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EXECUTIVE SUMMARY

A. School Highlights for 2014-2015 (details follow)

For many years, Millersville University 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 more than twenty-three 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:

- Andrew Lytle completed a Summer Research Fellowship at the Stowers Institute, conducting research in molecular biology.
- Liz Sautter received a summer internship to study sharks at Bimini Biological Station in the Bahamas.
- Jennifer Spengler has been accepted into the Stowers Institute Summer Scholars program for Summer 2015.
- The Respiratory Therapy Program was awarded the Distinguished RRT Credentialing Award at the summer 2014 national meeting of the Commission on Accreditation for Respiratory Care. This was the third year in a row that the program had this distinction.
- A group of twelve Chemistry majors attended the American Chemical Society national meeting in Denver, CO to present their research results.
- The American Chemical Society Student Affiliate chapter received the Commendable Chapter Award for its 2013 – 2014 activities, at the 248th ACS National Meeting in Denver. The chapter also was awarded the Green Chemistry Award at the same meeting.
- Six students attended the PACISE conference held at Edinboro University and participated in the programming contest. The team of Mevin Fansler, Erik Ginter, and Dan Rabiega took first place.
- Hannah Ashberry (Chemistry) has been accepted into the NSF-funded Research Experience for Undergraduates programs at the University of Kansas and University of Maryland.
• Pineal Berkere (Chemistry) has been accepted into the NSF-funded Research Experience for Undergraduates program at the New York University School of Medicine.
• Emily Dalbey (Chemistry) has been accepted into the NSF-funded Research Experience for Undergraduates program at Princeton University.
• James Dreer (Chemistry) has been accepted into the NSF-funded Research Experience for Undergraduates program at the Penn State University College of Medicine.
• Ivanny Jacome Ottati (Chemistry) has been accepted into the NSF-funded Research Experience for Undergraduates program at Princeton University.
• Billy Maximuck (Chemistry) has been accepted into the NSF-funded Research Experience for Undergraduates program at the University of Tennessee.
• Renee Stover (Chemistry) has been accepted into the NSF-funded Research Experience for Undergraduates program at the University of California, Riverside.
• Nikki Wolford (Chemistry) has been accepted into the NSF-funded Research Experience for Undergraduates program at the North Carolina State University.
• Dan Rabiega, Tyler Helsel, and Jason Zimmerman received National Institute of Standards and Technology Research Fellowships for summer 2015 in Gaithersburg, MD.
• Nine students participated in the ACM Regional Programming Contest at Shippensburg, PA.
• A group of seventeen Meteorology majors accompanied Dr. Richard Clark to Golden, CO, as part of the NASA-funded Discover-AQ project.
• Ashley Orehek (Meteorology) was selected for the National Center for Atmospheric Research, Undergraduate Leadership Workshop, to be held in June 2015.
• Sylvia Hitz (Earth Sciences) is the recipient of the Ernest Hollings Scholarship and Internship Program.
• Six MU Mathematics majors sat for the prestigious Putnam Exam, a national exam taken by the best mathematics students across North America. One of the students scored 17 points on the exam, on which more than half of the takers nationally score no points.
• Four mathematics majors passed a total of five actuarial examinations.
• Nick Heil (Mathematics) won an Outstanding Presentation Award in the Mathematical Association of America (MAA) Undergraduate Poster Session at the 2015 Joint Mathematics Meeting in San Antonio, Texas.
Five mathematics majors (Sarah E. Bradley, Alana Clark, Jennifer Tran, Ross M. Young and Rebecca Janeshefskie) gave a poster presentation at the Noyce Northeast Conference on The Noyce Scholars program at Millersville University.

Jessica Butts and Justin Eastman (Mathematics) have been accepted into the Undergraduate Modeling Workshop at North Carolina State University May 17-22, 2015.

Justin Eastman (Mathematics) has been accepted into the NSF-funded Research Experience for Undergraduates program at Rochester Institute of Technology from June 8 to July 31, 2015.

Melissa Kramer (MSN student) presented her work on community engagement to the PA State Nurses Association Day on Capitol Hill.

George Hinerman (Physics alumnus) submitted a paper in collaboration with Dr. Xin Li: “The Simulation of the Energy Flow Pattern for a Linear Dipole in a Dielectric Medium”, as an invited research article, “The Open Access Journal of Science and Technology”.

Kanan J Grosklos (Physics) gave an oral presentation in collaboration with Dr. Xin Li: “The Interferences patterns of Dipole Radiation”, at the American Physical Society April Conference in Baltimore, Maryland.

Kevin Piaskowski (Physics) was awarded a summer 2015 Internship in the Department of Applied Physics at Johns Hopkins University.

Kevin Miller (Physics), attended the summer 2014 Research Experience for Undergraduates program at the Arecibo Observatory in Puerto Rico.

Daniel Long (Physics alumnus) presented a poster: “Optics Research at Millersville University: Columnar Thin Films as Gas Sensors” with co-authors Dr. Natalia Dushkina and Dr. Tariq Gilani at the National Educators Workshop on November 2-4, 2014 in Seattle, WA.

The Society of Physics Students Demo Team, under the direction of Dr. Mehmet Goksu, continues to be active making presentations at local high schools and middle schools.

Students in the undergraduate Nursing Research course presented their evidence-based practice analyses in a Poster Showcase at Pinnacle Health Community General Hospital.

Thirty undergraduate and graduate nursing students attended the PA State Nurses Association Action Day on Capitol Hill.

Heather Beal (MSEM) won the Global Student Council Essay Competition from the International Association of Emergency Managers.

The MU Student Chapter of the International Association of Emergency Managers was awarded the Student Chapter of the Year Award for 2014-2015.
• The MU Student Chapter of the International Association of Emergency Managers was awarded the Excellence in Academic Programming Award.

• At the 2015 School of Science and Mathematics Research Recognition Symposium, 140 students were recognized for 183 student-faculty research projects, along with students who received internships, grants and awards.

• The School of Science and Mathematics continued its emphasis on capstone research experiences, with the School's Spring 2015 Research Poster Display, showcasing twenty-three posters with joint faculty/student authors; the Fall 2014 Homecoming Poster Display included eighteen posters with joint faculty/student authors.

• Twenty-three (23) nursing graduate students completed Scholarly Projects in 2014 – 2015 and presented their results at the annual Nursing Scholarship Showcase in May 2015.

• Thirty-seven (37) SCMA students completed co-ops during 2014 – 2015.

• Thirty-two (32) SCMA students gave presentations on their research at regional, national or international professional meetings during 2014 – 2015. In addition, many students presented research papers at the Made in Millersville Student Research Conference and at other venues on campus, including departmental colloquia.

• Thirty-three (33) SCMA students were selected for internships with various agencies in 2014 – 2015, including the Bimini Biological Station in the Bahamas, P.H. Glatfelter, Rite Aid Corporation, Lancaster County Emergency Management Agency, York County Office of Emergency Management, National Weather Center, Center for Multi-Scale Modeling of Atmospheric Process, National Center of Atmospheric Research, Texas A&M University, US Geological Service, WGAL TV, CBS 21 TV, WBRE TV, MU Office of Planning and Assessment, Contribution Health, Capitol Blue Cross/Shield, Philadelphia City Office of Emergency Management, Chester County Office of Emergency Management, New Castle County, DE Office of Emergency Management and Johns Hopkins University.

Graduate and Professional School Placements:

Graduate Schools: Recent SCMA graduates were accepted for graduate study at the following universities: University of Delaware, Virginia Tech, Duke University, Cornell University, Georgia Tech, Mississippi State University, UNC-Chapel Hill, University of Michigan, UC-Irvine, University of Illinois – Urbana Champaign, NC-State, University of Oregon, Texas A&M, University of Utah, University of Vermont, Bryn Mawr, University of Maryland Baltimore County, Vanderbilt, Temple University, Ohio State, UCLA, University of Florida, University of Rochester, Pitt, University of Pennsylvania, University of Maryland College Park, University of North Dakota, University of Arizona, Millersville University, University of Wisconsin-Madison, University of Alabama-Huntsville, Texas Tech, Kent State University, West Virginia University, University of
California, Riverside, Bowling Green State University, Clemson University and the University of California, Davis.

**Professional Schools:** In Fall, 2015, recent SCMA graduates will be starting medical school at the University of Pittsburgh and Penn State Hershey Medical School, as well as the veterinary medicine program at Lincoln Memorial University, and the doctor of chiropractic program at the National University of Health Sciences.

**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 program completers.**

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

Millersville science and mathematics faculty members are active scholars and their scholarly endeavors help to make them better teachers. In 2014 – 2015, SCMA faculty members **published three books, with one additional book currently in press** and published **22 articles, with 28 additional papers submitted.** SCMA faculty presented **90 papers** at professional meetings and attended **117 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 twenty-one (21) external grant or contract proposals in 2014 – 2015, representing requests of nearly $3.8M. Altogether, four external grants were funded during 2014 – 2015, representing more than $915,000 in awards; a decision on one large grant proposal is still pending at this time. The above amounts do not include a number of grants carried over from previous years.

New grants awarded in 2014 – 2015 include:

- $507,767 awarded by the National Science Foundation to Dr. Judy Cebra-Thomas (Biology), for research on turtle shell development.
- $240,000 awarded by NASA to Dr. Richard Clark (ESCI) for Deriving Information on Surface Conditions from Column and Vertically Resolved Observations Relevant to Air Quality (DISCOVER-AQ)-Colorado.
$116,000 awarded to Mr. Eric Horst (ESCI) by the Pennsylvania Department of Transportation, for winter storm forecasting.

$13,400 awarded to Dr. Richard Clark (ESCI) by NASA for Deriving Information on Surface Conditions from Column and Vertically Resolved Observations Relevant to Air Quality (DISCOVER-AQ)-HOUSTON- phase II.

$9,614 awarded to Dr. Robert Vaillancourt by the PASSHE FPDC for the project: A study of the microbial food web and toxic phytoplankton blooms of the Delaware Bay Estuary using a ship-of-opportunity autonomous sampling system.

$10,450 awarded by the County of Hunterdon, NJ to Dr. John Wallace (BIOL) for a continuation of his black fly surveillance project.

$15,000 awarded to Dr. Kelly Kuhns (Nursing) by the PASSHE Foundation for program development for the Doctorate of Nursing Practice program.

$3,500 awarded by the End Buruli Ulcer Alliance to Dr. John Wallace (Biology) to support his research into Buruli ulcer.

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.

$289,967 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”.

$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.

$387,738 awarded by the National Science Foundation to Drs. Richard Clark and Todd Sikora (ESCI), for the project Collaborative Research: Ontario Winter Lake-effect Systems, Surface and Atmospheric Influences on Lake-effect Convection.

$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.

$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. Ryan Wagner (BIOL) serves as President of the Commonwealth of Pennsylvania University Biologists (CPUB).
- Dr. John Wallace (Biology) serves as a member of the Board of Directors for the End Buruli Ulcer Alliance and is Secretary of the American Board of Forensic Entomology.
- Dr. Jeremiah Mbindyo (CHEM) is a member of the Academic Advisory Board for the Nanotechnology Institute. He also serves as a member and lead faculty for the Program Design and Implementation Task Force 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. Amy Miller (Chemistry) organized the symposium “Institutional Initiatives for Introductory Student Success” at the Biennial Conference on Chemical Education.
- Dr. Steven Bonser (Chemistry) serves as Millersville University’s Institutional Liaison to the Council on Undergraduate Research (CUR), 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. Puya Ghazizadeh (CSCI) is a member of the Steering Committee for the 1st IEEE Workshop on Vehicular Networks Applications: From Physical Layer to Cloud (VNA’15), as well as a reviewer for 2015 IEEE 82nd Vehicular Technology Conference.
- Dr. David Hutchens (CSCI) serves on the Board of PACISE (Pennsylvania Association for Computer and Information Science Educators).
- Dr. Stephanie Schwartz (CSCI) serves as the General Chair, International Conference on Theory and Application of Diagrams, 2016 and served as the Graduate Symposium Chair for the International Conference on Theory and Application of Diagrams, Australia, 2014. She is also an elected member of the International Steering Committee for Theory and Application of Diagrams.
- 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 (Chair) 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 the Technology Advisory Committee for Space Weather, the Committee on Environmental Stewardship and the 96th Annual Meeting Program Committee, all 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 the 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 an invited 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 an invited member of the Natural Hazard Mitigation Association International Group, as well as an invited member of the Emergency Management Institute Higher Education Accreditation Focus Group and the National Environmental Educational Foundation Advisory Group. She is also an invited member of the Central Pennsylvania Integrated Weather Impacts Team and an invited Guest Member of the American Meteorological Society's Board on Best Practices.

• Dr. Ximena Catepillan (MATH) is a member of Committee on Sections of the Mathematical Association of America, as well as the Silent Auction Conference Coordinator, the Chair of the Nominating Section Officers Committee, the History of Mathematics representative for the Eastern PA and Delaware section of the MAA. She was also the Ethnomathematics Session Chair at the national Joint Mathematics Meetings, in January 2015 and a member of the Editorial Board for RLE (Revista Latinoamericana de Etnomateematicas).

• Dr. Erin Moss (MATH) served as a co-editor of the Problem-Solving Department of 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 (one of six selected nationally) 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) served as Chair of the Advisory Board for the Innovation Transfer Network (ITN) and served as a member of the statewide Transfer Articulation Oversight Committee (TAOC).
• Dr. Cynthia Taylor (MATH) serves 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 a Co-Editor of the Pennsylvania Council of Teachers of Mathematics Magazine.
• Dr. Janet White (MATH) served as the local Arrangements Chair for 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. Jenny Monn (NURS) is the State Representative for the PA Coalition of Nurse Practitioners.
• Dr. Kelly Kuhns (NURS) is a member of the Board of Directors of the PA State Nurses Association and an Executive Council Member of the South Central PA Evidence Based Practice Consortium.
• Dr. Mehmet Goksu (PHYS) is in his second term as the President of the Central PA Section of the American Association of Physics Teachers. Dr. Goksu also served as the Site-Director to organize the 8th 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, 140 students completed 183 research projects with our faculty. Further, thirty-two (32) of these students gave presentations of their research at professional meetings. Of particular note:

• Ten Biology majors and one Earth Sciences major attended the Commonwealth of Pennsylvania University Biologists meeting in April 2015, held at Indiana University of PA, in order to present the results of their research projects. Five of the MU students received awards at the meeting, garnering three first place awards and two second place awards.
• Twelve (12) Chemistry undergraduates presented the results of their research projects at the 248th American Chemical Society National Meeting and Exposition in March 2015 in Denver, CO. These are: Pineal Bekere, Sue Roberts, and Edward Rajaseelan, “Synthesis of Novel green Chemistry Catalysts,” Joseph Charlonis and Michael Elioff. “Synthesis and Characterization of InP Quantum Dots,” Angela DiAscro, Sam Young, and Jim Hutchison “Synthesis of Small, Ligand-stabilized Copper

- Eight Meteorology undergraduates presented the results of their research projects at national or international meetings, including “Analysis of Lower Tropospheric Trace Gas Profiles Obtained from a Unique Combination of Aircraft and Tethered Balloon Observations”, at the 17th Conference on Atmospheric Chemistry and the 95th Annual Meeting of the American Meteorological Society.
- Meteorology undergraduates Timothy W. See Jr. and James T. Simkins presented the co-authored paper, “Constructing vertical profiles of kinematic turbulent fluxes during OWLeS field campaign” at the 19th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface at the 95th Annual Meeting of the American Meteorological Society.
- Meteorology undergraduate Chris Prebish presented the co-authored paper, “Langley Mobile Ozone Lidar Results at South Table Mountain Golden: Comparison with Tethers, In-situ, and Aircraft Ozone Data” at the DISCOVER-AQ/FRAPPE Science Meeting in Boulder, CO.
- Meteorology undergraduate Gina Mazzuca presented the co-authored paper, “Observations and Modeling of the Influence of Thunderstorms on O3 and NOy during DISCOVER-AQ Summer Deployments” at the DISCOVER-AQ/FRAPPE Science Meeting in Boulder, CO.
- Mathematics undergraduate Nick Heil won an Outstanding Presentation Award for his poster, “A new approach to Maya division” at the Mathematical Association of America Undergraduate Poster Session at the 2015 Joint Mathematics Meeting.
- Mathematics undergraduates Benjamin Baer and Faheem Gilani gave a talk entitled “Periodic Orbits on the 120 Isosceles Triangle” at the PASSHE-MA conference.
- Eight Mathematics Noyce Scholars, Khristina Schultz, Ross Young, Emily Copenhaver, Alex DiMarzio, Sarah Bradley, Rachel Chioda, J. Miller and
Amanda Valent presented “Geogebra or Bust: Infusing Technology into Your Classroom” at the annual state PCTM conference.

- Five Noyce Scholars: Sarah E. Bradley, Alana Clark, Jennifer Tran, Ross M. Young and Rebecca Janeshefskie, gave a poster presentation at the Noyce Northeast Conference, “The Noyce Scholars program at Millersville University”.
- Melissa Kramer, MSN student, presented her work on community engagement to the PSNA Day on Capitol Hill audience.
- Students in the undergraduate Nursing Research course presented their evidence-based practice analyses in a Poster Showcase at PinnacleHealth Community General Hospital.
- Physics major Kanan J. Grosklos gave an oral presentation in collaboration with Dr. Xin Li: “The Interferences patterns of Dipole Radiation”, at the APS April Conference in Baltimore, Maryland.

Additional special accomplishments in the past year include:

- MU's Respiratory Therapy program was recognized at the American Association for Respiratory Care's Summer Forum with the Distinguished RRT Credentialing Success Award, selected by the Committee on Accreditation for Respiratory Care Board on the basis of key accreditation metrics. This is the third year in a row that the MU Respiratory Therapy program has been honored with this award.
- 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.
- The MU Student Chapter of the American Chemical Society was awarded to awards: the Commendable Chapter Award and the Green Chemistry Award at the national meeting of the American Chemical Society in Denver, CO, in March 2015.
- Renee E. Duff, senior meteorology major, received top honor as the best student poster out of nearly 200 posters presented at the 14th Student Conference, held on 3-4 January 2015 during the Annual Meeting of the American Meteorological Society in Phoenix, AZ. Renee presented the research that she conducted at the Colorado State University in Fort Collins, CO during her summer 2014 internship on "wildfire pollution and its effects on the microphysical and electrical properties of pyrocumulus."
- The MU chapter of the International Association of Emergency Managers (IAEM) received the award as the Student Chapter of the Year at the annual meeting of the IAEM in San Antonio, TX in November 2014.
- Dr. Richard Clark (Earth Sciences) and a group of Meteorology majors spent the month of July 2014 on-site in Denver, CO, participating as part of a multi-university team, engaged in a major air quality study, funded by a grant from NASA, under the Discover-AQ-Denver program. Millersville
students regularly launched tethered balloons to conduct detailed air quality measurements.

- Dr. Ximena Catepillan (Mathematics) has a book entitled *Mathematics in a Sample of Cultures* in press with the Kendall-Hunt Publishing Company.
- Drs. Zhigang Han and Ron Umble (Mathematics) had their textbook, *Transformational Plane Geometry*, published by the CRC Press, Taylor & Francis Group.

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

In March, 2015, 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 8th 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., which sent a representative to the event for the first time this year. As in the past, the reviews from participants were uniformly excellent. The 30th 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. Derrick Pitts, the Chief Astronomer and Director of the Fels Planetarium at the Franklin Institute in Philadelphia. Dr. Pitts 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 New Universe" was the highlight of the day and was very well received. 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 Dr. Lisa Porter, Professor of Materials Science & Engineering at Carnegie Mellon 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. Approximately seventy students from eighteen 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 389 students and 29 teachers. Likewise, the **AP Statistics simulation** attracted 300 students and 19 teachers. 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 32 middle and high school students from around the region over 9 days in summer 2014; eight of these students were supported by scholarships, half of which were provided by Project Gear Up.

D. Significant School Achievements

After a very careful review of the success rate (A-B-C rate) in CHEM 111 (Introduction to Chemistry I), the Department of Chemistry proposed reinstituting the Chemistry Placement Test (CPT), in order to better prepare students for the rigors of general chemistry. This effort was begun after CHEM 111 was identified as one of the courses with the highest number of D’s F’s and W’s. The department overcame concerns from the Department of Biology that this change would disadvantage Biology majors. After careful consideration, it was agreed that the proposed change will indeed help to speed students through the introductory chemistry curriculum taken by all Biology and Chemistry majors. The change was approved and beginning with Fall 2016, all incoming students needing to take CHEM 111 will take the CPT, with those failing to obtain a sufficient score being placed into CHEM 110, prior to being allowed to register for CHEM 111. In the past year, the Department of Computer Science determined that its curriculum needed to reflect greater content in databases and web development. After careful consideration, the department decided to drop the requirement of MATH 211 (Calculus II), in favor of requiring CSCI 366 (Database and Web Development). The Department of Earth Sciences continues to build out the new (2012) MS program in Integrated Scientific Applications. The Heliophysics and Space Weather minor, developed in 2013 – 2014 by the Department of Earth Sciences, was fully approved in the past year, providing a credential for students who wish to pursue this area. The new option in Environmental Hazards and Emergency Management, under the BA Multidisciplinary Studies program, approved in 2013 – 2014, drew new students in the past year. The MSEM program also developed new plans to recruit more international students and as part of this effort, proposed a new graduate certificate program in Emergency and Disaster Management, which is currently working its way through the program approval process. Although the MSEM program is already very full, it is expected that the new certificate program will attract a new audience, some of whom will want to continue on to the MSEM program. In the past year, the Department of Mathematics developed revised requirements for the BSEd Mathematics program. Beginning with Summer 2015, students will be required to take MATH 301 (History of Mathematics) and CSCI 140 (Discrete Structures). These changes were made in order to better satisfy PDE requirements for the preparation of secondary mathematics teachers. During summer sessions, winter session and the fall semester some sections of MATH 130 (Elements of Statistics I) and MATH 235 (Survey of Statistics) were offered in a distance learning format, with some sections of these courses continuing to require students to use MyStatLab, an online homework system. MATH 235 and MATH 535 are currently scheduled to be offered in an online format with face-to-face exams during Summer Session II in 2015.
The Department of Nursing has been pressing ahead in a number of new directions in the past year. The department has been revising its flagship RN to BSN program, in order to add online cohorts, with multiple starts each year. This work has been spurred on by the University's Bold New Path strategic plan, which envisions growing a number of fully-online programs. The first such program will be the RN to BSN program, with a planned roll-out in August 2015. At the same time, the department has been developing the School’s first doctoral program, the Doctor of Nursing Practice (DNP) program. This program is nearly fully developed at this time, with an anticipated roll-out in Summer of 2016. Finally, with increasing demand for the MSN program from well-qualified students, the department is making plans to add an MSN cohort at the Dixon University Center, beginning in Spring 2016, pending approval from the State Board of Nursing. In addition to meeting the demand for nurse practitioners in the Capital region, it is hoped that this expansion will also lead to increased availability of clinical placements for MSN students, something that continues to challenge us in the Lancaster area. With a 100% first-time pass rate on the licensing exams, our MSN FNP program continues to be a very successful program.

The “review option” for some students who place into MATH 101 (College Algebra) was continued in the past year. Through this option, if at least one of the student’s scores on the math placement test is close to the next level and the student had previously taken courses that covered material in Precalculus or higher, they were offered the option to review material in MATH 101 on their own and complete approximately fifty-five software based assignments. Upon successful completion of the assignments, they may take another assessment and, if successful, place into the next course (generally, Math 151 or MATH 160). While many students have indicated an initial interest, a much smaller number have completed the assignments. To add accountability to students to complete assigned homework problems, the department continued to adopt textbooks with software based homework systems for MATH 090 (Basic Mathematics), MATH 101 and MATH 151 (Calculus for Management) for the 2014 – 2015 academic year. This year, the department adopted Enhanced Web Assign as the online homework system for MATH 090, MATH 101, MATH 110 (Trigonometry), MATH 151, and MATH 160 (Precalculus). Using one system for all these courses requires that a student only learn a single homework system and thus, eases the transition while taking a sequence of these courses. Web Assign provides immediate feedback and the opportunity for input as students are working on homework problems, leading to more efficient and effective movement through the curriculum.

Over the last seven years, recruitment of underrepresented students has increased significantly 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 392 in 2014 (based on Fall official enrollments), representing a 124% 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, by 4.7% from 2010 to 2011 and by 33% from 2011 to 2012, with a slight 2% drop from 2012 to 2013, followed by an increase of 10% from 2013 to 2014. Overall, the increase in underrepresented enrollments significantly outpaced the (already quite significant) overall growth in SCMA majors, which increased by a total of 30% from 2008 to 2014. 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, by 3.1% from 2012 to 2013 and by 1.7% from 2013 to 2014.

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 Franklin and Marshall College and Lebanon Valley College. 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 continued with MU leadership during the summer of 2014.

E. Summary

Despite facing ongoing budgetary challenges and pressures from increasing numbers of students majoring in our programs, 2014 – 2015 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, notably Biology, Nursing and Computer Science majors. These increases have driven increased enrollments across the School, but most significantly in these three departments, plus in introductory through advanced courses in Chemistry and introductory courses in Mathematics and Physics.
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 programs. 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 a series of NASA’s Discover AQ (Air Quality) projects. During 2014 – 2015, this involved a group of MU undergraduate Meteorology majors, who spent four weeks near Denver, Colorado, 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. These students participated in hands-on research opportunities generally only afforded to graduate students. In 2014 – 2015, 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 three cohorts participated in a number of activities, including the Philadelphia Urban Semester, in Spring 2013, 2014 and 2015. 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 2014 – 2015, SCMA faculty pressed forward with numerous curricular developments, including the development of courses for the newly-implemented MS program in Integrated Scientific Applications. As well, the Nursing faculty have been working hard to develop the structure of the School’s first doctoral program, the DNP (Doctor of Nursing Practice) degree, for which a proposal is expected to go the Council of Trustees this summer or fall. In addition, the department is completing the development of an online RN to BSN program and developing plans to offer the MSN program at the Dixon University Center in Harrisburg, meeting the needs of many more students than we can accommodate on our campus. 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 2014.
DEPARTMENT OF BIOLOGY

A. Curricular Changes

During the 2014-2015 academic year, the Department of Biology approved and/or implemented the following curricular changes:

1. **BS Allied Health, Respiratory Therapy; BS Biology, Respiratory Therapy:** Effective Summer 2015, the Department changed a course requirement in the respiratory therapy curricula; Cardiopulmonary Physiology (BIOL 455) was replaced with Nutritional Science (BIOL 352). With recent changes in the professional phase of the respiratory therapy program, the content covered in BIOL 455 is now presented in greater depth in several of the required clinical courses. Thus, BIOL 455 no longer uniquely served the purpose for which the course was designed. Furthermore, the curriculum lacked any significant coverage of the important role of nutrition in health. The addition of BIOL 352 to the curriculum corrected this omission.

