EXECUTIVE SUMMARY FOR THE SCHOOL OF SCIENCE AND MATHEMATICS ANNUAL REPORT

A. School Highlights for 2013-2014 (details follow)

For many years, Millersville has been 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, in highly demanding and rigorous programs of study. Further, the number of science and mathematics majors at Millersville continues to increase quite rapidly, with majors in the school now accounting for approximately twenty-two percent of the overall student population. A sampling of the outstanding achievements of students and faculty is included below.

B. Student Achievements (selected detail)

Undergraduate and Graduate Research and Student Awards:

- Heather Gochnauer (Biology) presented a poster titled “Regulation of neural crest cell emigration in turtle embryos” (with Matthew Smith, Class of 2014, and Judy Cebra-Thomas) at Experimental Biology 2014 in San Diego, CA.
- Teah Nauman (Biology) published a paper in Wildlife Professional Magazine.
- Emily Neideigh (Biology) received the Clarence Schock Environmentalist Fellowship award.
- Jenn Teson (Biology) presented a paper at the Atlantic Estuaries Research Society in Ocean City, MD.
- The Respiratory Therapy Program was awarded the Distinguished RRT Credentialing Award at the summer 2013 national meeting of the Commission on Accreditation for Respiratory Care, for the second year in a row.
- A group of six Chemistry majors attended the American Chemical Society national meeting in Fort Worth, Texas to present their research results.
- The American Chemical Society Student Affiliate chapter received the Honorable Mention Chapter Award for its 2012 – 2013 activities, at the 247th ACS National Meeting in Fort Worth.
- Computer Science major Allyssa Zevallos won the award for the Best Undergraduate Paper at the 2014 PACISE conference.
- Nine Computer Science students attended the PACISE conference held at California University of PA.
- Nine Computer Science students participated in the ACM Regional Programming Contest at Shippensburg, PA.
- Jared McAndrews (Computer Science) received a National Institute of Standards and Technology Research Fellowship for summer 2013 in Gaithersburg, MD.
- The MU Cyber Defense Team advanced to the Mid-Atlantic Regional Collegiate Cyber Defense Competition and placed 8th in the region.
- The Computer Science Department’s Programming Team of Eric Ginter, Dan Rabiega, and Alyssa Zevallos placed 2nd in the 2014 PACISE programming contest. Two other Millersville teams of three students each also participated.
• Jordan McCormick (Meteorology) was the recipient of the 2013 – 2014 NOAA Ernest Hollings Undergraduate Scholarship.

• A group of Meteorology students accompanied Dr. Richard Clark to Houston, Texas for approximately one month in August 2013, as part of the NASA-funded Discover-AQ Houston project.

• Twenty-four Millersville Meteorology students, together with Drs. Richard Clark and Todd Sikora (Earth Sciences) joined researchers from across the country in a project funded by the National Science Foundation, studying lake effect snows near Geneva, NY. The students were there to launch weather balloons, monitor surface conditions and photograph ice crystals as part of the NSF-funded Ontario Winter Lake-effect Systems (OWLeS) project. Students spent several weeks in December and several weeks in January in upstate New York.

• Jessica Butts (Mathematics) was accepted into the Summer Institute in Biostatistics at the University of Minnesota, for Summer 2014.

• Five MU Mathematics majors sat for the prestigious Putnam Exam, a national exam taken by the best mathematics students in North America. Four of the students scored points on the exam, on which more than half of the takers nationally score no points. The MU team was ranked 143 out of the 557 teams who took the exam.

• A group of seven NSF Noyce scholars (Mathematics majors) gave a presentation at the National Council of Teachers of Mathematics regional conference in Baltimore.

• Megan Rehm (Mathematics graduate student) gave the presentation “Maya Calendars in the Classroom” at the Graduate Student Talk session of the EPaDel Conference of the Mathematical Association of America, held at the University of Scranton, April 26, 2014.

• MSN student, Cayleigh Minter presented a poster entitled Implementing Mid-Level Provider Utilization in Emergency Department Triage and Patient Throughput Outcomes at Pinnacle Health Medical Education Day and was awarded “Best Allied Health Poster.”

• Four BSN students presented posters on their research projects at the Pinnacle Health Nursing Research Symposium.

