromley had the Philip C. and Karen Ashkar Murley ’63 Scholarship renewed for academic year 2012-2013.

David Emery had the Faraday Physics Scholarship renewed for academic year 2012-2013.

Sean Forsyth attended the March American Physical Society Meeting in Boston.

Sean Forsyth will attend Officer Candidate School this summer for the US Navy under the auspices of the NUPOC Program. This is a program that allows college students to join the Navy in their junior or senior year. After graduation from OCS, Sean plans to work on nuclear powered submarines.

Sarah Geiger was inducted into the Sigma Pi Sigma Physics Honors Society. She also participated in the Hershey Park Physics Day (with Dr. Sean Hendrick, see Faculty Achievements) and will serve as vice president of SPS (Society of Physics Students).

Sarah Geiger was selected for the annual Engle Award
Sarah Geiger has been accepted into the University of Florida’s Material Science REU (Research Experience for Undergraduates) program for the summer of 2012.

Daniel Gochnauer was inducted into the Sigma Pi Sigma Physics Honors Society.

Daniel Heck (with Dr. Mehmet Goksu, see Faculty Achievements) received a $252 Neimeyer-Hodgson research grant to fund his senior research: “Dye-Sensitized Solar Cells”. He presented his results at the annual conference of the American Association of Physics Teachers – Central Pennsylvania Section (AAPT-CPS) on March 23-24 at State College, PA.

Justin Hoffman received a $433 Neimeyer-Hodgson Research Grant to fund his senior research: “Wind Energy Efficiency Mechanism”.

Karl Heldt was inducted into the Sigma Pi Sigma Physics Honors Society. He also participated in the Hershey Park Physics Day (with Dr. Sean Hendrick, see Faculty Achievements).

Adam Jacobs, a double major in Physics and Meteorology, has a summer internship with NASA Goddard Space Flight Center. He also plans to attend graduate school at George Mason University and pursue a PhD in Physics.

Cody Johnson attended the March American Physical Society Meeting in Boston.

Joshua Jones attended (with Dr. Sean Hendrick, see Faculty Achievements) the Central Pennsylvania Consortium Astronomers’ Meeting at Dickinson College. He also joined Dr. Sean Hendrick for the Hershey Park Physics Day.

Eric Junga was inducted into the Sigma Pi Sigma Physics Honors Society.

Will Kassis participated in the Hershey Park Physics Day (with Dr. Sean Hendrick, see Faculty Achievements). He is also the new Treasurer of the Society of Physics Students (SPS).

Will Kassis attended the March American Physical Society Meeting in Boston.

Walter Klahold (December 2011 graduate) was awarded the annual Van Horn Prize for excellence in applied physics. His senior research (with Drs. John Dooley and Tariq Gilani, see Faculty Achievements) was “Rayleigh Wave Excitation in Aluminum”. Walter has also been accepted as a graduate student at the University of Pittsburgh. He has chosen experimental condensed matter physics as his area of study.

Matthew Lewis was accepted into an REU programs (Research Experience for Undergraduates) at the University of Maryland and conducted research with Dr. Ray Phaneuf on “Multifunctional Atomic Layer Deposition (ALD) Films as Oxidant Barriers”. Matt has also been accepted to graduate school in Materials Science at the University of Delaware.

Matthew Lewis (with Dr. Chris Nelson, see Faculty Achievements) presented a poster at the American Physical Society Boston March meeting: “Electromagnetically induced
transparency in a four-Level W scheme: effect of beam intensity and phase on propagation”. He also presented this poster at Alumni weekend.

Matt Lewis, David Pede, and John Timlin (under the supervision of Dr. Mike Nolan, see Faculty Achievements) earned the rank of Accomplished Competitor in the 2011 University Physics Competition.

Brian Luckenbill is the new President of SPS, the Society of Physics Students.

Brian Luckenbill had the Faraday Physics Scholarship renewed for academic year 2012-2013.

Austin Martin received the 2012-2013 Chip and Kathy Brabson, PhD Physics Scholarship.

Samantha McCulloch had the Faraday Physics Scholarship renewed for academic year 2012-2013.

David Pede attended the March American Physical Society Meeting in Boston. He also attended the Central Pennsylvania Consortium Astronomers’ Meeting at Dickinson College.

David Pede developed a poster (with Dr. Mike Nolan, see Faculty Achievements): “Discrete Markovian dynamics of a finite system”.