2. **BS Biology, Marine Biology; Coastal Biology (BIOL 290) and Problem Solving in Marine Biology (BIOL 292):** Effective Summer 2016, the Department added two new courses, Coastal Biology (BIOL 290, 3 credits) and Problem Solving in Marine Biology (BIOL 292, 1 credit), and changed the marine biology curriculum to allow students to substitute the combination of BIOL 290 and 292 for the existing requirement of Marine Biology (BIOL 291, 4 credits). The impetus for these changes was the insistence of the Academic Advisory Committee (AAC) of the Chincoteague Bay Field Station (CBFS) that all marine science courses offered at the CBFS be three-credit courses. To meet the demands of the AAC, the Department will offer the two new courses (BIOL 290 & 292) separately at CBFS during the summer. Since the new courses are collectively equivalent to BIOL 291, MU students will have the option of taking BIOL 291 on campus or the combination of BIOL 290 & 292 at CBFS.

3. **Animal Behavior (BIOL 485):** Effective Spring 2016, the Department changed the prerequisite for Animal Behavior (BIOL 485) from Concepts of Zoology (BIOL 211) to Principles of Ecology and Evolution (BIOL 343). The rationale for the change was that students entering BIOL 485 without BIOL 343 were lacking knowledge of certain fundamental ecological concepts and consequently not performing as well as students who had completed BIOL 343. Therefore, BIOL 343 was made a prerequisite for all students taking BIOL 485.
B. Faculty achievements – grants, research, sabbaticals

Members of the Department of Biology had a productive year of scholarly activity. Our faculty published 11 articles in scholarly journals and 2 books, an additional 8 articles have been submitted. In addition, Biology faculty presented 19 papers at professional meetings, engaged in 11 consulting activities, had 11 grant proposals funded, and involved many students in independent study projects. Listed below are representative examples of individual faculty achievements.

Dr. Jean Boal co-authored a chapter with C. Jozet-Alves and A-S Darmaillacq in *Cephalopod Cognition*, A-S Darmaillacq, L Dickel, and J Mather, eds., Cambridge University Press, p. 150-166. Dr. Boal also gave a presentation and mini-workshop on “Spatial Learning” for the Gifted and Talented Students Program at Manheim Central H.S. on April 14.

Dr. Judith Cebra-Thomas co-authored two peer-reviewed publications on turtle shell development in the scientific journals *Development* and *Journal of Experimental Zoology*. She also (with student co-authors) presented two papers at scientific meetings: "Regulation of neural crest cell emigration in turtle embryos" at the 73rd Annual Meeting of the Society for Developmental Biology in Seattle, WA, and "Trunk neural crest cell specification and emigration in turtle embryos" at the Mid-Atlantic Regional Meeting of the Society for Developmental Biology, at Princeton University. In addition, Dr. Cebra-Thomas received funding for her research from the Faculty Grants Committee (FGC) and the National Science Foundation ("RUI: Formation of the Turtle Plastron by Re-specified Trunk Neural Crest Cells"; total award of $507,763 over 3 years).

Dr. Dominique Didier published two books, *Sea Anemone* and *Moray Eels*, part of an educational series of books published by Cherry Lake Press. Dr. Didier and colleagues also published a paper on the biomechanics of the *Helicoprion* jaw in *Journal of Morphology*. This paper was featured in the “Research News” section of *Nature*. In addition, Dr. Didier served as an external reviewer and jury member (via videoconference) for the Ph.D. thesis defense of Cyrena Riley at the University of Quebec.

Dr. Aaron Haines had three paper accepted for publication: (1) a book chapter on “Spatial Organization of Sympatric Carnivores” in *Small Carnivore Ecology*; (2) a book review on wildlife trafficking in the *Journal of Wildlife Management*; (3) and a paper co-authored with Dr. John Wallace in the *Wildlife Professional Magazine* titled “Cracking Down on Wildlife Crime.” In addition, Dr. Haines received a grant from the FGC and was elected Vice President of the Commonwealth of Pennsylvania University Biologists (CPUB) for 2015-2016.

Drs. Christopher Hardy and Julie Ambler co-authored a talk presented by Dr. Ambler on March 14th at the annual conference of the Atlantic Estuarine Research Society in Wanchese, North Carolina. The talk was titled "Reaching out to students of all types: a
website for Mid-Atlantic estuarine and coastal zooplankton". The website featured in this talk, *Zooplankton of Mid-Atlantic Estuarine & Coastal Waters*, was released on March 10th and can be found at [www.natureatlas.org/zooplankton/midatlantic/](http://www.natureatlas.org/zooplankton/midatlantic/).

**Dr. Brent Horton** co-authored a paper with D.L. Maney, and W. Zinzow-Kramer titled “Estrogen Receptor Alpha as a Mediator of Life History Trade-offs" in *Integrative and Comparative Biology*. Dr. Horton also received a Robertson Junior Faculty Release Time Grant.

**Dr. Sharmin Maswood** received an award from the FGC.

**Dr. James Moné** received an award from the FGC.

**Dr. Ryan Wagner**, as President of CPUB, presided over the 2015 Annual Meeting (April 10-11) at Indiana University of PA. Dr. Wagner also received two FGC grants.

**Dr. John Wallace** gave the following invited presentations: (1) “Living on the Dead – The application of aquatic ecology in forensic investigations” at the Peter Doherty Institute for Infection and Immunity at the University of Melbourne, Australia; (2) “Buruli Ulcer: Demystifying the Ecology and Transmission of a Neglected Tropical Disease” at the Biology Department of SUNY Oneonta; and (3) “Buruli Ulcer: Cultural, Epidemiological, and Ecological Aspects of a Neglected Tropical Disease of Vulnerable Populations” at Penn State Medicine’s Global Health Night in Hershey, PA. In addition, Dr. Wallace and his collaborators made two presentations at the World Health Organization in Geneva, Switzerland, “Mechanical transmission of *Mycobacterium ulcerans* may resolve the mystery of Buruli ulcer” and “Eight years in Lalo Commune, Benin: What have we learned about the demography of Buruli ulcer, *Mycobacterium ulcerans* and transmission,” and he chaired the Environment and Transmission Research session. Dr. Wallace also taught two forensic entomology workshops, at Missouri Western State University and Philadelphia College of Medicine. Moreover, he was senior author of an invited book chapter titled “History of Forensic Entomology in North America” in *Forensic Entomology: International Dimensions and Frontiers*, J.K. Tomberlin and M.E. Benbow, eds., CRC Press, Boca Raton, FL. He also co-authored a publication titled “The potential of high throughput metagenomic sequencing of aquatic bacterial communities to estimate the postmortem submersion interval” in the *Journal of Forensic Science*. Finally, Dr. Wallace was awarded a research and travel grant from the End Buruli Ulcer Alliance and two grants from the FGC.

**C. Student Achievements**

Students in the Department of Biology achieved notable successes inside and outside the classroom. For example, many students were actively involved in independent research projects. These 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.

Six Biology students completed honors theses.

Departmental honors theses:

Matthew Fowler
Thesis Title: The Community Composition of Marine Phytoplankton of the Sargasso Sea as Determined by Chemotaxonomy, with Phylogenetic Relationships to Vertical Gradients in Environmental Factors
Thesis Supervisor: Dr. Robert Vaillancourt

Charissa Mohn
Thesis Title: Impacts of Ailanthus altissima leaf pack leachate on Radish (Raphanus sativus) and Wheat (Triticum aestivum) Seed Germination and Seedling Growth
Thesis Supervisor: Dr. Ryan Wagner

Emily Neideigh
Thesis Title: Impacts of stream restoration on macroinvertebrate community structure and adult stream insect colonization on Big Spring Run (BSR), Lancaster County, PA.
Thesis Supervisor: Dr. John Wallace

Lori Sampsell
Thesis Title: Reducing Anxiety Related Symptoms in Domesticated Cats
Thesis Supervisor: Dr. Jean Boal

University honors theses:

Kristin Ost
Thesis Title: The Effects of Antibiotics on the Evolution of Resistant Bacteria
Thesis Supervisor: Dr. Dominique Didier

Jennifer Spengler
Thesis Title: Neural Crest Migration in Turtle Embryos
Thesis Supervisor: Dr. Judith Cebra-Thomas

Jessica Grove has been accepted to veterinary medical school at Lincoln Memorial University in Tennessee.

Andrew Lytle completed a Summer Research Fellowship at the Stowers Institute conducting research in molecular biology.
Julia Moses and Dr. Chris Hardy presented the workshop "Digital Christmas Tree Identification" at the annual Women in Math and Science Conference.

Liz Sautter received a summer internship to study sharks at Bimini Biological Station in the Bahamas.

Jennifer Spengler has been accepted into the Stowers Institute Summer Scholars program for Summer 2015.

Alumni Achievements

Tiffany Bohr (MU ’13) was admitted to medical school at the University of Pittsburgh.

Robert Brennan (MU ’11) received his Doctor of Chiropractic degree from the National University of Health Sciences, Lombard, IL.

Derek Carbaugh (MU ’14) completed a summer REU fellowship at the University of North Carolina conducting genetics research.

Desi Carozza (MU ’04) is now a faculty member at the University of Texas S.W. Medical School. She holds positions in pediatric internal medicine and palliative care.

Tristan Conrad (MU ’14) was hired by the Delaware State Parks System.

Meta Griffin (MU ’14) received a graduate assistantship at the University of Maryland Environmental Lab at Frostburg University.

Nate Hartley (MU’14) was accepted by Duke University to pursue a doctorate in Plant Systematics.


Pam Klinefelder (MU’14) was accepted into the MS program in Microbiology at Mississippi State University.

Teah Nauman (MU ’13) was accepted at the University of Delaware as a doctoral student.

Tiffany Rhoads (MU ’07) was admitted to Hershey Medical School.

Adam Shellhammer (MU’09) has been accepted to a MS program in Natural Resource Management in the Environmental Policy concentration at Virginia Tech.
Matthew Smith (MU’14) began a 2-year post-bacc program at the NIH.

Ken Strauser (MU’13) had his research published in the Keystone Journal of Undergraduate Research.

Andrew Watson (MU’12) successfully defended his master’s thesis at West Virginia University titled “An Ecological Assessment of Restoration Efforts Developed to Recover an Intensively Mined Appalachian Watershed”. Andrew will soon begin two years of service with the US Peace Corps in their Protected Areas Program in Peru.

D. Progress toward department goals/5 year review

The Department conducted a five-year program review during the 2012-2013 academic year. The following items are from the report’s Action Plan.

1. The Chair will discuss with the Dean and Director of Admissions how to better manage enrollments in the Biology Department and how to recruit/select students better prepared to succeed in Biology.
   Status: Ongoing
   When the Provost met with the Department last fall, members of the faculty expressed their concerns that the Department’s resources (e.g. operating funds, faculty and staff positions) have not kept pace with the growth in the number of students. The Dean and Chair have also had conversations with members of the administration about these issues. To date, no action has been taken to slow the growth of Biology’s enrollments and the University’s need for tuition revenue make this unlikely in the near future, nor have additional resources be allocated to the Department.

2. Members of the Biology Graduate Program Committee and others will meet to discuss the future of our graduate program. Among other issues, they will explore whether a “biology track” can be added to the MS in Integrated Science program. The Chair will provide time on Thursday afternoons (4pm) for these meetings.
   Status: Not started

3. The Allied Health Curriculum Committee and others will meet to discuss how ALHT-RT students can complete their degree in those instances where they are not accepted into the hospital program. Among other issues, they will explore whether the BS in Multidisciplinary Studies (MDST) is a suitable alternative.
   Status: Completed
   Only a small number of students (~1 per year) are unable to complete the hospital program. The Allied Health Coordinator advises them on how to complete the requirements for a different degree. In the MDST program,
students have the option of completing individualized curricula. Thus, there has not been a need for a formal curricular track.

4. The Department recently formed an Assessment Committee charged with the continued development of our assessment efforts, and the analysis and reporting of the findings. The Committee will develop proposals on how to better use the MFAT and how to incorporate pre/post testing and embedded questions to assess our curriculum. The Chair will provide time on Thursday afternoons (4pm) for these meetings.

Status: Ongoing
The Committee has presented several proposals to the Department for discussion. For example, the use of embedded questions and pre-post testing has been adopted for several core courses. This spring the Assessment Committee submitted information in support of the University’s Middle States Periodic Review Report. Biology’s submission was very favorably received.

5. The Department will explore strategies for increasing retention (particularly for underrepresented students) and reducing D, F, and W rates. Members of the Department will attend presentations and workshops on these issues and report back to the Department for discussion. The use of voluntary online “preparedness tests” will also be discussed.

Status: Ongoing
During the Fall 2014 semester, the Chair participated in a Faculty Learning Community on “Making Scientists.”

6. Representatives of the Biology Department will meet with representatives from the Departments of Mathematics and Computer Science to determine if the interest and expertise exists to develop a course in bioinformatics.

Status: Ongoing
The Chair of Biology discussed with the Chair of Computer Science (CS) whether any faculty in the CS Department might have the expertise and interest to collaborate on the development of a bioinformatics course. At present, a lack of faculty expertise and more pressing demands in both departments make this unlikely. This year, Biology conducted a search for a geneticist. One of the stated preferences for the position was expertise suitable for teaching a course in bioinformatics. Unfortunately, the search failed. However, it is likely that Dr. Rachel Fogle will offer a 2-credit senior seminar on bioinformatics and –omics during the Spring 2016 semester.

E. New faculty, new facilities/equipment

New Faculty
1. During the Spring 2015 semester, the Department conducted a search for a geneticist to fill a vacancy left by the retirement of Dr. Julie Ambler. Five
candidates were interviewed, two were offered the position, both declined. Therefore, the search failed.

2. During the Spring 2015 semester, the Department received permission to rehire Dr. Sharmin Maswood and Dr. Rachel Fogle as Temporary Full-Time Faculty for a second year. They will fill the positions vacated by Dr. Julie Ambler’s retirement and Dr. Yuan Zhong’s departure. The Department will request permission to conduct two tenure-track searches next year.

New Equipment
The following new equipment was purchased during the past year from University funds:

1. Office computers for five faculty/staff
2. Six iMac Desktop computers for the Botany lab
3. Two water baths for the Cell & Developmental Biology lab
4. Six electronic balances for the Cell & Developmental Biology lab
5. A stereo fluorescence adapter for the Cell & Developmental Biology lab

F. Outcomes Assessment

The Biology Assessment Committee is chaired by Dr. Joel Piperberg. The 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.

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

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. Click here to view the Millersville University
Mission Statement

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.
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, 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 experienced the new curriculum.

Source of Evidence: Alumni survey or tracking of alumni achievements

Achievement Target (may consider as Expected Outcome):

A majority of graduates will either find employment or a spot in graduate or professional school within one year of Commencement.

**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.

**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, 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 experienced the new curriculum.
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. (I would recommend that this be considered a different measure and then align with appropriate outcome since it is a different tool used to survey a different group of student / seniors instead of alumni -- LRS)

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.

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:
1.1.1 Critical Thinking
1.1.6 Scientific Reasoning
**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

**Connected Document**
- GRE Analytical Writing Scores Fall 2009 - Fall 2011

**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).

**Connected Document**
- GRE Analytical Writing Scores Fall 2009 - Fall 2011

**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

**Connected Document**
- Composite PRAXIS Results (No names) Fall 2006 - Spring 2012
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).

Connected Document
• Composite PRAXIS Results (No names) Fall 2006 - Spring 2012

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

Connected Document
• Biology Skills Assessment 1998 - 2010

Achievement Target (may consider as Expected Outcome):
Our original goal was to have a mean score of 2.0 (on a scale of 0 to 4) or above for each skill.

Connected Document
• Biology Skills Assessment 1998 - 2010

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

SLO 4: Biology majors will be able to analyze scientific data.
Biology majors will be able to analyze scientific data.

SLO 5: Biology majors will be able to interpret scientific data.
Biology majors will be able to interpret scientific data.

SLO 6: Biology majors will be able to present scientific data
Biology majors will be able to present scientific data

SLO 7: Biology majors will be able to communicate a clear, concise interpretation of scientific data (written and/or oral) and draw relevant conclusions.
Biology majors will be able to communicate a clear, concise interpretation of scientific data (written and/or oral) and draw relevant conclusions.

SLO 8: Biology majors will be able to access/select/present references
Biology majors will be able to access/select/present references

SLO 9: Biology majors will be able to integrate information from literature and experimental results
Biology majors will be able to integrate information from literature and experimental results

SLO 10: Biology majors will be able to formulate rational hypotheses.
Biology majors will be able to formulate rational hypotheses.

SLO 11: Biology majors will be able to design experiments to test hypotheses.
Biology majors will be able to design experiments to test hypotheses.
SLO 12: Our goal is that, while different students will be well trained in one or a few fields of biology, all will be 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, advance the discipline and the good of society.

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

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Established in Cycle: 2009 - 2010
Implementation Status: In-Progress
Priority: High
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, given the 25% decrease in our secretarial support which is due to take 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.

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

**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, if time permits, given the 25-50% decrease in our secretarial support which is due to take effect on July 1, 2010.

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
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: 05/30/2013
Responsible Person/Group: Biology Department Faculty Members

Analytical Writing Skills
Writing skills will continue to be monitored through the GRE Analytical Writing exam. Also, student writing will continue to be emphasized in our majors courses, especially in the Writing-Across-the-Curriculum courses within the curriculum (like BIOL 363 - Cell and Molecular Biology).

Established in Cycle: 2012-2013
Implementation Status: Planned
Priority: Medium

Continued Monitoring of National Exams
We will continue to monitor student performance on the GREs, MFATS (periodically) and PRAXIS exams each year. Should disturbing trends be noticed, action will be
taken to remedy them.

**Established in Cycle:** 2012-2013  
**Implementation Status:** Planned  
**Priority:** Medium

**GRE Subject Test Results**  
We will continue to monitor the GRE subjects tests for useable information. It is hoped that some students will take the exam and that we will be able to obtain good information in the near future.

**Established in Cycle:** 2012-2013  
**Implementation Status:** Planned  
**Priority:** High

**MFAT Testing Strategy**  
We will reexamine the circumstances under which we administer the MFAT exams to develop a method that seems to better reflect the students’ abilities and content knowledge.

**Established in Cycle:** 2012-2013  
**Implementation Status:** Planned  
**Priority:** Medium  
**Projected Completion Date:** 12/31/2014

**PRAXIS Reports**  
We will continue to monitor PRAXIS results each year and should performance on these exams decrease, we will try to assess what the cause of said drop in performance is.

**Established in Cycle:** 2012-2013  
**Implementation Status:** Planned  
**Priority:** High

**Skills Assessment**  
We will continue to monitor the skills of our junior and senior students in our 300- and 400-level courses each semester. If their performance begins to drop, we will shore up the deficiencies by addressing the appropriate topic in the appropriate lower level course.

**Established in Cycle:** 2012-2013  
**Implementation Status:** Planned  
**Priority:** High
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Established in Cycle: 2012-2013
Implementation Status: Planned
Priority: High

Technology Acquisition
In the past, feedback from these surveys indicated that a significant number of alumni felt that the technology in our classrooms was substandard. Since then, we have obtained new classroom instructional equipment through various sources (the Base Equipment Budget, the Student Technology Fee, etc.). We have also encouraged faculty members to make use of new teaching strategies (flipping the classroom, using D2L, developing selected distance learning courses [BIOL 204, BIOL 207], smartpens, and other online tools). These strategies appear to have been successful and we will continue to keep up with innovations in this area.

Established in Cycle: 2012-2013
Implementation Status: Planned
Priority: High

Additional Resources Requested: To state the obvious, we need increased funding to adequately support our growing population of Biology majors.
Budget Amount Requested: $5,000.00 (recurring)

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In the past, feedback from these surveys indicated that a significant number of graduating seniors felt that the technology in our classrooms was substandard. Since then, we have obtained new classroom instructional equipment through various sources (the Base Equipment Budget, the Student Technology Fee, etc.). We have also encouraged faculty members to make use of new teaching strategies (flipping the classroom, using D2L, developing selected distance learning courses [BIOL 204, BIOL 207], smartpens, and other online tools). These strategies appear to have been successful and we will continue to keep up with innovations in this area.

Established in Cycle: 2012-2013
Implementation Status: Planned
Priority: High

Additional Resources Requested: To state the obvious, we need increased funding to support our consistently growing population of majors.
Budget Amount Requested: $5,000.00 (recurring)
Department Will Concentrate on Raising the Lower Scores
The 5 lowest average scores over the last 5 years are: leadership quality, performing calculations, ability to design experiments, ability to integrate information and ability to work with references. We will focus on these activities in relevant courses and will look for improvement in these scores over the next three to four years in the appropriate courses. Progress will be monitored by the Department's Assessment Committee. We will also work on making sure that scores in other areas will not decline while we concentrate on these scores. We have already taken action by including work in the introductory majors Biology course that deals with these areas and we hope to see improvement over the next four years when these students begin to graduate.

Established in Cycle: 2013-2014
Implementation Status: Planned
Priority: High
Implementation Description: The Department is aware of these scores and is committed to raising student performance in these areas.
Projected Completion Date: 11/29/2018
Responsible Person/Group: Assessment Committee
Additional Resources Requested: Funding to the University and consequently the Biology Department has not increased in at least a decade. Undoubtedly, the funding will continue to drop in the future. In recent years, the number of Biology majors has doubled from roughly 350 - 400 to a number rapidly approaching 800. The Department requires additional funding to accomplish further improvement; this funding will necessitate more funding for lab supplies, the costs of which have continued to rise since 2000, and frankly a new faculty line or lines. The Department has 19 full-time faculty, the same number of faculty members that we had when we had half as many majors. Furthermore, additional lab support in the form of a second lab preparateur is also essential. Such a hire would free faculty members up to attend more completely to improving student skills.
Budget Amount Requested: $40,000.00 (recurring)
DEPARTMENT OF CHEMISTRY

A. CURRICULAR CHANGES

a) The chemistry department proposed to reintroduce the requirement of the Chemistry Placement Test (CPT) to register for Chemistry 111. It is approved effective Spring 2016. The new prerequisite for the course is: CPT of CHEM 111 or CHEM 110 with a grade of C- or higher; and MPT of MATH 160 or higher or MATH 101 with a grade of C- or higher; or permission of the instructor. The department strongly feels this would decrease the D’s, F’s, and W’s for the course which has grown to about 25%. To help the under prepared students succeed in CHEM 111, CHEM 110 will be offered during the fall semester and on-line during the winter and summer sessions.

b) The chemistry department proposed to change the prerequisite for CHEM 326 (Biochemistry I), by adding a minimum grade of C- in the prerequisite course (either CHEM 232 or CHEM 235). It is approved effective Fall 2015. More than 50% of the students who earned below a C- in CHEM 232/235, receive a D,W, or F grade in CHEM 326. It will improve student success in Biochemistry I.

c) The B.A. in Chemistry 3/2 Cooperative Engineering Option was suspended effective Fall 2014 after the participating engineering institution didn’t renew the agreement. Since no student in the past 25 years had graduated from this option, it will not affect the chemistry program in any way. The department will continue to advise students who are interested chemical engineering with course selections to better prepare them for graduate studies in that field.

d) The department will continue to assess the substitution of UNIV 103 for CHEM 188 over a 3-5 year cycle to evaluate retention in the major.

B. FACULTY ACHIEVEMENTS-GRANTS, RESEARCH, SABBATICAL

Dr. Steve Bonser

1. AMERICAN CHEMICAL SOCIETY (ACS) Governance Meetings
   Attended:
2014-2015 School of Science and Mathematics Annual Report

b. 249th American Chemical Society Meeting & Exposition in Denver, CO, March 20 – 26, 2015.

2. Professional Membership/Program Chair/Organizer:
   a. Committee on Science (COMSCI)
      a) Science and Technology Subcommittee
         (i) Program Chair: COMSCI
         (ii) Organizer/Presider:
         (iii) National Awards Subcommittee Chair for the
            a) National Medal of Science
            b) National Medal of Technology and Innovation
            c) Grand Prix Award
            d) The Dreyfus Prize in the Chemical Sciences
            e) American Chemical Society Fellows

3. Speaker & Panelist:
   a. Awards Symposium sponsored by the ACS Awards Office Management, the Board of Directors, Grants and Awards Committee, entitled, "Earning ACS Awards: An Interactive symposium on constructing successful nominations," at the 249th American Chemical Society Meeting & Exposition in Denver, CO, March 20 – 26, 2015

4. COUNCIL ON UNDERGRADUATE RESEARCH (CUR)
   a. Millersville University’s Institutional Liaison to CUR.

Dr. Michael Elioff

1. Publication:

2. Presentation(national):

Dr. Steven Kennedy

1. Presentations (regional and national):
   b) John Noyes, Janelle Biehl, James Dreer, Steven M. Kennedy. “Studies Toward the Total Synthesis Of Hunanamycin A.”
i. 2014 Disappearing Boundaries Summer Research Meeting on July 17th, 2014 at Elizabethtown College, PA.

c) James Dreer, and Matthew Carta, Steven M. Kennedy. “Studies Toward the Total Synthesis of Hunanamycin A.”

i. 2015 Made In Millersville and School of Science and Mathematics Annual Research Poster Display, April 22, 2015.

d) Andrew Smaligo, Magenta Hensinger, Steven M. Kennedy. “Studies Toward the Synthesis of Altersolanol P.”

i. 2015 Made In Millersville and School of Science and Mathematics Annual Research Poster Display, April 22, 2015.

e) James Dreer, and Matthew Carta, Steven M. Kennedy, “Studies Toward the Total Synthesis of Hunanamycin A.”

i. 249th National ACS meeting, Denver, CO, March 2015.

f) Andrew Smaligo, Magenta Hensinger, Steven M. Kennedy. “Studies Toward the Synthesis of Altersolanol P.”

i. 249th National ACS meeting, Denver, CO, March 2015.

