Appendix A

Annual Reports

For years

2011-2012
2010-2011
2009-2010
2008-2009
2011-2012 Annual Report of the Department of Earth Sciences
Annual Faculty and Student Achievements

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

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

A. Curricular changes

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

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

2. New graduate and undergraduate courses for emerging trends and workforce development:
b. ESCI 369: Physical Oceanography, a complete revision and merging of two courses in a single required course for the Ocean Sciences and Coastal Studies majors.

c. ESCI 468: Ocean Data Analysis & Presentation was approved as a new major field requirement in OSCS.

3. **Distance Learning Courses** to provide greater student access and flexibility:

   a. ESCI 390, Topics in Earth and Space Sciences was approved as a fully online course, and later changed to ESCI 202, Earth in Space. This change is designed primarily to accommodate MDLV education majors and BSE in Earth Sciences majors.

   b. ESCI 347, Satellite Meteorology, an elective for meteorology, was converted from f2f to a fully online DL format.

4. **Curriculum Changes** were approved that better align programs with emerging trends and workforce needs:

   a. ESCI 421 was approved as a capstone advanced geology course in 2010 and was approved in 2011-12 as a major field requirement.

   b. Major curriculum changes in Ocean Sciences and Coastal Studies include changes to the curriculum in OSCS and the option in Physical Oceanography.

   c. ESCI 386 was approved for a title, catalog description, and prerequisite change to expand the option for students to choose between two programming languages: IDL and Python. The new title for ESCI 386 is “Scientific Programming, analysis, and Visualization with "variable language"

   d. ESCI 464 and 468 were approved as major field requirements in OSCS

   e. Prerequisite changes were approved for ESCI 386, ESCI 347, and ESCI 380 for easier course sequencing and student access, and to better reflect course content.

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

<table>
<thead>
<tr>
<th>Category</th>
<th>Schl</th>
<th>Acad Dept</th>
<th>Curric Action Type</th>
<th>Curriculum Action Description</th>
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<td>new grad course</td>
<td>HMSS</td>
<td>CDRE</td>
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<td>EMGT 633 − GIS Applications for Emergency Management, 3 crs, elective course for the M.S. Emergency Management and M.S. Integrated Scientific Applications programs, DISTANCE LEARNING FORMAT</td>
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### COURSE CHANGES

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<td>TITLE change, catalog description and pre-req changes: ESCI 386 - IDL Programming for Adv ESCI TO Scientific Programming, analysis, and Visualization with &quot;variable language&quot;</td>
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### B. Faculty achievements – grants, research, sabbatical

**Sabbatical:**

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

**Refereed Publications:**


Davies, A., A. Kumar, and J. Moisan, 2011. CODAR observed spatial resolution of tidal dynamics along the lower Delmarva peninsula. KJUR, Spring 2012.


**Non-refereed Publications:**

change effects on water resources in eastern Nevada, Desert Research Institute Publication 41252.


**Publications in Review:**


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


**Publications in Preparation:**

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


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

Earth Sciences faculty reviewed 42 manuscripts/proposals in 2011-12.

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

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

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

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


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

**Yalda, S.,** National Science Foundation Invited Panel Reviews (22).
Presentations at Professional Meetings:

**Earman, S, Marquez L., and Price, J.,** 2011: Development and Initial Results of an Exam to Assess Learning outcomes for Geology Majors, Geological Society of America Abstracts with Programs, Vol. 43, No. 5, p. 299. GSA Annual Meeting, Minneapolis MN.


McDowell L., **Marquez L.,** and O’Neill D., 2012: Data is the Lesson, Experience is the Teacher: Keys to Building a Successful FYE Program. 31st Annual Conference on the First-Year Experience, San Antonio, TX February 17-21, 2012.


Dettinger, M. D., **Earman, S.,** and Funk, C., 2011 Climate change and groundwater—Implications for global food and water security. Abstract #GC21D-01, American Geophysical Union Fall Meeting, San Francisco, CA. [Invited talk]


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


Vaillancourt, R.D. Vaillancourt, B. Hargreaves, V.P. Lance, and J. Marra, Time scales of photoacclimation in phytoplankton of the Western Antarctic zone, poster presentation at Ocean Sciences Meeting, Feb 2012, Salt Lake City, Utah.


Grants and Contracts Received:

External Grants and Contracts:

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

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

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

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

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

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

Faculty member: **Todd D. Sikora**
- Title of grant: Applications of Synthetic Aperture Radar to Meteorology and Oceanography Command Operations
- Grant amount: $136,500, FY 07-12, 5th year of 5-year grant
- Awarding agency: Office of Naval Research
Faculty member: **Todd D. Sikora**
Title of contract: Spaceborne Ocean Intelligence Network
Contract amount: $48,000 FY 07/08-12/13, 6th year of a 6-year contract
Awarding agency: Bedford Institute of Oceanography

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

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

**Grants Received (Internal)**

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

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

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

- **Sam Earman** received Robertson New Faculty Release time grant

**Grants and Contracts pending:**

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

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


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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Faculty member: **Alex DeCaria**  
Organization: National Assessment of Education Progress  
Status: Member of Science Standing Committee, attended 3-day meeting in Washington, DC, January 18-20, 2012.
Faculty member: **Alex DeCaria**  
Organization: Trends in International Mathematics and Sciences Study  
Status: Consultant, attended 2-day meeting in Washington, DC, December 15-16, 2011

Faculty member: **Ajoy Kumar**  
Organization: Consortium for Ocean Leadership  

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

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

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

Faculty member: **Sepideh Yalda**  
Status: Appointed Member (2005-Present).

Faculty member: **Sepideh Yalda**  
Organization: American Meteorological Society  
Status: Appointed Member for the AMS Teaching Excellence Award (2012).

Faculty member: **Sepideh Yalda**  
Organization: Natural Hazard Mitigation Association  
Status: Appointed Member for the International Activities Committee (2012).
External Graduate Committees:

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

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

Student Research Activities:

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<tr>
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<th>STUDENT LAST NAME</th>
<th>ADVISOR FIRST NAME</th>
<th>ADVISOR LAST NAME</th>
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<td>Wendoloski</td>
<td>Todd</td>
<td>Sikora</td>
<td>SAR remote sensing of open cell convection</td>
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<td>Robert</td>
<td>Marter</td>
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<td>SAR remote sensing of open cell convection</td>
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<td>Peresolek</td>
<td>Jason</td>
<td>Price</td>
<td>Heavy minerals of the Yangtze and Nile River deltas</td>
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<td>Ajoy</td>
<td>Kumar</td>
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<td>Tia</td>
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<td>Sierra Club – Chickies Rock</td>
<td>11/19/2011</td>
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<td>Lynn Marquez</td>
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<td>3/24/2012</td>
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<td>Lynn Marquez</td>
<td>World Water Wars Screening – Faculty Panel</td>
<td>3/29/2012</td>
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<td>Lynn Marquez</td>
<td>Talk presented at IUP Geoscience Department- Nature of Science Instruction in the General Education Course: Can we convey the nature of science without doing science?</td>
<td>3/30/2012</td>
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<td>Jason Price</td>
<td>Developing a new hands-on exhibit at the Lancaster Science Factory entitled, “Radiation in the Environment.”</td>
<td>Ongoing</td>
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Present faculty/staff community service¹.

¹ Present faculty/staff community service.

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<tr>
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<td>Lynn Marquez</td>
<td>How Ore Deposits Came to Be? Heritage and Horizons Adult Learning Opportunities</td>
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<td>Science Olympiad – Rocks and Minerals Supervisor</td>
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<td>World Water Wars Screening – Faculty Panel</td>
<td>3/29/2012</td>
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<td>Lynn Marquez</td>
<td>Talk presented at IUP Geoscience Department- Nature of Science Instruction in the General Education Course: Can we convey the nature of science without doing science?</td>
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<tr>
<td>Jason Price</td>
<td>Developing a new hands-on exhibit at the Lancaster Science Factory entitled, “Radiation in the Environment.”</td>
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<td>Name</td>
<td>Activity</td>
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<tr>
<td>Jason Price</td>
<td>Assisted an Eshelmann Elementary School 4th grader with a science fair project addressing mineral hardness.</td>
<td>April 2012</td>
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<tr>
<td>Sam Earman</td>
<td>Presentation of talk “Tectonic Influences on groundwater quality” to Harrisburg Area Geological Society, Harrisburg, PA, February 2012.</td>
<td>Feb, 2012</td>
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<tr>
<td>Alex DeCaria</td>
<td>Presentation to three 2nd grade classes at Union Canal Elementary School, Lebanon, PA</td>
<td>March 20, 2012</td>
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<tr>
<td>Ajoy Kumar</td>
<td>Guest Speaker at a S.T.E.M. Career Night hosted at Manheim Township High School.</td>
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<td>Sepideh Yalda</td>
<td>Commonwealth of PA All-Hazard Mitigation Planning Committee (invited)</td>
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<td>Richard Clark</td>
<td>Great Eastern Balloon Association</td>
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<td>Richard Clark</td>
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<td>Richard Clark</td>
<td>Science Olympiad 2012: Supervisor: Reach for the Stars</td>
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</table>

A significant number of community service activities were performed by Dr. Charles K. Scharnberger, the ESCI Dept Volunteer-in-Service. Please refer to Appendix C.

C. Student achievements – awards, graduate and professional school, job placement, presentations at regional/national meetings (student name, faculty name, title).

National Awards:

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

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

Other University Awards Received by ESCI students:

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

2011-2012 Graduates

<table>
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<tr>
<th>Name</th>
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### Spring 2012 Graduates

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<td>Rafach, Jeff Matthew</td>
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### Student Job Placement and Advanced Studies (partial list):

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<td>Charnick, Michael</td>
<td>Employment: AccuWeather, State College, PA</td>
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<td>Dolinar, Erica</td>
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<tr>
<td>Eckhoff, Matthew</td>
<td>Graduate Studies, University of North Dakota</td>
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<tr>
<td>Falgoust, Phillip</td>
<td>Employment: Field Service Engineer, Vaisala, Inc.</td>
</tr>
<tr>
<td>Hoffman, Donald</td>
<td>Employment: AccuWeather, State College, PA</td>
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<td>Name</td>
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<td>Gehman, Bradley</td>
<td>Employment: ARM Group, Inc., Columbia, MD</td>
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<td>Jacobs, Adam</td>
<td>Graduate Studies, George Mason University</td>
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<tr>
<td>King, Matthew A.</td>
<td>Graduate Studies, University of Arizona, Tucson, AZ</td>
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<tr>
<td>Laboy, Kristina</td>
<td>Graduate Studies, Millersville University (MSEM)</td>
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<td>Moore, Joseph</td>
<td>Employment: National Weather Service, Goodland, KS</td>
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<td>Seshan, Ajay</td>
<td>Graduate Studies, Millersville University (MSISA)</td>
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<td>Socoloski, Gwen</td>
<td>Employment: New Jersey Analytical Laboratories</td>
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<tr>
<td>Stelma, Sigourney</td>
<td>Graduate Studies, University of Delaware</td>
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<tr>
<td>Stoflet, Robert</td>
<td>Internship in New Mexico</td>
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</tbody>
</table>

**Student Internships:**

Student name: Gail Altieri  
Internship title/site: Meteorology Intern, WGAL-TV, Lancaster, PA

Student name: Christopher Bernard  
Internship title/site: Meteorology Intern, WGAL-TV, Lancaster, PA

Student name: Lindsay Blank  
Internship title/site: Thunderstorm Predictability over the Southwestern US, NOAA Office of Oceanic and Atmospheric Research, National Severe Storms Lab, Norman, OK, **Hollings Scholarship**

Student name: Felicia Guarriello  
Internship title/site: CREST REU Intern, Hampton University.

Student name: Adam Jacobs  
Internship title/site: NASA GSFC, sponsored by Catholic University of America (Summer 2012)

Student name: Robert Marter  
Internship title/site: Decadal variability of the Southern Hemisphere, Lamont Doherty Summer Intern Program at the Lamont-Doherty Earth Observatory of Columbia University
Student name: Jesse Manzi  
Internship title/site: Outfall Reconnaissance Inventory (ORI) team leader, MU partnership with Lancaster Inter-Municipal Committee, Lancaster, PA

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Student attendance at regional or national conferences:
  Number of Students: 27
  Conference: 92nd Annual AMS Meeting, New Orleans, LA

  Number of Students: 11
  Conference: Space Weather Workshop, Boulder, CO

  Number of Students: 4
  Conference: Ocean Sciences Meeting 2012, Salt Lake City, UT

D. Progress toward department goals/5 year review

In 2007, the members of the Department of Earth Sciences approved the following strategic goals/actions for the period 2007-2012.
1. Improve facilities and expand the equipment inventory and educational resources for education and research: A broad spectrum of initiatives is planned including a new facility for Earth Sciences; a 10\textsuperscript{th} faculty position; pursuit of grants for equipment; expanding endowments for equipment.

2. Preparation and Preparedness for Lifelong Careers in Earth Sciences:

   Emphasis on Curriculum, Creative thinking, Problem-solving/computational skills across the disciplines, with a special emphasis on strengthening the BSE program.