Melanie Ragon had the Faraday Physics Scholarship renewed for academic year 2012-2013.

John Timlin (with Dr. Sean Hendrick, see Faculty Achievements) presented a poster “X-ray analysis of Large Magellanic cloud supernova remnant DEM I71” at the Central Pennsylvania Consortium Astronomers’ Meeting at Dickinson College. He also presented this poster at Alumni Weekend.

John Timlin was awarded Physics Departmental Honors. His thesis title (with Dr. Sean Hendrick, see Faculty Achievements) was: “X-ray analysis of Large Magellanic cloud supernova remnant DEM I71”

John Timlin plans to pursue a PhD at Drexel University

Logan Walters is the new Secretary of SPS, the Society of Physics Students.

D. Progress Toward Departmental Goals/5 Year Review

1. Continue to implement plans for our use of space, equipment, and facilities.

Dr. Mehmet Goksu suggested that we renovate one of our storage rooms to accommodate demonstration equipment. The department enthusiastically endorsed this recommendation and requested $7500 for new shelving in room R247A. Unfortunately, the money which was initially approved for the project was later rescinded. The Physics Department decided to undertake this project and pay for it out of its own Operating Budget. This project was completed near the end of the 2011 academic year. During the 2011-2012 academic year,
the demonstration room became widely used. A goal for the 2012-2013 academic year is to catalog our demonstration equipment and systematize the use of this storage space.

2. Prepare a brochure with examples of the success of our department’s alumni for use by the Admissions Office. This was a 2011-2012 goal that was not accomplished.

3. Establish Physics scholarships for students to help in recruitment and retention.

No new scholarships were established in the 2011-2012 academic year but we continue to administer a number of existing scholarships to attract gifted students.

4. Continue to modify the curriculum and to develop new programs in Physics with emphasis on versatility and recruitment. (See Curricular Changes)

The Physics Department renewed its Dual Degree Program (previously known as the 3/2 Co-operative Engineering Program) with Penn State. The minimum number of MU credits for the dual Degree Program with Penn State was changed from 100 semester hours to 95 semester hours. This curricular change was approved in December of 2011.

The Physics Department also had a 3/2 Co-operative Program with the University of Southern California (USC). However, attempts to communicate with USC concerning this program have not been successful. As a result, we are unilaterally terminating the program.

Dr. Gilani, with his contacts at the University of Delaware, is exploring the possibility of 3/2 and 4/2 programs with the University.

We will continue to investigate the desirability and feasibility of an Astronomy Option and Minor in accordance with suggestions made by outside reviewers in our 2001 Five Year Review.

We will also continue to discuss with Earth Sciences the feasibility of developing a minor in Space Weather. Tentative plans call for Earth Sciences students taking PHYS 233, 317, 321, and 322.

5. Examine in depth the future requirements, intellectual direction, and faculty needs of the department in light of recommendations by outside reviewers who participated in the 2005-2006 Five Year and the 2010-2011 Five Year Reviews.

This departmental goal is long term and under development. We are currently investigating the possibility of developing a course in medical physics, an Astronomy minor, and a Space Weather minor in collaboration with the Earth Sciences Department. We will also investigate the possibility of a new course in alternative energies.

In previous years, Foucault Pendulums were purchased for distribution among our graduating BSEd majors. This was a policy initiated by Dr. Dooley who is now retired. The Foucault pendulum gives direct proof that the Earth rotates on its axis. This is a reminder that our beliefs about the nature of the universe must have an empirical basis. A goal for the 2012-2013 academic year is to renew this policy and again purchase or build Foucault Pendulums for graduating BSEd Physics majors.
Dr. John Dooley, after many years of service, retired at the end of the 2010-2011 academic year. The Physics Department requested a tenure track position to replace Dr. Dooley. A decision on this request was postponed by the administration. Consequently, the Physics Department undertook a search for a one year temporary replacement and hired Dr. Chris Nelson as a temporary full time faculty member for the 2011-2012 academic year. Dr. Nelson had primary responsibility for our large enrollment algebra-based introductory physics sequence, PHYS 131,132. In addition, Dr. Nelson taught MATH 101 (College Algebra). (See New Faculty, New Facilities/Equipment).