• BSN students Charlene Stein and Laura Lau presented their poster, “The Effects of Chlorhexidine Bathing on Reducing Central Line Associated Blood Stream Infections” at the Oncology Nursing Society Annual Oncology Nursing Congress.

• Twenty-eight undergraduate nursing students and one graduate student attended the PA State Nurses Association Action Day on Capitol Hill.

• Physics majors Brianna Beasley, Kanan Grosklos and Katherine McClintock attended the Northeast Conference for Undergraduate Women in Physics, January 17 – 19, 2014 at Penn State University.

• George Hinerman (Physics) gave a poster presentation, “The Energy flow of a Linear Dipole in a Dielectric Medium” at the American Physical Society March Conference in Denver, Colorado. He also
gave a poster presentation, “The Energy flow in water” at the inaugural Undergraduate Research in Science, Technology, Engineering and Math Conference at Slippery Rock University.

- Society of Physics Students (SPS) members George Hinerman, Brianna Beasley, Kevin Miller, and Chris Reuling attended the American Physical Society (APS) meeting in Savannah, GA.
- The Society of Physics Students Demo Team made a number of presentations during the past year at local high schools and middle schools.
- Daniel M. Long (Physics) participated in the summer 2013 REU at Penn State with Dr. John Badding, “Interdisciplinary Materials and Physics”.
- Kevin Miller (Physics) was accepted into the summer 2014 REU program at the Arecibo Observatory in Puerto Rico.
- At the 2014 School of Science and Mathematics Research Recognition Symposium, 133 students were recognized for 164 student-faculty research projects, along with students who received internships, grants and awards. In addition, the Departments of Biology, Earth Sciences and Mathematics all held 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 2014 Research Poster Display, showcasing thirteen posters with joint faculty/student authors; the Fall 2013 Homecoming Poster Display included nine posters with joint faculty/student authors.
- Thirty-two (32) nursing graduate students completed Scholarly Projects in 2013 – 2014 and presented their results at the Nursing Scholarship Showcase.
- Thirty-eight (38) SCMA students completed co-ops during 2013 – 2014.
- Seventeen (17) SCMA students gave presentations on their research at regional, national or international professional meetings during 2013 – 2014. In addition, many students presented research papers at the Made in Millersville Student Research Conference and at other venues on campus, including departmental colloquia.
- Eighteen (18) SCMA students were selected for internships with various agencies in 2013 – 2014, including Los Alamos National Laboratory, Hawk Mountain Sanctuary, University of Washington, University of Michigan, University of Buffalo, MU Police and Division of Health and Safety, NASA Student Airborne Research Program in California, WRAL-TV, National Weather Service, PA Department of Conservation and Natural Resources, the National Center for Atmospheric Research, Milton Hershey School, Delta Development Group, Exelon Energy Corporation and LEMA.

Graduate and Professional School Placements:

Graduate Schools: Recent SCMA graduates were accepted for graduate study at the following universities: University of Delaware, University of Pittsburgh, North Carolina State University, Indiana University, Penn State University, American University, Johns Hopkins University, University of Washington, Purdue University, Ohio State University, University of Michigan, University of North Carolina, University of Illinois, Hampton University, Texas A&M, Millersville University, University
of Colorado, University of Texas, Arlington, Arcadia University, West Chester University and East Stroudsburg University.

**Professional Schools:** In Fall, 2014, recent SCMA graduates will be starting physician assistant programs at Hofstra University, Massachusetts College of Pharmacy and Health Sciences, Alderson-Broadus University and Lock Haven University, the physical therapy program at Widener University and the veterinary medicine program at Ross 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 also a 100% pass rate on the Praxis content exams for science and mathematics education majors.

**C. Faculty Achievements (selected detail)**

Millersville science and mathematics faculty and staff members are active scholars and their scholarly endeavors help to make them better teachers. In 2013 – 2014, SCMA faculty members published 1 book, with 5 additional books currently in press and 39 articles, with 30 additional papers submitted. SCMA faculty presented 87 papers at professional meetings and attended 215 professional conferences or seminars. It is noteworthy that much of the faculty research is conducted collaboratively with Millersville students.