3. Ocean Sciences and Coastal Studies Program Enhancement –

   Recruitment/Retention in Program, Connections with regional and national research and educational initiatives, in addition to the Marine Science Consortium at Wallop’s Island, VA

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

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

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

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

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

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

New Faculty:

The Department of Earth Sciences completed a successful search resulting in the hiring of Dr. Duane Hagelgans, JD, CSP. Dr. Hagelgans responsibilities will be to the MSEM program. Dr. Hagelgans has over thirty years’ experience as a professional in the emergency services. He earned his JD from Widener University and his Bachelor of Science in Occupational Safety and Hygiene Management from Millersville University. He is a Certified Safety Professional and has taught in both the Occupational Safety undergrad program and the Masters of Emergency Management Program. Additionally, he is on the leadership team for the South Central Task Force (SCTF) regional emergency management organization. He is an active volunteer with Lancaster County Emergency Management, Millersville Borough and Manor Township as their Emergency Management Coordinator. Dr. Hagelgans has taught courses at the local, state and federal levels on various aspects of emergency management, with a specialty in Public Information. He was a career fire chief for the City of Lancaster for almost thirty years and most recently was the Fire Commissioner for Blue Rock Regional Fire District. In his role with the SCTF, he has responded to numerous high impact events such as the 2006 Nickel Mines Amish schoolhouse shooting. His main areas of research interest are regionalization of the emergency services and emergency management and the “Whole Community” approach to emergency preparedness. He has taught the following courses: OSEH 220: Legal Aspect of Health and Safety; OSEH 320: Principles of Safety Engineering; MSEM 601: Principles and Practices of Emergency Management; MSEM 616: Terrorism, WMD and Homeland Security; MSEM 693: Field Experience Practicum.
Equipment:

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

F. Outcomes assessment – Include the Learning Outcomes Assessment 2011-2012, but do not include results/analysis. “Results” will be due in October 2012. (To be entered into WEAVEonline)

See Appendix A

G. Appendix B: Weather Information Center Annual Report
H. Appendix C: Volunteer-in-Service Annual Report (Charles Scharnberger)
APPENDIX A

Millersville University of Pennsylvania

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

Mission / Purpose

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

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

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

G 3: To provide a learning experience in the Earth Sciences that is second to none
   To provide a learning experience in the Earth Sciences that is second to none

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

G 1: To provide a rich, authentic, and challenging learning experience in the areas of Earth Science
   To provide a rich, authentic, and challenging learning experience in the areas of geology, meteorology, ocean science and coastal studies, Earth science education, and general earth sciences

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

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

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

Related Measure (may consider as Assessment Strategy):

   M 1: Senior exit survey question on problem solving
   The number of ESCI graduating seniors who indicate that they are able to apply
   basic scientific principles of Earth science to solve problems (Q1 on exit survey).
   Source of Evidence: Exit interviews with grads/program completers
   Achievement Target (may consider as Expected Outcome):
   None Listed

   M 2: Senior exit survey question on the scientific method
   The number of ESCI graduating seniors who believe that their experiences in
   the laboratory and/or in the field through the Earth sciences has given them a
   broader understanding of the scientific method - how to take steps to solve, or
   address, a scientific problem (Q2 on exit survey)
   Source of Evidence: Exit interviews with grads/program completers
   Achievement Target (may consider as Expected Outcome):
   None Listed

   M 3: Senior exit survey question on critical thinking and argument
development
   The number of graduating seniors that believe they can think critically and
   develop sound scientifically based arguments on topics related to their Earth
   Sciences discipline (Q6 on exit survey).
   Source of Evidence: Exit interviews with grads/program completers
   Achievement Target (may consider as Expected Outcome):
   None Listed

   M 4: Students' grades in required major courses
   Number of students earning a C- or greater in their sophomore, junior, and
   senior level required courses in their major.
   Source of Evidence: Academic indirect indicator of learning - other
   Achievement Target (may consider as Expected Outcome):
   None Listed

   M 5: Grade-level assessment exams
   The number of students achieving satisfactory scores on grade-level
   assessment exams.
Source of Evidence: Standardized test of subject matter knowledge

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

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

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

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

Source of Evidence: Alumni survey or tracking of alumni achievements

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

**Student Learning Outcomes/Objectives, without Goals, along with Any Associations and Related Measure (may consider as Assessment Strategy), Achievement Target (may consider as Expected Outcome), Findings (consider as Actual Results), and Action Plan (consider as application of results -- closing the loop)**

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

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

**General Education/Core Curriculum Associations:**
6 Scientific Reasoning

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

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

Source of Evidence: Exit interviews with grads/program completers

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

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

Source of Evidence: Exit interviews with grads/program completers

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

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

Source of Evidence: Exit interviews with grads/program completers

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

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

Source of Evidence: Standardized test of subject matter knowledge

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

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

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

M 7: Online alumni survey
Online alumni survey

Source of Evidence: Alumni survey or tracking of alumni achievements

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

**M 8: Number of internships/undergraduate research awards for ESCI majors**

The number of internships and undergraduate research awarded is evidence of quantitative skills. Data from the annual report on internships

Source of Evidence: Academic indirect indicator of learning - other

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

None Listed

**SLO 3: All Earth Sciences graduates demonstrate proficiency in the application of tools and skills appropriate to their discipline.**

All Earth Sciences graduates demonstrate proficiency in the application of tools and skills appropriate to their discipline.

**Relevant Associations:**

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

**General Education/Core Curriculum Associations:**

6 Scientific Reasoning

**Strategic Plan Associations:**

Millersville University of Pennsylvania

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

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

**M 7: Online alumni survey**

Online alumni survey

Source of Evidence: Alumni survey or tracking of alumni achievements

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

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

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

Source of Evidence: Exit interviews with grads/program completers

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

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

Source of Evidence: Exit interviews with grads/program completers

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

**SLO 4: All Earth Sciences graduates demonstrate effective oral and written communication skills appropriate to their discipline.**
All Earth Sciences graduates demonstrate effective oral and written communication skills appropriate to their discipline.

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

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

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

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

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

Source of Evidence: Alumni survey or tracking of alumni achievements

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

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

Source of Evidence: Exit interviews with grads/program completers

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

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

Source of Evidence: Exit interviews with grads/program completers

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

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

Source of Evidence: Academic indirect indicator of learning - other

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

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

Source of Evidence: Presentation, either individual or group

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

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

Eric J. Hörst, Director

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

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

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

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

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

Finally, the WIC remains active in outreach and service to the local community. Over the past year, Mr. Hörst has given more than two dozen weather talks, Weather Center tours, and “shadowing” days. Additionally, the WIC held three Open House events, including the Annual Science Lectureship, the Women in Science & Math event, and the Earth Sciences Department’s 12th Annual Weather Center Open House for the general public.
Throughout this period I monitored the operation of the Department’s seismic station (MVL), fixing problems as they arose, or seeing to it that they were fixed by others.

I also responded to numerous inquiries from the press and public regarding seismic activity.

Specific activities:

2011

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

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

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

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

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

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

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

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

2012

2/16: With Jeri Jones of Jones Geological Services, presented a program about the Dillsburg earthquake swarm and the 8/18/11 central Virginia earthquake at the Dillsburg Public Library.
3/18: Attended the annual meeting of the Northeastern Section of the Geological Society of America and gave a talk on “Controversies over Overthrusts in the Pennsylvania Piedmont” in the History and Philosophy of Geology session. Hartford, Connecticut.

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

4/11 and 4/12: Lectured to introductory geology classes at York College about earthquakes in stable continental regions.

5/1: Co-presented, with a bridge engineer from PennDOT, a webinar on seismic events and bridge safety in Pennsylvania, for the Pennsylvania Department of Transportation.

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

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

1. Development and University Approval of the proposal for the Master of Science in Integrated Scientific Applications (Approved by MU Council of Trustees on 14 June 2011). The Proposal will be reviewed by the PASSHE Board of Governors on 29 June 2011. Millersville University of Pennsylvania (MUP) proposes the creation of the Master of Science in Integrated Scientific Applications (MSISA), which will serve as the academic and administrative canopy for specializations in Environmental Systems Management (ESM), Geoinformatics (GI), Weather Intelligence and Risk Management (WIRM), and Climate Science Application (CSA). The MSISA is designed for flexibility and agility for meeting existing and emerging challenges and opportunities of a changing workforce dynamic. Specializations that fall under the MSISA rubric can be modified, or new ones created, without requiring the development of completely new M.S. programs at every juncture. The curriculum plan incorporates common core content areas across all specializations. The specializations are chosen because: 1) each represent areas of current or emerging workforce needs; 2) train students in integrative disciplines that should remain at the forefront throughout their careers; 3) build knowledge that can transfer to other practical science applications; 4) be readily implemented with existing or accessible expertise; and 5) will attract partners from business/industry/commerce for research and internship opportunities in Pennsylvania and the high density regions of the mid-Atlantic and Northeast U.S. The overarching goal of this program is to create a curriculum that will provide the transdisciplinary marriage between science content, methods and tools for information analysis, and management and policy skills necessary for careers in business, industry, commerce, and government.

2. ESCI 221, Physical Geology, had changes approved to the prerequisites. This course is a G2 (Science and Mathematics) general education course with a laboratory, and is also a
requirement for the B.A. in Earth Sciences, B.A. in Earth Sciences with Option in Environmental Geology, B.S.E. in Earth Sciences, B.S. in Geology, Minor in Earth Sciences, and Minor in Geology. It is a prerequisite for nearly all other geology courses. The increase in prerequisites ensures that the students are prepared for the class and increases the likelihood of student success.

3. ESCI 444. Adopting a new textbook for ESCI 444 required corresponding changes to the course material. Thus, I felt it was necessary to revise the course catalog description. I also revised the course title, which was formerly, “Meso- and Storm-Scale Meteorology.” Because “storm” and “meso” were redundant, the title was changed to the more simple, “Mesoscale Meteorology.” Moreover, the new title is in keeping with traditional descriptions of the course’s subject matter.

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

Sabbatical:

DeCaria, A.J. (Fall 2011)
One ESCI faculty member (J. Price) applied for sabbatical in 2010-11, but was denied

Refereed Publications:


Earman, S., and Dettinger, M., in press. Potential impacts of climate change on groundwater resources—A global review. Accepted for publication in Journal of
Water and Climate Change (manuscript JWC-D-10-00034R1; doi: 10.2166/wcc.2011.034).


Non-refereed Publications:


Price, J.R., and Shadler, B., 2011: Carbon Dynamics at Coweeta Hydrologic Laboratory, North Carolina, USA: Atmospheric CO$_2$ Consumption by Chemical Weathering and Seasonal CO$_2$ Exchange Across the Stream-Atmosphere Interface: Geochemistry of the Earth’s Surface 9, Program and Abstracts.

Publications in Review:

Davies, A., A. Kumar, and J. Moisan, 2011. CODAR observed spatial resolution of tidal dynamics along the lower Delmarva peninsula.

Gilchrist, J., A. Davies, and A. Kumar, 2011. A simple technique to remove tidal influence from ADCP measurements., M. L. Bender, P.


**Publications in Preparation:**

Kumar A. and P. J. Minnett., Accuracy of MODIS sea surface temperatures

Kumar A. and P. J. Minnett., Uncertainty Analysis of MODIS TERRA and AQUA sea surface temperatures

Ambler, J. and A. Kumar., Seasonal nearshore distributions of tunicates and the cladoceran Penilia avirostris in the southern Mid-Atlantic Bight.


- Vaillancourt, RD, Lance, V., Marra, J. (In Prep.) The deep-chlorophyll maximum in the stratified ocean: the chemostat hypothesis.
- Vaillancourt, RD., Lance, VP., Hargreaves, B., Marra, J., (In Prep.) Phytoplankton photosynthetic physiology at the Polar Front; Results from the Southern Ocean Gas Exchange Experiment.


Price, J.R., and Shadler, B. Silicate weathering and CO₂ consumption at Coweeta Hydrologic Laboratory, western North Carolina, USA.

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


Yalda, S., National Science Foundation peer review panel (1), Proposal review (25)

- Review of manuscript by Hirata, Brewin, et al., submitted to Geophysical Research Letters, entitled “Global Change in detailed phytoplankton community structure revealed by satellite observations and linked to climate change. April, 2011.

Sikora, T. D., Journal of Geophysical Research, Oceans (1)

Geochimica et Cosmochimica Acta (1); Hydrologic Processes (1); Hydrogeology Journal (2) [note—the two listed here are reviews performed as a solicited reviewer, I’m not including reviews performed as Associate Editor]; US Geological Survey (1) [USGS requires any manuscripts written by its employees to undergo external review prior to submission to a peer-reviewed journal (not sure why, but it’s the second one of these I’ve done in the past few years)]

Price, J.R., Journal of Geophysical Research (1); Applied Geochemistry (2); Marine Chemistry; and Hydrological Sciences.

Presentations at Professional Meetings:


Faculty Awards

DeCaria, A.J., Pennsylvania Science Olympiad Distinguished Service Award, 2011

Clark, R. D., Nominated to a second term as a members of the Board of Trustees of the University Corporation for Atmospheric Research. Election in October 2011.

Grants and Contracts Received:

External Grants:

Faculty member: **Ajoy Kumar**
Title of grant: Projecting the impacts of Climate Change and Identifying adaption options at Chincoteague National Wildlife Refuge
Grant amount: $161,012.29, FY 10-11, $344,330 total (2010-2013)
Awarding agency: NASA

Faculty member: **Ajoy Kumar, O. Dreon, N. Dietrich, D. Dagit, J. Boal, J. Ambler, J. Bray, and R. Smith**
Title of grant: Wallops Island Science Training Program for Emergency Certified Teachers
Grant amount: $135,000, 2010-2013
Awarding agency: PASSHE

Faculty member: **Richard Clark, Sepideh Yalda and Gary Zoppetti**
Title of grant: GEOPOD: Geoscience Probe of Discovery
Grant amount: $ 350,000
Awarding agency: National Science Foundation (Information and Intelligent Systems)

Faculty member: **Todd D. Sikora**
Title of grant: Applications of Synthetic Aperture Radar to Meteorology and Oceanography Command Operations
Grant amount: $100,500, FY 07-11, 4th year of 4-year grant
Awarding agency: Office of Naval Research

Faculty member: **Jason R. Price**
Title of grant: The Influence of Radiation Damage on the Solubility of Epidote-Group Minerals During Chemical Weathering
Grant amount: $115,282, 1st year of 3-year grant
Awarding agency: National Science Foundation
**Internal Grants**

- ESCI faculty has received $3,605.00 in MU Faculty Grants in 2010-11.
  
  **Ajoy Kumar** received ¼ load reduction in support of his released-time grant proposal; Projecting the Impacts of Climate Change and Identifying Adaption Options at Chincoteague National Wildlife Refuge.