After a postponement of one year, the administration approved our request to hire a new permanent tenure-track faculty member. The Physics Department initiated a nationwide search and interviewed four exceptionally strong candidates. After considerable discussion, the Department made an offer to Dr. Xin Li who accepted. Dr. Li will join our department for the 2012-2013 academic year. (See New Faculty, New Facilities/Equipment).

6. Continue to develop a coherent plan for integration of computational software into each of the courses required by our majors.
This is a long term department goal and is under continual discussion and development. Currently Mathematica is the preferred computational tool among advanced students. In the more elementary courses, the spreadsheet Excel is the primary tool.

7. Replace and upgrade laboratory equipment as funding allows.

Eight setups of a new and sophisticated measurement of the electron e/m ratio have been added to the PHYS 132 and 232 laboratories. This purchase was initiated by Dr. Mehmet Goksu. (See New Faculty, New Facilities/Equipment).

Dr. Natalia Dushkina, teaching our PHYS 205 Musical Acoustics course, continues to upgrade and revamp the laboratories for this course. In academic year 2011-2012, she added new lab: “Fourier Analysis and Synthesis”. (See Faculty Achievements.)

Purchase of a solar tracking system is currently underway. This purchase was initiated by Dr. Mehmet Goksu (See New Faculty, New Facilities/Equipment).

A new green HeNe laser was purchased for use in the optics laboratory course (PHYS 331 Fundamentals of Optics). The laser will also find use in the intermediate and advanced labs (PHYS 351,352 and 451,452). This purchase was initiated by Dr. Natalia Dushkina. Four new computers were also purchased for the optics laboratory. (See New Faculty, New Facilities/Equipment.)

A 405 nm blue diode laser was purchased for use in the Intermediate Lab (PHYS 351,352). This laser will facilitate measurements of the photoelectric effect. This purchase was initiated by Dr. Tariq Gilani (See New Faculty, New Facilities/Equipment.)

Three new faculty computers were purchased for Drs. Uy, Hendrick and Gilani (See New Faculty, New Facilities/Equipment.)

8. Reviving and Sustaining the Society of Physics students (SPS).

External reviewers of the 2006 Physics Department Five Year Program Review strongly recommended that the Physics Department revive a moribund SPS chapter. Dr. Sean
Hendrick has successfully undertaken this responsibility. Our local, resuscitated SPS Chapter is now a vital part of the campus social life of physics majors. The department continues to allocate membership funds for all interested students and the chapter has been involved in a number of activities and field trips. We also consider SPS activities to be an important component of our retention efforts. (See Faculty Achievements, Student Achievements.)

Again this year, we inducted several students (see Student Achievements) into Sigma Pi Sigma (ΣΠΣ), the Physics Honors Society.

9. Continue to implement assessment of our students and programs. (See Outcomes Assessment.)

E. New Faculty, New Facilities/Equipment

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Three new faculty computers were purchased for Drs. Uy, Hendrick and Gilani. (See Progress Toward Departmental Goals/5 Year Review.)

A major purchase (initiated by Dr. Natalia Dushkina) in the 2010-2011 Academic Year was a Nikon LV100 Polarizing Microscope for use in the Optics Laboratory and for use with senior research projects. (See Progress Toward Departmental Goals/5 Year Review.)

F. Outcomes Assessment

The Department continues to conduct exit interviews (in the form of a questionnaire) with graduating seniors. This feedback is an important tool in assessing and modifying our programs.

Students continue to favorably assess the quality and rigor of our programs. In fact, a common response to the question “What did you like least about being is physics major at Millersville?” is the very challenging nature of some of the courses. On the other hand, when students are polled about “What did you like most about being Physics major at Millersville”, they cite the same challenges as being very fulfilling. They also compliment the faculty on their personal involvement, commitment, and accessibility.

In the 2010-2011 academic year, we had four BSEd students graduating. A common complaint on their part was the challenge of scheduling both their Physics courses and their Education courses. This same issue arose during our external 2010-2011 Five Year Review. A major goal of the 2012-2013 academic year will be a review of our BSEd program. The Pennsylvania Department of Education has recently revised the number of required Education courses required of our BSEd majors. We will attempt to ease scheduling constraints imposed by the excessive number of Education courses and our own rigorous standards.