2. Conference Attended:

a) Appearing Boundaries Summer Research Meeting on July 17th, 2014 at Elizabethtown College

3. Grant co-authored:

a) “Relatively Small Parts of the Logic Model for the NSF STEP Working Committee in the School of Science and Mathematics as part of our application for the Department of Applications First in the World Program-Development Grants


4. Courses for Which New or Innovative Pedagogy was Adopted:

a) Chemistry 391 – Advanced Laboratory 1
   a. Problem-Based Learning Laboratory

b) Chemistry 231 – Organic Chemistry 1
   a. Adaptive Learning Online Homework system

c) Chemistry 232 – Organic Chemistry 2
   a. Online Homework System

d) Chemistry 435 – Advanced Organic Chemistry
   a. Full-Flipped Course Design

Dr. William Kittleman

1. Presentation:

a. Tran, Tan and Kittleman, William, “Construction of a His-tagged expression plasmid for SfnaD in the staphyloferrin A biosynthetic
2014-2015 School of Science and Mathematics Annual Report

pathway.” Millersville University School of Science and Mathematics, student research poster display, April 22-29, 2015.

2. Courses for Which New or Innovative Pedagogy was Adopted:
   a. Chemistry 326 – Biochemistry 1
      i. Group Learning
   b. Chemistry 111 – Introductory Chemistry 1
      i. Group Learning

Dr. Jeremiah Mbindyo
1. Professional memberships:
   a. Program Advisory Council
      i. Department of Industry and Technology
   b. Academic Advisory board
      i. The Nanotechnology Institute
   c. Member and Lead Faculty
      i. Pennsylvania Collaborative for Applied Nanotechnology Institute

2. Editorial Advisory
   a. Proteus
   b. Scientific Journals International

3. Reviewer:
   a. 10+ Scientific Journals.

Dr. Aimee Miller
1. Honors and Awards:
   a. “Science Alumni of the Year,” Eastern Mennonite School, Harrisonburg, VA.

2. Oral Presentation:
      i. Biennial Conference on Chemical Education 2014.

3. Symposium Organizer:
   a. “Institutional Initiatives for Introductory Student Success.”
      i. Biennial Conference on Chemical Education 2015.

4. Courses for Which New or Innovative Pedagogy was Adopted:
   a. Chemistry 326 – Biochemistry 1
      i. used a variety of classroom activities interspersed with lectures, including problem-based learning, group collaboration/flipping, case study analysis
   b. Chemistry 327 – Advanced Biochemistry
      i. student pairs work to assemble a poster outlining the biological pathway, structural mechanism, and protein modeling relevant to a drug and present to class

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c. Chemistry 103 & 104 – General, Organic, and Biochemistry 1 & 11
   i. used online homework and offered adaptive textbook activities

5. Grants:
   a. Millersville Faculty Grants: Special Activities Grant for BCCE symposium organization and presentation.
      i. Awarded $450

Dr. Edward Rajaseelan
1. Presentations:

Dr. Lyman Rickard
1. Oral Presentation:
   a. “Chemical Education in India: Observations.”
      i. 249th National ACS meeting, Denver, CO March 2015.

2. Courses for Which New or Innovative Pedagogy was Adopted:
   a. Chemistry 111 and 112 – Introductory Chemistry I & II
      i. Use of POGIL methods – collaborative learning

Dr. Maria Schiza
1. Presentations:
      i. “Made in Millersville” Conference, April, 2015.
      ii. 15th Annual Poster Display in the School of Science and Mathematics
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      ii. 15th Annual Poster Display in the School of Science and Mathematics
      i. “Made in Millersville” Conference, April, 2015.
      ii. 15th Annual Poster Display in the School of Science and Mathematics
2014-2015 School of Science and Mathematics Annual Report

   i. 249th National ACS meeting, Denver, CO, March 2015.

2. Conference Attended:
   a. SEPSACs Education Night, April 9, 2015, York.

**Dr. Robert Wismer**

1. Professional Development:
   a. Compiled the CD for the Scientific Instrument Society’s 2015 Study Conference to Switzerland. Three of his photographs were published in the SIS bulletin.

2. Conference Attended:
   a. SIS Study Conference in Lisbon and Porto, Portugal in May 2015

3. Presentations:
   a. Three departmental seminars presented at Millersville University; one in physics and two in chemistry.

**C. STUDENT ACHIEVEMENTS**

Currently there are 129 chemistry majors. To date, there are 34 paid admits for next year. Twenty chemistry majors will be graduated in May. A number of majors (12) attended the ACS national meeting in Denver, CO in March 2015 to present their research. We had 33 majors engaged in undergraduate research during this academic year; the majority of whom received Neimeyer-Hodgson Grants and Student Research Grants to support their research.

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

<table>
<thead>
<tr>
<th>Student Name</th>
<th>Thesis Title</th>
<th>Advisor’s Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angela M. DiAscro</td>
<td>Synthesis of Copper Nanoparticles for the Electrochemical Reduction of Carbon Dioxide</td>
<td>Dr. Maria V. Schiza</td>
</tr>
<tr>
<td>Magenta J. Hensinger</td>
<td>Studies Toward the Total Synthesis of Altersolanol P</td>
<td>Dr. Steven Kennedy</td>
</tr>
<tr>
<td>Daniel M. Hofmann</td>
<td>Synthesis of Luminescent Carbon Dots and Gold Nanorods for Applications in Functional Liquid Crystal Nanocomposites</td>
<td>Dr. Maria V. Schiza</td>
</tr>
<tr>
<td>Andrew J. Smaglio</td>
<td>Synthetic Studies Toward Altersolanol P</td>
<td>Dr. Steven M. Kennedy</td>
</tr>
<tr>
<td>William J. Rutledge</td>
<td>Synthesis of N-Heterocyclic Carbene-Based</td>
<td>Dr. Edward Rajaseelan</td>
</tr>
</tbody>
</table>
Iridium (I) Catalysts for Use in Green Transfer Hydrogenation Reactions

Jillian J. Weissenrieder The Use, Synthesis, and Characterization of Rhodium and Iridium Catalysts with N-Heterocyclic Carbenes Dr. Edward Rajaseelan

David L. White Computational Studies into High Density Materials Dr. Michael S. Elioff

Graduating Students Receiving Neimeyer-Hodgson and/or Student Research Grants:
1. Robyn Blauberg (Dr. Wismer)
2. Joseph Charlonis (Dr. Elioff)
3. Magenta Hensinger (Dr. Kennedy)
4. Taylor Keller (Dr. Schiza)
5. Andy Smaligo (Dr. Kennedy)
6. Luke Wayman (Dr. Schiza)
7. David White (Dr. Elioff)
8. Andrea Zeppuhar (Dr. Schiza)

Student Attendance and Presentation at National Conferences:
Attending: 12; Conference: 249th ACS National Meeting & Exposition, March 2015, Denver, CO

1. Pineal Bekere

2. Joseph Charlonis

3. Angela DiAscro
Angela DiAscro, Sam Young, and Jim Hutchison. “Synthesis of Small, Ligand-stabilized Copper Nanoparticles as Building Blocks for Electroreduction Catalysis.”

4. James Dreer
James Dreer, and Matthew Carta, Steven M. Kennedy. “Studies Toward the Total Synthesis of Hunanamycin A.”

5. Magenta Hensinger
Andrew Smaligo, Magenta Hensinger, Steven M. Kennedy. “Studies Toward the Synthesis of Altersolanol P.”
6. **Daniel Hofmann**
   Daniel Hofmann, S. Crotty, A. Sharma, Y. Gao, E. Hegmann and T. Hegmann. “Self-assembly and Ordering at the Nanomaterial Liquid Crystal Interface.”

7. **Taylor Keller**

8. **Rebecca Kisling**
   Rebecca Kisling and Robert Wismer. “Studies in polymer crystallization kinetics & birefringence of PEG.”

9. **William Maximuck**

10. **Andrew Smaligo**
    Andrew Smaligo, Magenta Hensinger, Steven M. Kennedy. “Studies Toward the Synthesis of Altersolanol P.”

11. **David White**
    David L. White and Michael S. Elioff. “Computational Studies into High Density Materials.”

12. **Nikki Wolford**
    Nikki Wolford, Sue Roberts, and Edward Rajaseelan, "Synthesis of Novel Green Inorganic Catalyst"

**Information on the Graduating Class of 2015 (including Fall 2014)**

- The number of Chemistry Graduates is 22.
- 12 Females, 10 Males, 2 Veterans, 5 Under Represented Minority.
- 8 came as chemistry freshmen (6 are graduating in 4 yrs, 1 4.5 yrs, and 1(part time) 5 yrs)
- 2 changed their major to chemistry (5 yrs)
- 12 Transfers (average time 2.5 yrs)
- 11 B.S. in Chemistry, 7 Biochemistry option, 3 Environmental option, 1 Nanotech option

The following 10 students have been accepted into graduate programs in chemistry:

- Janelle Biehl: Duke, UNC-Chapel Hill, Univ. of Michigan, UC-Irvine
- Angela Diascro: Univ. of Illinois – Urbana Champaign, NC-State, Univ. of Oregon, Texas A&M
- Magenta Hensinger: Utah, Vermont, Bryn Mawr, UMBC
Dan Hofmann Vanderbilt, Texas A&M, NC-State, Univ. of Illinois – Urbana Champaign
Taylor Keller Temple, UMBC
Bill Rutledge Texas A&M, Ohio State
Andrew Smaligo UCLA, Florida, Rochester, Pittsburg
Jillian Weissenrieder U. Penn, Temple, Penn State - College of Medicine
David White Pittsburg, NC-State
Andrea Zeppuhar University of Maryland

. 4 students have jobs in a chemistry related field/industry.
. 2 students have applied to Pharmacy Schools
. 6 students plan to work in chemistry-related field

Summer Research Experience for Undergraduates Program (REU/SURP)
The following 8 chemistry students have been accepted into 2015 REU Programs

Hannah Ashberry University of Kansas and University of Maryland
Pineal Berkere New York University, School of Medicine
Emily Dalbey Princeton University
James Dreer Penn State, College of Medicine
Ivanny Jacome Ottati Princeton University
Billy Maximuck University of Tennessee
Renee Stover University of California, Riverside
Nikki Wolford North Carolina State University

Student Internships Summer 2014 – Spring 2015

Jennifer Cederberg Rite Aid, Manchester PA-FA14
Quang Pham Glatfelter, Spring Grove PA-FA14
Matt Krause K&L Plating, Lancaster PA-SP15
Laura Guevara Penn State NMT-SU14
David White Penn State NMT-SU14
Manij Battle Penn State NMT-SU14

Student Awards

1. The Student Chapter of the American Chemical Society was the recipient of 2 prestigious awards at the National Conference of the ACS in Denver, CO.
A. Commendable Chapter Award.
B. Green Chemistry Award.
2. The following are the recipients of 2015 All-University Scholarships and Awards:
   Daniel Hofmann  John K. Harley and Grace W. Evans Award
   Jose Urena  Albert, Christina and Gregory Hoffman Scholarship
   Bernice R. Rydell Scholarship for excellence
   Rachel Ashmore  Honors College Scholarship
   Peter Sitarik  Clarence Schock Foundation Scholarship
   Pineal Bekere  Elizabeth Smithgall Scholarship

3. The following students are the recipients of 2015 School of Science and Math Awards:
   Daniel Hofmann  Henry Franklin Bitner Science Prize in Physical Sciences
   Pineal Bekere  Dr. James Groff Scholarship for Pre-Medicine Studies
   Ivanny Jacome Ottati  James E. Koken Science Scholarship
   Jose Urena  George F. Stauffer Scholarship

4. The following students are the recipients of 2015 Chemistry Department Awards:
   William Rutledge  ACS Award in Analytical Chemistry
   ACS Award in Inorganic Chemistry
   Daniel Hofmann  ACS Southeastern Pennsylvania Section Award
   Millersville University Student affiliate of the ACS Award
   Andrew Smaligo  ACS Award in Organic Chemistry
   Magenta Hensinger  American Institute of Chemists Award
   Jillian Weissnieder  American Institute of Chemists Award
   Peter Sitarik  Joseph A. and Linda R. Caputo Award in Chemistry
   Ivanny Jacome Ottati  Chemical Rubber Company Chemistry Achievement Award
   Gerald S. Weiss Chemistry Scholarship
   Rebecca Kisling  Millersville University Student affiliate of the ACS Award
   Matthew Carta  Polymer Education Undergraduate Award
   William Maximuck  Cecil M. Upton Organic Chemistry Award
   Jose Urena  Gerald S. Weiss Chemistry Scholarship
D. PROGRESS TOWARDS DEPARTMENT GOALS FOR 2014-15

The department goals encompass both academic and infrastructure initiatives. These goals are related both directly and indirectly to the Learning Outcomes the department has identified. The initiatives are based on the ACS guidelines.

Progress made to date:

(a.) We have maintained a highly qualified faculty complement. To that end we hired a full-time, tenure-track faculty member as a result of a faculty retirement: an organic/polymer chemist (Dr. Katie Allen). This goal is completed.

(b.) We are currently doing a 1 year full time temporary faculty search to fill the position made available due to Dr. Robert Wismer’s retirement. We hope to fill this position with a tenure track Physical Chemist and conduct a search during the fall 2015 semester. The goal is ongoing.

(c.) Based on recommendations from previous five year reviews, we hired a full time laboratory technician who also maintains some of our instruments. He received additional training to troubleshoot and repair the new NMR. This goal is completed.

(d.) With the departure of the chemistry/physics departments’ secretary (Ms. Ivonne Ocasio), we are in the process of hiring a new secretary. This goal is ongoing.

(e.) We are developing an instrument repair, maintenance, and replacement plan with appropriate levels of funding. We have been able to purchase some large pieces of equipment with funding from the student technology fee. Smaller pieces have been upgraded through base-equipment funds each year. The department has been very fortunate in that the administration has supported our recent instrument requests with supplemental funding. This goal is ongoing.

(f.) We are in the process of obtaining internal and external funding to support undergraduate research. Almost all of the chemistry faculty have their students researchers write internal grants to support their research. The source of funding is the Neimeyer-Hodgson grant proposals and the Student Research grants funded from the Provost’s Office. In addition, the faculty write internal grants to support their work. This funding is from the university Faculty Grants Committee. The chemistry faculty are encouraged to write external grants. This goal is ongoing.
(g.) We are actively working to promote the department’s general education courses to increase our student/faculty ratio. This goal is ongoing.

(h.) We are closely monitoring the growth of the environmental, nanotechnology, and polymer options within the B.S. degree. We have not graduated any students in the polymer option in the past 4 years. There are 3 students in the pipeline for this option. The department hired Dr. Katie Allen, a polymer chemist, to develop and to revitalize the option. The environmental option is growing. There are 7 students in the option. This semester the department had to open a second section in advanced environmental chemistry course to accommodate the increasing number of students in the environmental chemistry minor. With Green Chemistry becoming a trend we hope to recruit more students into the option. Since the development of the nanotechnology option in 2005, three majors graduated from the program and there are 6 in the pipeline. The marketing for this degree has been mainly at the department level. We made several changes to the introductory nanotechnology course so that it now counts in the major chemistry elective block. We are developing a freshman seminar that will have an academic component dealing with topics in each of these options. Our hope is that when the incoming freshmen learn more about the sub-disciplines, it will engage their interest enough to pursue one of these options. This goal is ongoing.

(i.) We maintained and improved our successful assessment program. This is in place and we have used it to strengthen our program. The May 2014 MFATs results showed all scores above the 60th percentile nationally in each of the sub disciplines except in organic chemistry (50th). The exam was taken by 18 graduating seniors. This goal to improve their performance is ongoing.

(j.) We publish an annual alumni newsletter to maintain and further develop a strong relationship with our alumni. We created a user friendly web page for the department that allows us to keep in touch with our alums. The web page has been reconstructed and is maintained by a faculty member (Dr. Schiza) with support from our laboratory technician. This goal is ongoing.

In 2012-13 the department conducted a 5-year self-study as a result of which additional goals were generated. We have cycled through one year on the several of these initiatives.

1. Replace retiring faculty with new faculty with experience in polymer, physical and/or biochemistry positions. The biochemistry and polymer chemistry positions have been filled with tenure track faculty. We hope to do a national search to fill the physical chemistry position during the Fall 2015 semester.
2. Make a request and justify the case for hiring a part time instrument technician. A technician to do the general and organic chemistry preparations will relieve the current technician to devote his time and expertise to instrument repair.

3. Increase retention in the major. The department will regularly review retention rates in the major. A University Freshman Seminar for chemistry majors is offered. It will be assessed as part of our annual assessment program to determine its effectiveness in retaining freshmen in the major. The faculty will work with the tutoring center to improve tutoring and increase the use of online tutorials.

4. Obtain external support for funding undergraduate summer research from NSF or Keystone Grants. Faculty will pursue both internal and external funding to support this initiative.

5. Assess persistence in the major from sophomore to junior year. Develop an exit interview tool to assess factors that influence change in the major and use the data to address areas of weakness in the program.

6. Reduce W, D, and F grades in Introductory Chemistry and general education chemistry courses. In CHEM.111 the faculty will assess the new CPT prerequisite and investigate the role of CHEM.110 to improve performance in CHEM.111. The faculty will investigate curricular and/or pedagogical innovation to reduce the W, D, and F rates in Introductory Chemistry courses. Investigate more online homework assignments. Asses other delivery tools used in the classroom (POGIL, FLIP, etc.). Work with the tutoring center to improve tutoring services. Students respond better to individual tutoring than group tutoring.

7. Investigate external granting sources from NSF or Dreyfus for a post-doctoral teaching fellow. Investigate the funding sources for a post-doctoral teaching position.

E. NEW FACULTY, NEW FACILITIES/EQUIPMENT

The department hired a full time tenure-track polymer chemist effective 2015-16 academic year. This position was a returned complement created by Dr. Pat Hill’s retirement from the university. Dr. Katie Allen was selected and she will assume the tenure track position as of August 2015. Dr. Allen received her B.S. from Juniata College and her Ph.D. from Columbia University. She did her post-doctoral studies at the University of Southern California. Dr. Allen’s research involves the development and synthesis of unique polymer structures for materials applications especially in solar cells. Dr. Robert Wismer announced his retirement as of May 2015. We are conducting
a full-time temporary search to cover the course offerings in Introductory Chemistry for majors and non-majors. We hope to fill the position with a tenure track physical chemistry faculty position next year.

With funds from both the base-equipment and the technology fee budget, the department purchased 5 new explosion proof freezers/refrigerators. They are placed in the organic, analytical, inorganic, and 2 of the organic research labs. This will greatly improve storing hazardous chemicals in a very safe environment. The department also replaced 8 of the computers in the analytical lab. These computers would be used by students taking the following courses: Quantitative Analysis (CHEM 265), Advanced Analytical Chemistry (CHEM 465), Environmental Chemistry (CHEM 375), Advanced Environmental Chemistry (CHEM 476), and Nanotechnology (CHEM 312).

F. OUTCOMES ASSESSMENT

Our assessment guidelines are driven by criteria set forth by the American Chemical Society as requirements for an approved program in chemistry. Many of our Learning Outcomes are reflected in our 5-year self-study document. Our primary assessment tools are the MFATs, ACS subject area exams, lab notebooks, and written reports in Physical Chemistry (CHEM 341 and 342) and Analytical Chemistry (CHEM 465). Results will be entered in Weave Online in October 2015.

Our current Learning Outcomes Assessment Initiatives are:

1. Chemistry students will be able to effectively communicate chemistry concepts both orally and in written form.
2. Upon completion of the chemistry major, students will be knowledgeable about the factual and theoretical basis of chemistry.
3. Students will report satisfaction with the chemistry major.
4. Students will have a higher success rate in Chemistry 111.
5. Students will complete a three credit freshmen seminar course in chemistry.
6. Students will receive a lower percent of W, D, and F grades.
7. Chemistry majors will earn grades of C or better in upper level majors courses for which a “C” or better in the 100- and 200-level course prerequisites is required.
8. Chemistry majors will compare favorably to national standards on the subtests for MFAT and ACS sub-discipline exams.
9. Chemistry majors will be able to access and critique information in multiple formats that is unique to the discipline and profession.
10. Chemistry majors will demonstrate competency in professional written and oral presentation of information appropriate for chemists.
11. Chemistry majors will be able to think critically, solve problems and know when a result is reasonable within the chemistry discipline.

12. Chemistry majors will demonstrate scientific reasoning that is expected of professionals in the discipline, including appropriate experimental design and follow through.
DEPARTMENT OF COMPUTER SCIENCE

A. Curricular Changes

We have a new course, CSCI 366 Database and Web Development, for Computer Science Majors. We changed the major requirements, effective Fall 2015, to add CSCI 366 to the required CS courses. To make room in the program for CSCI 366, we will no longer require MATH 211 Calculus 2. For accreditation, we will treat CSCI 340 as a Math course and we will ensure that it has significant mathematical reasoning, particularly proofs.

We dropped the CSCI 340 from the prerequisite list for CSCI 450.

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. Schwartz serves on the Steering Committee for the Theory and Applications of Diagrams. She also served as the Graduate Symposium Chair for International Conference on Theory and Application of Diagrams, Australia, 2014. She also serves as the General Chair of the International Conference on Theory and Applications of Diagrams for 2016.

Dr. Hutchens served on the PACISE Board.

Dr. Ghazizadeh served as a member of the Steering Committee for the first IEEE Workshop on Vehicular Networks Applications.

Dr. Webster worked as a consultant and software developer on a very large software development project for Alcoa Technical Center in Pittsburgh, PA on the ARMS - Alcoa Rolling Mill Simulator,

Dr. Webster worked as a consultant and software developer for EZSolution Corp. in Lancaster, PA.

Dr. Schwartz worked with two students developing a website for Teachers in the Parks, a community based organization encouraging education.

We have published 3 papers and continue to work on work on grants as detailed below.
Grants:

Dr. Schwartz coordinated a $26018 NIST (National Institute of Standards and Technology) grant that allows three students to do a Summer Undergraduate Research Fellowship at NIST in Summer 2015.

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

Publications:


C. Student Achievements


Six students attended the PACISE conference held at Edinboro University and participated in the programming contest. The team of Mevin Fansler, Erik Ginter, and Dan Rabiega took first place.

Nine students participated in the ACM Regional Programming Contest at Shippensburg, PA.

Mervin Fansler received the Computer Science Award for outstanding senior computer science major.

Tyler Helsel received the Beth Ann Barry award for a student with 30 to 70 credits that has demonstrated community service and great potential in computer science.
Jessica Butts won the Boyer Award for a computer science major excelling in mathematics. Mervin Fansler won the Boyer Award for a mathematics major excelling in computer science.

Dan Rabiega, Tyler Helsel, and Jason Zimmerman received National Institute of Standards and Technology Research Fellowships for summer 2015 in Gaithersburg, MD.

Bryan Smith received the Kokat / Georgescu award.

Our cyber defense team participated in the preliminary round of the Mid-Atlantic Collegiate Cyber Defense Competition.

Computer science students worked on eight independent studies with faculty members on undergraduate research projects. Five students participated in COOP opportunities. The students and the titles of their research projects are listed in the School Statistics section of the Annual Report.

Dan Rabiega wrote a thesis for departmental honors: *Implementing a Concurrent-by-Default Programming Language with Automatic Memoization.*

The job market is strong with salaries high nationally. Our students are therefore finding employment. Some examples are:
Grant Blankenship: Neustar
Kim Broskie: Millersville University

D. **Progress Toward Department Goals / Five Year Program Review**

1. Maintain appropriate staffing:
   We have hired Puya Ghazizadeh to replace Dr. Chaudhary, who retired in Spring 2013.

2. 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**

Dr. Puya Gazizadeh joined us in Fall 2014.

We received funding through the student technology fee to replace our server. It was not installed last summer, but should be installed this summer.
F. Outcomes Assessment

We will meet, as usual, after the end of the spring term to analyze the data collected over the year.

A copy of our Weave-online analysis will be available after that meeting.
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 M.S. in Integrated Scientific Application is one area that is receiving the greater amount of attention in curriculum and course development. Curriculum is one of the three required focus areas in the department’s 2013-2018 Self-study and Strategic Plan. The table below provides a list of courses and programmatic changes that were proposed and approved during the 2013-2014 academic year.

1. M.S. in Integrated Scientific Applications (MSISA) was launched in fall 2012 with five graduate students. We currently have 14 students from a broad geographic and cultural demographic enrolled in the program. Students are enrolled in all four specializations: Weather Intelligence and Risk Management, Climate Science Applications, Geoinformatics, and Environmental Earth Systems Management (EESM). Dr. Joseph Bushey has been hired as TPTF to bring expertise and to build out the EESM specialization. This resulted in offering two new courses: 1) Environmental Sustainability (Fall 14) and 2) Stormwater Management (Sp 15). He is integrated Bentley software for watershed modeling into his courses. In addition, over the summer 2015 he will be developing four one-credit modules for training in specific content areas in EESM, and will offer a new course, Environmental Earth Systems Management in fall 2015. Course proposals are being developed for each of these courses. We were able to increase our GA allotment from 1.0 to 1.5 in 2014.