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

**Contracts Received:**

Faculty member: **Todd D. Sikora**
- Title of contract: Spaceborne Ocean Intelligence Network
- Contract amount: $43,000 FY 07-12, 4th year of a 5-year contract
- Awarding agency: Bedford Institute of Oceanography

Faculty member: **Todd D. Sikora**
- Title of contract: Discover-AQ
- Contract amount: $110,000 FY 11
- Awarding agency: NASA

Faculty Member: **Richard D. Clark**
- Title of Contract: Millersville Acid Rain Monitoring Site Project
- Contract Amount: $52,580 (Five year contract, 1 January 2010 - 31 December 2014)
- Awarding Agency: Pennsylvania Dept. of Environmental Protection (DEP)

**Grants pending:**

Faculty members: Ajoy Kumar
- Title of Grant: Develop Site Specific Algorithms to reduce elevation errors in the processing of LIDAR data for coastal habitats.
- Grant amount: $264,825.65
- Awarding agency: US Fish and Wild Life Service (USFWS)

Participant on grant proposal “Interpreting the Pulse of the Planet: Geoscience Literacy in a Data-Rich World”, submitted to NSF Science, Technology, Engineering and Mathematics Talent Expansion Program (STEP) [Susan McGeary, University of Delaware, PI];

**Contracts pending:**

None
Professional Development:

- Kumar, A., OOI Science Community Workshop, Baltimore, November, 19th, 2010
- Yalda, S., Emergency Management Higher Education Institute, How to Teach Emergency Management: Thoughts for Those New to the Disaster Field, Emmitsburg, June 6, 2011.
- Vaillancourt, R., ASLO Aquatic Sciences Meeting, Feb 18-23, 2011, San Juan Puerto Rico
- Sikora, T. D., Spaceborne Ocean Intelligence Workshop, Defence Research and Development Canada, Halifax, Canada, 14-15 December 2010
- Sikora, T. D., Seventeenth Conference on Air-Sea Interaction, American Meteorological Society, Annapolis, MD, 27-30 September 2010
- DeCaria, A.J., 91st Annual Meeting of the American Meteorological Society, Seattle, WA, January 2011
- DeCaria, A.J., Using Python in Climate and Meteorology, 2-Day short course sponsored by the American Meteorological Society, Seattle, WA 22–23 January 2011
- Price, J.R., Geochemistry of the Earth’s Surface 9, Boulder, CO, 3-7 June 2011.
- Price, J.R., Geochemistry of the Earth’s Surface 9, Boulder, CO, 3-7 June 2011.
Major Service to Scientific and Science Education Communities:

Faculty member: **Ajoy Kumar**  
Organization: Mid-Atlantic Coastal Ocean Observing Regional Association (MACOORA)  
Status: key representative (2010-2011)

Faculty member: **Sepideh Yalda**  
Organization: Cooperative Program for Operational Meteorology, Education and Training (COMET) Advisory Panel  
Status: Chair of the COMET Advisory Panel (2007-December 2010)

Faculty member: **Sepideh Yalda**  
Organization: American Meteorological Society Battan Book Award  
Status: Appointed member

Faculty member: **Sepideh Yalda**  
Organization: National Environmental Education Foundation (NEEF) Eyes on the Environment Advisory Committee  
Status: Advisory Committee member

Faculty member: **Sepideh Yalda**  
Organization: American Meteorological Society Anderson Award Committee  
Status: Appointed member

Faculty member: **Sepideh Yalda**  
Organization: American Meteorological Society Teaching Excellence Award Committee  
Status: Appointed member

Faculty member: **Sepideh Yalda**  
Organization: American Meteorological Society Board on Women and Minorities  
Status: Chair selected by Council of the AMS

Faculty member: **Sepideh Yalda**  
Organization: American Meteorological Society Annual Meeting Program Committee  
Status: Appointed member

Faculty Member: **Robert Vaillancourt**  
As campus editor to the Keystone Journal of Undergraduate Research, I reviewed a manuscript submitted by Alex Davies (MU MET/OSCS 2010) entitled: CODAR observed spatial resolution of tidal dynamics along the lower Delmarva peninsula.

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

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

Faculty member: **Todd D. Sikora**  
Status: Session Chair (2010)

Faculty member: **Alex J. DeCaria**  
Organization: Educational Testing Service  
Status: Consultant, Exam Writer, Exam Reviewer

Faculty member: **Richard D. Clark**  
Organization: American Meteorological Society  
Status: Elected member of the AMS Council (2008-2011)

Faculty member: **Richard D. Clark**  
Organization: University Corporation for Atmospheric Research  
Status: Elected member of the Board of Trustees (2009-2012)

Faculty member: **Richard D. Clark**  
Organization: University Corporation for Atmospheric Research – Board of Trustees  
Status: Member, Audit and Finance Subcommittee (2008-2011)

Faculty member: **Richard D. Clark**  
Organization: American Meteorological Society Science and Technology Activities Commission on Space Weather  
Status: Member (2 years)

Faculty member: **Richard D. Clark**  
Organization: American Meteorological Society APT Mobile Observations Committee  
Status: Member (Ad hoc)

Faculty member: **Richard D. Clark**  
Organization: American Meteorological Society Full Waiver Committee  
Status: Member (1 year term)

Faculty member: **Richard D. Clark**  
Organization: American Meteorological Society  
Status: Member of the Drafting team for Statement on Science Education.

Faculty member: **Robert Vaillancourt**,  
Organization: Ocean Sciences 2010  
Status: Session chair at the Ocean Sciences Meeting, Portland, OR

Faculty member: **Sam Earman**  
Organization: International Association of Hydrogeologists  
Status: Associate Editor for peer-reviewed publication *Hydrogeology Journal*
Faculty member: **Ajoy Kumar**  
Organization: 2010 Ocean Sciences Meeting  
Status: Session co-chair

Faculty member: **Sepideh Yalda**  
Organization: Cooperative Program for Operational Meteorology, Education and Training (COMET) Advisory Panel  
Status: Chair of the COMET Advisory Panel

Faculty member: **Sepideh Yalda**  
Organization: American Meteorological Society Battan Book Award  
Status: Appointed member

Faculty member: **Sepideh Yalda**  
Organization: National Environmental Education Foundation (NEEF) Eyes on the Environment Advisory Committee  
Status: Advisory Committee member

Faculty member: **Sepideh Yalda**  
Organization: American Meteorological Society Anderson Award Committee  
Status: Appointed member

Faculty member: **Sepideh Yalda**  
Organization: American Meteorological Society Minority Scholarship Award Committee  
Status: Appointed member

Faculty member: **Sepideh Yalda**  
Organization: American Meteorological Society Board on Women and Minorities  
Status: Chair selected by Council of the AMS

Faculty member: **Sepideh Yalda**  
Organization: American Meteorological Society History of Atmospheric Sciences Committee  
Status: Appointed Chair

**External Graduate Committees:**

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

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

Faculty member: **Jason R. Price**  
**Katherine Datin:** Geochemistry and Geomorphology of Iron Ore Deposits of South Mountain, Pennsylvania. Franklin & Marshall College. Research advisor: Dr. Dorothy Merrits
Volunteer-in-Service Activities (see attachment)

**Charles K. Scharnberger**: Professor Emeritus, Volunteer-in-service (see attached)

**Yin S. Soong**: Professor Emeritus, Volunteer-in-service

Present faculty/staff community service.

<table>
<thead>
<tr>
<th>Name</th>
<th>Event</th>
<th>Date</th>
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<tbody>
<tr>
<td>Ajoy Kumar</td>
<td>Central Pennsylvania Science Olympiad Tournament-Supervisor for Remote Sensing Section</td>
<td>March 26, 2011</td>
</tr>
<tr>
<td>Ajoy Kumar</td>
<td>STEM Career Night, Manhein School District</td>
<td>April 25th, 2011</td>
</tr>
<tr>
<td>Sepideh Yalda</td>
<td>Commonwealth of PA All-Hazard Mitigation Planning Committee (invited) ongoing</td>
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<tr>
<td>Todd Sikora</td>
<td>I was the featured scientist at the North Museum of Natural History &amp; Science’s Founders Day. Together with meteorology seniors Joseph Moore and Erica Dolinar, I provided hands-on demonstrations and tutorials focused on thunderstorms and tornadoes.</td>
<td>October 9, 2010.</td>
</tr>
<tr>
<td>Todd Sikora</td>
<td>I provided a one-hour seminar for the Heritage and Horizons program, Church of the Apostils, United Church of Christ, Lancaster, PA. The talk was titled “They’re Called Supercells for a Reason.”</td>
<td>October 5, 2010.</td>
</tr>
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<td>Alex DeCaria</td>
<td>Classroom Presentation, 2nd grade classes, Union Canal Elementary School, Lebanon, PA</td>
<td>3/11/2011</td>
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<tr>
<td>Alex DeCaria</td>
<td>PA Central Region Science Olympiad, Event Supervisor</td>
<td>3/26/2011</td>
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<tr>
<td>Jason Price</td>
<td>Developing a NSF-funded interactive exhibit at the Lancaster Science Factory entitled, “Radiation in the Environment.”</td>
<td>Ongoing</td>
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</tbody>
</table>
C. Student achievements – awards, graduate and professional school, job placement, presentations at regional/national meetings (student name, faculty name, title).

The Department of Earth Sciences is committed to offering programs of national distinction. What this means to us is that we provide rich and meaningful opportunities for students to find their niche, build a knowledge base and gain deep understanding in their respective disciplines, develop skills and proficiencies that will elevate their competitiveness in the job market or advanced degree programs and serve them throughout their careers, while empowering them to become valued contributors to their professional communities. We take pride in understanding the undergraduate mindset, the needs and challenges facing undergraduate students as they make their way toward productive careers, and the importance of creating an authentic learning environment where the individual can realize their potential and achieve their goals. We are confident that our graduates are as or better prepared than their peers, and we measure this by their lifelong success.

Student Awards:

• **Jeff M. Rafach:** Dr. William B. McIlwaine Scholarship
• **Gregory A. Boggs:** William Malcolm Jordan
• **Joseph P. Markiewicz:** Clark-Yalda Cirrus Scholarship in Atmospheric Sciences
• **Sigourney A. Stelma:** Paul H. Nichols Scholarship
• **Bradley S. Gehman:** Rettew Associates Scholarship in Geology
• Earth Sciences Award for Academic Excellence
  - **Justin R. Gilchrist:** Liberal Arts
  - **Kalyn M. Godziejewski:** Secondary Education
### 2010-2011 Graduates

#### Fall 2010 Graduates

<table>
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<tr>
<th>Name</th>
<th>Degree</th>
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#### Spring 2011 Graduates

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<td>Bordow, Leah Rachel</td>
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<td>Smith, Rebecca Katherine</td>
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</table>
Student Job Placement and Advanced Studies (partial list):

Justin Gilchrist: Graduate Studies, University of Delaware

Mark Miller: Employed with company in Minnesota

John Dougherty: Vaisala Inc., USA branch, Helsinki, Finland.

Student Internships:

Student name: Gail Altieri
   Internship title/site: Meteorology Intern, WGAL-TV, Lancaster, PA

Student name: Hilary Ames
   Internship title/site: Meteorology Intern, WGAL-TV, Lancaster, PA

Student name: Andrew Bohrer
   Internship title/site: Weather Intern, WJET-TV, Erie, PA

Student name: Shane Brown
   Internship title/site: Meteorology Intern, WPMT-TV FOX 43, York, PA

Student name: Matthew Moore
   Internship title/site: Meteorology Intern, WGAL-TV, Lancaster, PA

Student name: Caleb Meute
   Internship title/site: Meteorology Intern, WGAL-TV, Lancaster, PA

Student name: Katherine Nohe
   Internship title/site: Meteorology Intern, WGAL-TV, Lancaster, PA

Student name: Colin Thomas
   Internship title/site: Meteorologist Intern, WHP-TV 21/WLYH 15, Harrisburg, PA
### Student Research Activities:

<table>
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<tr>
<th>STUDENT FIRST NAME</th>
<th>Mid. Initial</th>
<th>STUDENT LAST NAME</th>
<th>ADVISOR FIRST NAME</th>
<th>ADVISOR LAST NAME</th>
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<td>Virginia</td>
<td>C</td>
<td>Maroulis</td>
<td>Ajoy</td>
<td>Kumar</td>
<td>Circulation Studies at Wallops Island</td>
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<td>Kristin</td>
<td>M</td>
<td>Brubaker</td>
<td>Lynn</td>
<td>Marquez</td>
<td>Little Conestoga Watershed</td>
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<td>Justin</td>
<td>M</td>
<td>Roth</td>
<td>Lynn</td>
<td>Marquez</td>
<td>Petrography of the Wilmington Complex</td>
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<td>Katherine</td>
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<td>Jason</td>
<td>Price</td>
<td>Investigation of Heavy Minerals in Delta Sediments of the River Nile and Yangtze River</td>
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<td>Bridget</td>
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<td>Shadler</td>
<td>Jason</td>
<td>Price</td>
<td>CO$_2$ Degassing form Appalachian Streams</td>
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<tr>
<td>Lindsay</td>
<td>R</td>
<td>Blank</td>
<td>Gary Richard Sepideh</td>
<td>Zoppetti Clark Yalda</td>
<td>Geopod: An Interactive Module for Navigating and Probing Geophysical Data  (This project is funded through a grant from the National Science Foundation)</td>
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<td>Lindsey</td>
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<tr>
<td>Adam</td>
<td>D</td>
<td>Jacobs</td>
<td>Richard</td>
<td>Clark</td>
<td>grant from the National Science Foundation) Detection and Impact of the Nocturnal Low Level Jet on Mid-Atlantic Air Quality</td>
</tr>
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<td>Phillip</td>
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<td>Falgoust</td>
<td>Richard</td>
<td>Clark</td>
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<td>Richard</td>
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<td>Erica</td>
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<td>Snow</td>
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<td>Lyman Alpha Airglow Observations from SORCE SOLSTICE</td>
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<td>Michael</td>
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<td>Use of Acoustic SODAR to Detect Wakes from Wind Turbines</td>
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<td>Anthony</td>
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<td>Matthias</td>
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<tr>
<td>Kristina</td>
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<td>Laboy</td>
<td>Eric</td>
<td>Maloney</td>
<td>Investigating how background state affects the propagation of the MJO</td>
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</tbody>
</table>
Student Research Grants:

Noonan Grants Received:

$500.00 – MU AMS to AMS Conference, Seattle, WA
$400.00 – MU AMS to Northeastern Storms Conference
$300.00 – 4 Meteorology students to Space Weather Workshop

Student attendance at regional or national conferences

Number of Students: 21
Conference: 90th Annual AMS Meeting, Atlanta, GA

Number of Students: 12
Conference: Northeastern Storms Conference, Springfield, MA

Number of Students: 4
Conference: GSA Northeastern/North-Central Joint Section Meeting, Pittsburg, PA
Number of Students: 4
Conference: Space Weather Conference, Boulder, CO

Number of Students: 1
Conference: NCAR Leadership Conference, Boulder, CO

Number of Students: 7
Conference: AMS Summer Meeting, State College, PA

Student presentations at regional or national conferences –
D. Progress toward department goals/5-year review

The Department of Earth Sciences is guided by the action items identified in its 5-year review conducted 2006-2007 and its 2007-2012 Strategic Plan. The Department of Earth Sciences contributes significantly to the University mission, follows a vision congruent with the University vision, and is one of the most productive departments in the School of Science and Mathematics in several areas including but not limited to faculty/student ratio, grants and contracts, promoting undergraduate research, and providing opportunities for student internships and participation in national conferences in the disciplines.