Another very important assessment tool is the Major Field Assessment Test (MFAT), which must be taken by all graduating seniors. This year, 13 students took the exam. The highest scoring student (Walter Klahold) scored at the 95th percentile. The median score for all our students was at the 50th percentile. We would like to improve the performance of our students on the MFAT. Because of previous comments by students who took the exam and an analysis of test statistics, we continue to place more preparatory emphasis on basic, introductory material. We also encourage students to efficaciously prepare for the exam by becoming tutors for the introductory courses. During the 2012-2013 academic year, the Department will discuss these results and continue to address further methods of improving these scores.

Mission / Purpose

Our mission is to teach the skill of using mathematics and empirical investigation to understand the physical world. We will accomplish this mission by offering rigorous major programs of study and research, authoritative surveys for the general audience, and outreach to the community at large. Click Here to view the Millersville University Mission Statement

Goals
G 1: To teach the skill of using mathematics and empirical investigation to understand the physical world
   To teach the skill of using mathematics and empirical investigation to understand the physical world

G 2: To offer rigorous major programs of study and research, authoritative surveys for all students, and outreach to the community
   To offer rigorous major programs of study and research, authoritative surveys for the general audience, and outreach to the community at large.

Student Learning Outcomes/Objectives, with Any Associations and Related Measures, Targets, Findings, and Action Plans

SLO 1: Graduating seniors will be able to recall and apply key physics concepts to solve physics problems.
   Graduating seniors will be able to recall and apply key physics concepts to solve physics problems.

Relevant Associations:
   Connection to Univ/Dept mission: ... preparing students to engage in productive and contributive lives as professionals.

General Education/Core Curriculum:
   1 Critical Thinking
   5 Quantitative Reasoning

Strategic Plans:
   Millersville University of Pennsylvania
   1.5 Strategic Direction: Developing Life and Leadership Skills that Promote the Greater Public Good

Related Measures:

M 1: MFT will test senior students' comprehension and application of concepts
   Performance of graduating seniors on the nationally normed physics MFT will demonstrate whether seniors have an understanding of key physics concepts and whether they are able to solve physics problems.

Source of Evidence: Standardized test of subject matter knowledge

Target:
   Performance of graduating seniors on the nationally normed physics MFT will be at the national mean or better.

Findings (2011-2012) - Target: Met
   MFT scores for fall, 2011 showed that as a class, our students were slightly below average in introductory topics (49%ile) and above average in advanced topics (51%ile). This was the first class to take the MFT while taking our formal quantum mechanics course, PHYS 471. The student score in the Advanced Physics topics increased from
44%ile to 51%ile, which shows that our decision to move PHYS 471 from the spring semester (Senior year) to the fall semester (Senior year) was right.

**M 2: Prerequisite changes for PHYS 104**
Annual departmental prerequisite review to determine whether math 101 placement is helpful in selecting what students are mathematically prepared for Physics 104

Source of Evidence: Academic direct measure of learning - other

**Target:**
None Listed

**Findings (2011-2012) - Target: Met**
The prerequisite of MATH 101 placement for physics 104, while a relatively low standard, continues to be successful in selecting students ready to do algebra in the course of solving applied physics problems.

**M 8: Reorganizing the content of PHYS 395**
1) Reorganizing the content of PHYS 395 to address perceived math weaknesses (Gauss and Stokes theorems, for example) among our students. This is feedback from student performance in PHYS 321.

Source of Evidence: Efficiency

**SLO 2: Graduating seniors will be able to design, carry out, and communicate the results of an investigation of a physical phenomenon**
Graduating seniors will be able to design, carry out, and communicate the results of an investigation of a physical phenomenon, as demonstrated in our two-semester capstone experience; PHY492, PHY498.

**Relevant Associations:**
Connections to Univ/Dept mission: Millersville University ... resolutely embraces the conviction that all of its degree programs must maintain a strong liberal arts component while preparing students to engage in productive and contributive lives as professionals.

**General Education/Core Curriculum:**
3 Oral Communication
4 Written Communication
7 Technological Competencies

**Strategic Plans:**
Millersville University of Pennsylvania
1.5 Strategic Direction: Developing Life and Leadership Skills that Promote the Greater Public Good

**Related Measures:**

**M 3: Students performance on the intermediate/advanced lab sequence and on the senior research project**
Student performance on lab reports for the intermediate/advanced lab sequence and faculty analysis of the public presentation of two-semester senior research project.
Source of Evidence: Capstone course assignments measuring mastery

**Target:**
Students will perform up to departmental standards on lab projects in the intermediate/advanced lab sequence and on the public presentation of the senior research project. 1)

**Findings (2011-2012) - Target: Partially Met**
We continue to evaluate student performance in Senior Seminar and evaluate the quality of their papers and presentations. The proper use of references, units, and error analyses has improved substantially. There could be further improvement on the proper use of significant figures.