2. Heliophysics and Space Weather Minor was developed three years ago but was relegated to a concentration in the Physics program. In 2014, it was submitted to the PASSHE as the full-fledged minor for which it was intended, and was approved. There are currently five students enrolled in the minor. With a B.S. in meteorology and a minor in Heliophysics and Space Weather, students receive the preparation needed to advance to graduate programs in aerospace engineering, solar physics, heliophysics, and the like, or to seek employment at the NOAA Space Weather Prediction Center.

3. New graduate and undergraduate courses for emerging trends and workforce development:
1. **EMGT 634: Comparative Emergency Management Systems: Fully online: graduate course for the Master of Science in Emergency Management Program (approved in fall 2014).**

2. **Environmental Sustainability: Face-to-face graduate course for the Master of Science in Integrated Scientific Applications, EESM specialization.**

3. **Stormwater Management, Face-to-face graduate course for the Master of Science in Integrated Scientific Applications, EESM specialization.**

4. **Distance Learning Courses** to provide greater student access and flexibility:
   
   **EMGT 634: Comparative Emergency Management Systems: Fully online: graduate course for the Master of Science in Emergency Management Program (approved in fall 2014).**

   **ESCI 441, Synoptic Meteorology,** was taught as in a blended delivery format in fall 2014 by a TPTF, Andrea Smith, while Dr. Todd Sikora was on sabbatical. Ms. Smith engaged Millersville through the UVISIT program of the University Corporation for Atmospheric Research.

5. **Curriculum Changes** were approved that better align programs with emerging trends and workforce needs:
   
   The MSISA program continues to evolve as it aligns with workforce needs.
   
   Environmental Systems Management was modified to Environmental Earth Systems Management to better align with the larger scope of the specialization and to distinguish itself from programs that focus on mechanical systems.

**B. Faculty achievements – grants, research, sabbatical**

**Sabbatical:**

Dr. Richard D. Clark was awarded a one-year sabbatical for fall 2015-spring 2016.

Dr. Todd D. Sikora completed a sabbatical in fall 2014.

**Books Published:**

**N/A**

**Refereed Publications:**

**Hagelgans, D.,** 2014: Education versus Experience: Solving the Puzzle, *International Association of Emergency Managers Journal.* (September)


**Non-refereed Publications:**

Publications in Review:

None.

Publications in Preparation:


Smith, A., and R.D. Clark, Synoptic meteorology from a distance To be submitted to Bulletin of the American Meteorological Society.

DeCaria, A. is preparing a textbook on Python Programming to be published by Sundog Publishing.


Manuscripts/Proposals Reviewed: (number are in the parentheses)

Kumar A.: Reviewed 3 separate proposal calls: NSF postdocotral proposal review (6 proposals); Gulf of Mexico RFP-IV (10 proposals); Gulf of Mexico RFP-V (10 proposals)

DeCaria: Journal of Geophysical Research (1 manuscript reviewed); American Journal of Undergraduate Research (1 manuscript reviewed).


Hagelgans: Colleges and Universities Sticking to Their Guns?” [Paper JEM14-0568]

Sikora: Journal of Applied Meteorology and Climatology (39). Dr. Sikora is an editor for this journal.

Sikora: National Science Foundation. One proposal review.

Yalda: National Science Foundation. Served on one (1) proposal review panel (15)
Presentations at Professional Meetings: (* denotes student presenter)


DeYoung, R., C. Prebish, N. Strickland, and R. D. Clark, 2015; Langley Mobile Ozone Lidar Results at South Table Mountain Golden: Comparison with Tethers, In-situ, and Aircraft Ozone Data, DISCOVER-AQ/FRAPPE Science Meeting, Boulder, CO, 4-8 MAY 2015

Stein-Zweers, D., R.D. Clark and others: Operation of the KNMI NO2 Sonde at Golden, CO: Case Studies, DISCOVER-AQ/FRAPPE Science Meeting, Boulder, CO, 4-8 MAY 2015

Mazzuca, G., R. D. Clark, and others, 2015; Observations and Modeling of the Influence of Thunderstorms on O3 and NOy during DISCOVER-AQ Summer Deployments, DISCOVER-AQ/FRAPPE Science Meeting, Boulder, CO, 4-8 MAY 2015

Berkoff, T., R. D. Clark and others, 2015; Summary of Micro-Pulse Lidar Data Obtained During DISCOVER-AQ, DISCOVER-AQ/FRAPPE Science Meeting, Boulder, CO, 4-8 MAY 2015

DeCaria, A.J. Delivered oral presentation titled “Scientific Computing in the Undergraduate Meteorology Curriculum at Millersville University,” 13th Annual Conference for Scientific Computing with Python, Austin, TX, July 8, 2014


**Grants and Contracts:**

**External Grants and Contracts:**

**Collaborative Grants:**

**Dr. Sepideh Yalda and Dr. Duane Hagelgans**

Title of grant: Emergency Management for Transit Facilities
Grant amount: $ 33,900.00
Duration: 2014-January 2015

**Drs. Richard Clark and Todd Sikora**

Title of grant: Collaborative Research: Ontario Winter Lake-effect Systems, Surface and Atmospheric Influences on Lake-effect Convection
Sponsor: National Science Foundation
Support: $ 387,738 including other Millersville University personnel
Duration: FY 13-16

Title of grant: Collaborative Research: Stable Boundary Layer Processes and their Interaction with Nocturnal Convection over the Great Plains in PECAN
Sponsor: National Science Foundation
Support: $289,976 including other Millersville University personnel
Duration: FY 15

**Dr. Richard Clark**

Title of grant: Deriving Information on Surface Conditions from Column and Vertically Resolved Observations Relevant to Air Quality (DISCOVER-AQ)-HOUSTON- phase II
Sponsor: NASA
Grant amount: $13,400
Duration: August 2014 – December 2014

Title of grant: Deriving Information on Surface Conditions from Column and Vertically Resolved Observations Relevant to Air Quality (DISCOVER-AQ)-Colorado
Sponsor: NASA
Grant amount: $240,000
Duration: 1 April 2014 – 31 May 2015

**Mr. Eric Hörst**

Title of Grant: MUWIC Winter Snow Warning for PennDOT District 8.
Sponsor: PA Dept of Transportation
Grant amount: $116,000  
Duration: Three-year renewal beginning 08/01/2014

Dr. Ajoy Kumar  
Title of grant: Impact of global warming on the oceanic oxygen along the East  
Sponsor: FDPC  
Grant amount: $9645  
Decision: Not Funded  

Title of grant: COMET, Harris and Millersville University Proposal for Round 1 of the Research to Operations Initiative  
Sponsor: NASA  
Grant amount: $74,995  
Decision: Not funded

Dr. Robert Vaillancourt  
Title of Grant: A study of the microbial food web and toxic phytoplankton blooms of the Delaware Bay Estuary using a ship-of-opportunity autonomous sampling system;  
Sponsor: PASSHE FPDC Research Grant  
Grant Amount: $9,614 plus $6,000 match.  
Duration: Two years; 2014-16

Grants Received (Internal)

ESCI faculty has received $ 3,690.40 in MU Faculty Grants in 2014-2015. In addition:

- **Ajoy Kumar** received ¼ load reduction for spring 2016 in support of his released-time grant proposal; Adapting Now to a Changing Climate – Seagrass Mapping and Restoration.

Grants and Contracts pending:

- Clark/DeCaria: Title of grant: Millersville Acid Rain Monitoring Site Project;  
  Sponsor: Pennsylvania Dept. of Environmental Protection (DEP)  
  Contract Amount: $32,268 (Three-year contract)  
  Duration: 1 January 2015 - 31 December 2017

- Dr. Sam Earman: Co-PI on grant proposal “Evaluating Stream Restoration Effectiveness” submitted to PASSHE FPDC program (Joe Bushey, ESCI PI)

- Faculty: **A. Kumar**
  Proposal Title: Improving persistence and graduation rates among STEM majors with marginal mathematics profiles. Sponsor: National Science Foundation (IUSE), Amount: $644,067

- Faculty: **D. Hagelgans**: CAE Innovation Block Grant: Developing educational materials for third, fifth and ninth graders to be implemented as a trial in local school districts
Professional Development:

Dr. Ajoy Kumar
- “Teaching About Climate Change”, Susquehanna University, January 9th, 2015

Dr. Todd Sikora

Dr. Richard D. Clark
- OWLeS Science Meeting, Oswego, NY, 25-26 June 2014
- 2014 Fall Meeting of the American Geophysical Union, San Francisco, CA, December 2014
- Clark, R. D., 95th Annual Meeting of the American Meteorological Society, Phoenix, AZ, 2-6 January 2015 (With 30 undergraduate meteorology students and 10 MSISA graduate students)
- Clark, R. D., 2015 Space Weather Workshop, Boulder, CO, 8 – 13 April 2015 (with nine Millersville students)
- 2015 American Meteorological Society Washington Forum, 21-23 April 2015 (six MSISA graduate students)
- NASA DISCOVER-AQ/FRAPPE Science Meeting, Boulder, CO, 4-8 May (one student)

Dr. Alex DeCaria

Dr. Sam Earman

Dr. Duane Hagelgans
- IAEM, 2014 Professional Development Conference
- Homeland Security Conference: South Central Task Force
- George Washington University: emergency management symposium
- FEMA, E104: Planning for Emergency Management course
- FEMA, E105: Public Information and Warning
- South Central Task Force: Mass evacuation workshop
• DHS: Invited participant: Pilot: Mass Care and Sheltering Course
• DHS: Integrated Emergency Management Course: IMT/EOC Interface
• FEMA: E110: Train the Trainer
• FEMA: Higher Ed symposium
• Lancaster County Emergency Management: Initial Damage Assessment
• Lancaster County Emergency Management: HSEEP
• IAEM Region III Conference
• Adams County DES: Point of Distribution workshop
• FEMA IS: 235: Emergency Planning
• FEMA IS: 244: Developing Volunteers
• FEMA IS: 240: Leadership and Influence
• FEMA IS: 242: Effective Communications

Dr. Sepideh Yalda

• Yalda, S., Unidata Strategic Advisory Committee Meeting, Boulder, CO. October 8-9, 2014.
• Yalda, S., Unidata Strategic Advisory Committee Meeting, Millersville, PA. April 23-24, 2015.

Dr. L. Lynn Marquez

• Shank, Stephen and Marquez, L Lynn, Geology of the Baltimore Mafic Complex in State-Line Area. Accepted field trip for the National Meeting of the Geological Society of America, 31 October 2015.
• O’Neill, D. and Marquez, L. These Things We Know for Sure: Key Components and Strategies for a Successful FYE Program. Invited Workshop National Meeting of the First-Year Experience and Students in Transition, Dallas TX 7 February 2014
• Marquez L., First-Year Experience and Students in Transition Conference, Dallas TX, 7-10 February 2015
• Marquez L. AACU Transforming STEM Higher Education Conference, Atlanta GA 6-8 November, 2014
Dr. Robert Vaillancourt

- Vaillancourt, R., MARACOOS meeting, Baltimore, MD, 3 October 2013
- Vaillancourt, R. Ocean Carbon & Biogeochemistry Workshop, Woods Hole, MA, July 2013

Faculty Travel:

In 2014-15, Department support for travel for professional development and presentations at conference totaled $21,973.62, of which $4,085.27 (18.6%) came from the Department operating budget, $1,715.37 (7.8%) came from the MSISA operating budget with the remainder coming from grants (external and internal), and the Dean’s travel funds.

Major Service to Scientific and Science Education Communities:

Dr. Richard D. Clark

- Board of Trustees, University Corporation for Atmospheric Research (UCAR), 2009-2015, MEMBER.
- UCAR Board of Trustees Budget and Program Committee, 2014-2015, CHAIR
- UCAR Members Nominating Committee, 2015-, MEMBER
- UCAR Board of Trustees, Executive Committee, 2014-2015, MEMBER
- High Altitude Observatory Strategic Advisory Committee, Ongoing, MEMBER.
- American Meteorological Society Science and Technology Advisory Committee for Space Weather, Ongoing, MEMBER
- American Meteorological Society Committee on Environmental Stewardship, Ongoing, MEMBER
- American Meteorological Society 96th Annual Meeting Program Committee, 2014-2016, MEMBER

Dr. Ajoy Kumar

Organization: Pennsylvania Environmental Resource Consortium (PERC)
Status: Member Since 2013

Dr. Richard D. Clark

Organization: University Corporation for Atmospheric Research (UCAR)
Status: Member (2nd term 2012-15), Board of Trustees (BOT)
Organization: UCAR - BOT
Status: Member (appointed), UCAR- BOT Executive Committee

Organization: UCAR- BOT
Status: Chair (appointed), UCAR-BOT Budget and Programs Committee

Organization: UCAR-BOT
Status: Member (appointed) UCAR-BOT Members Nominating Committee

Organization: National Center for Atmospheric Research High Altitude Observatory
Status: Member (invited) HAO Advisory Board

Organization: American Meteorological Society
Status: Member (appointed) Committee on Environmental Responsibility

Organization: American Meteorological Society
Status: Member (appointed) Scientific and Technical Advisory Committee (STAC) on Space Weather

Dr. Alex DeCaria
Organization: National Assessment of Education Progress
Status: Member of Science Standing Committee

Dr. Duane Hagelgans
Vice Chairman of the Lancaster County Emergency Planning Committee
Emergency Management Coordinator: Manor Township and Millersville Boro
Foundation Board Member: Lancaster County Public Safety Center
Advisory Board Member: Lancaster County Public Safety Center
Leadership Team Member: South Central Task Force (Emergency Management TF in eight counties of SC Pa)
Public Information Officer: Lancaster County Emergency Management Agency

Dr. Ajoy Kumar

Todd D. Sikora
Organization: American Meteorological Society
Status: Session co-chair, 20th Conference on Air Sea Interaction, Coastal and Marine Boundary Layers in the Atmosphere and Ocean, 2015

Organization: University Corporation for Atmospheric Research Membership Committee
Status: Member (2011-present)

Organization: American Meteorological Society
Status: Editor for peer-reviewed publication Journal of Applied Meteorology and Climatology (2013-present)

Sepideh Yalda
Battan Book Award- American Meteorological Society- Invited Member (2014-present)

University Corporation for Atmospheric Research, Governance Task Group- Selected Member (2013- present)

University Corporation for Atmospheric Research, Appointed Member Representative (2011-present)

University Corporation for Atmospheric Research Unidata Strategic Advisory Group-
Appointed Member (2013-present)

Natural Hazard Mitigation Association International Group- Invited Member (2012-present)

Emergency Management Institute Higher Education Accreditation Focus Group- Invited Member (2013-present)

National Environmental Educational Foundation Advisory Group-Invited Member (2010-present)

American Meteorological Society, Board on Best Practices, Invited Guest Member (2015-)

Central Pennsylvania Integrated Weather Impacts Team, Invited Member (2015-)

External Graduate Committees:

- Clark, R. D. as program coordinator and graduate advisor for the M.S. in Integrated Scientific Applications program.
- Yalda, S. as program coordinator and graduate advisor for the M.S. in Emergency Management program
- Hagelgans, D. as graduate advisor for the M.S. in Emergency Management program

Student Research Activities:

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<tr>
<th>STUDENT FIRST NAME</th>
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<th>ADVISOR FIRST NAME</th>
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<th>RESEARCH TITLE</th>
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<tr>
<td>Clark</td>
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Phytoplankton species diversity in the Western North Atlantic Ocean during research cruise K219

Earth Science Applications

Present faculty/staff community service.

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<td>Presented talk, “Air pressure and winds,” at the Great Eastern Balloon Camp</td>
<td>July 2014</td>
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<td>Ajoy Kumar</td>
<td>“The Wisdom to Survive: Climate Change, Capitalism &amp; Community”; Sponsored by Berks Peace Community</td>
<td>October, 13th, 2014</td>
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<td>Ajoy Kumar</td>
<td>Junior Achievement of Central PA’s STEM SUMMIT</td>
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<td>Lynn Marquez</td>
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<td>Richard Clark</td>
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<td>Sepi Yalda</td>
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<td>Sepi Yalda</td>
<td>North Museum of Lancaster, STEM Sisters Discovery Dinner Committee I</td>
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<td>Leadership Team Member: South Central Task Force (Emergency Management TF in eight counties of SC Pa)</td>
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</table>
A significant number of community service activities, such as *Pathways*, were performed by Dr. Charles K. Scharnberger, the ESCI Dept Volunteer-in-Service.

Perhaps the most arduous service provided by the WIC is fulfillment of 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. Additionally, an increasing number of media requests—dozens per month—come from a wide range of local and regional newspapers, radio and TV stations. The Director of the Weather Information Center takes responsibility for fulfilling all such requests for expert forecasting and storm analysis—this engagement brings Millersville tremendous exposure in papers such as the *Intelligencer Journal*, *Lancaster Sunday News*, and *York Dispatch*, to name a few. Finally, the WIC remains active in outreach and service to the local community. Over the past year, Mr. Hörst gave more than a dozen off-campus weather talks, Weather Center tours, and “shadowing” days. Additionally, the WIC held a number of Open House events, including the Annual Science Lectureship and the Women in Science & Math event.

C. **Student achievements**

**National Awards:**

- **Ashley Orehek** (Meteorology, junior) was selected for the National Center for Atmospheric Research, Undergraduate Leadership Workshop, 2-9 JUNE 2015.

- **Sylvia Hitz** (BSE Earth Sciences) is the recipient of the Ernest Hollings Scholarship and Internship Program.

**Earth Sciences Students’ Awards:**

- Scott Kleebauer: Dr. William B. McIlwaine Scholarship
- Jennifer Gentry and Erin Johnson: William Malcolm Jordan Earth Sciences Scholarship
- Alyssa Cannistraci: Clark-Yalda Scholarship in Atmospheric Science
- Melinda Hatt: Paul H. Nichols Scholarship
- Jillian Weitkamp: Rettew Associates Scholarship in Geology
- Earth Sciences Award for Academic Excellence
• Renee Duff: Liberal Arts
• Aaron Musselman: Secondary Education

Other All University Awards Received by ESCI students:
• Amber Liggett, Board of Governors Scholarship for Science, Mathematics, and Technology.
• Nicholas Rufo, Laurence E. Cassady-Auker Scholarship
• Jillian Weitkamp, William A. Dinges Veterans Scholarship
• Edward Oswald, Blanche Henninger Snyder 1918 Scholarship
• Curtis Silverwood, Starbrad Excellence in Science Award

Neimeyer-Hodgson Research Grant:
• Michael Burns, $700, Spring 2015
• Melinda Hatt, $700, Spring 2015

2014-2015 Graduates

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Student Job Placement and Advanced Studies (partial list):

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<td>David Bludis</td>
<td>A summer in emergency management from staff meetings to a nationally recognized railroad exercise with TRANSCAER, Lancaster County Emergency Management Agency</td>
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<td>Samantha Connolly</td>
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<td>Rebecca DiLuzio</td>
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<td>Renee Duff</td>
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<td>James Fowler</td>
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<td>Brooke Hooper-Attig</td>
<td>Phase 1 Environmental Site Assessment, Element Environmental Solutions</td>
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<td>Jordan McCormick</td>
<td>Evaluation in the Bias of Temperature Measurements based on siting criteria used for Climate Observing Systems, Texas A&amp;M, College Station, TX</td>
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<td>Curtis Silverwood</td>
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<td>Jean Vivola</td>
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Student name: Michael Yalch  
Internship title/site: Meteorologist Intern, WBRE TV, Wilkes-Barre, PA

**Student Research Grants Received:**

**National Student Grants:**

- Ashley Orehek (Meteorology, junior) was selected for the National Center for Atmospheric Research, Undergraduate Leadership Workshop, 2-9 JUNE 2015.
- Sylvia Hitz (BSE Earth Sciences) is the recipient of the Ernest Hollings Scholarship and Internship Program.

**Neimeyer-Hodgson Research Grant:**

- Michael Burns $700, Spring 2015
- Melinda Hatt $700, Spring 2015

**Noonan Grants Received:**

- 17 Students: ESCI 321 Structural Geology Class Field Trip to Hudson Valley, NY

**Student attendance at regional or national conferences:**

- Number of Students: 30 Undergraduate and 10 graduate students  
  Conference: 95th Annual AMS Meeting, Phoenix, AZ

  Number of Students: 9  
  Conference: Space Weather Workshop, Boulder, CO

  Number of Students: 14  
  Conference: Northeastern Storm Conference, Saratoga Springs, NY

**Student Travel:**

The Department of Earth Sciences supports student travel to conferences and other extra-curricular educational experiences. In **2014-2015, $65,904.43 was directed toward student travel.** Of this amount, $5,006.24 (7.6%) came directly from the Department operating budget, $11,480.79 (17.4%) came from the MSISA operating budget with the remainder coming from research grants, SCMA Dean’s Travel Funds, the MU Chapter of the American Meteorological Society.

**STUDENT OUTREACH TO THE COMMUNITY**

We would be remiss in this report if we did not include the significant contribution to outreach on the part of the students through their membership and association with the Millersville University Student Chapter of the American Meteorological Society. Through this student organization, the largest discipline-related club on campus, is sponsored the Public Weather Awareness Day in April 2015 where nearly 200 visitors make their way to Pucillo Gym to take part in sundry weather-related activities. In addition, The AMS chapter sponsors the Weather Outreach Program whereby a teacher in an elementary or middle school wanting to supplement their lesson on weather can use a Web-based form to request a student(s) to come to the school and do a weather presentation. In 2014-15, students visited 20 schools and presented on topics of weather and climate.
Annual Summary – MU Weather Information Center
(July 2014 – June 2015)

Eric J. Hörst, Director

The Weather Information Center (WIC) has grown into one of the region’s most recognized sources for high quality, accurate and hype-free weather information. In addition to servicing more than one hundred meteorology students and a variety of MU coaches and administrators, the WIC has become a dependable resource for many in the community, local media, and numerous public and government agencies. In the past year, the WIC issued more than 800 forecasts and discussions, 200 streaming videos, and dozens of weather briefs to MU administrators and coaches, State agencies, and local media.

The primary function of the WIC remains to provide academic support activities for the meteorology students. To this end, the Campus Weather Services (CWS) exists as a source of operational forecasting experience where students prepare and disseminate local forecasts to the University and local community. Over 50 meteorology majors participated in the CWS this year, creating numerous forecast products for the MU Weatherline, Snapper newspaper, and the University web site.

WIC broadcast initiatives—Streaming Video weathercasts and the feature-length Weather Watch show—provide engaging content to an expanding audience that reaches far beyond that local region. Streaming video short-term forecasts and extended outlooks are issued up to ten times per week, while several five-minute Weather Watch episodes are released each semester (approximately one episode every two to three weeks).

Perhaps the most arduous service provided by the WIC is fulfillment of 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. Additionally, an increasing number of media requests—dozens per month—come from a wide range of local and regional newspapers, radio and TV stations. The Director of the Weather Information Center takes responsibility for fulfilling all such requests for expert forecasting and storm analysis—this engagement brings Millersville tremendous exposure in papers such as the Intelligencer Journal, Lancaster Sunday News, and York Dispatch, to name a few.

Also notable is a three-year extension ($116,000 grant) of the “Winter Weather Forecasting” MOU with the Pennsylvania Department of Transportation (PaDOT). For an eighth winter season, the WIC provided targeted forecasts for PaDOT District 8 counties. Managed by Director Horst, this forecasting and storm analysis service
employed five 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 gave more than a dozen off-campus weather talks, Weather Center tours, and “shadowing” days. Additionally, the WIC held a number of Open House events, including the Annual Science Lectureship and the Women in Science & Math event.

A. Progress toward department goals/5 year review

The overarching theme guiding our 2013-2017 strategic direction is Integration and Transformation, and this theme will be applied to all focus areas and guide the goals and initiatives that the department will pursue over the next several years. The strategic plan involves six focus areas: three required by the university for all program reviews, and three selected by the department from a list provided by the MU Office of Planning, Assessment and Analysis.

Required Focus Areas:
I. Curriculum
II. Student success
III. Integrated planning

Selected Focus Areas:
1. Faculty accomplishments
2. Pedagogy (from the perspective of integration and transformation)
3. Integration and transformation across the curriculum

The Department of Earth Sciences continues to take a progressive stance on curricular revisions to accommodate emerging trends, workforce demands, and student access. Our current curriculum is deep in the core discipline and broadened by electives, minors, and double majors. The meteorology curriculum conforms to the American Meteorological Society (AMS) Guidelines for a B.S. in Meteorology/Atmospheric Science and the GS-1340 civil service requirements. Our geology program provides the skills needed to become a professional licensed geologist. Our recently revised ocean sciences and coastal studies curriculum immerses students in hands-on experience at the Wallops Island MSC. We are pleased with the number of meteorology majors who have declared OSCS with the option in physical oceanography as a double major.

There are three key areas where the department has made significant strides towards achieving its strategic goals.

1) M.S. in Integrated Scientific Applications (MSISA) The graduate program in MSISA continue to expand its course offerings with the addition of Environmental Sustainability and Stormwater Management. We are in the process of moving away from the current arrangement of having to take the business courses at Shippensburg University to those
courses being taught at Millersville. In fall 2015, we will offer the fully online Leadership in Science and Strategic Management, which will thereafter take the place of the Shippensburg Strategic Leadership and Management. We have hired two TPTF: Dr. Joseph Bushey whose expertise in the field of environmental systems management, and Dr. Cheryl Batdorf, whose expertise is in business administration with an emphasis on strategic management. In addition, topics courses have been taught in Weather Derivatives and Valuation and Statistical Applications for Integrative Science. Course proposal for each will be developed in fall 2015.