**External Grants**

SCMA faculty members submitted sixteen (16) external grant or contract proposals in 2013 – 2014, representing requests in excess of $2.1M. Altogether, sixteen external grants were funded during 2013 – 2014, representing more than $1.01M in awards; decisions on several grant proposals 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 2013 – 2014 include:

- $633,214 awarded by NSF to Drs. Richard Clark and Todd Sikora (ESCI) for “Stable Boundary Processes and Their Interaction with Nocturnal Convective Activities over the Great Plains during PECAN”.
- $33,900 awarded by Dering Consulting Group, Inc. to Dr. Sepideh Yalda (ESCI) for Emergency Management for Transit Facilities.
- $3,000 awarded by the County of Hunterdon, NJ to Dr. John Wallace (BIOL) for a continuation of his black fly surveillance project.
- $20,484 awarded by the National Security Agency (NSA) to Dr. Mingquan Zhan (MATH) for research into Hamiltonian and Hamiltonian-connected Line Graphs and Claw-Free Graphs.
- $6,588 seed assistance grant awarded by the PA Department of Community and Economic Development to Dr. David Hutchens (CSCI) for Enhancing Face the Waste.
$20,000 awarded by NSF to Dr. Stephanie Schwartz (CSAC) as an NSF Travel Grant to support the Diagrams 2014 Doctral Consortium.

$36,500 awarded to Mr. Eric Horst (ESCI) by the Pennsylvania Department of Transportation, for winter storm forecasting.

$240,537 awarded by NASA through SSAE to Dr. Richard Clark (ESCI) to support participation in Discover-AQ Denver.

Continuing grant awards include:

$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.

$4,900 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 summer workshops to local middle and high school mathematics teachers.

$52,349 awarded to Dr. Dominique Dagit (BIOL) by the NSF, to fund a five-year collaborative research project on jaws and backbones: chondrachthyan 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.

$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.

$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 Chincoteague Bay Field Station 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) completed her term as the Chair of the Academic Advisory Council for the Chincoteague Bay Field Station at the Marine Science Consortium.

Dr. Ryan Wagner (BIOL) serves as President of the Commonwealth of Pennsylvania University Biologists (CPUB).

Dr. Christopher Hardy (BIOL) is the Chair of the Vascular Plants Technical Committee of the Pennsylvania Biological Survey.

Dr. John Wallace (BIOL) is a member of the Board for the Buruli Ulcer Victims Aid Foundation and is Secretary of the American Board of Forensic Entomology.

Dr. Julie Ambler (BIOL) is the Newsletter Editor and a Board member for the Atlantic Estuarine Research Society (AERS).

Dr. Steven Bonser serves as Millersville University’s Institutional Liaison to the Council on Undergraduate Research (CUR), a Member-at-Large of the Southeastern Section of the Pennsylvania American Chemical Society, the Chair of the Awards Subcommittee of the
Committee on Science of the American Chemical Society and a member of the Science & Technology Subcommittee of ComSci (American Chemical Society).

- 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 Pennsylvania Collaborative for Applied Nanotechnology and as a member of the Editorial Advisory Board for 2 journals: Proteus and Scientific Journals International.
- Dr. Aimee Miller (CHEM) is a member of the Committee on Computers in Chemical Education, Division of Chemical Education, American Chemical Society.
- Dr. David Hutchens (CSCI) serves on the Board of PACISE (Pennsylvania Association for Computer and Information Science Educators) and served on the PACISE editorial board in Spring 2014.
- Dr. Blaise Liffick (Computer Science) completed his term as a member of the Computing Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).
- Dr. Stephanie Elzer serves as a member of the Diagrams Steering Committee and the Graduate Symposium Chair for the International Conference on Theory and Application of Diagrams, Australia, 2014.
- Dr. Richard Clark (ESCI) is in his second term on the Board of Trustees of the University Corporation for Atmospheric Research, which he also serves on several committees, including the Executive Committee, the Budget and Programs Committee and the Nominating 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. Alex DeCaria (ESCI) is a member of the Science Standing Committee for the National Assessment of Education Progress.
- Dr. Duane Hagelgans (MSEM/ESCI) is a member of the Advisory Board and the Foundation Board for the Lancaster County Public Safety Center, serves as Vice Chair of the Lancaster County Emergency Planning Committee, is the Emergency Management Coordinator for Millersville Borough and Manor Township, the Public Information Officer for the Lancaster County Emergency Management Agency and is a Leadership Team member of the South-Central Task Force (emergency management task force for eight central PA counties).
- Dr. Todd Sikora (ESCI) is an Associate Editor for the *Journal of Applied Meteorology and Climatology*. Dr. Sikora also serves on the Membership Committee of the University Corporation for Atmospheric Research.
- Dr. Sepideh Yalda (ESCI) is a member of the University Corporation for Atmospheric Research (UCAR) Governance Task Group and is a member of the American Meteorological Society’s Battan Book Award Committee. Dr. Yalda is also a Member Representative for UCAR, was appointed to the Unidata Strategic Advisory Group and is a member of the International Group of the Natural Hazard Mitigation Association, as well as an invited member of the Emergency Management Institute Higher Education Accreditation Focus Group and the National Environmental Educational Foundation Advisory Group.
- Dr. Erin Moss (MATH) is the co-editor of the problem-solving department for the journal *Teaching Children Mathematics*, a monthly publication of the National Council of Teachers of Mathematics.
- Dr. Kevin Robinson (MATH) serves as the President of the Harrisburg Chapter of the American Statistical Association, as the vice-chair of PASSHE-MA and as an Associate Editor for both the *Journal of Statistics Education* and for the *Journal of Probability and Statistical Science*. 
Dr. Delray Schultz (MATH) serves as a question leader for the AP Statistics exam reading and was a triage and contention round judge for Moody’s Mega Math Challenge competition.