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, and meaningful opportunities for students to engage in extra-curricular activities, and by attentiveness to inter- and cross-disciplinary trends and opportunities for student engagement.

Department of Earth Sciences Vision Statement

Our vision is to provide a learning experience in the Earth Sciences disciplines that is second to none.

Strategic Goals for 2007-2012

The members of the Department of Earth Sciences approved the following strategic goals for the period 2007-2012.

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

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

3. Ocean Sciences and Coastal Studies Program Enhancement – Recruitment/Retention in Program, Connections with regional and national research and educational initiatives, in addition to the Marine Science Consortium at Wallop’s Island, VA
The following actions emerge from the 5-year review and Strategic Plan. These actions continue to guide the department efforts and initiatives for the period 2007-2012 and beyond. During the academic year 2009-10 we made the following progress toward our Five-Year Goals.

**Progress Related to Goal #1:**

- The Department’s proposal for a new facility has been accepted to the University Master Plan – Phase 2. We plan to seek funding from granting agencies and/or foundations for partial support for bricks and mortar in order to shorten the timeline to Phase 1 for this construction.
- The Department was allocated $85,000 from the University Technology Fee for the purchase of a DigiCora II Rawinsonde System for meteorology research and education. We conducted our first launch in April 2010 and plan to deploy the system for research in summer 2010. The Rawinsonde system has been listed in two pending grant proposals.
- The Department has upgraded its weather map wall as we move toward a fully electronic weather display environment in the Weather Center. Funds for this initiative are made available as part of a contract for Winter Weather precision forecasting between Millersville University (E. Hörst, project director) and the PA Department of Transportation District 8. This summer the map wall will be expanding from six to eight monitors.
- The Department submitted equipment requests through the base equipment and University technology Fee for the acquisition of new computers for Caputo 402, and the Windows/Linux servers. In addition, through an effort by A. DeCaria and D. Fitzgerald the department was awarded a grant of $11K for the acquisition of a data server and repository from the Unidata Program Center, Boulder, CO.
- Department faculty have been especially productive in developing proposals and receiving external funding. In summer 2009 alone, the following proposals were submitted to external agencies:


3. Kumar: Oceanic Oxygen Changes as an indicator of Global Climate Change. NASA; $467,289


5. Price: The influence of radiation damage on the solubility of epidote-group minerals during chemical weathering. NSF-EAR-SEP; $123,134.
6. Vaillancourt: Acquisition of autonomous underwater vehicles (Slocum Gliders) for continental shelf research, training, and education. NSF-MRI-R²; $1,349,418

7. Yalda/Clark: Geoscience Probe of Discovery (GEOPOD). NSF_Advanced Learning Technologies, $350,000

8. Horst: Winter storm forecasting. 2-year contract with PA-DOT; $67,000

- The Department filled the geology position vacated by the retirement of Dr. Ramama with Dr. Sam Earman.
- A new scholarship became available (first award in fall 2010) through an endowment created by Drs. Richard Clark and Sepideh Yalda. The Clark-Yalda Cirrus Scholarship in Atmospheric Sciences provides a $1000 scholarship for a freshman meteorology major.

**Progress Related to Goal #2:**

- One faculty member (Marquez) submitted a proposal to NSF-CCLI to transform undergraduate science instruction for BSE students ($124,750). The proposal was not funded.
- Another faculty member (Kumar) along with several colleagues from the Biology Dept and the School of Education were funded $135,000 from PASSHE for science training of emergency certified teachers in marine science at the Wallops Island Marine Science Consortium.
- Meteorology faculty played a role in the revision to the American Meteorological Society guidelines for a B.S. degree in Meteorology/Atmospheric Science

**Progress Related to Goal #3:**

- The Ocean Sciences and Coastal Studies (OSCS) Program is maintaining gradual but steady increases in student enrollment in the major.
- Curricular changes are tuning the program to current trends in the discipline.
- The University has become a senior member of the Marine Science Consortium (MSC), and A. Kumar and R. Vaillancourt play key roles in promoting OSCS in MSC (see MSC Annual report in the attachments)
- One faculty member (A. Kumar) has been twice successful in obtaining grant funding for research (NASA) and education (PASSHE). In addition, R. Vaillancourt is developing an active research program with ongoing funding.

**Department Actions for 2010-2011**

1. The Department of Earth Sciences will continue to aspire to maintain its position as a “flagship” department of Millersville University and continue to build national recognition.
2. Put a new building on the fast track (Phase 1) for funding. The scattering of the faculty offices, the lack of laboratory facilities for teaching and research, and the difficulty in maintaining equipment severely limit the future growth of this very productive Department. Pursue funding conduits for partially financing the cost of construction.

3. Continue to build enrollments in the Ocean Science and Coastal Studies Program through general recruitment strategies and through the MSC.

4. The meteorology program continues to sustain large enrollments. Fall 2010 freshmen enrollment are remaining near all-time high levels and we are preparing to see additional interest in the discipline as NOAA moves forward with the creation of the Climate Services Division. The program has lost 50% of a faculty complement with Dr. Yalda accepting the position as Director of the Center for Disaster Research and Education and Manager of the MSEM program. Although we are very excited by the prospect for greater collaboration with the CDRE as a result of this appointment (see Action item #7), we are concerned that we do not have enough meteorology faculty to sustain the program at current levels. **We will work with the University administration to give the department a new one-half complement, which when added to that given up to CDRE will allow us to hire a full-time tenure track meteorology faculty.**

5. At least one new faculty position is definitely needed, especially if the majors continue to grow. New faculty members should have an Earth Systems focus.

6. Expand and enhance collaborations among faculty associated with the Center for Disaster Research and Education (CDRE), and in conjunction with action item #2, incorporate the physical location for the CDRE into the new building plan. We are seeing a healthy number of Earth Sciences graduates matriculating into the M.S. program in Emergency Management.

7. Continue to seek funding for two post-doctoral teaching associates to increase the frequency of regular course offerings within the Department. Proposals to educational foundations or government agencies could be the source for these funds, especially if tied to innovative changes to the curriculum or pedagogy (Yalda working on proposal).

8. Strengthen the BSE program by having a dedicated faculty director, as indicated above, and replace some of the survey courses with upper-division major courses to promote higher-order thinking among pre-service teachers.

9. The Brossman facilities are in need of repair and is on schedule for some much needed painting in summer 2010.

10. Prioritize equipment requested for the acquisition of basic laboratory equipment. The School acquired a van that is being heavily used by Earth Sciences faculty and students.

11. Where possible, link new course development to NSF-CCLI proposals.
E. New Faculty, New Facilities/Equipment and more…

1. NEW FACULTY

Dr. Sam Earman, Geology, joined the Department in August 2009.

2. NEW FACILITIES/EQUIPMENT

The Department received $18,321 from the University Technology Fee for the purchase of a dual server for Windows and Linux.

- The Department received $21,600 from the University Technology Fee for the purchase of 23 computers for Caputo 402. The Department used $2,963 in summer revenue funds from 2009 and 2010 to upgrade the ceiling-mounted projector in the Ocean Sciences Lab located in Brossman G02.

- Mention Department Ricoh copier??

F. Outcomes Assessment

Department: 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

Faculty Member Completing this Form: Richard Clark on behalf of all Earth Sciences faculty

Update on prior years’ application of results: The Department of Earth Sciences had elected to implement all the intended student outcomes (1 through 5) in 2009-2010 in order to form a consistent statistical database.

Accomplishments in 2008-2009 based on the Learning Assessment Outcomes Plan

- See action items for 2009-10 below.

Notes on Measurable Criteria: We have in the process of making significant changes to measurable criteria from previous years, and plan to implement those metrics in 2009-2010.

1) Although the department still recognizes the potential of portfolios, they have not been successful over the past four years mainly, in our opinion, because it cannot be required or easily integrated in courses beyond ESCI 110, in which the students were required to produce a
foundations essay.” Moreover, we have noticed a national trend away from the use of portfolios. Therefore, the department had elected to drop the portfolio requirement from the measurable criteria beginning with the 2008-09, and we will continue to not have the portfolio as part of the measurable criteria.

2) The department has been largely dissatisfied with embedded test items tied to Bloom’s taxonomy as a means of assessing intended outcomes for a department-wide assessment. Because of the breadth of Earth sciences disciplines, embedding questions in exams across multiple disciplines with the expectation that half-dozen questions will somehow provide meaningful metrics for a DEPARTMENTAL assessment and continual improvement has not yielded results that provide guidance, and are therefore difficult to interpret and act upon. However, embedded test items are still considered to be a viable assessment tool and data source if they are applied programmatically. During summer 2010, we will be working on the development of program/discipline-specific embedded test items and which will be launched in 2010-2011.

3) In summary, the assessment plan for 2009-10 contains the results and interpretations from the senior exit survey, and outcomes based upon the success of our graduates, as well as the number of internships that our students have garnered. These data are contained in the Annual Report. Our assessment strategy this year has focused on the evaluation of the assessment plan itself. We are in the process of establishing new objectives/goals, and defining separate measureable criteria for each degree program to assess whether the intended outcomes are being met (more on this in closing the loop). See 2010-2011 action plans.

**Intended Student Outcome 1**

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

**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**
  
  G2, L Courses: G3 (scientific reasoning)
  
  ESCI majors take courses in science and mathematics. Specifically, ESCI majors take required ESCI courses related to their discipline, included among them; ESCI 221, 222, 241, 245 261. ESCI majors also take courses in Physics (PHYS 131/231, 132/232), Math (MATH 161, 211), and geography courses such as GEOG 101 and 285.

- **Related Courses**
  
  ESCI majors take courses in Physics, Mathematics, Chemistry, Biology, and Geography to build knowledge and understanding related to their discipline. Fundamental knowledge and understanding is gleaned in basic Physics courses (131/132 for BA; 231/232 for BS), Chemistry courses (111 and for some degrees 112), degree-specific mathematics courses, among them 161,211,311,365, 235, and Geography courses related to the major such as GEOG 295.

- **Interdisciplinary Component**
  
  Many students (approximately 40%) also earn a minor in one or more of the following: Math; Chemistry; Communications (option); Business; Economics; Government and Political Affairs; Environmental Hazards and Emergency Management.
Measurable Criteria

Measurable Criteria for 2009-10

a. The majority of ESCI majors will indicate confidence in their ability to apply knowledge and understanding of their ESCI discipline on an exiting senior survey

Data Source/Results

Data Sources: ESCI faculty members have identified the follow data source for this intended outcome.

a. Faculty established guidelines and administer exiting senior survey.
b. The number of successful admissions to graduate school
c. The number of internships

Results:

Action Items Related to Intended Outcome #1:

- Develop additional measureable criteria for this intended outcome as it relates to each degree program.

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Intended Student Outcome 2

All Earth Sciences graduates can articulate the relationships between hydrosphere, lithosphere, and atmosphere.

Connection to Univ/Dept Mission

MU seeks to prepare its students to live in an increasingly diverse, multicultural and technologically complex society.

Coherence Considerations

See Statement for outcome 1.

Measurable Criteria

a. The majority of ESCI majors will indicate confidence in their ability to articulate the relationships between the hydrosphere, lithosphere, and atmosphere on an exiting senior survey.
b. Growth in the number of students pursuing minors and second degrees.

Data Source/Results

a. Faculty established guidelines and administer the exiting senior survey.
b. Trends in the number of students that minor or earn second degrees in other disciplines
Results:

Action Items Related to Intended Outcome #2

- Develop additional measureable criteria for this intended outcome as it relates to each degree program
- Evaluate this intended outcome from the perspective of a program. This outcome may not be viable for students following degree criteria specific to their discipline.

Intended Student Outcome 3

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

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.

Coherence Considerations

See Statement for outcome 1.

Measurable Criteria

a. The majority of ESCI majors will indicate confidence in their ability to demonstrate quantitative skills appropriate to their Earth Sciences discipline on an exiting senior survey.

Data Source/Results

a. Faculty established guidelines and administer the exiting senior survey.

Results:

Action Items Related to Intended Outcome #3

- Develop additional measureable criteria for this intended outcome as it relates to each degree program.