**SLO 3: Physics graduates will be admitted to graduate school or obtain employment in fields related to physics.**
Physics graduates will be admitted to graduate school or obtain employment in fields related to physics.

**Relevant Associations:**
Connection to Univ/Dept mission: ... preparing students to engage in productive and contributive lives as professionals.

**Strategic Plans:**
Millersville University of Pennsylvania
1.5 Strategic Direction: Developing Life and Leadership Skills that Promote the Greater Public Good

**Related Measures:**

**M 4: Preparation of graduates for a physics-related job or graduate school**
Five-year review of physics program to identify possible weak areas in Physics curriculum

Source of Evidence: Exit interviews with grads/program completers

**Target:**
The physics curriculum will fully prepare graduates for a physics-related job or graduate school

**M 9: The 3/2 Program with Penn State**
Reviving the dual-degree program with Penn State (aka 3/2 program) to offer more opportunities to our students. (is back on track.)

Source of Evidence: Graduate/professional school acceptance rate

**M 10: The 3/2 Program with USC**
We are terminating the 3/2 program with University of Southern California (USC).

Source of Evidence: Job placement data, esp. for career/tech areas
SLO 4: Our graduates will have the knowledge and skills for professional advancement

Our graduates will have the knowledge and skills for professional advancement

Relevant Associations:
Connection to Univ/Dept mission: Millersville University ... resolutely embraces the conviction that all of its degree programs must maintain a strong liberal arts component while preparing students to engage in productive and contributive lives as professionals.

Strategic Plans:
Millersville University of Pennsylvania
1.5 Strategic Direction: Developing Life and Leadership Skills that Promote the Greater Public Good

Related Measures:

M 5: Alumni success in graduate school or jobs
- Reports of graduate school success
- Reports of professional success
- Web alumni survey
- Reports by alumni invited back to give seminars to our Senior Seminar students (2 in 07/08)

Source of Evidence: Alumni survey or tracking of alumni achievements

Target:
On the Alumni Survey alumni will report success in graduate school or jobs.

SLO 5: Our graduates will carry with them the strong reputation of the Millersville Physics Department.

Our graduates will carry with them the strong reputation of the Millersville Physics Department.

Relevant Associations:
... preparing students to engage in productive and contributive lives as professionals.

Institutional Priorities:
0.5.1 IP 200910  1. Delivering the Second to None Promise to Our Students (Lead: Cabinet)

Strategic Plans:
Millersville University of Pennsylvania
1.5 Strategic Direction: Developing Life and Leadership Skills that Promote the Greater Public Good

Related Measures:

M 6: SATs of entering freshman
SAT scores of entering freshmen reflect on the department's reputation within the community

Source of Evidence: Academic indirect indicator of learning - other
**Document:**
- *Entering Physics student SAT scores*

**Target:**
SATs of entering freshman will indicate a competitive profile.

**Document:**
- *Entering Physics student SAT scores*

**M 7: Students' perception of Physics department reputation**
- Presentation of senior research projects at conferences and in publications.
- Reports from Alumni Survey, Co-op supervisors, and external reviewers confirm strength of the program.

Source of Evidence: Academic indirect indicator of learning - other

**Target:**
None reported
CENTER FOR DISASTER, RESEARCH AND EDUCATION

A. Curricular Changes
   New Course: EMGT 633: GIS for Emergency Managers was approved in spring 2012. This course will serve as an elective in the MSEM program.

B. Faculty Achievements – grants, research, sabbatical (Refer to School Statistics section).

Faculty Attendance at Conferences, Seminars, and Workshops:

- Emergency Management Institute Higher Education Conference: Emmitsburg, MD, June 4-7, 2011. (Alex DeCaria and Sepi Yalda)
- Emergency Management Institute, Hazus Multihazard Course, Emmitsburg, MD, Sept 12-15, 2011. (Alex DeCaria)
- Hague Academy of International Law, Responding to the Challenges of Natural and Industrial Catastrophes. New Directions for International Law, Hague, Netherlands, Jan 15-21, 2012. (Kirsten Bookmiller)
- Center for Public Safety Seminar, Orlando, FL. March 8-9, 2012 (Sepi Yalda)