Dr. Robert T. Smith (Dean’s Office) serves as 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 Co-editor of the Pennsylvania Council of Teachers of Mathematics Magazine.

Dr. Tyrone Washington (MATH) serves as a board member of the Pennsylvania Council of Teachers of Mathematics and as the Editor of the Pennsylvania Council of Teachers of Mathematics Magazine.

Dr. Janet White (MATH) serves as President of the Pennsylvania Association of Mathematics Teacher Educators and coordinated the AP Calculus and AP Statistics simulations held for IU-13 in Lancaster, as well as the statistics simulation for Harford County, Maryland teachers and students.

Dr. Michael Wismer (MATH) was a member of the faculty planning team responsible for planning content and developing presentations for the 2013 Project PULSE [Partnership to Understand and Lead STEM Education] sponsored by IU-13.

Dr. Deborah Castellucci (NURS) is a member of the Editorial Advisory Board and Reviewer for Scientific Journals International.

Dr. Ruth Davis (NURS) served as a Peer Reviewer for the journal, Qualitative Health Research and as a member of the advisory board for Domestic Violence Services of Lancaster County.

Dr. Kelly Kuhns (NURS) is an elected member of the PA State Nurses Association (PSNA) Board of Directors, a member of the editorial board for The Pennsylvania Nurse journal, the President of the local PSNA district, and is the co-convener of the South Central Regional Action Coalition to Advance the Future of Nursing and is the Program Chair for the South Central PA Evidence-Based Practice Consortium; she also maintains her role on the PSNA Continuing Education Peer-Reviewer Unit.

Professor Jenny Monn (NURS) is a member of the Board of Directors of the Lancaster County Nurse Practitioner Association and is a member of the South Central PA Evidence-based Practice Consortium Program Committee.

Dr. Natalia Dushkina (PHYS) is a consultant to the Educational Policy Improvement Committee of the College Board and is a Certified Reviewer for the Advanced Placement Course Audit for both AP Physics B and AP Physics C.

Dr. Mehmet Goksu (PHYS) serves as the President of the Central PA Section of the American Association of Physics Teachers and was recently re-elected to another term. 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 7th Annual Central PA Regional Science Olympiad, hosted by Millersville.

Special Activities of Note:

The School of Science and Mathematics maintains a long-standing emphasis on undergraduate research and each year, scores of our students are involved in undergraduate research projects with our faculty. In particular, in the past year, 133 students completed 164 research projects with our faculty. Further,
seventeen of these students gave presentations of their research at professional meetings. Of particular note are:

- Dr. Judy Cebra-Thomas (BIOL), with three undergraduate co-authors, published a paper entitled “Late-Emigrating Trunk Neural Crest Cells in Turtle Embryos Generate an Osteogenic Ectomesenchyme in the Plastron” in *Developmental Dynamics*.
- Undergraduate student Heather Gochnauer (BIOL) presented a poster titled “Regulation of neural crest cell emigration in turtle embryos” (along with Matthew Smith, Class of 2014 and Dr. Judy Cebra-Thomas) at Experimental Biology 2014 in San Diego, CA.
- Along with MU student Jonathan Kettering, Dr. Yuan Zhong (BIOL) co-authored a paper entitled “A Model for Evolutionary Relationship between Short-chain Isoprenyl Diphosphate Synthases, Terpene Synthases and Triterpene Synthases” that was selected for the Highlight Track at the 2013 International Conference of Systems Biology.
- Undergraduate student Teah Nauman published a paper in *Wildlife Professional Magazine*.
- Recent graduate Matt Zak (BIOL ’13) published a paper in the journal *Animals*; he also got 3rd place for his paper submitted at the PASSHE Undergraduate Research Symposium.
- Computer Science undergraduate Alyssa Zevallos (CSCI) presented the paper, “Identification of Most Relevant Paragraph in an Article for a Bar Chart Using Machine Learning and Kullback-Leibler Divergence” at the 2014 PACISE conference in California, PA, for which she won the Best Undergraduate Paper award.
- Meteorology undergraduate Michelle Serino presented the co-authored paper, “Trace Gas and Particle Measurements Made at Rural Sites during DISCOVER-AQ: A Comparison of Trends Between an Inland Wintertime Site and a Coastal Summertime Site” at the 16th Conference on Atmospheric Chemistry, in February 2014.
- Meteorology undergraduate Felicia Guarriello presented the co-authored paper, “Chemical Dynamics Driving NO2 in the Lower Troposphere at Rural Sites During DISCOVER-AQ: A Comparison Between an Inland Wintertime Site and a Coastal Summertime Site” at the 16th Conference on Atmospheric Chemistry, in February 2014.
- Meteorology undergraduate Ricordo Uribe presented the co-authored paper, “Boundary layer profiles of particle size distribution and trace gases over Huron, CA during DISCOVER-AQ” at the 16th Conference on Atmospheric Chemistry, in February 2014.
- Graduate student Michael Charnick (MSISA) presented the co-authored paper, “Impacts of mesoscale phenomena on local air chemistry during the DISCOVER-AQ campaign”, at the 16th Conference on Atmospheric Chemistry, in February 2014.
- Undergraduate Nate Murray (Ocean Sciences and Coastal Studies) presented the co-authored paper, “Climate adaptation strategies for the Eastern Shore” at the Ocean Sciences Meeting in Honolulu, HI in February 2014; he also presented, “LiDAR application for the Eastern Shore” at the Chincoteague Bay Conference at Wallops Island, VA, in October, 2013 and “Climate Adaptation Strategies for Wallops Island”, presented at the NASA Climate Conference, Wallops Island, VA, in November, 2013.
• Undergraduate Kaitlyn Colna (Ocean Sciences and Coastal Studies) presented the co-authored paper, “Adapting to a changing climate along the eastern shore” at the Ocean Sciences Meeting in Honolulu, HI in February 2014.

• Graduate student Megan Rehm, (MATH) presented the paper, “Maya Calendars in the Classroom” at the Graduate Student Talk session of the EPaDel Conference at the University of Scranton, in April, 2014.

• Graduate student Cayleigh Minter (NURS) gave a podium presentation of her research, entitled “Implementing Mid-Level Provider Utilization in Emergency Department Triage and Patient Throughput Outcomes” at the Pinnacle Health Medical Education Day and was awarded “Best Allied Health Poster” in April, 2014.

• Nursing undergraduates, Lisa Hostetter and Jill Faber presented their poster “Nuisance Alarms – When Seconds Count: An Evidence-Based Practice Review Evaluating the Relationship between Nuisance Alarms and Failure to Rescue Events” at the Pinnacle Health Nursing Research Symposium in April 2014.


• Nursing undergraduates Charlene Stein and Laura Lau presented their poster, “The Effects of Chlorhexidine Bathing on Reducing Central Line Associated Blood Stream Infections” at the Oncology Nursing Society Annual Oncology Nursing Congress in May 2014.

• Undergraduate George Hinerman (PHYS) gave a poster presentation, “The Energy flow of a Linear Dipole in a Dielectric Medium”, at the American Physical Society March 2014 Conference in Denver, Colorado. He also gave the poster presentation, “The Energy flow in water”, at the inaugural Undergraduate Research in Science, Technology, Engineering and Mathematics Conference at Slippery Rock University.