Intended Student Outcome 4

All Earth Sciences graduates demonstrate proficiency in the application of tools and skills appropriate to their discipline.
**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.

**Coherence Considerations**

See Statement for outcome 1.

**Measurable Criteria**

a. The majority of ESCI majors will indicate confidence in their ability to demonstrate proficiency in the application of tools and skills appropriate to their discipline on an exiting senior survey.

**Data Source/Results**

a. Faculty established guidelines and administer the exiting senior survey.

Results:

**Action Items Related to Intended Outcome #4**

- Develop additional measurable criteria for this intended outcome as it relates to each degree program.

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**Intended Student Outcome 5**

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

**Connection to Univ/Dept Mission**

MU seeks to prepare students for the workforce while promoting intellectual development through an exemplary liberal arts-based education.

**Coherence Considerations**

See Statement for outcome 1.

**Measurable Criteria**

a. The majority of ESCI majors will perform to expectations related to outcome #5 on culminating activities in several courses that integrate presentations (oral communication) and papers (written communication) as part of the course requirements.
b. The majority of ESCI majors will indicate confidence in their ability to demonstrate effective oral and written communication skills appropriate to their discipline on an exiting senior survey.

Data Source/Results

a. Faculty established guidelines and administer the exiting senior survey.
b. Faculty established criteria for the oral and written communication skills in courses across the disciplines, including W courses.

Results:

Action Items Related to Intended Outcome #5

• Develop additional measureable criteria for this intended outcome as it relates to each degree program.
• Continue to offer courses and extra-curricular activities for students that contain a significant writing component.

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Annual Summary – MU Weather Information Center
(July 2009 – June 2010)

Eric J. Hörst, Director

The Weather Information Center (WIC) continues to expand its service to MU meteorology students and administrators, the local community, area media, and numerous public and government agencies. Widely recognized as the region’s leading source for quality forecasts and expert commentary the WIC has issued, over the past year, over 700 Campus Weather Service forecasts, 300 streaming videos, 150 Special Weather Discussions, 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. Approximately 60 meteorology majors participated in the CWS this year, creating numerous forecast products for the MU Weatherline, Snapper newspaper, and the University web site.

Streaming video (SV) continues as the marquee product of the WIC. Now in its seventh year, the SV initiative provides cutting-edge, engaging content to a local—and global—audience interested in high-quality forecasts and expert analysis. About 15 meteorology students participate in the production and broadcast of daily short-term forecast streaming videos. The Director also broadcasts Extended Outlooks three days per week, while Dr. Sepi Yalda provides a monthly Climate Review.

The Director of the Weather Information Center (WIC) is responsible for overseeing student forecasting activities, managing the operation of the Weather Center, and fulfilling requests for “point forecasts” from a variety of MU officials, government agencies, and local media. The Lancaster Newspapers, Inc. remains an extensive user of our forecasts and storm analysis—our quotes frequently appear on front-page articles, providing excellent promotion and exposure for the University.

Also notable is a two-year extension of the “Winter Weather Forecasting” project with the Pennsylvania Department of Transportation (PaDOT). For a third consecutive winter, the WIC provided targeted forecasts for eight counties in south-central PA. This forecast service runs from November 1st through April 30th, with forecasts and briefings provided to PADOT on a 24-7 basis when winter storms are impacting—or expected to impact (within the next five days)—the region. WIC Director Horst is the manager and lead forecaster of the project, however, eight junior and senior meteorology students also participate in the preparation of these forecasts.

The WIC remains active in outreach and service to the local community. Over the last twelve months, the Director provided more than twenty weather talks, Weather Center tours, and “shadowing” days. Additionally, the WIC held three Open House events—for the Annual Science Lectureship, the Women in Math and Science Conference, and our 10th Annual Open House for the general public.
Marine Science Consortium REPORT-2010-2011

Dr. Ajoy Kumar

The annual Fall and Spring meeting, held at Harrisburg, was well attended by faculty and administrators from PASSHE schools and other PASSHE officials. The Marine Science Consortium (MSC) has a NEW and FRESH appearance with new buildings replacing the old ones. All construction work is now complete, dormitories and classrooms are functional. Laboratories are partly functional and will need few equipments like microscopes to make it more effective. There is a plan to equip the MSC laboratories with about $200,000 grant from PASSHE and we are working on finalizing the equipment list priorities. A number of used computers are being sent to the MSC computer labs from MU this summer and will be installed in the computer hall space.

A major accomplishment this year is the on-line registration for MSC courses. This new system will integrate ALL PASSHE school courses offered at Wallops and will allow ANY student to register to ANY summer classes that are offered at the MSC. The system worked satisfactorily this year for most schools. Any changes to this system will be implemented this fall. A number of new courses were proposed, approved by the Academic Advisory Council and will be offered this summer. All courses offered this summer are available at the MSC website.

Another major accomplishment this year was the implementation of a number of research projects with NASA and USFWS through the office of the NASA-MSC Liaison. The highlight of this effort was the Coastal Zone Research Symposium, held at the MSC on May 13th, 2011. The presentations included ongoing work from PI’s of the projects, representatives from NASA and USFWS. NASA-MSC has also brought out the annual report for 2011 that can be viewed at the MSC website.

The next Fall meeting will be held on September 24th, 2011 at the MSC.

Charles K. Scharnberger
Volunteer in Service

Report on Activities, May 1, 2010 to April 30, 2011

Seismic Station

I continued to monitor the operation of the broadband seismograph, trouble-shoot problems, and respond to questions from the public and the media regarding earthquakes. In March, the station received a significant upgrade with a new computer, new software, a new digitizer, and a new wireless connection between
the vault and the computer. This work was done by personnel from the Lamont-Doherty Earth Observatory, the cost being covered by a federal grant to them for the purpose of upgrading station in the Lamont Cooperative Seismic Network. Unfortunately, a downside to this upgrade is that the hallway display of the real-time data has been lost. Restoration of this display is one of my priorities for this year.

**Other Service to the University**

On June 21, I participated by phone as an expert on earthquakes for Dr. Yalda’s emergency management class.

On September 15, I spoke to the ESCI 110 class about the seismic station, and conducted a tour.

On October 7, I presented “Multiple Working Hypotheses for the Origin of the Lancaster Seismic Zone” in the Earth Sciences Department’s seminar series.

Throughout the spring semester, I was a consultant for ESCI 326, Sedimentation and Stratigraphy.

**Other Professional Activities**

On March 21 and 22 I attended the annual meeting of the Northeast Section of the Geological Society of America (this year combined with the meeting of the North Central Section) in Pittsburgh. With Jeri Jones of Jones Geological Services (York County), I presented a poster paper, “Then and Now: Geologic Investigations of Florence Bascom, George W. Stose, and Anna Jonas Stose in Southeastern Pennsylvania.”

I participated in the annual Field Conference of Pennsylvania Geologists and associated symposium, September 23-25. I also attended the annual meeting of the Eastern Section of the Seismological Society of America in Boston, October 17-19, and three of the monthly meetings of the Harrisburg Area Geological Society.

I also did several presentations for classes at other colleges, adult learning groups, and public forums, as well as working with Webelos and Cub Scouts on geology badges.
Mission Statement
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Vision Statement
Provide a learning experience in the Earth Sciences that is second to none

A. Curricular Changes


2. ESCI 321, *Structural Geology*, had changes approved to the prerequisites and course description. This course is required for the B.S. in geology major. The new course description better reflects the content of the course, and the increase in prerequisites ensures that the students are prepared for the class and increases the likelihood of student success.

3. ESCI 421, *Advanced Geology*, Synthesis and integration of knowledge from required classes in the B.S. in Geology major via student-led exploration of current developments in geology. Class will be taught with some lectures, but mainly as a seminar, with students responsible for interpreting pertinent geological research, then participating in and periodically fostering class discussion of the research, including its importance to the science and society. Prereq: ESCI 321, ESCI 326, ESCI 328; open only to geology majors with senior status. NEW COURSE, approval in progress.

4. ESCI 281 as a substitute for ESCI 386: ESCI 386, *IDL Programming for Advance Earth Sciences*, is a required course for meteorology majors. However, this course is more appropriate for students bound for graduate school or careers at NASA. To accommodate the changing weather and climate enterprise dynamic, we will offer ESCI 281, *GIS Applications in the Earth Sciences*, in alternate years as a required alternative.

5. *Environmental Geology Curriculum* is undergoing changes to the course structure, as well as inclusion of a required minor. The proposal recently received departmental approval.
B. Faculty achievements – grants, research, sabbatical (Refer to School Statistics section).

Sabbatical:

One ESCI faculty member (A. DeCaria) applied for sabbatical in 2009-10. It was not awarded.

Refereed Publications:


Sikora, T. D., G. S. Young, and M. J. Bettwy¹, 2010: Analysis of the western shore Chesapeake Bay bay-breeze. *National Weather Digest*, in press. (Peer-reviewed manuscript)


Non-refereed Publications:


¹ Italics denotes Millersville student


Publications in Review:


Publications in Preparation:

Price, J.R., Silicate weathering and CO$_2$ consumption at Coweeta Hydrologic Laboratory, western North Carolina, USA.

Kumar A. and P. J. Minnett., Accuracy of MODIS sea surface temperatures

Kumar A. and P. J. Minnett., Uncertainty Analysis of MODIS TERRA and AQUA sea surface temperatures

Ambler, J. and A. Kumar., The physical and biological characteristics of the Delmarva shelf.

Earman, S., and Dettinger, M., Potential impacts of climate change on groundwater resources—A global review

Vaillancourt, R.D., Lance, V., Marra, J. (In Prep.) The deep-chlorophyll maximum in the stratified ocean: the chemostat hypothesis.

Lance, V.P., Strutton, P.G., Vaillancourt, R., Hargreaves, B., Marra, J., (In Prep.) Primary productivity, new productivity and carbon export during two Southern Ocean Gas Exchange (SOGasEx) Lagrangian tracer experiments.

Vaillancourt, R.D., Lance, V.P., Hargreaves, B., Marra, J., (In Prep.) Phytoplankton photosynthetic physiology at the Polar Front; Results from the Southern Ocean Gas Exchange Experiment.

Yalda, S., R. Clark, and J. McLaughlin, New Educational Opportunities for the Changing Role of Broadcast Meteorologists, Bulletin of the American Meteorological Society

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

Clark, R. D., National Science Foundation peer review (3); Bulletin of the American Meteorological Society (1).

Earman, S., National Science Foundation peer review (2)


Price, J.R., National Science Foundation peer review (1); Geochimica et Cosmochimica Acta (1); Clays and Clay Minerals (1); Applied Geochemistry (1); Journal of Geophysical Research (1); Journal of Hydrology (1).


Vaillancourt, R., National Science Foundation peer review (2)

Yalda, S., National Science Foundation peer review (2); National Science Foundation Committee of Visitors Invited Panel Member (1)

**Presentations at Professional Meetings:**


Clark, R. D., 2010: Local and regional circulations, North Carolina State University, Raleigh, NC, 8 March 2010.


Grants and Contracts Received:

External Grants:

Faculty member: Richard Clark, Sepideh Yalda and Gary Zoppetti
Title of grant: GEOPOD: Geoscience Probe of Discovery
Grant amount: $350,000
Awarding agency: National Science Foundation (Information and Intelligent Systems)

Faculty members: Alex DeCaria and David Fitzgerald
Title of Grant: Establishment of THREDDS and RAMADDA Server at Millersville University
Grant amount: $11,000
Award agency: Unidata Program Center

Faculty member: Ajoy Kumar
Title of grant: Projecting the impacts of Climate Change and Identifying adaption options at Chincoteague National Wildlife Refuge
Grant amount: $161,012.29, FY 10-11, $344,330 total (2010-2013)
Awarding agency: NASA

Faculty member: Ajoy Kumar, O. Dreon, N. Dietrich, D. Dagit, J. Boal, J. Ambler, J. Bray, and R. Smith
Title of grant: Wallops Island Science Training Program for Emergency Certified Teachers
Grant amount: $135,000, 2010-2013
Awarding agency: PASSHE

Faculty member: Jason R. Price
Title of grant: The Influence of Radiation Damage on the Solubility of Epidote-Group Minerals During Chemical Weathering
Grant amount: $115,282.00
Awarding agency: National Science Foundation

Faculty member: Todd D. Sikora
Title of grant: Applications of Synthetic Aperture Radar to Meteorology and Oceanography Command Operations
Grant amount: $100,500, FY 07-11, 3rd year of 4-year grant
Awarding agency: Office of Naval Research

Internal Grants

- ESCI faculty has received $4,124.27 in MU Faculty Grants in 2009-10.