Other Faculty Achievements:

- Dr. Kirsten Bookmiller representing the Center for Disaster Research and Education was selected by the Hague Academy to participate at the Hague Academy’s Responding to the Challenges of Natural and Industrial Catastrophes. New Directions for International Law.
- Dr. Sepi Yalda was selected to serve on the Natural Hazards Mitigation Association International Activities Committee (January 2012-present).
- Dr. Duane Hagelgans continues to serve as a member of the leadership team of the South Central Task Force (2009-present).
- Dr. Duane Hagelgans continues to serve as a member of the regional mass distribution and medical countermeasure subcommittee (2011-present).

C. Student Achievements

2011-2012 MSEM Graduates:
1. Jacqueline Edelbaum
2. Nicholas Genovese
3. Brian Bannon
4. Kelli Audette
5. Hannah Cottman
6. Megan Fasick
7. William Miner
8. Matthias Miziorko
9. Joyce Kirk
10. Alfred Behr
11. James Berninghausen
12. Aaron Clevenstine
13. Heather Morgan
14. Troy Neville
15. Zeljko Radovanovic
16. Alex Rojas
17. Amy Shorter
18. Marianne Souders
19. Brooke Tomlinson

EHM Minor Graduates:
1. Mark Ahner
2. Robert Bechtel
3. Carolyn Jeffrey
4. Katia Pfister
5. Christin Rollis
6. Kasey Voges

The following students were selected for Who’s Who:
James Berninghausen
Aaron Clevenstine
Joyce Kirk
Heather Morgan
Amy Phillips

The following student was selected for the 2012 Quarantelli Award:
Christin Rollis

The following students were inducted to Epsilon Pi Phi Academic Honor Society (Emergency Management):
Aaron Clevenstine
Mathias Miziorko
Marianne Souders
Heather Morgan
Brian Bannon
Amy Phillips

The following students received external awards or leadership positions in 2011-2012:
Heather Morgan: 2012 Annual Florida Governor’s Scholarship
Marianne Souders: Elected as the President of the Maryland Emergency Management Association (2012-present)
Robert Bailey: National Police Award (2011)
Troy Neville: Member, Business, Industry and Infrastructure Subcommittee of the Pennsylvania South Central Task Force (2011-present)
The following student will be pursuing doctoral work in disaster studies and emergency management:
Heather Morgan: Oklahoma State University (Fall 2012)

Employment: It should be noted that a great majority of MSEM students work in emergency management and related fields. The following students secured new positions in the field of emergency management:
Pamela Drake: Booz-Allen Hamilton
Mathias Miziorko: Carroll County, MD Office of Emergency Management
Aaron Clevenstine: FEMA Emergency Management Specialist

Student Presentations:
Chelsea Eggelston: 6th Annual Graduate Research Symposium. Millersville University Community Emergency Response Team. April 2012: Dixon University Center. (Faculty: S. Yalda)

Chelsea Eggelston: 2011 and 2012 CERT Training. Millersville University. (Faculty: S. Yalda)


Troy Neville: 2011 South Central Pennsylvania Business Continuity Conference. Nov 2, 2011, Harrisburg Area Community College. (Faculty: S. Yalda)

Heather Morgan: 2012 CERT Training. Millersville University. (Faculty: S. Yalda)

Mathias Miziorko: 2012 CERT Training. Millersville University. (Faculty: S. Yalda)

Student Publications:


Internships:
Chelsea Eggelston: Exelon (2012)

D. Progress Toward Department Goals/5 Year Review

E. New Faculty, New Facilities/Equipment

New Faculty:
Dr. Duane Hagelgans was hired in spring 2012, as the first full-time, tenure-track faculty member for the MSEM program.