• Millersville students participated, along with students at 557 other colleges and universities in North America in the annual William Lowell Putnam Competition, a day-long and exceptionally challenging mathematics examination. More than half of the students who take the exam nationally score NO points. Millersville students had scores of 20, 18, 10, 2 and 0 (considered an unusually strong team finish). The pre-selected team (with scores of 20, 10 and 0) ranked 143rd out of 557 teams in North America. (With a slightly different team composition, the MU team would have placed in the top 80 teams in the competition.

• Millersville's Respiratory Therapy program was notified that it will be awarded the Outstanding RRT Credentialing Award for the third year in a row, by the Commission on Accreditation for Respiratory Care. The award will be presented at a national meeting in summer 2014.

• Millersville's Cyber Defense Team competed in the Mid-Atlantic Regional Cyber Defense competition, finishing in fourth place.

• Dr. Richard Clark (Earth Sciences) and a group of 13 Meteorology majors spent the month of September on-site near Houston, TX, participating as part of a multi-university team, engaged in a major air quality study, funded by NASA. Millersville students regularly launched tethered balloons to conduct detailed air quality measurements, as part of NASA’s Project AQ-Houston. The Millersville team was one of six organizations conducting atmospheric chemistry research using our tethered balloon system.

• Twenty-four Millersville Meteorology students, together with Drs. Richard Clark and Todd Sikora (Earth Sciences) joined researchers from across the country in a project funded by the National Science Foundation, studying lake effect snows near Geneva, NY. The students were
there to launch weather balloons, monitor surface conditions and photograph ice crystals as part of the NSF-funded Ontario Winter Lake-effect Systems (OWLeS) project. Students spent several weeks in upstate New York in December and several weeks in January. During their stay in New York, the students observed and captured video of a "thundersnow" storm, where lightning and thunder occur within a heavy snow storm.

- Dr. Lyman Rickard (CHEM) was awarded a Fulbright Scholarship and spent the Fall 2013 semester at Cotton College, in the city of Guwahati, Assam, India, where he worked with faculty and students and gave numerous presentations at a number of universities.
- Dr. Duane Hagelgans (ESCI/CDRE/MSEM) is one of only ten individuals in the country selected by FEMA to become an Instructor for a series of emergency management courses, to be offered at the National Emergency Management Academy, providing training to hundreds of emergency managers from around the country.
- Dr. Alex DeCaria (ESCI) had his co-authored book, *A First Course in Atmospheric Numerical Modeling*, published by Sundog Publishing in 2014. Dr. DeCaria is currently preparing a textbook on Python Programming also to be published by Sundog Publishing.
- Dr. Ximen Catapillan (MATH) has a book entitled, *Mathematics in a Sample of Cultures*, in press with the Kendall-Hunt Publishing Company.
- Drs. Zhigang Han and Ron Umble have a textbook, *Transformational Plane Geometry*, in press with the CRC Press, Taylor & Francis Group.

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

In March, 2014, approximately 650 middle and high school students from throughout the Central Pennsylvania region participated in the **Central PA Science Olympiad**, a day-long science competition, hosted for the 7th year in a row by the MU School of Science and Mathematics. Thanks to the ongoing efforts of Advancement staff, the Olympiad continues to be partially funded for the next several years through the generous support of Phoenix Contact, Inc. The reviews from participants were uniformly excellent. The 29th annual **Brossman-Frisbie Science Lectureship** attracted hundreds of elementary, middle school and high school students and members of the community to two presentations by Dr. Michael Mann, Distinguished Professor of Meteorology at Penn State University. Dr. Mann gave an afternoon presentation to select elementary and middle school students from around the area and gave an evening lecture that was open to the public. His lecture, entitled, "The Hockey Stick and the Climate Wars" was the highlight of the day and garnered both television and newspaper coverage of the event. The **Women in Mathematics and Science Conference** was attended by a capacity crowd of 250 students from 50 area middle and high schools, who attended the keynote address by prominent mathematician Dr. L. Pamela Cook, President-elect of the Society for Industrial and Applied Mathematics and Professor of Mathematics at the University of Delaware; 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. Approximately one Hundred 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) included a total of 325 students and 30 teachers. Likewise, the AP Statistics simulation attracted 450 students and 19 teachers. Another 140 students and 20 teachers participated in an AP Statistics simulation offered to Harford County, Maryland students by MU faculty. 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 25 middle and high school students from around the region over 9 days in summer 2013; eight of these students were supported by scholarships, half of which were provided by Project Gear Up.