- Todd Sikora received ¼ load reduction in support of his released-time grant proposal; Application of Synthetic Aperture radar to Meteorology and Oceanography Command Operations.
Contracts Received:

Faculty member: **Todd D. Sikora**
- Title of contract: Spaceborne Ocean Intelligence Network
- Contract amount: $43,000 FY 07-12, 3rd year of a 5-year contract
- Awarding agency: Bedford Institute of Oceanography

Faculty member: **Eric Hörst** (Director of Weather Information Center)
- Title of Contract: Winter Forecasting for PennDOT District 8
- Contract amount: $33,480/year (Two-year contact total $67,960)
- Awarding agency: Pennsylvania Department of Transportation-District 8

Faculty Member: **Richard D. Clark**
- Title of Contract: Millersville Acid Rain Monitoring Site Project
- Contract Amount: $52,580 (Five year contact, 1 January 2010- 31 December 2014)
- Awarding Agency: Pennsylvania Dept. of Environmental Protection (DEP)

Grants pending:

Faculty members: **Richard Clark**
- Title of Grant: Collaborative Research: Structure, Dynamics, and Mixing Process in the Nocturnal Atmospheric Boundary layer Near Urban Areas (NABLU)
- Grant amount: $381,950
- Awarding agency: National Science Foundation: Atmosphere and Geospace Sciences (AGS)

Contracts pending:

None

Professional Development:

- Clark, R. D., Space Weather Workshop, Boulder, CO, 26-29 April 2010
- Kumar, A., ENVI and IDL User Group Meeting - VISualize 2010, May 20th, 2010
- Kumar, A., OOI Science Community Workshop, Baltimore, November, 19th, 2010
- Sikora, T.D., Defense Canada Spaceborne Ocean Intelligence Network Workshop, Halifax, Canada, 22-23 June 2010
- Sikora, T. D., Defense Canada Spaceborne Ocean Intelligence Network Workshop, Halifax, Canada, 18-19 February 2010
• Sikora, T. D., Defense Canada Spaceborne Ocean Intelligence Network Workshop, Halifax, Canada, 2-3 December 2009

• Vaillancourt, Ocean Sciences Meeting, Portland, OR, Feb 22-26, 2010

• Vaillancourt, Ocean Carbon & Biogeochemistry Workshop, Woods Hole, MA, July 2009

• Vaillancourt, OOI Science Community Workshop, Univ of Maryland, MD., Nov. 2009


• Yalda, S., Emergency Management Higher Education Institute, GIS in Emergency Management, Emmitsburg, MD, 7 June 2010

• Yalda, S., Emergency Management Higher Education Institute, How to Teach Emergency Management: Thoughts for Those New to the Disaster Field, Emmitsburg, MD, 7 June 2010

**Major Service to Scientific and Science Education Communities:**

Faculty member: **Richard D. Clark**
Organization: American Meteorological Society
Status: Elected member of the AMS Council (2008-2011)

Faculty member: **Richard D. Clark**
Organization: University Corporation for Atmospheric Research
Status: Elected member of the Board of Trustees (2009-2012)

Faculty member: **Richard D. Clark**
Organization: University Corporation for Atmospheric Research – Board of Trustees
Status: Member, Audit and Finance Subcommittee (2008-2011)

Faculty member: **Richard D. Clark**
Organization: American Meteorological Society Science and Technology Activities
Commission on Space Weather
Status: Member (2 years)

Faculty member: **Richard D. Clark**
Organization: American Meteorological Society APT Mobile Observations Committee
Status Member (Ad hoc)

Faculty member: **Richard D. Clark**
Organization: American Meteorological Society Full Waiver Committee
Status: Member (1 year term)

Faculty member: **Richard D. Clark**
Organization: American Meteorological Society
Status: Member of the Drafting team for Statement on Science Education.
Faculty member: **Robert Vaillancourt**,  
Organization: Ocean Sciences 2010  
Status: Session chair at the Ocean Sciences Meeting, Portland, OR

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

Faculty member: **Ajoy Kumar**  
Organization: 2010 Ocean Sciences Meeting  
Status: Session co-chair

Faculty member: **Sepideh Yalda**  
Organization: Cooperative Program for Operational Meteorology, Education and Training (COMET) Advisory Panel  
Status: Chair of the COMET Advisory Panel

Faculty member: **Sepideh Yalda**  
Organization: American Meteorological Society Battan Book Award  
Status: Appointed member

Faculty member: **Sepideh Yalda**  
Organization: National Environmental Education Foundation (NEEF) Eyes on the Environment Advisory Committee  
Status: Advisory Committee member

Faculty member: **Sepideh Yalda**  
Organization: American Meteorological Society Anderson Award Committee  
Status: Appointed member

Faculty member: **Sepideh Yalda**  
Organization: American Meteorological Society Minority Scholarship Award Committee  
Status: Appointed member

Faculty member: **Sepideh Yalda**  
Organization: American Meteorological Society Board on Women and Minorities  
Status: Chair selected by Council of the AMS

Faculty member: **Sepideh Yalda**  
Organization: American Meteorological Society History of Atmospheric Sciences Committee  
Status: Appointed Chair

**External Graduate Committees:**

Faculty member: **Richard D. Clark**  
Cory Demko: Ph.D. Dissertation Committee (Final Defense), University of Wyoming  
Department of Atmospheric Science, Laramie, WY. Research advisor: Dr. Bart Geerts
Volunteer-in-Service Activities (see attachment)

Charles K. Scharnberger: Professor Emeritus, Volunteer-in-service (see attached)

Yin S. Soong: Professor Emeritus, Volunteer-in-service

Present faculty/staff community service.

<table>
<thead>
<tr>
<th>Name</th>
<th>Event</th>
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<tbody>
<tr>
<td>Jason Price</td>
<td>Science Fair Judge, Hempfield Middle School</td>
<td>1/30/2010</td>
</tr>
<tr>
<td>Sepideh Yalda</td>
<td>Commonwealth of PA All-Hazard Mitigation Planning Committee (invited)</td>
<td>Ongoing</td>
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<td>Richard Clark</td>
<td>WITF –SMART TALK: Global Warming on the Hot Seat</td>
<td>02/19/2010</td>
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<tr>
<td>Alex DeCaria</td>
<td>Co-organizer, 2010 Science Olympiad</td>
<td>3/20/2010</td>
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<tr>
<td>Ajoy Kumar</td>
<td>Instruction Services Lancaster-Lebanon IU 13. Presented a seminar to the Gifted students on Global Climate Change</td>
<td>10/21/2009</td>
</tr>
<tr>
<td>Ajoy Kumar</td>
<td>Willow Valley Retirement Communities. Presented a seminar on effects of Global Climate Change</td>
<td>02/02/2010</td>
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<tr>
<td>Ajoy Kumar</td>
<td>Willow Valley Retirement Communities: Presented a seminar on Global Warming Gases</td>
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<tr>
<td>Jason Price</td>
<td>Science Fair Judge, Hempfield Middle School</td>
<td>1/30/2010</td>
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<tr>
<td>Todd Sikora</td>
<td>Maple Avenue Middle School, Littlestown Area School District, Spring 2010. Participated in a program organized by 6th grade teacher Mrs. Becker in which students and scientists exchanged letters</td>
<td>Spring 2010</td>
</tr>
<tr>
<td>Todd Sikora</td>
<td>Eshleman Elementary School, Penn Manor School District, 16 October 2009. Organized a school visit by members of the MU AMS Outreach Committee to Mrs. Thomson’s 2nd grade class. The MU students presented meteorology instruction and demonstrations.</td>
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<td>Lynn Marquez</td>
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<td>Lynn Marquez</td>
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<td>Lynn Marquez</td>
<td>North Museum Portal to the Public – NSF Grant Discussion Group</td>
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<tr>
<td>Lynn Marquez</td>
<td>Science Olympiad – Dynamic Earth</td>
<td>3/27/2010</td>
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C. Student achievements – awards, graduate and professional school, job placement, presentations at regional/national meetings (student name, faculty name, title).

The Department of Earth Sciences is committed to offering programs of national distinction. What this means to us is that we provide rich and meaningful opportunities for students to find their niche, build a knowledge base and gain deep understanding in their respective disciplines, develop skills and proficiencies that will elevate their competitiveness in the job market or advanced degree programs and serve them throughout their careers, while empowering them to become valued contributors to their professional communities. We take pride in understanding the undergraduate mindset, the needs and challenges facing undergraduate students as they make their way toward productive careers, and the importance of creating an authentic learning environment where the individual can realize their potential and achieve their goals. We are confident that our graduates are as or better prepared than their peers, and we measure this by their lifelong success.

Student Awards:

- **Christopher R. Funk**: Dr. William B. McIlwaine Scholarship
- **Ricardo Gonzalez**: William Malcolm Jordan
- TBA: Clark-Yalda Cirrus Scholarship in Atmospheric Sciences
- **Phillip E. Falgoust**: Paul H. Nichols Scholarship
- **Nikole L. Rutters**: Rettew Associates Scholarship in Geology
- Earth Sciences Award for Academic Excellence
  - **Alexander Davies and McArthur Jones** - Liberal Arts
  - **Rachel C. Lilick** - Secondary Education
### 2009 – 2010 Graduates

#### Fall 2009 Graduates

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### Student Job Placement and Advanced Studies (partial list):

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<tr>
<th>Name</th>
<th>Degree Study</th>
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<tr>
<td>Baldi, Sarah</td>
<td>Graduate Studies (Math Education)</td>
<td>Millersville University, PA</td>
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<td>Baxter, Stephen</td>
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<td>University of Maryland, MD</td>
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<td>Davies, Alex</td>
<td>Graduate Studies (Marine Science)</td>
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<td>Graduate Studies (Aerospace Engineering)</td>
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<td>Kyper, Nick</td>
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<td>Lawston, Patricia</td>
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<td>Graduate Studies (Emergency Management)</td>
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<td>Salvaggio, Anna</td>
<td>Commissioned officer</td>
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<td>Veilleux, Adrienne</td>
<td>Employment; Ocean fleet forecasting</td>
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Student Internships:

Student name: Philip Bergmaier  
Internship title/site: Facilitating tropical cyclone analysis of hurricane satellite (HURSAT) imagery with Google Earth/National Climatic Data Center, Asheville, NC.

Student name: Michael Charnick  
Internship title/site: Engineering, Scientific, Technical Intern in Air Quality/PA Dept. of Environmental Protection, Harrisburg, PA

Student name: Alex Davies  
Internship title/site: High frequency coastal radar/NASA Undergraduate Summer Research Program Wallops Island Flight Facility, Wallops Island, VA

Student name: Erica Dolinar  
Internship title/site: Modeling the effects of scattered ionospheric photons/Laboratory for Atmospheric and Space Physics, University of Colorado at Boulder, CO

Student name: Justin Gilchrist  
Internship title/site: Hyper-spectral Semi-analytical Inverse Model/NASA Wallops Island Flight Facility, Wallops Island, VA

Student name: Justin Gilchrist  
Internship title/site: Detection and analysis of harmful algal blooms in the Chesapeake Bay using NASA products and technologies/NASA Wallops Island Flight Facility, Wallops Island, VA

Student name: Adam Gonsiewski (2009 HOLLINGS SCHOLAR)  
Internship title/site: Lightning research/National Weather Service, Mt. Holly (WFO), NJ

Student name: Phillip Falgoust  
Internship title/site: Space weather research intern/University of Michigan Center for Earth and Space Sciences, Ann Arbor, MI

Student name: Adam Jacobs  
Internship title/site: Analysis of data from the Solar Dynamics Observatory, NASA Goddard Space Flight Center, Greenbelt, MD

Student name: Daniel Johnson  
Internship title/site: Forecasting Intern, National Weather Service, Sterling WFO, VA
Student name: Kristina Laboy  
Internship title/site: Center for Multiscale Modeling of Atmospheric Processes, Colorado State University, Fort Collins, Colorado.

Student name: Nick Kyper  
Internship title/site: Meteorology Intern, WGAL-TV, Lancaster, PA

Student name: Patricia Lawston  
Internship title/site: Meteorology Intern, WJLA ABC 7, Arlington, VA

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

Student name: Heather Morgan  
Internship title/site: Emergency management/Maryland Emergency management Agency (MEMA), Reisterstown, MD

Student name: Courtney Robbins  
Internship title/site: Meteorology Intern, WGAL-TV, Lancaster, PA

Student name: Ajay Seshan  
Internship title/site: Graphics development/Meteorology Intern, WGAL-TV, Lancaster, PA

Student name: Shayne Taylor  
Internship title/site: Meteorology Intern, WGAL-TV, Lancaster, PA

Student name: Travis Toth  
Internship title/site: Meteorology Intern, Planalytics, Inc., Wayne, PA

Student name: Travis Toth  
Internship title/site: Formation mechanisms of thin clouds/Dept. of Energy Science Undergraduate Laboratory Intern, Pacific Northwest Laboratory, Richland, WA

**Student Research Activities:**

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<th>STUDENT FIRST NAME</th>
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<th>ADVISOR FIRST NAME</th>
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<tr>
<td>Erica</td>
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**Student Research Grants:**

**Erica Dolinar:** Noonan Grant for travel and presentation at the Northeast Storms Conf., in Saratoga Springs, NY.

**Adam R. Gonsiewski:** 2009-2010 Ernest F. Hollings – NOAA Undergraduate Scholarship (national competition)

**Alex Davies:** USRP NASA Fellowship, summer 2009 (national competition)

**Stephen Baxter:** NOAA Student Career Experience Program (SCEP); only one awarded by the Center for Climate Prediction (CPC), Camp Springs, MD, fall 2009

**McArthur Jones,** SOARS Program, University Center for Atmospheric Research, National Center for Atmospheric Research, Boulder, CO

**Student attendance at regional or national conferences**

- Number of Students: 20
  - Conference: 90th Annual AMS Meeting, Atlanta, GA

- Number of Students: 12
  - Conference: Northeastern Storms Conference, Springfield, MA

- Number of Students: 1
  - Conference: National Science Teachers Association (NSTA) National Conference, Philadelphia, PA

- Number of Students: 2
  - Conference: Ocean Science Meeting, Portland, OR

- Number of Students: 11
  - Conference: Space Weather Conference, Boulder, CO

**Student presentations at regional or national conferences –**

- Student(s) name: **Philip Bergmaier**, Faculty mentor: Kevin Knapp (National Climatic Data Center)
  - Poster paper/presentation title: facilitating tropical cyclone analysis of hurricane satellite (HURSAT) imagery with Google Earth

- Student(s) name: **Alex Davies**, Faculty mentor: John Moison and Ajoy Kumar
Poster paper/presentation title: Using HF radar to observe coastal ocean tidal features

Student(s) name: Erica Dolinar
Faculty mentor: Richard Clark
Poster paper/presentation title: A correlation between vehicle miles driven and air quality in select U.S. cities

Student(s) name: Justin Gilchrist,
Faculty mentor: Ajoy Kumar
Poster paper/presentation title: A simple technique to remove tidal influence from ADCP measurements
Conference: Ocean Sciences 2010, Portland, OR, 22-26 February 2010

Student(s) name: Justin Gilchrist and Alex Davies,
Faculty mentor: Ajoy Kumar
Poster paper/presentation title: De-tiding of ADCP velocities collected over the continental shelf and shelf break region off the Delmarva Peninsula using the ROMS model

Student(s) name: McArthur Jones,
Faculty mentor: Hanli Liu and Art Richmond (NCAR High Altitude Observatory)
Poster paper/presentation title: Eliassen-Palm and Vertical Energy Fluxes of the Diurnal Tides from the Whole Atmosphere Community Climate Model-Extended (WACCM-X)

Student(s) name: Heather Morgan,
Faculty mentor: Eric Maloney (Dept of atmos. Sci., CSU, Fort Collins, CO)
Poster paper/presentation title: Improving Atlantic hurricane predictions with the Madden-Julian Oscillation
Student(s) name: **Nicole Rutters and Courtney Robbins**  
Faculty mentor: Jason Price  
Poster paper/presentation title: A comparison of different green roof constructions on runoff nitrate fluxes  

Student(s) name: **Matthew Potter and Patrick Selmer**,  
Faculty mentor: Richard Clark  

Student(s) name: **Nate Wardle, Travis Toth, and Elmer Bauers IV**  
Faculty mentor: Richard Clark and Todd Sikora  
Poster paper/presentation title: An investigation of severe climatology of the Chesapeake Bay region.  