We currently have 14 students from a broad geographic and cultural demographic enrolled in the program. Students are enrolled in all four specializations: Weather Intelligence and Risk Management, Climate Science Applications, Geoinformatics, and Environmental Earth Systems Management (EESM). Dr. Joseph Bushey has been hired as TPTF to bring expertise and to build out the EESM specialization. This resulted in offering two new courses: 1) Environmental Sustainability (Fall 14) and 2) Stormwater Management (Sp 15). He is integrated Bentley software for watershed modeling into his courses. In addition, over the summer 2015 he will be developing four one-credit modules for training in specific content areas in EESM, and will offer a new course, Environmental Earth Systems Management in fall 2015. Course proposals are being developed for each of these courses. We were able to increase our GA allotment from 1.0 to 1.5 in 2014.

2) Heliophysics and Space Weather Minor was developed three years ago but was relegated to a concentration in the Physics program. In 2014, it was submitted to the PASSHE as the full-fledged minor for which it was intended, and was approved. There are currently five students enrolled in the minor. With a B.S. in meteorology and a minor in Heliophysics and Space Weather, students receive the preparation needed to advance to graduate programs in aerospace engineering, solar physics, heliophysics, and the like, or to seek employment at the NOAA Space Weather Prediction Center.

3) New graduate and undergraduate courses for emerging trends and workforce development:


   5. Environmental Sustainability: Face-to-face graduate course for the Master of Science in Integrated Scientific Applications, EESM specialization.

   6. Stormwater Management, Face-to-face graduate course for the Master of Science in Integrated Scientific Applications, EESM specialization.

4) Distance Learning Courses to provide greater student access and flexibility:


   ESCI 441, Synoptic Meteorology, was taught as in a blended delivery format in fall 2014 by a TPTF, Andrea Smith, while Dr. Todd Sikora was on sabbatical. Ms. Smith engaged Millersville through the UVISIT program of the University Corporation for Atmospheric Research.
5) **Curriculum Changes** were approved that better align programs with emerging trends and workforce needs:
   The MSISA program continues to evolve as it aligns with workforce needs. Environmental Systems Management was modified to Environmental Earth Systems Management to better align with the larger scope of the specialization and to distinguish itself from programs that focus on mechanical systems.

6) **B.S. in Environmental Engineering**: The department has been discussing whether or not to develop a B.S. in Environmental Engineering. A Letter of Intent has been sent to the PASSHE. Authorization to move forward was awarded on 5/13/15.
A. Curricular Changes

MATH 419, was approved. This is a one credit seminar course that will prepare students in the actuarial science option to take the Society of Actuaries Exam P. The department voted to remove the writing course designation from MATH 353, Survey of Geometry. Proposed changes to the requirements for the BSE major are currently in the curricular process. We have proposed to require History of Mathematics, MATH 301, for the BSE major. MATH 301 is a general education perspectives course and with the changes in General Education guidelines the course may now fulfill the general education perspectives requirement as well as be required for the major. We have also proposed that CSCI 161 and CSCI 140 be the only required related courses for the BSE Mathematics major. This reduces the number of courses required by one but restricts the possible courses that may be taken to fulfill this requirement.

The “review option” for some students who place into MATH 101 was continued. If at least one of the student’s scores on the math placement test 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 fifty-five software based assignments. Upon successful completion of the assignments they may take another assessment and, if successful, place into the next course (Math 151 or MATH 160). While many students indicated an initial interest a much smaller number completed the assignments.

To add accountability to students to complete assigned homework problems the department continued to adopt textbooks with software based homework systems for MATH 090, MATH 101 and MATH 151 for the 2014-2015 academic year. This year the department used Enhanced Web Assign, as the online homework system, for MATH 90, 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. There is immediate feedback and the opportunity for input as students are working on homework problems.

During summer sessions, winter session and the fall semester some sections of Math 130, Elements of Statistics I, and/or Math 235, Survey of Statistics, were offered in a distance learning format. Some sections of MATH 235 and MATH 130 continued to require students to use MyStatLab, an online homework system. Math 235 and MATH 535 are currently scheduled to be offered in an online format with face-to-face exams during Summer Session II.

A new graduate topics course, Enthnomathematics was developed and taught for the first time in the fall 2014 semester.
B. Faculty Achievements - Grants, Research, Sabbatical

Mathematics Department faculty had a productive year of scholarly activity. Our faculty published 6 papers in scholarly journals and have another eight papers submitted and an additional 13 papers are in preparation for publication. Faculty, also have published one book, and have another in press and another text book for MATH 204 has been completed that will be available to students free of charge online. In addition, MU mathematics faculty presented nineteen 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. Department faculty also hold thirteen leadership positions in academic/professional organizations.

Dr. Dorothee Blum was awarded a two semester sabbatical leave to write a textbook appropriate for preparing pre-service middle level teachers in algebra. Dr. Mingquan Zhan was granted a semester sabbatical to continue his research in graph theory. Dr. Noel Heitmann has been awarded a sabbatical for fall semester to complete a math modeling textbook. 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 twenty-five 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 had to be rescheduled due to inclement weather. However there were still 82 students from 21 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 simulation brought 29 teachers and 122 students to campus and evaluated an additional 267 students’ responses who took the exam on their campus. The AP Statistics simulation brought 19 teachers and 66 students to campus and evaluated an additional 234 students’ responses who took the exam at their campus.

Individual faculty achievements are listed below.

Dr. Dorothee Blum was awarded a sabbatical for the 2014-2015 academic year. She wrote a textbook entitled *Algebraic Foundations and Structures for Pre-Service Middle-Level Teachers* which is appropriate for use in MATH 204. Dr. Blum’s was a co-author of this course and was motivated to write the text after our mathematics education faculty found no suitable text available. Dr. Blum plans to make this available online to students at no charge. She also submitted an article entitled “A History of Mathematics Course: Bringing together Older and Newer Mathematics” to the MAA Notes Volume On History of Mathematics Courses. She also served as a consultant for a middle school student’s science fair project in graph theory.

Dr. J. Robert Buchanan: He presented “Design and Analysis of a New Cryptosystem” at the joint MU/F&M colloquium and “Mathematics of Pari-Mutuel Wagering” at the joint MU/F&M colloquium and at the Haverford College colloquium series. He also served as
a judge for Moody’s Mega Math Challenge and was a consultant to Colloid, LLC located in Harrisburg, PA. His consulting project involved the analysis of a novel cryptosystem, description of key space, detection and mitigation of potential vulnerabilities, description of potential cryptanalytic attacks, composition of technical article describing this new cryptosystem for publication. He experimented with using problem-based learning, inquiry-based learning and online discussion boards in two upper level mathematics courses.

**Dr. Antonia Cardwell** was part of a panel presentation entitled “On-Campus Interview Survival Guide,” at the Joint Mathematics Meetings. She also had a book review of “101 Careers in Mathematics” (co-authored with Ximena Catepillan) published in the MAA Horizons journal. She also directed two students doing independent study in complex analysis.

**Dr. Ximena Catepillan** has a book entitled “Mathematics in a Sample of Cultures” in press with the Kendall-Hunt Publishing Company. She had a book review of “101 Careers in Mathematics” (co-authored with Antonia Cardwell) and career profile of Gregory Coxson, Mathematical Engineer published in the MAA Horizons journal. She also has an article entitled “Maya calendars in the classroom” accepted for publication in *Mathematics Teaching in the Middle School*. She presented her paper entitled ” Remarks on Vedic Arithmetic-Multiplication” at the Joint Mathematics Meetings and presented “An Ethnomathematics Graduate Course” at Mathfest. She serves the EPADEL Section of the Mathematical Association of America in many areas. She is a member of the Committee on Sections and served as the session chair of the Ethnomathematics session at the national level. She is the EPADEL representative on the History of Mathematics special interest group, is the chair of the nominations committee and coordinates the silent auction at the EPADEL meetings (with Dr. Antonia Cardwell). She is on the editorial board of Revista Latinoamericana de Etnomatematicas and serves as a referee for this journal as well as a referee for the MAA Convergence Journal, and the Journal of Mathematics and Culture. Additionally, co-directed (with Cynthia Taylor) an honors thesis.

**Dr. James Fenwick** directed two students doing honors theses studies in time series (Christopher Schneider and Ben Baer). He also co-directed (with Kevin Robinson) three students doing independent studies in statistical software programming in R and SAS. He also taught the statistical portion of the mathematics major first year inquiry sections.

**Dr. Zhigang Han** had a textbook, *Transformational Plane Geometry*, co-authored with R. Umble, published by the CRC Press, Taylor & Francis Group. He also co-directed (with Dr. Minquan Zhan) a non-credit mathematics contest problem solving seminar. He also taught a portion of the mathematics major first year inquiry sections.

**Dr. Noel Heitmann** was awarded a sabbatical for the fall 2015 semester to finish a math modeling text that he is coauthoring with his advisor. For all of his courses he used a smart pen and posted each of his lectures to D2L and in two sections of MATH 365 (Ordinary Differential Equations) he used flipped classroom. He also served as a judge for Moody’s Mega Math Challenge competition.

**Dr. Bruce Ikenaga** supervised the Putnam Exam. The exam was taken by 6 students and 1 of the students had a score of 17 points. He also has a paper, “Almost cyclic
groups” and a book “Topics in Linear Algebra” in preparation for publication. He used videos recorded on a tablet computer in nine different sections. The courses included MATH 101, the lowest level course Dr. Ikenaga typically teaches to MATH 393 one of the most advanced courses he teaches. He continues to use “class work” in his courses and continues to grade all problems he assigns to give students feedback on their work.

Dr. Erin Moss had two papers published; “Pattern Blocks: How Does Your Igloo Grow?” in Teaching Children Mathematics, and “Problem Solvers Solution: Dessert Dilemma” in Teaching Children Mathematics and has another paper accepted for publication, “Philosophies of Mathematics and their Implications for Mathematics Education” to be published in the Mathematics Association of America (MAA) Notes series. She co-presented (with Tyrone Washington) a paper entitled “Using Students’ Thinking to Drive Mathematical Discussions and Optimize Learning” at the National Council of Teachers of Mathematics (NCTM) Annual Meeting and presented “Female Representation in PASSHE Leadership” at Kutztown University’s 2015 CHD Diversity Conference and at the Pennsylvania State System of Higher Education 8th Annual Summit. She also served as a co-editor of the Problem-Solving Department of Teaching Children Mathematics, a monthly publication of the National Council of Teachers of Mathematics. She also presented to area teachers at the AP calculus simulation sponsored by IU-13 and with Project PULSE (Partnership to Understand and Lead STEM Education), a professional development opportunity for local mathematics and science teachers also sponsored by IU-13. She taught three sections of Math 104 via problem-based learning and is directing an honors thesis.

Kevin Robinson was an invited speaker in a Millersville nursing research course and math history course and he co-presented (with Michael Wismer) a talk entitled “Ponderings & Reflections: A Data-Driven Statistics Course for Middle-Level Majors” at the PASSHE-MA conference. He co-directed (with Jim Fenwick) three students doing independent study in statistical software programming in R and SAS. He is serving as the president of the Harrisburg Chapter of the American Statistical Association, the vice-chair of PASSHE-MA 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 judge for Moody’s Mega Math Challenge national competition.

Dr. Delray Schultz directed a statistics honors thesis. He served as a question leader (one of six selected nationally) for the AP Statistics exam reading and was a triage and contention round judge for the Moody’s Mega Math Challenge competition. He offered sections of a cross-listed course giving students the option of meeting face-to-face or taking the course online.

Dr. Zhoude Shao has a textbook, A First Course in Partial Differential Equations, co-authored with J.R. Buchanan in preparation. He has two papers in preparation. The first entitled, “Global attractor, determining modes, and regularity of partly dissipative evolutionary systems,” and another with a co-author from Bloomsburg University entitled “On asymptotic representation of solutions of the fourth Painlevé equation”. He also serves as the department’s tutoring coordinator and he served as a judge for the Moody’s Mega Math Challenge competition.

Dr. Lewis Shoemaker has a paper in preparation entitled “Comparison of Parametric and Nonparametric Methods for Testing Differences in Location”. He taught Math 130, Elements of Statistics I, and Math 235, Survey of Statistics, in an online format and will
offer MATH 535, Statistical Methods I, in an online format during summer session. He also served as a consultant to the Lancaster-Lebanon League Cross Country.

**Dr. Cynthia Taylor** had two papers published; “Integrating universal design and response to intervention in methods courses for general education mathematics teachers” in *the Journal of Mathematics Education at Teachers College* and “Problem Solvers: Solutions: What is the best option?” in *Teaching Children Mathematics*. She has submitted an additional paper, and has three other in preparation. She presented four papers at national conferences and two at regional meetings. She also presented to area teachers with Project PULSE (Partnership to Understand and Lead STEM Education), a professional development opportunity local mathematics and science teachers also sponsored by IU-13. She also serves as a co-editor for Pennsylvania Council of Teachers of Mathematics (PCTM). Additionally, she is directing a Master’s thesis and co-directed (with Ximena Catepillan) an honors thesis.

**Dr. Ronald Umble** had his textbook, *Transformational Plane Geometry*, co-authored with Z. Han, published by CRC Press, Taylor & Francis Group. He has four papers in preparation one with two of our undergraduate mathematics majors. He presented a paper at a national meeting and serves as the coordinator of the Tetrahedral Geometry/Topology Seminar.

**Dr. Tyrone Washington** serves as a co-editor of the *Pennsylvania Council of Teachers of Mathematics Magazine*. He co-presented (with Erin Moss) a paper entitled “Using Students’ Thinking to Drive Mathematical Discussions and Optimize Learning” at the National Council of Teachers of Mathematics (NCTM) Annual Meeting and presented “Geogebra or Bust: Infusing Technology into Your Classroom at the annual state conference of the Pennsylvania Council of Teachers of Mathematics. He also serves as a board member of Pennsylvania Council of Teachers of Mathematics and he is a member of the group of faculty from the school who submitted the NSF-IUSE project grant request. During the academic year he taught multiple sections of MATH 101 in a flipped classroom format and he co-taught a graduate course this spring with a wide variety and major components of the course placed online. He is also co-directing (with Janet White) a Master’s thesis and is a co-PI on the $1.2 million Noyce grant funded by NSF.

**Dr. Janet White** is the PI on the $1.2 million Noyce grant funded by NSF, one of the largest grants ever received by Millersville University. She directed one Master’s thesis and is co-directing (with Tyrone Washington) another. She also directed four other students in independent studies. She served as the local chair for the Pennsylvania Council of Teachers of Mathematics conference and coordinated the AP Calculus and AP Statistics simulations held for IU-13 at Millersville. She presented “The Noyce Scholars Program at Millersville University of PA – the Research Cycle” at the Noyce, Annual PI Conference and presented “The Noyce Scholars Program at Millersville University of PA – 3 year update” at the Noyce Northeast Conference. She co-taught a graduate course this spring with a wide variety and major components of the course placed online.

**Dr. Michael Wismer** presented to area teachers with Project PULSE (Partnership to Understand and Lead STEM Education), a professional development opportunity local mathematics and science teachers also sponsored by IU-13 and co-presented (with
Kevin Robinson) a talk entitled “Ponderings & Reflections: A Data-Driven Statistics Course for Middle-Level Majors” at the PASSHE-MA conference. He also used lecture-capturing technologies in a number of sections of a number of courses. He also attended Camp Idea this spring.

**Dr. Mingquan Zhan** is a very active researcher in graph theory and was awarded a sabbatical for spring semester to pursue this research. He presented his paper “Hamiltonicity in nearly claw-free graphs” at the 28th Midwest Conference on Combinatorics, Cryptography, and Computing. He submitted a paper entitled “Pancyclicity in 4-connected claw-free, net-free graphs” to Discrete Applied Mathematics. He also directed an honors thesis.

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

Edna Meyers scholarships will be renewed for five upperclassmen as long as they remain in good standing. The Edna Butler Cohen Scholarship will be renewed to a sophomore mathematics major and the Rutter/Seiverling Scholarship will be renewed to a junior mathematics major and the Joseph and Anita Meier Mathematics Scholarship will be renewed to a sophomore. One incoming freshmen has accepted our offer of an Edna Meyers scholarship. Additionally, we will be considering offering some outstanding seniors mathematics majors awards of at least $1000 (Edna H. Meyers Scholarships).

**Putnam Exam Results:** Six students took the exam, one had a positive score. The scores are:

- Benjamin R. Baer 17
- Steven Bromley 0
- Justin Eastman 0
- Kanan Grosklos 0
- Quinn Minnich 0
- Samuel Reed 0

4320 students from 577 institutions took the exam.

**Actuarial Exam Successes:**

- Fernando DelPosio: passed Exam FM
- Taylor Lagler: passed Exam P
- Christopher Schneider: Passed both P and FM actuary exams.
- Sean Walsh passed Exam P

**Mathematics graduates who will be attending graduate school** in the fall are:

- Ben Baer, Cornell (statistics)
- Faheem Gilani, Texas A&M University (applied mathematics)
- Jacob Hikes, West Virginia University (aerospace engineering)
Hunter Kenyon, Georgia Tech (nuclear engineering)
Jing Li, University of California, Riverside (pure mathematics)
Samuel Reed, Bowling Green University (pure mathematics)

Students completing an honors thesis and receiving departmental honors:

Student: Benjamin R. Baer
Advisor: James Fenwick
Thesis: Topics in Time Series Analysis with a Focus on Transfer Function Methodology

Student: Nicholas S. Heil
Advisors: Ximena Catepillan & Cynthia Taylor
Thesis: Ethnomathematics: Maya Arithmetic in Vigesimal and Chronological Mathematics Systems

Student: Jacob Hikes
Advisor: Robert Buchanan
Thesis: Optimal Takeoff for Clearing an Obstacle

Student: Ann C. Kovacs
Advisor: Delray Schultz

Student: Jing Li
Advisor: Mingquan Zhan
Thesis: Square of a connected quasi claw-free graph

Student: Christopher M. Schneider
Advisor: James Fenwick
Thesis: Generating Box-Jenkins ARIMA Data in Java, with a Concentration on Seasonal Model Analysis

Student Presentations at Conferences:

Nick Heil, won an Outstanding Presentation Award in the Mathematical Association of America (MAA) Undergraduate Poster Session at the 2015 Joint Mathematics Meeting: Nick Hiel, January 2015. Poster Title: A new approach to Maya division

Benjamin Baer and Faheem Gilani gave a talk entitled “Periodic Orbits on the 120 Isosceles Triangle” at the PASSHE-MA conference

Presentation by 8 Noyce Scholars at annual state PCTM conference: “Geogebra or Bust: Infusing Technology into Your Classroom” Khristina Schultz, Ross Young, Emily Copenhaver, Alex DiMarzio, Sarah Bradley, Rachel Chioda, Miller, J., & Amanda Valent
Poster presentation by Noyce five Noyce Scholars at the Noyce Northeast Conference: The Noyce Scholars program at Millersville University” Sarah E. Bradley, Alana Clark, Jennifer Tran, Ross M. Young and Rebecca Janeshefskie

Nick Heil, colloquium presentation: April 30, 2015. Presentation Title: *Ethnomathematics: Maya arithmetic in vigesimal and chronological mathematics systems*

Alex DiMarzio, colloquium presentation: March 26, 2015, Teaching mathematics abroad as a volunteer

**Internships/ Co-Op:**

Ann Kovacs: Internship MU Office of Planning and Assessment

Scott Singleton: Internship MU Office of Planning and Assessment

Taylor Lagler: Actuarial Internship Summer 2015, Contribution Health

Chris Schneider: Actuarial Internship, Spring 2015, Capitol Blue Cross/Shield

**Graduates Employment:**

Christopher Schneider, Actuary, Donegal Insurance (offer from Capital Blue Cross)

Ann Kovacs, Supply Chain Project Specialist, Lutron Inc. (additional job and interview offers)

Robert Lehman, received an offer from the Carrol County School District in Maryland. He is still interviewing and deciding whether to accept the offer.

Meredith Keller, Accepted an offer from the Baltimore County School District in Maryland

**Summer Research Experience for Undergraduates/Internships:**

Jessica Butts, Undergraduate Modeling Workshop: May 17-22, 2015, NC State

Justin Eastman, Undergraduate Modeling Workshop: May 17-22, 2015, NC State

Justin Eastman, REU at Rochester Institute of Technology, 6/8 – 7/31, 2015

**Master’s Thesis:**

Lindsay A. Eisenhut

**Advisor:** Cynthia Taylor

**Thesis:** In-Class Practices of Flipped Mathematics Educators
D. Progress Toward Department Goals / 5-Year Review

2012-2013 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 eight 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, Cynthia Taylor, Tyrone Washington, Michael Wismer, and Erin Moss supervised the majority of our students. Dr. John Ward, 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. A section of each of the courses for middle level education majors, MATH 205 (Geometry for the Middle level
Teacher), MATH 204, Algebraic Foundations for the Middle Level Teacher, and MATH 230 Data Analysis and Probability for the Middle Level Teacher were taught this year. The department has requested information regarding demand for these courses from the early Childhood Education department to effectively adjust course offerings to allow for sufficient sections. We are monitoring the number of current and incoming freshmen middle level education majors to help gage the demand.

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

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

b. Offering new and innovative courses in applied mathematics.

Ongoing. MATH 478: Calculus of variations was offered for the first time during the fall 2014 semester.

c. The department hired Dr. Baoling Ma, an additional faculty member specializing in the area of applied mathematics. This is to replace the open position created when Dr. E. Sell resigned.

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

a. Developing additional mathematics content courses of interest to returning teachers.

Ongoing. Beginning in summer of 2013, 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 most semesters of the regular academic year we have offered a graduate mathematics education course and a graduate mathematics course in the evening, giving teachers an opportunity to take graduate coursework. The mathematics education course course drew an enrollment of 5 graduate students in the 2014 fall semester and 7 in the 2015 spring semester, likely due to the topical nature of the courses, as well as the convenient time and location. The mathematics course attracted 3 graduate students, which is lower than some previous years. In view of the success of these mathematics education course offerings for the past years, we plan to continue (in most semesters) to offer appropriate courses in the late afternoon/early evening time frame 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 courses in mathematics and mathematics education, geared for the needs of current teachers. The department will investigate and evaluate the need and interest in EDW's.
4) To continue the annual cycle of outcomes assessment by...


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

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

   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 communicating the option of a 2.80 QPA combined with a higher score on the Praxis II exam. Additionally, faculty will find ways of helping students to achieve this level of performance without giving in to the pressure to inflate grades. **Ongoing.** Some of our students in our BSEd program struggle with the 3.00 QPA requirement. However, with appropriate advising students take corrective steps or even leave the major before they have progressed too far, 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. Studying 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. Preparing 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 appears to be highly variable. 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, flexibility is necessary in deciding the number of sections to offer for courses appropriate for these various programs. Based on enrollments from the previous year we had designated one section of MATH 104 as a contingency section for the spring 2015 semester. Two sections were sufficient to satisfy the demand...
therefore the contingency section was not opened. However, we needed to offer some middle level MATH courses by individualized instruction to not delay students’ graduation. We are monitoring the number of middle level majors and the need for additional sections of MATH 104 and/or one or more of the middle level math courses (204, 205 and 230). We also have offered these courses during summer sessions, however the demand has not been sufficient to run the course. An area of concern is that we must teach some MDLV students via individualized instruction since they delay taking the required mathematics courses. It appears that they are not getting advisement or are getting incorrect advisement regarding when to take their mathematics requirements.

6) To increase recruitment efforts by…

a. Using our endowed (Meyers, Rutter, Meier and Cohen) scholarship funds and the Noyce 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. From 2002 to 2011 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. For the past two years the number of majors to fell to approximately 50 and this year based on paid deposits, we expect the number of incoming mathematics majors to be approximately 55 for the fall 2014 semester. We have used our endowed scholarships to help us recruit academically talented students. For the coming 2014-2015 academic year, we offered six students Edna Myers scholarships, however, three have accepted, two declined and we are waiting to hear from one student. 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. The Admissions Office returned to hosting University Open House programs during the 2013-2014 academic year. We (the chair and assistant chair) have met with prospective students and families at each of these events and, where appropriate we have been involving additional faculty and students. 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 undergraduate and graduate students and are updated regularly. In addition, information is more easily accessible from the department’s home page. The number of incoming mathematics majors who have paid deposits (33) for fall 2015 has decreased from 54 at the same time last year. We believe this decrease may be contributed to by a combination of two separate issues. One issue is that the attendance at this year’s open house events was low (3-8 students). We expect that the low attendance at open house may be a result of campus tours and admissions presentations being given to small groups of potential students and their families on weekdays. A result of this format has been that prospective mathematics majors do not meet with a member of the mathematics faculty and consequently since no one in the admissions office has
sufficient understanding of mathematics or the mathematics department to give a clear presentation of the quality of our programs the prospective students and their families receive no information about the distinctives of our programs. A second issue is the negative attention in the media over the past few years regarding jobs in secondary education. We expect that the positive outlook for available secondary mathematics teaching positions is not realized by current high school seniors or their families. We intend to work with the admissions office so that when any potential mathematics major comes for a tour they will be given an invitation to meet with the chair or assistant chair at the time they schedule an appointment for a tour with the admissions office.

We appreciate that open houses are again being offered to prospective students. We are looking forward to this continuing. We also look forward to meeting with families when they come on campus for a tour on weekdays.

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. Faculty invite students to attend the fall and spring EPABEL conferences to give them an understanding of undergraduate research projects. Although none of our students attended an EPABEL meeting this year, two groups of Noyce scholars gave presentations at professional meetings. One group presented at the Noyce Northeast conference and the other group presented at the annual PCTM meeting. Two of our undergraduate majors (Alex DiMarzio and Nick Heil) gave talks at the MU/F&M colloquium and one of them (Nick Heil) also gave a presentation at the Joint Math Meetings where he won an award for an outstanding presentation.

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, we moved the convocation to a mid-week evening (from a Friday evening). The attendance at the convocation has maintained a higher level of attendance since this adjustment was implemented. Another factor is continuing the practice of having an outside speaker who addresses 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 had not been very active for the past two years. This year with new officers the club began meeting again became active and hosted a number of meetings and activities. While this is student led, faculty input and guidance is important to the health of the club. In the coming year, math faculty need to give input and guidance without stifling the students’ leadership.

e. Continuing to support Millersville Pre-Scholars program (formerly the Aim for Success) and other remedial programs.