D. Significant School Achievements

In the past year, the Department of Chemistry developed a 3+4 option in Pharmacy, in cooperation with Lake Erie College of Medicine (LECOM), which will allow students to spend three years at Millersville before transferring to LECOM, leading to a bachelor’s degree in Chemistry from MU and a Pharm.D. degree from LECOM. This program was approved in the past year. In Fall 2013, the Department of Computer Science introduced a special topics course on Software Productization that coordinates with an Art and Design class. This change successfully transitioned the Software Productization Center from a grant-funded entity, where external and internal funds provided student hours to work on a project for a single external client to a course-based, credit-bearing experience. The students in these two classes constructed eight web sites for external clients, ranging from small companies to non-profits. Four departments (Chemistry, Computer Science, Earth Sciences and Physics) developed and taught new UNIV 103 (Freshman Year Experience) courses for the first time in Fall 2013, while the Department of Mathematics taught their UNIV 103 course for the second time in Fall 2013. Major goals for these courses include better transitioning students to the demands of our curricula, introducing students to the disciplines and improving retention and graduation rates for science and mathematics majors. Faculty from the MSEM and CDRE developed a new option in Environmental Hazards and Emergency Management, under the BA Multidisciplinary Studies program, which was approved in the past year. MSEM/CDRE faculty introduced several new general education courses, which will support both the existing EHEM minor and the new program. The MSEM program also implemented plans during the past year designed to increase international enrollments in the MSEM program.

The M.S. program in Integrated Scientific Applications (MSISA) was launched in fall 2012 with five graduate students and now enrolls 14 students from a broad geographic area, in four specializations (Weather Intelligence and Risk Management, Climate Science Applications, GeoInformics, and Environmental Systems Management). The Department of Earth Sciences also developed and taught for the first time a new lecture/laboratory course (ESCI 120/121) in geology, intended to provide an additional option for introductory general education science. The Department of Mathematics continued to provide selected incoming freshmen with initial placement into College Algebra an option to utilize a software solution to review a sequence of material on a non-credit basis, allowing students who successfully complete this option to skip College Algebra and take the next mathematics course. At this time, the number of students participating in this option is rather small. The department also continues to expand its use of online homework systems in a range of introductory classes, for the purpose of improving student performance in these courses. Following the approval of a new dual-admission program with Harrisburg Area Community College (HACC) in 2013, the MU Department of Nursing is
now teaching their entire BSN curriculum either onsite at HACC’s Harrisburg campus or online, allowing Harrisburg students to complete the BSN program without the need to travel to MU. The program has been well-received at HACC and classes have been running at or near capacity, with several requiring us to open additional sections, in order to accommodate the demand. The department also submitted a Letter of Intent to PASSHE to develop of a Doctor of Nursing Practice program.

Through greatly improved recruitment and thanks to the increased flexibility due to the advent of the BS in Allied Health Technologies program, the joint MU/Lancaster Regional Medical Center Respiratory Therapy program is now operating at between 85% and 100% of its maximum capacity (after we increased the capacity by successfully petitioning the accrediting agency to increase the maximum number of students allowed in a cohort). This is a significant change, after many years of cohorts that were well below capacity. The Earth Sciences and Physics Departments jointly developed an interdepartmental minor in Helio-Physics and Space Weather, which was approved in the past year. The Department of Physics worked with the Department of Materials Science and Engineering at the University of Delaware to establish a new 3+2 co-operative engineering program, which was approved by the UD Faculty Senate in the past year. Upon completing the program (3 years at MU and 2 years at UD), students will be awarded the BA degree in Physics from Millersville and the Master’s degree in Materials Science and Engineering from the University of Delaware.

SCMA faculty and MU administration continue to be very involved with new initiatives at the Chincoteague Bay Field Station at the Marine Science Consortium, of which MU is one of the three senior full members. After serving several years, Dr. Dominique Dagit (BIOL) will be stepping down as chair the CBFS Academic Advisory Committee. In the past year, Dr. Robert Smith was appointed to lead the liaison team (consisting of the deans at the senior full partner institutions) working with local NASA staff to produce better ties (both research and educational) with the NASA Wallops Flight Facility, also located at Wallops Island, Virginia.