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

The Department of Earth Sciences is guided by the action items identified in its 5-year review conducted 2006-2007 and its 2007-2012 Strategic Plan. The Department of Earth Sciences contributes significantly to the University mission, follows a vision congruent with the University vision, and is one of the most productive departments in the School of Science and Mathematics in several areas including but not limited to faculty/student ratio, grants and contracts, promoting undergraduate research, and providing opportunities for student internships and participation in national conferences in the disciplines.

**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, and meaningful opportunities for students to engage in extra-curricular activities, and by attentiveness to inter- and cross-disciplinary trends and opportunities for student engagement.
Department of Earth Sciences Vision Statement

Our vision is to provide a learning experience in the Earth Sciences disciplines that is second to none.

Strategic Goals for 2007-2012

The members of the Department of Earth Sciences approved the following strategic goals for the period 2007-2012.

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

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

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

The following actions emerge from the 5-year review and Strategic Plan. These actions continue to guide the department efforts and initiatives for the period 2007-2012 and beyond. During the academic year 2009-10 we made the following progress toward our Five-Year Goals.

Progress Related to Goal #1:

- The Department’s proposal for a new facility has been accepted to the University Master Plan – Phase 2. We plan to seek funding from granting agencies and/or foundations for partial support for bricks and mortar in order to shorten the timeline to Phase 1 for this construction.
- The Department was allocated $85,000 from the University Technology Fee for the purchase of a DigiCora II Rawinsonde System for meteorology research and education. We conducted our first launch in April 2010 and plan to deploy the system for research in summer 2010. The Rawinsonde system has been listed in two pending grant proposals.
- The Department has upgraded its weather map wall as we move toward a fully electronic weather display environment in the Weather Center. Funds for this initiative are made available as part of a contract for Winter Weather precision forecasting between Millersville University (E. Hörst, project director) and the PA
The Department submitted equipment requests through the base equipment and University technology Fee for the acquisition of new computers for Caputo 402, and the Windows/Linux servers. In addition, through an effort by A. DeCaria and D. Fitzgerald the department was awarded a grant of $11K for the acquisition of a data server and repository from the Unidata Program Center, Boulder, CO.

- Department faculty have been especially productive in developing proposals and receiving external funding. In summer 2009 alone, the following proposals were submitted to external agencies:


3. Kumar: Oceanic Oxygen Changes as an indicator of Global Climate Change. NASA; $467,289


5. Price: The influence of radiation damage on the solubility of epidote-group minerals during chemical weathering. NSF-EAR-SEP; $123,134.

6. Vaillancourt: Acquisition of autonomous underwater vehicles (Slocum Gliders) for continental shelf research, training, and education. NSF-MRI-R²; $1,349,418

7. Yalda/Clark: Geoscience Probe of Discovery (GEOPOD). NSF_Advanced Learning Technologies, $350,000

8. Horst: Winter storm forecasting. 2-year contract with PA-DOT; $67,000

- The Department filled the geology position vacated by the retirement of Dr. Ramama with Dr. Sam Earman.

- A new scholarship became available (first award in fall 2010) through an endowment created by Drs. Richard Clark and Sepideh Yalda. The Clark-Yalda Cirrus Scholarship in Atmospheric Sciences provides a $1000 scholarship for a freshman meteorology major.
Progress Related to Goal #2:

- One faculty member (Marquez) submitted a proposal to NSF-CCLI to transform undergraduate science instruction for BSE students ($124,750). The proposal was not funded.
- Another faculty member (Kumar) along with several colleagues from the Biology Dept and the School of Education were funded $135,000 from PASSHE for science training of emergency certified teachers in marine science at the Wallops Island Marine Science Consortium.
- Meteorology faculty played a role in the revision to the American Meteorological Society guidelines for a B.S. degree in Meteorology/Atmospheric Science

Progress Related to Goal #3:

- The Ocean Sciences and Coastal Studies (OSCS) Program is maintaining gradual but steady increases in student enrollment in the major.
- Curricular changes are tuning the program to current trends in the discipline.
- The University has become a senior member of the Marine Science Consortium (MSC), and A. Kumar and R. Vaillancourt play key roles in promoting OSCS in MSC (see MSC Annual report in the attachments)
- One faculty member (A. Kumar) has been twice successful in obtaining grant funding for research (NASA) and education (PASSHE). In addition, R. Vaillancourt is developing an active research program with ongoing funding.

Department Actions for 2010-2011

1. The Department of Earth Sciences will continue to aspire to maintain its position as a “flagship” department of Millersville University and continue to build national recognition.

2. Put a new building on the fast track (Phase 1) for funding. The scattering of the faculty offices, the lack of laboratory facilities for teaching and research, and the difficulty in maintaining equipment severely limit the future growth of this very productive Department. Pursue funding conduits for partially financing the cost of construction.

3. Continue to build enrollments in the Ocean Science and Coastal Studies Program through general recruitment strategies and through the MSC.

4. The meteorology program continues to sustain large enrollments. Fall 2010 freshmen enrollment are remaining near all-time high levels and we are preparing to see additional interest in the discipline as NOAA moves forward with the creation of the Climate Services Division. The program has lost 50% of a faculty complement with Dr. Yalda accepting the position as Director of the Center for Disaster Research and Education and Manager of the MSEM program. Although we are very excited by the prospect for greater collaboration with the CDRE as a result of this appointment (see Action item #7), we are concerned that we do not have enough meteorology faculty to sustain the program at current levels. We will
work with the University administration to give the department a new one-half complement, which when added to that given up to CDRE will allow us to hire a full-time tenure track meteorology faculty.

5. At least one new faculty position is definitely needed, especially if the majors continue to grow. New faculty members should have an Earth Systems focus.

6. Expand and enhance collaborations among faculty associated with the Center for Disaster Research and Education (CDRE), and in conjunction with action item #2, incorporate the physical location for the CDRE into the new building plan. We are seeing a healthy number of Earth Sciences graduates matriculating into the M.S. program in Emergency Management.

7. Continue to seek funding for two post-doctoral teaching associates to increase the frequency of regular course offerings within the Department. Proposals to educational foundations or government agencies could be the source for these funds, especially if tied to innovative changes to the curriculum or pedagogy (Yalda working on proposal).

8. Strengthen the BSE program by having a dedicated faculty director, as indicated above, and replace some of the survey courses with upper-division major courses to promote higher-order thinking among pre-service teachers.

9. The Brossman facilities are in need of repair and is on schedule for some much needed painting in summer 2010.

10. Prioritize equipment requested for the acquisition of basic laboratory equipment. The School acquired a van that is being heavily used by Earth Sciences faculty and students.

11. Where possible, link new course development to NSF-CCLI proposals.

E. New Faculty, New Facilities/Equipment and more…

1. NEW FACULTY

Dr. Sam Earman, Geology, joined the Department in August 2009.

2. NEW FACILITIES/EQUIPMENT

- The Department received $85,000 from the University Technology Fee for the purchase of a DigiCora II Rawinsonde System for meteorology research and education.

- The Department upgraded its weather map wall. Two 32” LCD HDTVs were purchased with funds through a contract with the PA Department of Transportation. A new multipleVGA PC was purchased at a cost of $5700. These funds were also made available through the PA Department of Transportation contract along with the DeSouza and Stauffer Equipment accounts.
• With funds from the Stauffer Equipment account, the Department purchased 17 chairs for the microscope room, Roddy 156.

• The University provided $2500 in funding to purchase a WeatherBug Weather Station and WeatherBug Lightning Package for the Department.

• The University provided $5000 to the Department to update the Weather Kiosk. With these funds, the Department has purchased two 55” HDTVs, two computers and wall mounts. One display will be mounted in the lobby of Caputo Hall and the other will be located in the Cyber Café in Roddy Hall.

• The Department received funding from the University equipment budget ($14,250) and the Campus Technology equipment budget ($14,250) for 12 Tethersonde sensors.

F. Outcomes Assessment

Department: 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

Faculty Member Completing this Form: Richard Clark on behalf of all Earth Sciences faculty

Update on prior years’ application of results: The Department of Earth Sciences had elected to implement all the intended student outcomes (1 through 5) in 2009-2010 in order to form a consistent statistical database.

Accomplishments in 2008-2009 based on the Learning Assessment Outcomes Plan
• See action items for 2009-10 below.

Notes on Measurable Criteria: We have in the process of making significant changes to measurable criteria from previous years, and plan to implement those metrics in 2009-2010.

1) Although the department still recognizes the potential of portfolios, they have not been successful over the past four years mainly, in our opinion, because it cannot be required or easily integrated in courses beyond ESCI 110, in which the students were required to produce a “foundations essay.” Moreover, we have noticed a national trend away from the use of
portfolios. Therefore, the department had elected to drop the portfolio requirement from the measurable criteria beginning with the 2008-09, and we will continue to not have the portfolio as part of the measurable criteria.

2) The department has been largely dissatisfied with embedded test items tied to Bloom’s taxonomy as a means of assessing intended outcomes for a department-wide assessment. Because of the breadth of Earth sciences disciplines, embedding questions in exams across multiple disciplines with the expectation that half-dozen questions will somehow provide meaningful metrics for a DEPARTMENTAL assessment and continual improvement has not yielded results that provide guidance, and are therefore difficult to interpret and act upon. However, embedded test items are still considered to be a viable assessment tool and data source if they are applied programmatically. During summer 2010, we will be working on the development of program/discipline-specific embedded test items and which will be launched in 2010-2011.

3) In summary, the assessment plan for 2009-10 contains the results and interpretations from the senior exit survey, and outcomes based upon the success of our graduates, as well as the number of internships that our students have garnered. These data are contained in the Annual Report. Our assessment strategy this year has focused on the evaluation of the assessment plan itself. We are in the process of establishing new objectives/goals, and defining separate measurable criteria for each degree program to assess whether the intended outcomes are being met (more on this in closing the loop). See 2010-2011 action plans.

**Intended Student Outcome 1**

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

**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**
  - G2, L Courses; G3 (scientific reasoning)
  ESCI majors take courses in science and mathematics. Specifically, ESCI majors take required ESCI courses related to their discipline, included among them; ESCI 221, 222, 241, 245 261. ESCI majors also take courses in Physics (PHYS 131/231, 132/232), Math (MATH 161, 211), and geography courses such as GEOG 101 and 285.
- **Related Courses**
  ESCI majors take courses in Physics, Mathematics, Chemistry, Biology, and Geography to build knowledge and understanding related to their discipline. Fundamental knowledge and understanding is gleaned in basic Physics courses (131/132 for BA; 231/232 for BS), Chemistry courses (111 and for some degrees 112), degree-specific mathematics courses, among them 161,211,311,365, 235, and Geography courses related to the major such as GEOG 295.
- **Interdisciplinary Component**
  Many students (approximately 40%) also earn a minor in one or more of the following: Math; Chemistry; Communications (option); Business; Economics; Government and Political Affairs; Environmental Hazards and Emergency Management.
**Measurable Criteria**

**Measurable Criteria for 2009-10**

a. The majority of ESCI majors will indicate confidence in their ability to apply knowledge and understanding of their ESCI discipline on an exiting senior survey.

**Data Source/Results**

Data Sources: ESCI faculty members have identified the follow data source for this intended outcome.

a. Faculty established guidelines and administer exiting senior survey.
b. The number of successful admissions to graduate school.
c. The number of internships.

Results:

**Action Items Related to Intended Outcome #1:**

- Develop additional measurable criteria for this intended outcome as it relates to each degree program.

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**Intended Student Outcome 2**

All Earth Sciences graduates can articulate the relationships between hydrosphere, lithosphere, and atmosphere.

**Connection to Univ/Dept Mission**

MU seeks to prepare its students to live in an increasingly diverse, multicultural and technologically complex society.

**Coherence Considerations**

See Statement for outcome 1.

**Measurable Criteria**

a. The majority of ESCI majors will indicate confidence in their ability to articulate the relationships between the hydrosphere, lithosphere, and atmosphere on an exiting senior survey.
b. Growth in the number of students pursuing minors and second degrees.

**Data Source/Results**

a. Faculty established guidelines and administer the exiting senior survey.
b. Trends in the number of students that minor or earn second degrees in other disciplines.

Results:
Action Items Related to Intended Outcome #2

- Develop additional measurable criteria for this intended outcome as it relates to each degree program
- Evaluate this intended outcome from the perspective of a program. This outcome may not be viable for students following degree criteria specific to their discipline.

Intended Student Outcome 3

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

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.

Coherence Considerations

See Statement for outcome 1.

Measurable Criteria

a. The majority of ESCI majors will indicate confidence in their ability to demonstrate quantitative skills appropriate to their Earth Sciences discipline on an exiting senior survey.

Data Source/Results

a. Faculty established guidelines and administer the exiting senior survey.