**Ongoing.** For the ninth 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. This year out of the XX MU Scholars program students who began the extended MATH 090 course in the fall of 2014, YY (ZZ\%) had successfully completed MATH 090 with a grade of at least C-, by the end of the Spring 2015 semester. This is in line with recent years’ success rates of 74\%, 89\%, 81\%, 64\% and 70\%. 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 2014, for the seventh 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, for the fourth year we had the department’s GA involved providing some 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 joined us in August 2012. Dr. Elizabeth Sell resigned her position effective the first day of the spring 2014 semester. She had been on family leave during the fall 2013 semester.

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. At the beginning of the academic year we had two faculty positions unfilled. A successful search this year leaves us with one unfilled position.

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 recently to five with the hiring of Dr. H. Tyrone Washington. We requested to hire an applied mathematician to replace Dr. Sell’s position to bring additional strength in actuarial science and expand our offerings in this area.

E. New Faculty, New Facilities / Equipment

We had a successful search this year and hired Dr. Baoling Ma. Dr. Ma received her PhD in Mathematics with a specialization in applied mathematics from the University of Louisiana at Lafayette.

Last summer, the department purchased four personal computers to replace aging faculty computers. The computers were purchased with funds from the department’s operating budget. The department acquired a color Ricoh copier two years ago. The toner is supplied and a service contract is provided without cost to the department. The department has been given an insufficient annual allocation of copies. Since the allocation is exceeded the department is charged for each additional copy. Use during the first year of this copier exceeded the allocation by a large margin and we were charged close to $2000. This year the projection is that we will again exceed the allocation.

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 2014. An alumni survey will be sent to alumni who graduated in 2010.

During the Fall 2014 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 2015, five BSEd mathematics majors in MATH 405 were assessed with a corresponding instrument and 60% were judged to be proficient initially, however with minor remediation, 100% achieved proficiency. This continues to be a challenge and the mathematics education faculty will review these results and make recommendations.

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 2014 semester, 14 students made a total of 52 separate submissions to their portfolios for MATH 310, 311, 322, 333, 345, 353/355, 464 and various electives. In the Spring 2015 semester, 3 students made 9 separate submissions to their Mathematics Content Portfolios, corresponding to the same required courses as in Fall 2014, plus various electives. The portfolio submissions are still being evaluated at this time. If a student failed to submit their portfolio materials in the required timeframe they will be contacted and asked to do comply prior to the beginning of the Fall 2015 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.
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.

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**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:
- use of the ratio test to determine the interval of convergence of a power series,
- use of partial fractions to evaluate an indefinite integral, and
- 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:
DEPARTMENT OF NURSING

A. Curricular Changes

Undergraduate Curriculum Changes

The Department continues to monitor the curricula of our feeder programs to ensure we are meeting the needs of our fully transfer student population. Based on the addition of a Health Assessment course to the Harrisburg Area Community College Associates’ Degree in Nursing program, the Nursing Department has revised the RN to BSN curriculum to decrease the Health Assessment credit hours to 1, providing students an opportunity to focus on higher level assessments, such as review of systems. In addition, a new course NURS 330 Ethics of Healthcare Innovations has been added to the curriculum. The one credit of health assessment has been added to the existing diversity course, now renamed NURS 360 Assessment and Diversity, 4 credits. All these changes have been fully approved.

In preparation for the launch of our online RN to BSN program, all nursing courses were approved to be offered in a fully online environment.

Graduate Curriculum Changes

No significant changes were made to the MSN FNP or NUED programs.

Syllabi were approved for the proposed Doctorate of Nursing Practice program.

B. Faculty achievements

**Dr. Ruth Davis** served as a peer reviewer for several publications; she served as advisor for three graduate student scholarly projects; she maintained her position as a member of the advisory board for Domestic Violence Services of Lancaster County; she served as an Family Nurse Practitioner for Water Street Health Services.

**Professor Jenny Monn** continued her doctoral work at York College of PA and will defend her final evidence-based practice project in May 2015; she is the primary investigator for the study *Factors Influencing Barrier Protection Use Among College Students*: Implementation of an Educational Campaign and has received a $20,453 grant from the Center for Research on Women and Newborn Health to conduct this study; she served as advisor for three graduate student scholarly projects; she is a member of the South Central PA Evidence-based Practice Consortium Program committee and on the board of directors for the Lancaster County Nurse
Practitioners Organization; she was awarded the Robertson Release Faculty Research award; and she serves as the State Representative for the PA Council of Nurse Practitioners.

**Dr. Kelly Kuhns** continued to serve as 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 on the Executive Council for the South Central PA Evidence-based Practice Consortium; she maintains her role on the PSNA Continuing Education Peer-Reviewer Unit; she served as advisor for eight graduate nursing student scholarly projects; she was a preceptor for a graduate nursing education student completing her education practicum; she continues to serve as a research consultant for PinnacleHealth and is currently the PI or co-PI on numerous research and evidence-based practice initiatives; she received the PASSHE Highmark Grant for Curriculum Development ($15,000)

**Dr. Barbara Zimmerman** served as advisor for nine graduate nursing student scholarly projects; she served as a preceptor for one nursing education graduate student; she maintained her role as a member of Manuscript Review Panel for *Rehabilitation Nursing Journal* and the *Journal of School Nursing*.

C. **Student achievements**

March 2015 – Mariannette Calon-Munoz and Mallory Hull were awarded a Noonan Endowment Award for student research

April 2015 – 30 undergraduate and graduate students attended PSNA Day on Capitol Hill to advocate for nursing.

April 2015 – Melissa Kramer, MSN student, presented her work on community engagement to the PSNA Day on Capitol Hill audience.

April 2015 – Mariannette Calon-Munoz and Mallory Hull (BSN alumni, MSN students) presented “Helping the Hidden: Healthcare for PA’s Migrant Workers” at Made in Millersville.

April 2015 – Michele O’Neil (BSN alumnus, MSN student) presented her research project “Group Visits for Chronic Illness” to the MU Nursing Advisory Board.

April 2015 – Students in the undergraduate Nursing Research course presented their evidence-based practice analyses in a Poster Showcase at PinnacleHealth Community General Hospital
Numerous graduate students have been offered/has accepted offers for family nurse practitioner positions.

May 2015 – graduate student presented the following projects at the 18th Annual MU Department of Nursing Scholarship Symposium:

**Advised by Dr. Castellucci:**

- *The Role that Stress Testing Plays in the Evaluation of Patients with Chest Pain in the Emergency Department and in what Time Period this Testing Should Occur*, Elizabeth Kowalick
- *Urinary Incontinence*, Emmanuel Mukendi
- *A Needs Assessment of the Public’s Knowledge of and Willingness to Participate in Group Medical Appointments*, Michele O’Neill
- *Implementation of Group Medical Visits for Adolescent Obesity*, Ashley Reagle

**Advised by Dr. Davis:**

- *Lactation Issues in Primary Care Practice*, Nichole Gehman
- *Iodine Intake in PA and Issues related to Primary Care Practice*, Wendy Oberdorf
- *Back Injuries Among Healthcare Workers: An Ongoing Problem*, Erin Stauffer

**Advised by Dr. Kuhns:**

- *Use of High Fidelity Simulation in Baccalaureate Nursing Education*, Irene Bailey
- *Postpartum Depression Education*, Beth Fissel
- *Opioid Prescribing for Non-cancer Chronic Pain in Primary Care*, Janine Goodling
- *Provider Recommendation of the HPV Vaccine: Overcoming a Barrier Associated with Vaccinating our Youth*, Chereshia McKenzie
- *Lateral Violence Among RNs: The NP role in Elimination*, Melissa Miller
- *Medicinal Marijuana*, Suzette Misel
• Healthcare Needs Assessment of the Amish Community in Lancaster County Pennsylvania, Jessica Quirin

Advised by Professor Monn
• The Role of Nurse Practitioners in the Management of Multiple Sclerosis, Allison Koblitz
• Director of Advanced Practice Registered Nurses: Is there a need? Jo Miller
• Vaccine Resistance: A Delicate Discussion, Sarah Sell
• A Rare Disease Model of Care from Lived Experiences, Colleen Zak

Advised by Professor Petrokonis
• Implementation of a Nurse Practitioner Led Transitional Care Program Reducing Related 30-Day Re-admission Rates, Melissa Kramer

Advised by Dr. Zimmerman
• Incorrect Inhaler Technique by Healthcare Providers and the Impact on Patients, Theresa Del Biondo
• Geriatric Depression, Alana Glaznovia
• Parental Fever Literacy, Heidi Wilkerson

D. Progress toward department goals/5 year review

Goal 1 Maintain standards of accreditation through spring 2018. The department has continued to review updated accreditation standards. There have been recent changes in the national structure of our accrediting agency and we continue to evaluate which accrediting agency will be best support the vision and mission of our Department.

Goal 2 Refine methods of outcome measurement for the BSN and MSN program. Following full revision of both our BSN and MSN programs, the faculty are now working to develop specific and measurable outcomes for each level. This goal is ongoing.

Goal 3 Convert to an online method of exit and alumni surveys. The Department has revised our alumni survey tool and are exploring ways to conduct this survey
online. The faculty are also exploring online portfolio options to support both goals 2 and 3.

**Goal 4** Expand the continuing education program to achieve 6-8 programs/year. Based on other curriculum initiatives for the 2014-2015 year, the continuing education program has not been active.

**Goal 5** Explore additional methods to engage students in professional scholarly activities. As noted above, we have expanded our Evidence-based Practice Poster Showcase to a second site. Students in the fall semester present their findings at Lancaster Regional Medical Center and students in the spring semester present at PinnacleHealth Community General Hospital in Harrisburg. Further, we have continued to encourage students to submit their works to presentation at local and national conferences.

**Goal 6** Continue to grow and support off-site location at HACC Harrisburg for the BSN program. Our program on-site at Harrisburg continues to flourish. We have increased the number of courses being offered at that site and have continued to fill sections to capacity.

**Goal 7** Develop a detailed program proposal for the DNP. The DNP proposal has been completed and will be reviewed by the MU Council of Trustees and PASSHE Board of Governors in the coming months. All courses and related syllabi have been approved through the University process. If approved, the first cohort of students will begin in Summer 2016.

**Goal 8** Explore alternative program offerings. Program development has been a significant focus for the Department in the 2014-2015 academic year. First, the Department will launch the fully online RN to BSN option in August 2015. Second, due to overwhelming demand, the Department will launch a second MSN site in Spring 2016 at the Dixon Center in Harrisburg, third, the Department has submitted a proposal to offer a Doctorate of Nursing Practice starting Summer 2016. The Department continues to explore additional program options, including a fully online MSN in Nursing Education and other post-master’s certificate programs.

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

The Department hired two new adjunct faculty in the 2014-2015 academic year. Professor Rebecca Modene (BSN and MSN alumnus) has joined the faculty, teaching NURS 340 Environmental Factors (online) and NURS 438 Health Policy
and Nursing Issues in the Spring 2015 semester. Professor Linda Lee (MSN Alumnus) has joined the faculty as a clinical supervisor for FNP students.

F. Outcomes Assessment

The Department of Nursing Outcome Committee reported the following program outcomes in Spring 2015:

Nurse Practitioner Certification Exam – MSN- FNP 100% first time passage rate

Graduation rates:

- 82% of our BSN students graduate within 15 – 18 months of beginning our program. In spring 2015 we had 25 BSN graduates.

- 83% of our MSN students graduate within three years of beginning our program. In 2015, we had 23 MSN-FNP and 1 MSN Nursing Education graduates

Job Placement:

Based on alumni surveys, 90% of our BSN graduates are employed (part-time or fulltime) following graduation. Further, based on returned surveys, all MSN –FNP and MSN NUED graduates are employed in an advanced practice and/or teaching position within one year of graduation.
DEPARTMENT OF PHYSICS

A. Curricular Change

a) Dr. Zenaida Uy shepherded a prerequisite change for PHYS 471-Quantum Mechanics through the approval process. The new prerequisites are “MATH 322, MATH 365 and PHYS 335 or permission of the instructor”. The addition of MATH 322 also necessitated changes in the Physics BS Bluesheet. We now require five Math courses for the BS and one math elective, 200 level or higher. (See Progress Toward Departmental Goals, Faculty Achievements, Outcomes Assessment)

b) PHYS 101, Fundamentals of Physics, was offered in the fall semester as a continuing education course (taught by Dr. Natalia Dushkina) at the downtown campus. Fourteen students took the course, a number that indicates increasing interest by middle level education majors. Next academic year, the Physics Department will consider offering this course on a regular basis.

c) Dr. Dushkina re-wrote the syllabus for PHYS 492, Independent Research and Seminar, a required capstone course for all Physics majors. The new syllabus was implemented in the fall 2014 semester and the positive effects were immediately observed. Students started their projects earlier and demonstrated improved logistics of research and presentations.

d) The Physics Department (with Dr. Gilani taking primary responsibility) developed a UNIV 103 course for incoming freshmen. The course went through the approval process (shepherded by Dr. Tariq Gilani) and was offered for the first time in the fall of 2013. We have continued to offer UNIV 103 in academic year 2014-2015 and it has become an established component of our Physics curriculum. (See Progress Toward Departmental Goals/5 Year Review)

e) The Physics Department worked with the University of Delaware to establish a new 3/2 co-operative program. The program grants a BA degree in Physics from Millersville and a Master’s degree in Materials Science from the University of Delaware. Final approval by the University of Delaware and Millersville University was reached during the spring semester of 2014. As a result this program could be offered to the incoming freshmen class for the first time. We consider this important program to be potentially a major recruiting tool for the Physics
Department. (See Progress Toward Departmental Goals/5 Year Review)

f) In cooperation with the Earth Sciences Department, the Physics Department developed an interdepartmental minor: Heliophysics and Space Weather. However, this minor is now officially housed in the Earth Sciences Department. (See Progress Toward Departmental Goals/5 Year Review)

B. Faculty Achievements

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

Dr. Patrick Cooney is a Millersville University Physics emeritus professor who continues to be professionally active.

In June of 2014 the Activity Based Physics group invited Dr. Cooney to work with them on the production of "Interactive Video Vignettes" (IVVs). Working with faculty and staff at Dickinson College and the Rochester Institute of Technology, he has collaborated on the production of one new IVV on Circular Motion and edited older video to produce three additional IVVs on Electrostatics.

Dr. Cooney presented a short talk on the Circular Motion IVV at the Spring 2014 meeting of the Central Pennsylvania Section of the American Association of Physics Teachers (CPS-AAPT) at Messiah College. In July he is scheduled to make a presentation on the three Electrostatics IVVs at a national meeting of the AAPT.

This work is supported by NSF grants #1122828 and #1123118.

Additional information on the IVV Project is available at http://www.compadre.org/ivv/.

Dr. Dushkina was promoted to the rank of full professor, August 2014.

Dr. Dushkina was awarded a sabbatical leave for the spring 2015 semester to do collaborative research on “Structural Colors and Polarization Effects from Bio Nanostructures” at the laboratory of Dr. A Lakhtakia, Pennsylvania State University, State College, PA.

Dr. Dushkina attended the following conferences, professional associations, or seminars:

a) Poster presentation: “Optics Research at Millersville University: Columnar Thin Films as Gas Sensors” with co-authors Daniel Long (MU Physics graduate), and
Dr. Tariq Gilani. This poster presentation was at the National Educators Workshop on November 2-4, 2014 in Seattle, WA. (See Student Achievements).


d)“Industry Practicum: Additive Manufacturing of Metallic Materials for Sensing and Control” Earth Engineering Science (EES) Department seminar with speaker Dr. E. W. (Ted) Rentzel from the Engineering Science and Mechanics Department at Penn State on March 18, 2015, Penn State University, State College, PA.

e)“Making Space: Opportunities to Transform Space Exploration with in-situ resources” EES department seminar with speaker Prof. Mason Peck from the College of Engineering at Cornell University on March 31, 2015, Penn State University, State College, PA.

f) Attended the EES Student Research Conference on April 2, 2015, Penn State University, State College, PA.

Dr. Dushkina was also engaged in a number of consulting and review activities:

a) Consultant/Independent contractor (for 7th year) to Educational Policy Improvement Center, The College Board, Certified Reviewer for the Advanced Placement (AP®) Course Audit, AP PHYSICS B since 2007 to present, and AP PHYSICS C – since 2012.

b) Received a very positive feedback from David Young and Shane Stadler from Louisiana State University, the new co-authors of Cutnelll and Johnson’s College Physics textbook, for the comprehensive review of the 10th edition of the textbook that she prepared in spring 2014. In a non-solicited letter they wrote: “We appreciate the positive comments you made toward some of the digital content we proposed for the 10th edition….Again, thank you for your careful review and input.” Many of Dr. Dushkina’s suggestions were implemented in the revised edition.
Dr. Dushkina was awarded a MU Faculty Travel to Present Grant for presenting at the National Educators Workshop (NEW) on November 2-4, 2014, in Seattle, WA. ($210.00)

Dr. Tariq Gilani supervised the following student research:

a) “Wavelength Dependence of Faraday Rotation”, Seth Baker (See Student Achievements).

b) “Columnar Thin Films”, Brandon Goodyear. (See Student Achievements).

c) Poster presentation: “Optics Research at Millersville University: Columnar Thin Films as Gas Sensors” with co-authors Daniel Long (MU Physics graduate), and Dr. Natalia Dushkina. This poster presentation was at the National Educators Workshop on November 2-4, 2014 in Seattle, WA. (See Student Achievements).

Dr. Mehmet Goksu presented talks:

a) " Modeling for More Efficient Wind Turbine" at the 2014 Annual Conference of Association of Technology, Management, and Applied Engineering (ATMAE) on November 19-22, St. Louise, MO.

b) “Studies on Wind Turbines Using Solidworks” at the spring 2015 AAPT-CPS Conference on March 27-28 at Messiah College, Mechanicsburg, PA

Dr. Goksu organized workshops at Millersville:


b) Student Enrichment Experience (SEE) workshops to high school students on Friday, Feb 6, 2015.

Dr. Goksu received two MU Faculty Grants:

a) $310.00 - Travel to Present Grant for the 2014 Annual Conference of Association of Technology, Management, and Applied Engineering (ATMAE) on November 19-22, St. Louis, MO.

b) $119.00 – Special Academic and Administration Activities Grant for the spring 2015 AAPT-CPS Conference on March 27-28 at Messiah College, Mechanicsburg, PA.

Dr. Goksu supervised undergraduate research projects:
a) “Studies on Efficiencies of Wind Turbines”, George Smith.

b) “Photoelectric Effect and Applications in PV Cells”, $530.00 Neimeyer-Hodgson Research Grant, $400.00 Student Research Grant. Daniel Cox. (See Student Achievements)

c) “Physics Experiments for High School Students”, Nicholas Stauffer.

Dr. Goksu served on the University Honors thesis committee for Chemistry major Janelle Biehl. Her thesis is entitled “Electrodeposition of Indium Thin Film Microwells for Preparation of Crystalline Indium”

Dr. Goksu reviewed grant proposals for NSF and served as the President of the American Association of Physics Teachers – Central Pennsylvania Section (AAPT – CPS), 2014-2015. He was re-elected as the President of AAPT-CPS Conference on March 27-28 at Messiah College, Mechanicsburg, PA and will serve a third year as the President of AAPT CPS.

Dr. Goksu also served as the Director of the Central PA Regional Science Olympiad to organize the 8th Annual Central PA Regional Science Olympiad competition on Saturday, March 21, 2015 at Millersville University.

Dr. Goksu served as the faculty advisor for the following Millersville student clubs and organizations:

a) Men’s Rugby Club

b) SPS Physics Demonstration Team

c) Association of Technology, Management and Applied Engineering (ATMAE) Student Chapter at Millersville University (aka MU Robotics Team)

The MU Robotics Team competed in the 2014 National ATMAE Robotics Competition held in St. Louis, MO. The MU Robotics won three individual awards including:

a) Best Poster – 1st place

b) Best Electrical/Controls Methodology – 1st place

c) Fabrication/Design - 3rd place

Dr. Hendrick continues his study of supernova remnants in the Large Magellanic Clouds with the Chandra X-ray observatory and Spitzer Space Telescope.

Dr. Hendrick co-authored a paper “Spitzer Observations of the Type Ia SNR N103B: Kepler’s Older Cousin?” which was published in Volume 790 of the Astrophysical Journal in August of 2014.
Dr. Hendrick’s co-authored an observational proposal for a 400,000 second observation of SNR N103B with the Chandra X-ray Observatory along with a joint observation with the Hubble Space Telescope. The proposal was titled “N103B: A Type Ia Remnant with Circumstellar Interaction... Kepler’s Older Cousin?”

Dr. Hendrick advised three students in research project which resulted in two posters presented at the Annual Student Research Symposium. Steven Bromley research poster was “Chandra X-Ray Analysis of Supernova Remnant 0506-68.0 (N23)”. William Baldree’s poster was titled “X-ray Analysis of SNR 0519-69.0 in the LMC”. (See Student Achievements)

Dr. Hendrick was invited to speak during Dr. Tariq Gilani’s UNIV 103 classes, giving a talk titled “Being an Astronomer”.

Dr. Hendrick was invited to speak during Dr. Timothy Miller’s ENGL 292 – Science Fiction class again this semester. As the class was reading “The Time Machine” by H.G. Wells, Dr. Hendrick discussed what modern physics has to say on the possibility of time travel.

Dr. Hendrick supervised two events at this year’s Science Olympiad, the middle school Solar System event and the high school Astronomy event.

Dr. Hendrick took part in the Lancaster Public Library’s Telescope and Stargazing program. Giving talks on the history of telescopes and how they work to children and families at the Mountville branch on Monday, December 15th and the Leola branch on Thursday, December 18th.

Dr. Hendrick gave a lecture on the Solar System to the Mountville Boy Scouts Troop 349 on March 2nd at St. Paul’s United Methodist Church.

Dr. Hendrick gave a guest lecture in Space Exploration to two classes of 5th grade students at Eshleman Elementary School on March 31st.

The society of Physics Students under the supervision of Dr. Hendrick continues to be very active. The Annual Fall Barbecue was well attended by faculty, upper-classmen, and several freshmen physics majors. This is an important event that builds community spirit among our majors and helps with departmental retention.

The Telescope Team continues to use the department's 10.5" telescopes with several observing nights in the past year. The goal is to make this team available for local schools and organizations for public observing nights.

SPS members Chris Reuling, Brandon Goodyear, Cecilia Hall, Brianna Beasley, Alicia Panzarella, Seth Baker, Kevin Piaskowski, and Kanan Grosklos travelled to the
American Physical Society (APS) April Meeting in Baltimore, MD from April 11th through 14th. (See Student Achievements)

Four new members were inducted into the Sigma Pi Sigma Honor Society within the SPS: Michael DeCaria, Cody Petsch, Alicia Panzarella, and Chris Reuling. (See Student Achievements)

New Society of Physics Student officers were elected in April. The new President is Kevin Piaskowski, the Vice-President is Cecilia Hall, the new Secretary is Brianna Beasley, and the Treasurer is Chris Reuling. (See Student Achievements)

Dr. Xin Li was enthusiastically recommended by the Physics Department for her fourth year reappointment.

Dr. Li served on Women in Science and Math conference committee, and was one of the moderators and the speakers of the conference held at Millersville on April 7th.

Dr. Li served on Academic Standards committee and will attend the June Appeals.

Dr. Li was the supervisor of one of the event sections of the Science Olympiad held at Millersville on March 8th.

Dr. Li served on the Dean’s Search committee. The committee reviewed more than 60 applicants, skype interviewed 10 candidates, and brought four candidates on campus. The committee conducted a successful search in two months, a most commendable achievement.

Dr. Li visited Jinggangshan University in June 2014, and initiated the collaboration between Jinggangshan University and Millersville University. With the assistance of Dr. Li, a group of educators from Jinggangshan University visited Millersville November, 2014. Several exchange programs and 3+2 programs were established between the two universities during the visit. Dr. Li will continue her efforts to foster the relation between Millersville and universities abroad in an effort to recruit more international students.

Dr. Li in collaboration with student Kanan J. Grosklos gave an oral presentation: The Interferences patterns of Dipole Radiation at the APS April Conference in Baltimore, Maryland. (See Student Achievements)

Dr. Li in collaboration with student Kanan J. Grosklos gave a poster presentation: The Interferences patterns of Dipole Radiation at the Made in Millersville conference, April 2015. (See Student Achievements)

Dr. Li reviewed several manuscripts in Chinese Optics Letters and Optics Communications.

Dr. Li had the following publications:
a) Xin Li, and George Hinerman, *The Simulation of the Energy Flow Pattern for a Linear Dipole in a Dielectric Medium*, invited research article, *The Open Access Journal of Science and Technology*, Submitted, (2015). Note: George Hinerman is a former student of Dr. Li’s and a MU Physics alumnus.


Dr. Li attended the following conferences:

a) 28th Annual Women in Mathematics and Science Conference, Millersville, PA, April 2015, Presentation: *Physics and Nature*

b) April Meeting of the American Physical Society, Baltimore, Maryland, 2015. Presentation: *Interferences Patterns of Dipole Radiation*


Dr. Mike Nolan served on the University Honors thesis committee for Applied Engineering, Safety, and Technology major Joseph Steinmacher. His thesis is entitled “An Investigation into the Relationship between Technology and Engineering Education and Physics Education in a Selected High School”

Dr. Mike Nolan with student Graham Waegel presented a poster at the annual Student Research Poster Display (April 22-29) entitled: “Return Probabilities of Random Walks on a Restricted Lattice”. (See *Student Achievements*)

Dr. Zenaida shepherded a prerequisite change for PHYS 471-Quantum Mechanics through the approval process. The new prerequisites are “MATH 322, MATH 365 and PHYS 335 or permission of the instructor”. (See *Progress Toward Departmental Goals, Curricular Changes, Outcomes Assessment*).