Over the last five years, recruitment of underrepresented students has significantly increased in the School of Science and Mathematics. Notably, the total number of underrepresented students majoring in one of the school’s programs has increased from 175 in 2008 to 350 in 2013 (based on Fall official enrollments). Overall, this represents a doubling of underrepresented enrollments 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, by 4.7% from 2010 to 2011 and by 33% from 2011 to 2012, with a slight 2% drop from 2012 to 2013. Overall, the increase in underrepresented enrollments significantly outpaced the (quite significant) overall growth in SCMA majors, which increased by a total of 27% from 2008 to 2013. Specifically, SCMA enrollments increased by 6.5% from Fall 2008 to Fall 2009, by 7.3% from 2009 to 2010, by 7.7% from 2010 to 2011, by 1.7% from 2011 to 2012 and by 3.1% from 2012 to 2013.

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, offered a two-week intensive, hands-on workshop during Summer 2012 at MU for about 30 area secondary science teachers, as part of Project ARRMS, an IU-13 initiative funded by a US Department of Education grant. In previous years, this workshop had been held at area private colleges. Similarly, MU mathematics faculty developed and taught one week of the corresponding two-week summer IU-13 ARRMS workshop for area mathematics teachers. These workshops were funded through contracts with IU-13 totaling approximately $24,000. During spring 2012, SCMA and School of Education faculty and
administration supported IU-13 staff in developing a new grant proposal that was submitted to the US
Department of Education, which would fund several years of follow-up workshops (Project PULSE) for
area science and mathematics teachers, following a similar model. In late spring 2013, the grant was
funded and MU faculty worked quickly to develop workshops that were offered on the MU campus
during the summer of 2013. Project PULSE workshops are scheduled to continue with MU leadership
during the summer of 2014.

E. Summary

Despite facing ongoing budgetary challenges, 2013 – 2014 was another highly productive year for the
students and faculty of the School of Science and Mathematics. No doubt our greatest challenge
continues to be meeting the rapidly increasing demands for seats in our courses, with no increase in
staffing or operating budget. The increased demand for our courses has been driven by long-term and
very steep increases in the number of science and mathematics majors over the past five years, along
with increased demand from non-majors, notably from students enrolled in the middle level teacher
certification science and mathematics emphasis.

Science and mathematics faculty members continued their record of actively engaging undergraduate
students in research projects and successful publication and presentation (often together with their
students). Upon their graduation from MU, our students continue to experience success in gaining
admission to top graduate and professional schools. Faculty and staff continue to be very active in
writing successful proposals for extramural funding of research projects. Most notably, the Department
of Earth Sciences has been awarded a series of sizeable grants by NASA, which have funded MU
faculty and student participation in NASA’s Discover AQ (Air Quality) project. During 2013 – 2014,
this involved a group of MU undergraduate Meteorology majors, who spent four weeks near Houston,
Texas, using the MU tethered balloon facility to launch instruments as part of a large, coordinated study
of air quality in this area of the country. In addition, a team of MU meteorology majors spent a number
of weeks in upstate New York, studying lake-effect snows, as part of the NSF-funded OWLeS project.
These students participated in hands-on research generally only afforded to graduate students. In 2013 –
2014, we selected the third cohort of students funded under our $1.2M NSF Noyce grant, developed to
increase the number of mathematics teachers working in high need (urban or rural) school districts. The
students in the first two cohorts participated in a number of activities, including the Philadelphia Urban
Semester, in Spring 2013 and 2014. 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 2013 – 2014, SCMA faculty pressed forward with numerous curricular
developments, including the development of courses for the newly-implemented MS program in
Integrated Scientific Applications. Even as the Nursing faculty implemented their new onsite RN to
BSN program at Harrisburg Area Community College, they developed the structure of the School’s first
doctoral program, the DNP (Doctor of Nursing Practice) degree, for which they submitted a Letter of
Intent to PASSHE. In the past year, the Department of Chemistry developed a curriculum for a 3+4
Pharmacy degree program, even as we work to expand our existing academic affiliation agreement with
Lake Erie College of Medicine for post-graduate study in pharmacy. The School also continues to
increase its visibility and service to the community, by working in partnership with the IU-13 to deliver
federally-funded summer workshops for area mathematics teachers that were taught at Millersville in
Summer 2013.