F. Outcomes Assessment – Include the Learning Outcomes Assessment 2011-2012, but do not include results/analysis. “Results” will be due in October 2012.
(To be entered into WEAVEonline)
SCHOOL STATISTICS

ANNUAL REPORT

2011 - 2012
### Fall Undergraduate and Graduate Enrollment by Major 2011-2012

#### School of Science and Mathematics

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| CHEM       | Hannah | McWilliams | Steven | Bonser | The Synthesis and Chemistry of Some Sulfonyleldiaziridines
<p>| CHEM       | Christopher | Meeks | Steven | Bonser | New Synthesis of Diaziridines via Diazo Compounds |
| CHEM       | Jessica | Miller | Sandra | Turchi | Environmental Markers |
| CHEM       | Thi | Nguyen | Steven | Bonser | Synthesis of Some Novel Diaziridines |
| CHEM       | Michael | Novak | Mark | Iannone | Fluorescence Energy Transfer |
| CHEM       | Joseph | Puchalsky | Aimee | Miller | Characterization of Wild and Commercial Yeast |
| CHEM       | Gloriany | Rivas | Sandra | Turchi | Comparative DNA Studies |
| CHEM       | Sarah | Rogers | Jeremiah | Mbindo | Electroplating &amp; Chemistry Development of Lab Techniques for Environmental Testing of Electroplating |
| CHEM       | Jonathan | Shue | Lyman | Rickard | Development of a Biosensor |
| CHEM       | Lauren | Shumway | Mark | Iannone | Laboratory Methods of Physical Chemistry Physical Chemistry Laboratory II |
| CHEM       | Matthew | Smith | Sandra | Turchi | A Molecular Approach to the Study of Yeast Genetics |
| CHEM       | David | Walton | Ed | Rajaseelan | Promising Transfer Hydrogenation Catalysts in Green Inorganic ChemistryPromising NHC-based Ir and Rh Catalysts for Green Chemistry |
| CHEM       | Lindsey | Weidlick | Sandra | Turchi | Streptococcus Mutants and Tooth Decay |
| CSCI       | Ryan | Garchinsky | Blaise | Liffick | Using A Development Framework for Mobile Apps |
| CSCI       | Pavlo | Hrizhynku | Gary | Zoppetti | GEOPOD: GEOsciences Probe of Discovery |
| CSCI       | Edward | Kimmel | Roger | Webster | Development of GPS MU Campus Tour Mobile Phone App Continuation of Development of GPS MU Campus Tour Mobile Phone App |
| CSCI       | Neil | Obetz | Gary | Zoppetti | GEOPOD: GEOsciences Probe of Discovery |
| CSCI       | Lindsey | Young | Gary | Zoppetti | ExSciTech: Exploring Science, Technology and Health |
| EHEM       | James | Hyde | Sepideh | Yalda | StormReady Project |
| EHEM       | Christin | Rollis | Sepideh | Yalda | Emergency Preparedness for Health Services |
| EHEM       | Richard | Surdel | Sepideh | Yalda | StormReady Project |
| EHEM       | Kasey | Voges | Sepideh | Yalda | StormReady Project |
| ESCI       | Carrie | Bamper | Sepideh | Yalda | StormReady Project |
| ESCI       | Daniel | Berndt | Sepideh | Yalda | StormReady Project |
| ESCI       | Lindsay | Blank | Richard | Clark | NASA DISCOVER - AQ |
| ESCI       | David | Burcicki, Jr. | Ajoy | Kumar | Inter Annual Variation of Temperature and Salinity Off Delmarva |
| ESCI       | Michael | Charnick | Richard | Clark | Discover - AQ Analysis |
| ESCI       | Russell | Cool, Jr. | Ajoy | Kumar | Classification of Wetlands off Delmarva |
| ESCI       | Erica | Dolinar | Richard | Clark | Project Galactica NASA DISCOVER-AQ |</p>
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<td>Biology</td>
<td>UNESCO funded support for shipment of large volumes of books, journals and computers to universities in the developing countries of Morocco, Ethiopia, Liberia and Rwanda.</td>
<td>$6,630</td>
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<td>12/26/11</td>
<td>Not Funded</td>
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<td>National Science Fdn</td>
<td>Zhong</td>
<td>Yuan</td>
<td>Biology</td>
<td>An Efficient and Economical New Tissue Culture System for Rapid Plant Micropropagation.</td>
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<td>National Institute of Stds and Technology (NIST)</td>
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<td>Computer Science</td>
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<td>REU Supplement to NSF Collaborative Grant (Exploiting Information Graphics in a Digital Library) #1016900.</td>
<td>$16,000</td>
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<td>Submitted</td>
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<td>Georgia State University/NSF</td>
<td>Hill</td>
<td>Patricia</td>
<td>Chemistry</td>
<td>Chemistry Collaborations, Workshops and Communities of Scholars.</td>
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<td>$218,811</td>
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### Totals

- Funded: $3,200
- $277,782
- $218,811
- $14,958
- $61,462