C. Student Achievements

Physics majors were recipients of the following scholarships and awards:

Graham Waegel: Harry A ’65 and Carolyn J. Lohss Physics Scholarship

Austin J. Martin: Chip and Kathy Brabson ’70 Ph.D. Physics Scholarship

Alicia Panzarella: Harry A ’65 and Carolyn J. Lohss Physics Scholarship

Keith R. Coasey: Faraday Physics Scholarship
Michael A. DeCaria: Faraday Physics Scholarship  
Philip C. and Karen Ashkar Murley ’63 Science Scholarship  
Daniel G. Engle Scholarship  
Camden C. Van Scoik: Faraday Physics Scholarship  
Andrew R. Zimmerman: Faraday Physics Scholarship  
Steve Bromley was awarded Departmental Honors in Physics.  
Steve Bromley has been accepted into Physics Graduate School at Clemson University.  
Steve Bromley in collaboration with Dr. Sean Hendrick presented a poster at the Annual Student Research Symposium: “Chandra X-Ray Analysis of Supernova Remnant 0506-68.0 (N23)”. (See Faculty Achievements)  
William Baldree in collaboration with Dr. Sean Hendrick presented a poster at the Annual Student Research Symposium: “X-ray Analysis of SNR 0519-69.0 in the LMC”. (See Faculty Achievements)  
Graham Waegel has been accepted into Physics Graduate School at the University of California, Davis.  
Graham Waegel in collaboration with Dr. Mike Nolan presented a poster at the Annual Student Research Poster Display (April 22-29) entitled: “Return Probabilities of Random Walks on a Restricted Lattice”. (See Faculty Achievements)  
Graham Waegel was awarded Departmental Honors in Physics.  
George Hinerman (Millersville University Physics alumnus) submitted a paper in collaboration with Dr. Xin Li: “The Simulation of the Energy Flow Pattern for a Linear Dipole in a Dielectric Medium”, invited research article, The Open Access Journal of Science and Technology, (Submitted, 2015). (See Faculty Achievements)  
Kanan J Grosklos in collaboration with Dr. Xin Li gave an oral presentation: The Interferences patterns of Dipole Radiation at the APS April Conference in Baltimore, Maryland. (See Faculty Achievements)  
Kanan J Grosklos in collaboration with Dr. Xin Li gave a poster presentation: The Interferences patterns of Dipole Radiation at the Made in Millersville conference, April 2015. (See Faculty Achievements)  
Kanan Grosklos was awarded $260 by the Student Research Committee for her project entitled “Interference Patterns of Dipole Radiation”.

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Brandon Goodyear was awarded a $413 Neimeyer-Hodgson Research grant for his project “Columnar Thin Films”.

Seth Baker was awarded a $639 Neimeyer-Hodgson Research grant for his project “Wavelength Dependence of Faraday Rotation”.

Daniel Cox was awarded a $530 Neimeyer-Hodgson Research grant and a $400 Student Research Grant for his project “The Ultimate Bid: A Biomechanical Study of the Impact Forces of Sports Dives”.

Kevin Piaskowski was awarded a summer 2015 Internship in the Department of Applied Physics at Johns Hopkins University.

SPS members Chris Reuling, Brandon Goodyear, Cecilia Hall, Brianna Beasley, Alicia Panzarella, Seth Baker, Kevin Piaskowski, and Kanan Grosklos travelled to the American Physical Society (APS) April Meeting in Baltimore, MD from April 11th through 14th. (See Faculty Achievements)

Four new members were inducted into the Sigma Pi Sigma Honor Society within the SPS: Michael DeCaria, Cody Petsch, Alicia Panzarella, and Chris Reuling. (See Faculty Achievements)

New Society of Physics Student officers were elected in April. The new President is Kevin Piaskowski, the Vice-President is Cecilia Hall, the new Secretary is Brianna Beasley, and the Treasurer is Chris Reuling. (See Faculty Achievements)

Kevin Miller, who was accepted into a summer 2014 REU program at the Arecibo Observatory in Puerto Rico, presented his research results at a departmental seminar, November 19. His talk was entitled: “Detectability of Boulders on Near-Earth Asteroids”.

Daniel Long (MU Physics graduate) presented a poster: “Optics Research at Millersville University: Columnar Thin Films as Gas Sensors” with co-authors Dr. Natalia Dushkina and Dr. Tariq Gilani. This poster presentation was at the National Educators Workshop on November 2-4, 2014 in Seattle, WA. (See Faculty Achievements).

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

The Telescope Team under the auspices of Dr. Sean Hendrick continues 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. (See Faculty Achievements, Progress Toward Departmental Goals/5 Year Review).
D. Progress Toward Departmental Goals/5 Year Review

1. Continue to implement plans for our use of space, equipment, and facilities.

   a) In summer 2013, the Optics lab (Roddy 251) was painted with nonreflecting black paint. This helps eliminate accidental reflections and allows for greater precision in making optical measurements. By eliminating spurious reflections, it will also make the laboratory a safer place to work. As a continuation of this project, we investigated the availability of black (instead of white) blackout window shades. However, at this point we have not succeeded in purchasing such shades. We will continue to pursue this goal in the 2015-2016 Academic Year.

   b) As part of our outreach responsibilities, the SPS Demo Team, under the auspices of Dr. Goksu, continues to be active making presentations at local high schools and middle schools. The Telescope Team, under the auspices of Dr. Sean Hendrick, also continues to use the department's 10.5" telescopes with several observing nights in the past year. The goal is to make this team available for local schools and organizations for public observing nights. (See Student Achievements, Faculty Achievements)

   c) In parts of the renovated Roddy Building, the floor tiles became loose. This represented both a safety hazard and an aesthetic distraction. A major goal for the summer of 2014 was to replace these defective tiles and this goal was accomplished.

   d) Student research posters on display in the hallway used to hang from cork strips. The result was less than perfect. Posters often fell down or became ripped. During the spring 2015 semester, we replaced the strips with large wallboards from which the posters can securely hang.

2. Prepare a brochure with examples of the success of our department’s alumni for use by the Admissions Office. This was a 2014-2015 goal that was not accomplished.

3. Establish Physics scholarships for students to help in recruitment and retention.

No new scholarships were established in the 2014-2015 academic year but we continue to administer a number of existing scholarships to attract gifted students. (See Student Achievements)

4. Continue to modify the curriculum and to develop new programs in Physics with emphasis on versatility and recruitment. (See Curricular Changes)

   a) The Physics Department (with Dr. Gilani taking primary responsibility) developed a UNIV 103 course for incoming freshmen. The course went through the approval process (shepherded by Dr. Tariq Gilani) and was offered for the
first time in the fall of 2013. We have continued to offer UNIV 103 in academic year 2014-2015 and it has become an established component of our Physics curriculum. (See Curricular Changes)

b) The Physics Department worked with the University of Delaware to establish a new 3/2 co-operative program. The program grants a BA degree in Physics from Millersville and a Master’s degree in Materials Science from the University of Delaware. Final approval by the University of Delaware and Millersville University was reached during the spring semester of 2014. As a result this program could be offered to the incoming freshmen class for the first time. We consider this important program to be potentially a major recruiting tool for the Physics Department. (See Faculty Achievements, Curricular Changes)

c) In cooperation with the Earth Sciences Department, the Physics Department developed an interdepartmental minor: Heliophysics and Space Weather. However, this minor is now officially housed in the Earth Sciences Department. (See Curricular Changes)

d) Dr. Zenaida Uy shepherded a prerequisite change for PHYS 471-Quantum Mechanics through the approval process. The new prerequisites are “MATH 322, MATH 365 and PHYS 335 or permission of the instructor”. The addition of MATH 322 also necessitated changes in the Physics BS Bluesheet. We now require five Math courses for the BS and one math elective, 200 level or higher. (See Curricular Changes, Faculty Achievements, Outcomes Assessment)

e) 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.

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 courses in medical physics and an Astronomy minor. We will also investigate the possibility of a new course in alternative energies.

We are also continually discussing the structure of our mathematical prerequisites. Our perception is that physics students are deficient in their knowledge of complex variables and vector calculus. When should our students be introduced to these concepts? What courses are best structured for that introduction? These are some of the questions that
the Department will address in the coming academic year.

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 continuing goal for the 2015-2016 academic year is to renew this policy and again purchase or build Foucault Pendulums for graduating BSEd Physics majors.

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.

The following equipment and computers were purchased:

a) Three Dell Laptops. One computer is for the Physics II Laboratory instructor station upgrade. The other two new computers are “floaters” which replace existing outdated laptops.

b) Nine Dell Desktop computers. Seven of these computers are for the Physics II laboratory upgrade and two are for faculty/staff upgrades.

c) Machine Shop Equipment Purchases. The machine shop is continually being upgraded and modified as needed. This academic year we added a soldering/rework station and a compound miter saw.

d) TeachSpin Signal Processor/Lock-in Amplifier. This major purchase for the Advanced/Intermediate Laboratory allows an important upgrade to the Faraday Rotation apparatus. It is also a versatile piece of laboratory equipment now available for general use.

e) Michelson Interferometer (gift from Harry Lohss). The previous Michelson Interferometer had become unreliable and needed to be replaced. The new interferometer is a versatile piece of optical equipment applicable to many measurements and experiments in the Advanced/Intermediate laboratory and for general research use.
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, Faculty 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

Dr. Dushkina was awarded a sabbatical for the spring 2015 semester (See Faculty Achievements). Consequently, we hired Dr. Teman Cooke as her sabbatical replacement. Since joining the department, Dr. Cooke has enthusiastically participated in department activities. In addition, his classroom peer reviews are all very positive. We consider Dr. Cooke to be a very positive addition to our faculty.

Dr. Michael Jackson has been hired as the Dean of the College of Science and Technology (aka School of Science and Mathematics). Since Dr. Jackson has a PhD in Physics, his tenure in the Department of Physics was approved by the faculty.

A number of computer and laboratory purchases were made in the ongoing effort to maintain the currency of our labs and computational resources. (See Progress Toward Departmental Goals/5 Year Review, item seven, for a detailed list.)

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 a 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 a 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.

A senior level course in Quantum Mechanics (PHYS 471) is now required of all our BS Physics majors. The exit interview comments have suggested that we make Linear Algebra (MATH 322) a prerequisite for the Quantum Mechanics course. The Department considered this to be an excellent suggestion. Dr. Uy has shepherded through the approval process a prerequisite change for PHYS 471. The new prerequisites are “MATH 322, MATH 365 and PHYS 335 or permission of the instructor”. (See Progress Toward Departmental Goals, Faculty Achievements)

In the 2014-2015 academic year, we had one BSEd students graduating. A common challenge for all our BSEd majors is scheduling both their Physics courses and their Education courses. This same issue arose during our external 2010-2011 Five Year Review. The Pennsylvania Department of Education has recently revised the number of required Education courses required of our BSEd majors. We are trying to ease scheduling constraints imposed by the excessive number of Education courses and our own rigorous standards. A major goal of the 2015-2016 academic year will be a review of our BSEd program.

Another very important assessment tool is the Major Field Assessment Test (MFAT) which must be taken by all graduating seniors. This year nine students took the exam. As of this date, the final percentile scores are not yet available. However, we can assign approximate percentile rankings based on historical data. One student, Graham Waegel, scored at the 93th percentile. Two students scored at the 55th and 67th percentile while two students scored below the 10th percentile (sic). In comparison with the previous year, the score polarization was not as pronounced: fewer students scored below the 10th percentile, but also fewer students scored above the 90th percentile. The average score for all our students was at the 37nd percentile, significantly lower than the previous year’s average of 52nd percentile. Clearly the average does not describe adequately such a wide bimodal distribution. The Department needs to have an in-depth discussion of these results. How can we improve the performance of our students on the MFAT, especially those students scoring at the lower range of test scores? These 2014-2015 MFAT results for introductory and advanced physics showed that five students did better at the introductory level and four had improved their performance in advanced physics. We feel that students have improved their performance at the introductory level physics as a result of the department’s efforts to reinforce their physics knowledge from their early years in our program. 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 2015-2016 academic year, the Department will discuss these results and continue to address further methods of improvement.
SCHOOL STATISTICS

ANNUAL REPORT

2014 - 2015
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</table>
**School, Department or Interdisciplinary Program:** School of Science and Mathematics

**Submitted by:** Dr. Robert T. Smith

**Contact Information (Email and Desk Extension):** Robert.Smith@millersville.edu  x4292

Please enter information for each item by department or interdisciplinary program area, faculty, staff/administrator, graduate student, or undergraduate student categories(s). Only enter information that occurred during the *time period July 1, 2014 to June 30, 2015*. For example, if you submitted an article for publication on April 3, 2014, do not count the article in item 7. If the same article was then published in a January 2015 journal issue, then count the article in item 6. Do not provide information in areas with n/a (not applicable). The information provided will be used to help generate annual reports, promote the University, and inform future planning efforts such as resource allocations. For more information, please contact your Dean’s office.

*Teaching in an Interdisciplinary program?* If you teach in an interdisciplinary program, complete items 24 to 36 for those courses in that program and submit them to your program chair. Also submit items 1 to 36 for your home department contributions to your department chair.

*Department and Interdisciplinary Program Chairs:* Please return the department form to your Dean by the date requested in the instructions provided by your Dean.

<table>
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<th>Item</th>
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<th>Staff or Administrator</th>
<th>Graduate Students</th>
<th>Undergrad Students</th>
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### 2014-2015 School of Science and Mathematics Annual Report

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<td>$30,832</td>
<td>$300</td>
<td>$11,480</td>
<td>$56,521</td>
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<td>Number of articles or books published or presentations accepted with students listed as co-authors or presenters (May duplicate those counted above)</td>
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**External Honors and Awards** *(only between July 1, 2014 and June 30, 2015)*

| Item | Number of honors or awards *(Provide list of honors or awards)* | 0 | 5 | 0 | 1 | 2 |

\(^\d\) SOTL refers to sharing or presenting scholarship to address enhanced learning in the *college* classroom (one of Boyer’s four scholarship areas). For example, publications or presentations on research to improve teaching or learning, consulting with other higher education institutions on learning outcomes assessment, or discipline-specific textbooks that demonstrate integration of research-based pedagogy to enhance learning at the post-secondary level.
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**Grants and Contracts (only between July 1, 2014 and June 30, 2015)**

| 20.  | Number of grants and contract proposals submitted                         | n/a                               | 32      | 0                      | 2                 | 9                 |
| 21.  | Dollar amount for grants and contract proposals submitted                 | n/a                               | $2,704,991 | $0     | $750               | $8,341             |
| 22.  | Number of grants and contract proposals funded                           | n/a                               | $2,087,670 | $0     | $750               | $7,341             |

**Service Learning (only between July 1, 2014 and June 30, 2015)**

| 24.  | Number of service learning courses offered (Provide list of courses and course sections) and; (do not include internships, early field experience or student teaching experiences) | 6       | n/a     | n/a     | n/a   | n/a |
| 25.  | Number of students enrolled in service learning courses (do not include internships, early field experience or student teaching experiences) | n/a    | n/a     | n/a     | 0     | 133  |
| 26.  | Number of service learning hours students completed (total across course(s), do not include internships, early field experience or student teaching experiences) | n/a    | n/a     | n/a     | 0     | 3,210 |

**Partnerships with Community or Community-Based Research or (only between July 1, 2014 and June 30, 2015)**

| 27.  | Number of partnerships engaged with community organizations or community-based research projects presented to or with products delivered to external agencies or organizations. Provide the number of participating faculty and students engaged (for example, research or program assessment for civic, educational or community organizations) (Include list) | n/a    | 13      | 0       | 25    | 2    |

**First Year Seminar Courses and Learning Communities (Upper and Lower Division) (only between July 1, 2014 and June 30, 2015)**
2014-2015 School of Science and Mathematics Annual Report

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<td>28.</td>
<td>Number of non-major based UNIV 103 course sections taught (provide list) and students enrolled (note – this may also include sections of UNIV 103 courses that include both undecided and students in your major)</td>
<td>3</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
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<td>Number of major-based UNIV 103 course sections taught (provide list) and students enrolled</td>
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<td>Number of Learning Communities offered (with connection to FYI, provide list) and students enrolled</td>
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<td>n/a</td>
<td>n/a</td>
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<td>31.</td>
<td>Number of Learning Communities offered (without connection to FYI, provide list) and students enrolled</td>
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<td>n/a</td>
<td>n/a</td>
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Innovative Pedagogy and Experiential Learning Experiences *(only between July 1, 2014 and June 30, 2015)*

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<td>32.</td>
<td>Number of undergraduate-level course sections and students enrolled in which experimented with or adopted new or innovative pedagogy <em>(for example, problem-based learning, online discussion boards, flipped classrooms, adaptive learning technologies, use of smart pens, lecture capture technologies)</em> (Include list)</td>
<td>42</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>896 + 252 = 1148</td>
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<td>Number of graduate-level course sections and students enrolled in which experimented with or adopted new or innovative pedagogy <em>(for example, problem-based learning, online discussion boards, flipped classrooms, adaptive learning technologies, use of smart pens, lecture capture technologies)</em> (Include list)</td>
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<td>Number of course sections and students enrolled that included collaborative assignments and projects (Include list)</td>
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<td>Number of course sections and students enrolled in which offered opportunities to students that included capstone experiences or projects (Include list) <em>(Note – other information about capstone experiences will be taken from the inventory conducted in Spring 2015.)</em></td>
<td>12 + 1 = 13</td>
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<td>125 + 9 = 134</td>
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<td>Number of faculty and students engaged in undergraduate research experiences that are not part of a course <em>(non-credit experiment)</em> (Include list)</td>
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<td>n/a</td>
<td>n/a</td>
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*BIOLOGY: #23 includes $830,000 from B. Horton that is dispersed over 4 years to two institutions: Smithsonian Conservation Biology Institute and Virginia Tech.

Insert your lists below, be sure to provide corresponding item number. Thank you!!
BIOLOGY

12: Wagner: Served as CPUB President
Wallace: Board of Director Member for End Buruli Ulcer Alliance
Wallace: Secretary to the American Board of Forensic Entomologists

27. Didier: Faculty advisor for MU chapter of Hu-MAN up local college coalition a partnership with local universities and community partners (e.g., YWCA). HULCC was major partner in Lambda Chi Alpha Safe House training on campus.
Fogle: Manheim Middle School – Seminar on Genetics – 1 faculty, 10 students
Fogle: Elizabeth R. Martin School – STEM Fair Finalist Judge – 2 faculty, 40 students
Fogle: Whitaker Center for Science and the Arts – Girls in STEM Sundays (1/18) – 265 students
Fogle: Whitaker Center for Science and the Arts – Girls in STEM Sundays (2/15) – 300 students
Fogle: Capital Area Science and Engineering Fair – Fair Finalist Judge – 3 faculty, 15 students
Wallace: Lancaster County Conservancy with their BioBlitz effort.

32. Fogle: BIOL 100.01 (88 students) – TopHat Monocle to increase student engagement during lecture
Haines: Ornithology (25 students) – using the ebird program to keep track of course bird lists, use of classroom clickers, flipped classroom, problem-based learning with collecting data from the field and analyzing data using free statistical computer software, maintaining a field notebook of personal observations of birds identified during course, lab and extracurricular field trips.
Haines: Conservation Biology (10 students) – conducted a research project evaluating the impacts of next predation based on different habitat types, use of classroom clickers, flipped classroom, problem-based learning with collection data from the field and analyzing data using free statistical computer software.
Haines: Conservation Biology (15 students) – Use of classroom clickers, flipped classroom, problem-based learning with collection data from the field and analyzing data using free statistical computer software.
Haines: Honor’s Zoology (9 students) – Flipped classroom, classroom clickers, and student lead discussions.
Haines: Honor’s Biology (15 students) – Flipped classroom, student lead discussions.

34. Fogle: BIOL 100.01B (24 students) – Completion of Lab Exercises (and associated questions) requires group collaboration.
Fogle: BIOL 100.01B (22 students) – Completion of Student-Designed Projects in collaboration with Lab Group (including completion of hypothesis-driven projects such as enzymes and soybeans, as well as a group oral presentation of data).
Fogle: BIOL 101.01C (17 students) – Completion of Student-Designed Projects in collaboration with Lab Group (including completion of hypothesis-driven projects such as enzymes and soybeans, as well as a group oral presentation of data).
Haines: Ornithology (25 students) – Students work in set groups to conduct radio-telemetry and bird surveys.
Haines: Conservation Biology (10 Students) – Students work in set groups to collect data from the field and analyze collected data using statistical analysis.
Haines: Conservation Biology (15 students) - Students work in set groups to collect data from the field and analyze collected data using statistical analysis.

35. Haines: Melissa Sell at Philadelphia Zoo
Haines: Heather Smith at Lancaster County Conservancy
Haines: Paige Johnson at Organization for Responsible Care of Animals
Haines: Kira Klaassen at Environmental Recovery Organization of Lancaster
Haines: Daniel Korman at Lancaster County Conservancy
Haines: Samantha Davis at Speranza Animal Rescue
Haines: Kathryn Manorek at Humane League of Lancaster County
Haines: Hannah Reeves at Organization for Responsible Care of Animals
Haines: Kelsey Mattola at Lancaster County Conservancy
Wallace: ENVI 495 (1 student)

36. Didier: J. Brendan Cowhey is conducting independent research on ratfish spines as a non-credit experience.
Haines: Tristan Conrad: ‘Soil testing techniques to identify illegal baiting sites of white-tailed deer’ (2014) Millersville University, Department of Biology.
Haines: Leah Schwartz (Honors Student): ‘Animal Bio-inventory of Roddy Pond on the Millersville University Campus’ (2014) Millersville University, Department of Biology.
Haines: Angela Fetterolf: ‘Soil testing techniques to identify illegal baiting sites of white-tailed deer’ (2015) Millersville University, Department of Biology.
Hepfer: Ryan Moran & Mervin Fansler are both participating in research in her lab without receiving credit for the experience. In addition to them, she has supervised seven other students in research projects that earned them credits during the academic year.
CHEMISTRY

Elioff:
Item 7: Elioff, M. S., et al., Calculating Heat of Formation Values of Energetic Compounds: A Comparative Study; *Adv. Phys. Chem.* 2015. Accepted. (we are delaying publication in order to include some more calculations)
Item 28: UNIV 103, fall 2014, 23 students enrolled
Item 36: I’m not sure whether this is what they’re looking for, but I have three students working with me: David White, Joseph Charlonis, and Hannah Ashberry.

Kennedy:
9. REGIONAL STUDENT RESEARCH POSTER PRESENTATION:
   a. One poster was presented at the 2014 Disappearing Boundaries Summer Research Meeting on July 17th, 2014 at Elizabethtown College. Studies Toward the Total Synthesis of Hunanamycin A, Student Authors: John Noyes, Janelle Biehl, James Dreer. Student Presenters: John Noyes and James Dreer. Faculty Author & Research Advisor: Steven M. Kennedy
   b. Two posters will be presented at the 2015 Made In Millersville and School of Science and Mathematics Annual Research Poster Display on April 22nd, and April 23rd respectively. 1) Studies Toward the Total Synthesis of Hunanamycin A, Student Authors: James Dreer, and Matthew Carta. Student Presenters: James Dreer, and Matthew Carta. Faculty Author & Research Advisor: Steven M. Kennedy. 2) Studies Toward the Synthesis of Altersolanol P, Student Authors: Andrew Smaligo and Magenta Hensinger. Student Presenters: Andrew Smaligo and Magenta Hensinger, Faculty Author & Research Advisor: Steven M. Kennedy

10. REGIONAL STUDENT RESEARCH POSTER PRESENTATION:
   a. Two posters were presented at the Spring 2015 American Chemical Society in Denver, Co. Two posters will be presented at the 2015 Made In Millersville and School of Science and Mathematics Annual Research Poster Display on April 22nd, and April 23rd respectively. 1) Studies Toward the Total Synthesis of Hunanamycin A, Student Authors: James Dreer, and Matthew Carta. Student Presenters: James Dreer, and Matthew Carta. Faculty Author & Research Advisor: Steven M. Kennedy. 2) Studies Toward the Synthesis of Altersolanol P, Student Authors: Andrew Smaligo and Magenta Hensinger. Student Presenters: Andrew Smaligo and Magenta Hensinger, Faculty Author & Research Advisor: Steven M. Kennedy

14. ATTENDED CONFERENCE: 2014 Disappearing Boundaries Summer Research Meeting on July 17th, 2014 at Elizabethtown College

20 – 22. GRANT CO-AUTHORED relatively small parts of the Logic Model for the NSF STEP Working Committee in the School of Science and Mathematics as part of our application for the Department of Applications First in the World Program-Development Grants [https://www.federalregister.gov/articles/2014/05/16/2014-11463/applications-for-new-awards-first-in-the-world-program-development-grants](https://www.federalregister.gov/articles/2014/05/16/2014-11463/applications-for-new-awards-first-in-the-world-program-development-grants)

32. Courses for Which New or Innovative Pedagogy was Adopted:
   a. Fall 2014 – Chemistry 391 – Advanced Laboratory 1: Provided Students with a Problem-Based Learning laboratory course in which students were provided with recent primary Chemical Literature and required to create their, experimental plans, laboratory procedures, and analytical analysis based on the literature reported chemical method. This required students to solve problems related to repeating and/or adapting literature reported methods to their experimental constrains (including: available laboratory equipment, scale of reaction, substrate scope, etc.). The Problem-Based Learning Strategy also required students to adapt their experimental designs to
incorporate modern requirements of Green Chemistry (environmentally and sustainability conscious chemistry), based on required readings about green chemistry. This course also included laboratory report writing, spectroscopic analysis of reaction products, and a final synthesis design project that required students to design a detailed multi-step “green chemistry” synthesis of a target molecule.

b. Fall 2014 – Chemistry 232 – Organic Chemistry 2: Adopted Online Homework System, which allowed students to obtain points for working online homework problems. Pedagogically, the homework system provided students with “Just-in-Time” Learning opportunities. When students answered problems the first time (correctly or incorrectly), they were presented with a link to the related page number of an online electronic copy of the textbook. This enabled students to read about the relevant chemistry corresponding to the problem answered. When students answered a problem incorrectly a second time, a fraction of points were removed from the possible score (~5 to 10%). When students answered a problem incorrectly a third time they were provided with a hint, and another fraction of points was removed from the score (~5 to 10%). If they answered incorrectly a forth time, then they were presented with the correct answer, and a fraction of points was removed from the score (~5 to 10%). Each incorrect attempt lowered the student’s grade, but the lowest possible grade that a student could receive for completing the entire homework assignment was a 70%. This provided students with a way to receive “low-stakes feedback” on their understanding of course content prior to “higher-stakes” quizzes and exams. This online homework just-in-time feedback and low-stakes point system was worth 17.5% of the total course grade, which encouraged students to do the work required to obtain points and consequently spend time engaged with the course content outside of class. The most common student complaints had to do with the campus network and computer labs denying access or providing slow access to the homework site. Consequently, students were allowed to “opt-out” and contract for a more traditional course syllabus based on only quizzes, exams, and laboratory work. Only about 5% of students chose to opt-out.

c. Spring 2015 – Chemistry 231 – Organic Chemistry 1: Adopted Adaptive Learning Online Homework System, the current online homework system that I use for my organic chemistry courses incorporates adaptive learning algorithms so that students are presented with more of the problems that they struggle with understanding, and less of the problems that they have already mastered. The program provides students with a detailed summary analysis of their strengths and weaknesses. The student’s grade is partially (~50%) based on improvement over time, instead of the traditional total points approach in which problems were either answered correct (full points) or incorrect (no points). This means that a student can raise their grade more quickly, by demonstrating growth in course content understanding and proof skills competency mastery. The program still incorporates all of the just-in-time opportunities of the previous online homework system, and also provides the same “low-stakes feedback” opportunity. Student participation in this adaptive learning homework system was worth 15% of the total course grade, which encouraged students to do the work required to obtain points and consequently spend time engaged with the course content outside of class. The most common student complaints had to do with the campus network and computer labs denying access or providing slow access to the homework site. Consequently, students were allowed to “opt-out” and contract for a more traditional course syllabus based on only quizzes, exams, and laboratory work. Only about 5% of students chose to opt-out.

d. Spring 2015 – Chemistry 435 – Advanced Organic Chemistry: Adopted a Full-Flipped Course design in which students watch open-access lecture videos from UC, Irvine’s Chemistry 201 and 202 – Physical Organic Chemistry (Mech I and Mech 2) graduate courses. The lecture videos are embedded in EdPuzzle. EdPuzzle provides me with the ability to embed pop-up short answer questions into the lecture videos. As such, students are required to answer graded questions related to the video that they just watched (in the last 5 minutes) whenever a question pops up on their screen. This encourages students to actively watch the lecture video the first time, so that they do not have to re-watch parts of the video to answer the questions. EdPuzzle allows me (as an instructor) to ensure that students are both watching and understanding the course content. This frees up all of the face-to-face course time for Active Learning. During class time, students work complex chemistry problems related to each week’s lecture videos. As an instructor, I assist the students by providing instant feedback, guidance, and supplementation to their problem solving strategies while they work through challenging puzzles and problems that require them to apply, analyze, and synthesize chemistry concepts and fundamentals from not only the lecture videos, but also from the pre-requisite course requirements. During the last 30 minutes of every three-hour class meeting, students individually present the answers to the problems that they helped solve. Students are required to use the language of the chemistry being discussed. Students not only gain an understanding of presenting chemistry, but also learn to evaluate themselves, their peers, and possible solutions to complex chemistry problems (which often have more than one possible answer).
Students gain experiencing evaluating the strengths and weaknesses of proposed answers, and learn to assess their understanding and the understanding of others. One of the course goals is to provide the students with opportunities to not only learn chemistry, but also to learn how they and others learn, appraise, compare, communicate, and defend hypothetical solutions to a problem.

Mbindyo:
12. 1. Member, Program Advisory Council – Department of Industry 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 a) Proteus b) Scientific Journals International 5. Reviewer for 10+ scientific journals

Miller:
2: Casey Stover: Mg2+ levels and Inositides in Saccharomyces cerevisiae
10: Oral Presentation “Integrative Presentations and Explorations in the Biochemistry Context” at Biennial Conference on Chemical Education.
12: Organized symposium “Institutional Initiatives for Introductory Student Success” at Biennial Conference on Chemical Education.
18: Eastern Mennonite School: “Science Alumni of the Year” (Harrisonburg, VA)
32: CHEM326 (80 students): used a variety of classroom activities interspersed with lectures, including problem-based learning, group collaboration/flipping, case study analysis. CHEM103 (75 students)/CHEM104 (50 students): used online homework and offered adaptive textbook activities. CHEM327 (20 students): assign analysis of primary research articles.
34: CHEM327 (20 students): student pairs work to assemble a poster outlining the biological pathway, structural mechanism, and protein modeling relevant to a drug and present to class. CHEM104 (50 students): student pairs work to assemble and deliver a 5-minute oral presentation about an organic molecule and it’s biological target.

Rajaseelan:
#10 & 17

Rickard:
Use of POGIL methods – collaborative learning in CHEM 111 and CHEM 112 recitation.

Schiza:
9. Three (3) undergraduate* research poster presentations in the “Made in Millersville” Conference, April, 2015/ 15th Annual Poster Display in the School of Science and Mathematics.

10. One (1) undergraduate research poster presentations in the 249th National ACS Meeting in Denver, Colorado, March, 2015.

14. One (1) regional conference attended, SEPSACS Education Night, April 9, York, PA.
- 2015: SEPSACS Education Night

18. One (1) undergraduate* award from SEPSACS awarded to the Outstanding Senior Chemistry Major, SEPSACS Education Night, April 9, York, PA.
- Daniel Hofmann*

20, 21, 22, 23. Seven (7) undergraduate* research and travel grants applied for ($3441). 6 were funded ($2441) – Sources: (Student Research Grants, Neimeyer & Hodgson Grants, Noonan Grants)

2015: Spring
Taylor Keller* “Synthesis of Variable Size Silver Nanoprismis” $400 (Funded the amount of $400) – Student Research Grant
Taylor Keller* “Synthesis of Variable Size Silver Nanoprismis” $500 (Funded the amount of $200) – Noonan Grant
Joe Charlonis* “Synthesis and Characterization of Gold Nanocages for Microbial Identification and Catalysis” $371 (Funded the amount of $371) – Student Research Grant
Joe Charlonis* “Synthesis and Characterization of Gold Nanocages for Microbial Identification and Catalysis” $700 (Not Funded) – Neimeyer & Hodgson Research Grant

2014: Fall
Luke Wayman* “Assembly of Gold Nanoparticles for Application of Gene Suppression” $672 (Funded the amount of $672) – Neimeyer & Hodgson Research Grant
Luke Wayman* “Assembly of Gold Nanoparticles for Application of Gene Suppression” $398.80 (Funded the amount of $399) – Student Research Grant
Taylor Keller* “Synthesis of Variable Size Silver Nanoprismis” $398.30 (Funded the amount of $399) – Student Research Grant

29. One (1) majors UNIV 103 course taught with 21 chemistry majors.

35. Five (5) undergraduate* students were involved in doing research and writing research progress reports and/or departmental/honors theses under my direction.
- Daniel Hofmann*
- Angela DiAscro*
- Taylor Keller*
- Luke Wayman*
- Joseph Charlonis*

Bonser:
Attachment to Item 12:
AMERICAN CHEMICAL SOCIETY (ACS) Governance Meetings:
2. 249th American Chemical Society Meeting & Exposition in Denver, CO, March 20 – 26, 2015.
Member of the “Committee on Science” (COMSCI): “Science and Technology Subcommittee” member

(1) Program Chair: COMSCI
(2) Organizer/Presider:

b. “Awards Subcommittee” Chair

Responsible for the American Chemical Society’s nomination to the President of the United States, for the...

(1) National Medal of Science
...the highest award given by the President of the United States to a most distinguished academic scientist in the fields of Chemistry or Chemical Engineering.

(2) National Medal of Technology and Innovation
...the highest award given by the President of the United States to a distinguished scientist in the fields of Applied Chemistry or Engineering (may be an academic, an industrial chemist or chemical engineer, a Company, or a group of scientists within a company).

(3) Grand Prix Award

Responsible for the American Chemical Society’s (USA) nomination to the French Academy of Sciences. It is an international award given to a distinguished scientist who has made outstanding contributions to the field, service, and for the good of humanity.

(4) The Dreyfus Prize in the Chemical Sciences

The Dreyfus Prize in the Chemical Sciences is awarded to an individual in a selected area of chemistry to recognize exceptional and original research that has advanced the field in a major way.

...I, and my committee, are responsible for the American Chemical Society’s nomination to the Camille & Henry Dreyfus Foundation, Inc., for this award.

(5) American Chemical Society Fellows

The purpose of the ACS Fellows Program is to recognize and honor members of the American Chemical Society for their outstanding achievements in and contributions to the science and the profession and for their equally exemplary service to the Society.

...I, and my committee, are responsible for nominations to the Selection Committee appointed by the Chair of the ACS Board Committee on Grants & Awards.

I was an invited “speaker & panelist in an Awards Symposium sponsored by the ACS Awards Office Management, the Board of Directors, Grants and Awards Committee, entitled, “Earning ACS Awards: An Interactive symposium on constructing successful nominations”, Sunday March 22, 1 - 5 pm, at the Hyatt Regency (Host Hotel), Centennial F-G, at the 249th American Chemical Society Meeting & Exposition in Denver, CO, March 20 – 26, 2015.

COUNCIL ON UNDERGRADUATE RESEARCH (CUR)

Millersville University’s Institutional Liaison to CUR.

Wismer:

2. Two (2) undergraduate students supervised for independent study (research). Robyn Blauberg (2 credit fall 2014 semester), Rebecca Kisling (1 credit fall 2014, 2 credits spring 2015).
8. or 13. (I am not sure which.) I compiled the CD for the Scientific Instrument Society’s 2015 Study Conference to Switzerland. Three of my photographs were published in the SIS bulletin.

14. Will attend the SIS Study Conference in Lisbon and Porto, Portugal in May 2015. Attended the SIS Study Conference in Switzerland in June, 2014, which resulted in three presentations at Millersville (one physics and two chemistry)

Kittleman:
9. Millersville University School of Science and Mathematics, student research poster display, April 22-29, “Construction of a His-tagged expression plasmid for SfnaD in the staphyloferrin A biosynthetic pathway” Tran, Tan and Kittleman, William.
17. Same as #9.
32. CHEM 326, winter 2015, 1 section of 17 students. CHEM 111 recitation sections, Fall 2014, 3 sections of approximately 20 students each.
35. Independent Research with Tan Tran, Spring 2015.


P. Ghazizadeh, The 12th IEEE International Conference on Services Computing June 27 - July 2, 2015, New York, USA

12-P. Ghazizadeh, Steering Committee Member for The 1st IEEE Workshop on Vehicular Networks Applications: From Physical Layer to Cloud (VNA’15) Co-located with 18th IEEE International Conference on Intelligent Transportation Systems, September 15-18, 2015

P. Ghazizadeh, Reviewer for 2015 IEEE 82nd Vehicular Technology Conference: VTC2015-Fall 6–9 September 2015, Boston, USA’

D. Hutchens, Member of the Board of the Pennsylvania Association of Computer and Information Science Educators (PACISE)

S. Schwartz, General Chair, International Conference on Theory and Application of Diagrams, 2016

S. Schwartz, Graduate Symposium Chair for International Conference on Theory and Application of Diagrams, Australia, 2014

S. Schwartz, International Steering Committee for Theory and Application of Diagrams, elected member

R. Webster, Consultant and Software Developer, EZSolutions Corp, Lancaster, PA.

14-P. Ghazizadeh, B. Liffick, Computing Accreditation Workshop on Saturday, Nov. 1, 2014, 9am-5pm, BWI Airport Marriott, Linthicum, MD

P. Ghazizadeh, MU Advisement 101: An introduction to all advisement topics for Millersville University faculty and staff.

18-P. Ghazizadeh, Most-Accessed PhD Dissertations and Master’s Theses Award: One of the 25 Most-Accessed Dissertations and Theses of 1.7 million full-text graduate works.

20-P. Ghazizadeh, Faculty Professional Development Committee (FPDC) Grant Program for PASSHE Faculty

P. Ghazizadeh, Robertson Junior Faculty Release Grant

23-S. Schwartz, NIST fellowships, 26,018

34-
Collaborative work in courses:
CSCI 406 Special Topics: Software Productization, group projects, 18 CSCI students
CSCI 420 Software Engineering, 2 sections, group projects, 40 students),
CSCI 435, Compiler Construction, group assignments and projects, 20 students
CSCI 476, Parallel Programming, group assignments, 19 students

35-CSCI 420 Software Engineering, 2 sections, group projects, 40 students),

36-S. Schwartz, Community Organization partnering with: Teachers in the Parks (developing website). Sean Strange is working on this project without course credit (Kyle Hopkins is receiving credit)
**EARTH SCIENCES**


11. Presentations at International Meetings:
    


DeYoung, R., C. Prebish, N. Strickland, and R. D. Clark, 2015; *Langley Mobile Ozone Lidar Results at South Table Mountain Golden: Comparison with Tethers, In-situ, and Aircraft Ozone Data*, DISCOVER-AQ/FRAPPE Science Meeting, Boulder, CO, 4-8 MAY 2015

Stein-Zweers, D., R.D. Clark and others: *Operation of the KNMI NO2 Sonde at Golden, CO: Case Studies*, DISCOVER-AQ/FRAPPE Science Meeting, Boulder, CO, 4-8 MAY 2015

Mazzuca, G., R. D. Clark, and others, 2015; *Observations and Modeling of the Influence of Thunderstorms on O3 and NOy during DISCOVER-AQ Summer Deployments*, DISCOVER-AQ/FRAPPE Science Meeting, Boulder, CO, 4-8 MAY 2015

Berkoff, T., R. D. Clark and others, 2015; *Summary of Micro-Pulse Lidar Data Obtained During DISCOVER-AQ*, DISCOVER-AQ/FRAPPE Science Meeting, Boulder, CO, 4-8 MAY 2015

O’Neill, D. and Marquez, L. *These Things We Know for Sure: Key Components and Strategies for a Successful FYE Program*. Invited Workshop National Meeting of the First-Year Experience and Students in Transition, Dallas TX 7 February 2014

12. Leadership Positions

**CLARK**
- Board of Trustees, University Corporation for Atmospheric Research (UCAR), 2009-2015, MEMBER.
- UCAR Board of Trustees Budget and Program Committee, 2014-2015, CHAIR
- UCAR Members Nominating Committee, 2015-, MEMBER
- UCAR Board of Trustees, Executive Committee, 2014-2015, MEMBER
- High Altitude Observatory Strategic Advisory Committee, Ongoing, MEMBER
- American Meteorological Society Science and Technology Advisory Committee for Space Weather, Ongoing, MEMBER
- American Meteorological Society Committee on Environmental Stewardship, Ongoing, MEMBER
- American Meteorological Society 96th Annual Meeting Program Committee, 2014-2016, MEMBER

**HAGELGANS**
- Vice Chairman of the Lancaster County Emergency Planning Committee
- Emergency Management Coordinator: Manor Township and Millersville Boro
- Foundation Board Member: Lancaster County Public Safety Center
- Advisory Board Member: Lancaster County Public Safety Center
- Leadership Team Member: South Central Task Force (Emergency Management TF in eight counties of SC Pa)
- Public Information Officer: Lancaster County Emergency Management Agency
- Chairman of the Board, Building Links between Offices of Emergency Management, Childcare, and the community for Kids Safety

**YALDA**
- Elected Member: University Corporation for Atmospheric Research Governance Task Group, 2012-Present
- Appointed Member: University Corporation for Atmospheric Research Unidata Strategic Advisory Committee, 2013-present
- Appointed Member: University Corporation for Atmospheric Research Member Representative, 2010-present
- Appointed Supporting Member: American Meteorological Society Board on Best Practices, 2015-
- Appointed Member: American Meteorological Society Battan Book Award, 2013-present
- Member: Federal Emergency Management Agency Emergency Management Institute’s Higher Education Accreditation Focus Group, 2013-present
- Member: International Association of Emergency Managers Climate Change, Weather, and Water Committee, 2014-present
- Member: Natural Hazard Mitigation Association International Focus Group, 2013-present
- Member: Pennsylvania State Hazard Mitigation Planning Committee, 2012-present

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13. Derig Consultants, (With Dr Sepideh Yalda), development of training modules for National Rural Transit Assistance Program, $33,000 (2012-present)

14. 1) IAEM, 2014 Professional Development Conference
2) Homeland Security Conference: South Central Task Force
3) George Washington University: emergency management symposium
4) FEMA, E104: Planning for Emergency Management course
5) FEMA, E105: Public Information and Warning
6) South Central Task Force: Mass evacuation workshop
7) DHS: Invited participant: Pilot: Mass Care and Sheltering Course
8) DHS: Integrated Emergency Management Course: IMT/EOC Interface
9) FEMA: E110: Train the Trainer
10) FEMA: Higher Ed symposium
11) Lancaster County Emergency Management: Initial Damage Assessment
12) Lancaster County Emergency Management: HSEEP
13) IAEM Region III Conference
14) Adams County DES: Point of Distribution workshop
15) FEMA IS: 235: Emergency Planning
16) FEMA IS: 244: Developing Volunteers
17) FEMA IS: 240: Leadership and Influence
18) FEMA IS: 242: Effective Communications

17. Is This Thing On? The Role of Broadcast Meteorologists as Risk Communicators of Severe Weather Preparedness: 10 Years after Hurricane Katrina

*Tyra L. Brown, NOAA/NWS, Silver Spring, MD*

Evaluation in the Bias of Temperature Measurements Based on Siting Criteria Used for Climate Observing Systems

*Jordan McCormick, NOAA/ERL/ARL/ATDD, Mechanicsburg, PA; and B. B. Baker and J. Kochendorfer*
## Temporal and Spatial Variability of Tropical Rain Rates over Kwajalein Atoll

**Kaitlin Ann Rutt**, Millersville University, Lewisberry, PA; and C. Schumacher and F. Ahmed

## Atmospheric Variability along the Antarctic Coast

**Matthew Bessasparis**, Millersville University, Carlisle, PA

## Evaluating Surface Heat Fluxes in the Antarctica Ross Sea

**Austin D. Vacek**, Millersville University, Hanover, PA

## Wildfire Pollution and its Effects on the Microphysical and Electrical Properties of Pyrocumulus

**Renee Duff**, Millersville University, Millersville, PA; and L. D. Grant and S. C. van den Heever


18. Honors and Awards
- Scott Kleebauer: Dr. William B. McIlwaine Scholarship
- Jeremy Beckley: William Malcolm Jordan Earth Sciences Scholarship
- Alyssa Cannistraci: Clark-Yalda Scholarship in Atmospheric Science
- Melinda Hatt: Paul H. Nichols Scholarship
- Jillian Weitkamp: Rettew Associates Scholarship in Geology

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• Earth Sciences Award for Academic Excellence
  • Renee Duff: Liberal Arts
  • Aaron Musselman: Secondary Education
• Renee Duff, 1st Prize, best poster, AMS Student Conference, 95th Annual Meeting, Phoenix, AZ

20.

Dr. Sam Earman: Co-PI on grant proposal “Evaluating Stream Restoration Effectiveness” submitted to PASSHE FPDC program (Joe Bushey, ESCI PI)

President’s Commission on the status of Women’s: Women’s Commission: Developing educational materials for Women and Children in Disasters

24.
ESCI 442 has a Campus Weather Service service learning component.

27. Wide Vigilance Regional Preparedness Exercise: eight county, seven day full-scale exercise

32:
ESCI 102 – Origins & History of the Earth
ESCI 121 – Environmental Geology Lab
ESCI 321 – Structural Geology
ESCI 326 – Sedimentology & Stratigraphy

Item 34:
ESCI 121 – Environmental Geology Lab
ESCI 321 – Structural Geology
ESCI 326 – Sedimentology & Stratigraphy

36.
Two students (J. Stone and E. Ntonados) participated in 3-week ocean research cruise to north Atlantic Ocean May 18- June 6, 2014 as part of the Western Atlantic Climate Study II.
3. List of 7 Editorships:

Robert Buchanan:
1. Associate Editor, *Journal of Applied Mathematics*

Ximena Catepillan:
1. Member of the Editorial Board, Revista Latinoamericana de Etnomatemáticas

Erin Moss:
1. Editing appointment (2013-2015) of the Problem Solvers Department of Teaching Children Mathematics, an NCTM monthly

Kevin Robinson:
1. Associate Editor, *Journal of Statistics Education*
2. Associate Editor, *Journal of Probability and Statistical Science*

Cynthia Taylor:
1. Co-editor of Pennsylvania Council of Teachers of Mathematics Magazine

Tyrone Washington:
1. Co-editor – Pennsylvania Council of Teachers of Mathematics Magazine

12. List of 13 leadership positions in academic or professional organizations

Ximena Catepillan:
1. Member of Committee on Sections (National)MAA Mathematical Association of America
2. EPaDel Silent Auction Conference Coordinator (Regional)MAA
3. EPaDel Chair Nominating Section Officers Committee (Regional)MAA
4. EPaDel History of Mathematics representative (regional)
5. Ethnomathematics Session Chair (National)MAA Session at the JMM Meetings 2015
6. Member of the Editorial Board RLE, Revista Latinoamericana de Etnomatemáticas

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Kevin Robinson
1. President, Harrisburg PA Chapter, ASA (American Statistical Association)
2. Vice-Chair, The PA State System of Higher Education Mathematics Association- PASSHE-MA

Ron Umble:
1. Coordinator of the Tetrahedral Geometry/Topology Seminar

Tyrone Washington:
1. Board member (elected, at large) – Pennsylvania Association of Mathematics Teacher Educators

Janet White:
1. Local Arrangements Chair – Fall 2015 PCTM Conference

Cynthia Taylor
1. Co-editor, Pa Council of Teachers of Mathematics
2. Co-Professional Development Facilitator for Lancaster-Lebanon Intermediate PULSE Summer Institute

18. List of Honors and Awards
   Cynthia Taylor: STEM-UP PA Advancing Academic Women Program Fellow, NSF
   Tyrone Washington: STaR Fellow (AMTE national program)

24. Service Learning Courses
   Tyrone Washington: MATH 405 (Math Fair)
   EDFN 398 (Community service: cleaning)

28. Non-major U103 courses
   Ximena Catepillan: Culture, Science, and Mathematics in the Pre-Columbian Americas, 1 section, 25 students

29 & 30. Major based U103 courses
   From e to i through pi, 2 sections, 38 students
32. Undergraduate section with experimental/new pedagogy

   Bob Buchanan: 2 sections:
   MATH 478 *Topics in Applied Mathematics: Calculus of Variations* (problem-based learning, inquiry-based learning, online discussion boards)
   MATH 365 *Ordinary Differential Equations* (problem-based learning, inquiry-based learning, online discussion boards)

   Bruce Ikenaga: 9 sections (Math 211, Math 101, Math 161 (2 sections), Math 322 (2 sections), Math 310, Math 345, Math 393. Used videos recorded on a tablet computer

   Erin Moss: 3 sections of Math 104, taught via problem-based learning, 75 students

   Lew Shoemaker: 4 sections,
   Math 130 online courses - Summer (16 students) Spring (25 students) – Use of Smart Pen for delivery and MyStatLab for increased HW participation
   Math 235 online courses - Summer (21 students) Fall (31 students) – Use of Smart Pen for delivery and MyStatLab for increased HW participation

   Tyrone Washington: 2 sections of MATH 101, 75 students, Flipped Classroom

   Janet White 1 section, MATH 310 – continued experimentation with online postings, 31 students

33. Graduate-level course sections in which experimented with or adopted new or innovative pedagogy

   Bruce Ikenaga: 2 sections Math 504, Math 693, Used videos recorded on a tablet computer, 4 students

   Tyrone Washington: 1 section of MATH 697, 5 students, Online course

   Janet White: 1 section – MATH 697; graduate course: Advanced Perspectives in Teaching Secondary Mathematics, 7 students
   Wide variety and major components placed online.

34. Number of sections that included collaborative assignments and projects

   Ximena Catepillan: 4 sections, MATH 102 Collaborative Projects Spring 2015, (also similar list Fall 2014, Winter 2015, Summer 1, 2015), 59 students
Bruce Ikenaga: 9 sections, Math 211, Math 101, Math 161 (2 sections), Math 322 (2 sections), Math 310, Math 345, Math 393, 270 students

Erin Moss: 3 sections of Math 104, taught via problem-based learning, 75 students total

Delray Schultz: 2 sections of Math 151, 62 students
1 section of Math 161, 33 students

Tyrone Washington: 1 section of Math 160 with 35 students
1 section of Math 105 with 36 students
1 section of Math 204 with 12 students

36. Undergraduate research, non-credit

Zhigang Han and Mingquan Zhan: Math contest problem solving seminar, 5 students
NURSING

12. Jenny Monn – PA Coalition of Nurse Practitioners, State Representative; Kelly Kuhns, Board of Directors, PA State Nurses Association, Executive Council Member, South Central PA EBP Consortium
18. Lancaster Osteopathic Foundation
24. NURS 421 Public Health Nursing (2 sections); NURS 478 Transformational Leadership (2 sections)
27. Peter’s Porch Food Bank – Health Promotion Services
PHYSICS

Uy:
32. PHYS 495; Quantum Mechanics II
35. PHYS 498 research (Alice Stanley)
## 2014-2015 STUDENT RESEARCH

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