Results:

Action Items Related to Intended Outcome #3

- Develop additional measurable criteria for this intended outcome as it relates to each degree program.

Intended Student Outcome 4

All Earth Sciences graduates demonstrate proficiency in the application of tools and skills appropriate to their discipline.
**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.

**Coherence Considerations**

See Statement for outcome 1.

**Measurable Criteria**

a. The majority of ESCI majors will indicate confidence in their ability to demonstrate proficiency in the application of tools and skills appropriate to their discipline on an exiting senior survey.

**Data Source/Results**

a. Faculty established guidelines and administer the exiting senior survey.

**Results:**

**Action Items Related to Intended Outcome #4**

- Develop additional measureable criteria for this intended outcome as it relates to each degree program.

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**Intended Student Outcome 5**

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

**Connection to Univ/Dept Mission**

MU seeks to prepare students for the workforce while promoting intellectual development through an exemplary liberal arts-based education.

**Coherence Considerations**

See Statement for outcome 1.

**Measurable Criteria**

a. The majority of ESCI majors will perform to expectations related to outcome #5 on culminating activities in several courses that integrate presentations (oral communication) and papers (written communication) as part of the course requirements.
b. The majority of ESCI majors will indicate confidence in their ability to demonstrate effective oral and written communication skills appropriate to their discipline on an exiting senior survey.

Data Source/Results

a. Faculty established guidelines and administer the exiting senior survey.

b. Faculty established criteria for the oral and written communication skills in courses across the disciplines, including W courses.

Results:

Action Items Related to Intended Outcome #5

- Develop additional measureable criteria for this intended outcome as it relates to each degree program.
- Continue to offer courses and extra-curricular activities for students that contain a significant writing component.
Annual Summary – MU Weather Information Center
(July 2009 – June 2010)

Eric J. Hörst, Director

The Weather Information Center (WIC) continues to expand its service to MU meteorology students and administrators, the local community, area media, and numerous public and government agencies. Widely recognized as the region’s leading source for quality forecasts and expert commentary the WIC has issued, over the past year, over 700 Campus Weather Service forecasts, 300 streaming videos, 150 Special Weather Discussions, 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. Approximately 60 meteorology majors participated in the CWS this year, creating numerous forecast products for the MU Weatherline, Snapper newspaper, and the University web site.

Streaming video (SV) continues as the marquee product of the WIC. Now in its seventh year, the SV initiative provides cutting-edge, engaging content to a local—and global—audience interested in high-quality forecasts and expert analysis. About 15 meteorology students participate in the production and broadcast of daily short-term forecast streaming videos. The Director also broadcasts Extended Outlooks three days per week, while Dr. Sepi Yalda provides a monthly Climate Review.

The Director of the Weather Information Center (WIC) is responsible for overseeing student forecasting activities, managing the operation of the Weather Center, and fulfilling requests for “point forecasts” from a variety of MU officials, government agencies, and local media. The Lancaster Newspapers, Inc. remains an extensive user of our forecasts and storm analysis—our quotes frequently appear on front-page articles, providing excellent promotion and exposure for the University.

Also notable is a two-year extension of the “Winter Weather Forecasting” project with the Pennsylvania Department of Transportation (PaDOT). For a third consecutive winter, the WIC provided targeted forecasts for eight counties in south-central PA. This forecast service runs from November 1st through April 30th, with forecasts and briefings provided to PADOT on a 24-7 basis when winter storms are impacting—or expected to impact (within the next five days)—the region. WIC Director Horst is the manager and lead forecaster of the project, however, eight junior and senior meteorology students also participate in the preparation of these forecasts.

The WIC remains active in outreach and service to the local community. Over the last twelve months, the Director provided more than twenty weather talks, Weather Center tours, and “shadowing” days. Additionally, the WIC held three Open House events—for the Annual Science Lectureship, the Women in Math and Science Conference, and our 10th Annual Open House for the general public.
Marine Science Consortium-2009-2010

Dr. Ajoy Kumar

The Marine Science Consortium (MSC), during the 2009-10 year has implemented a new BYLAWS document that has created a new structure for the MSC, consisting of the Board of Governors, the Council of Administrative Advisors (CAA), the Academic Advisory Council (AAC) and the NASA Liaison Committee. Presently, the Millersville University (MU) president is the President of the MSC and the MU Provost is the heard of the CAA. The Chair of the ACC is Dr. Dominic Dagit from Biology Department and MU NASA Liaison representative is Dr. Ajoy Kumar from the Earth Science Department. During the course of the year, representatives from the MSC participated in workshops to develop a new MSC Strategic Plan.

The ACC met twice in Fall-09 and Spring-10. Among the items adopted in these meetings include new courses for summer 2010 and beyond, new online courses, new research initiatives for data collection, storage and dissemination, online class enrollment (future), new fee structure for the dorms, etc.

The MSC has a new physical look with a number of new buildings that are at various stages of completion. Presently, the physical plant and pre-college dorms are operational. The new administration and classroom buildings are scheduled for completion this fall along with the college dorms and permanent staff quarters. The rest of the buildings should be completed by spring, 2011.

The MSC-NASA-USFW partnership has embarked on a LIDAR project to map the topography of the coastal Delmarva region. Dr. Kumar and Dr. Hu from MU and ESU respectively will be in charge of the multi-year project that will also expose and train students on the processing of the LIDAR returns. The aim of the project is to study the impacts of sea level rise on the Delmarva ecosystem.
Charles K. Scharnberger  
Volunteer in Service to Millersville University  
Activities: May 1, 2009 - April 30, 2010

During this time I was solely responsible for the operation of the seismic station. This involves continually monitoring the system to be sure that it is operating properly, trouble-shooting and fixing problems when they arise, and responding to inquiries from the media and public about earthquakes. I also, from time to time, print out and post on a bulletin board interpreted records of notable world-wide earthquakes.

Other specific activities during the past year include:

May - August: Conducted research on the earthquake swarm at Dillsburg, York County, PA. This involved installing a local network of temporary seismic monitors and interpreting the obtained records of micro-earthquakes. Results showed that the earthquakes originated in a very small area at very shallow depth, were associated with a diabase intrusion into Mesozoic-age sedimentary rocks (but not on a clearly defined fault), and originated in the vicinity of long-abandoned iron mines. This research was conducted collaboratively with the Pennsylvania Geological Survey, and consulting geologist Jeri Jones, with assistance from Penn State University.

May: Gave talk to Mt. Joy Masonic Lodge about earthquakes.

Gave tour of seismic station to students from Elizabethtown High School.

August: Gave talk at Nixon County Park (York County) on geology and glaciology of Antarctica.

September: Conducted series of three classes for Pathways Institute, at Landis Homes Retirement Community, on “What’s New in the Universe?”

Gave guest presentation about the seismic station to ESCI 110 class.

Was speaker at Earth Sciences Department seminar, on the Dillsburg earthquake swarm.

September - March: Served as an informal consultant to student doing independent research project on aspects of local geology.

October: Attended annual meeting of the Eastern Section of the Seismological Society of America (of which I am treasurer) at Lamont-Doherty Earth Observatory in Palisades, NY, and presented oral paper on the Dillsburg swarm.

Presented two guest lectures at York College on seismicity of eastern North America.

November: With Jeri Jones, addressed a public meeting at Northern York High School about the results of the Dillsburg swarm research.

Also with Mr. Jones, presented results of Dillsburg research to the Harrisburg Area Geological Society.
January: Gave talk at Nixon County Park on earthquakes in the eastern U.S. and the Dillsburg swarm.

Presented informal seminar on earthquakes as part of The North Museum’s “Coffee and Conversation” series.

February: Co-conducted (with Lynn Marquez) a workshop on geologic time as part of The North Museum’s “Portals to the Public” project.

March: Co-presented (with Jeri Jones, Helen Delano, and William Kreiger) a poster paper on the Dillsburg earthquake swarm at the combined annual meetings of the Northeastern and Southeastern Sections of the Geological Society of America, in Baltimore, MD.

Participated as earthquake expert in virtual seminar for the Center for Disaster Research and Education.

Served as lead judge in the senior high Earth and Space Science Division for the Lancaster County Science Fair.

March-April: Conducted series of three classes for the Pathways Institute on the geology of the lower Susquehanna region.

April: Presented two guest lectures at York College on seismicity of eastern North America.
A. **Curricular Changes**

1. The following minors in the Earth Sciences (listed in the 2007-08 annual report) were approved by Faculty Senate in 2008-09:
   - B.S. Geology major can minor in any Earth Sciences program other than Geology.
   - B.S. Meteorology major can minor in any Earth Sciences program other than Meteorology.
   - B.S. Ocean Sciences and Coastal Studies major can minor in any Earth Sciences program other than Oceanography.
   - B.A Earth Sciences major WITHOUT the Environmental Geology Option can minor in any Earth Sciences program other than Earth Sciences.
   - B.A. Earth Sciences major WITH the Environmental Geology Option can minor in any Earth Sciences program other than Geology and Earth Sciences.
   - B.S.E. Earth Sciences major can minor in any Earth Sciences program other than Earth Sciences.

2. ESCI 442, *Advanced Weather Analysis and Forecasting Practicum* has been added to the meteorology curriculum. This course serves as a skills\(^1\) course for meteorology majors interested in pursuing careers in forecasting.

3. ESCI 348, *Broadcast Meteorology*, has been revised from one credit to two credits with the inclusion of a formal studio component in the Hash TV Production studio. This course also serves as a skills course for meteorology and in some cases, communications majors.

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

**Sabbatical:**

No ESCI faculty had sabbaticals in 2008-09.

**Refereed Publications:**

\(^1\) Skills courses are not counted as either required courses or electives in the major. They are designed to provide students with skills and proficiencies specific to certain career paths that cannot be integrated into other courses in the curriculum. To date, the department has developed four skills courses: ESCI 281: GIS Applications in the Earth Sciences; ESCI 348 and 442 described above; and Introduction to Perl and Shell Scripting (offered as an experimental course in Spring 2009; proposal in preparation).
Wilhemson, R., S. Yalda, E. Wiziecki, and R. Clark, 2009: An Interactive, Integrated, Instructional Pathway to the LEAD Science Gateway. TeraGrid ’09, Arlington, VA. (Peer-reviewed manuscript)


Non-refereed Publications:


Publications in Review:

DeCaria, A. C. et al.: Production of lightning NOx and it’s vertical distribution calculated from 3-D cloud-scale chemical transport model simulations, J. Geophys. Res.


2 Millersville students or former students are in Bold Italics.
Kumar, P. and A. Kumar Light limitation in the Bay of Bengal. *Indian Journal of Marine Science.*


**Publications in Preparation:**


Sikora, T. D., G. S. Young, and M. J. Bettwy², Analysis of Bay-Breeze Events along the Western Shoreline of the Chesapeake Bay.

Sikora, T. D., G. S. Young, *M. D. Stepp*², and C. M. Fisher, Remote sensing of high-latitude open cell convection.


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

Sikora, T. D., John Wiley and Sons Ltd review of new book proposal (1)

Kumar A., International Journal of Remote sensing (1); Remote sensing of the Env. (1).

Price, J.R., National Science Foundation peer review (2); Geochimica et Cosmochimica Acta (1); Journal of Great Lakes Research (1); Estuarine, Coastal, and Shelf Science (1).

Yalda, S. National Science Foundation review panel (1); National Science Foundation peer review (1).

**Presentations at Professional Meetings:**


V. Lance, P. Strutton, J. Marra and R. D. Vaillancourt, 2008: Primary Productivity and Carbon Export During the Southern Ocean Gas Exchange (SOGasEx) Lagrangian

J. Marra, E. Capuzzo, V. Lance, V. Montecino, and R. D. Vaillancourt, 2009:
Phytoplankton Respiration: Some New Measurements Based on C14”. Talk presented by J Marra at the American Society of Limnology and Oceanography (ASLO) meeting in Nice, France, Jan 25-29, 2009.

Grants and Contracts Received:

Grants Received:

Faculty member: Richard D. Clark
Title of grant: Acquisition of Remote Sensing Systems for Lower Atmospheric Research and Undergraduate Research Training at Millersville University
Grant amount: Total: $288,100 – 3rd year of 3-year grant
Awarding agency: National Science Foundation – Major Research Instrumentation

Faculty member: Richard D. Clark
Title of grant: Exploiting laboratory experiments in the teaching of meteorology, oceanography, and climate: Phase II
Grant amount: (Subaward with Massachusetts Institute of Technology) Total: $26,415 – 3rd year of 3-year grant.
Awarding agency: National Science Foundation – Division of Undergraduate Education

Faculty members: Richard D. Clark, PI; Sepideh Yalda, Co-PI
Title of grant: Linked Environments for Atmospheric Discovery (LEAD) – Final year – one year no cost extension (NCE)
Grant amount: Total: $691,932; Year 6 (NCE): $45,000
Awarding agency: National Science Foundation – Information Technology Research, Atmospheric Sciences Division

Faculty member: Ajoy Kumar
Title of grant: Powering the WeatherPak Using Renewable Energy Sources
Grant Amount: $600.00
Awarding Agency: MU Faculty Research Grants

Faculty member: Jason Price and Richard D. Clark
Title of grant: Green Roof Demonstration Project
Grant amount: $13,022 (Subaward with Lancaster County Planning Commission)
Awarding agency: Department of Environmental Protection: Harvest Grant

Faculty member: Jason Price
Title of grant: Establishment of a Geologic Map for the Redlair Property, Gastonia, North Carolina
Grant amount: $847.29
Awarding agency: MU Faculty Research Grants

Faculty member: Todd D. Sikora
Title of grant: Applications of Synthetic Aperture Radar to Meteorology and Oceanography Command Operations
Grant amount: $85,500, FY 07-10
Awarding agency: Office of Naval Research

**In addition, ESCI faculty has received $5,174.29 in MU Faculty Grants.**

Contracts Received:

Faculty member: Richard D. Clark
Title of Contract: Millersville Acid Rain Monitoring Site
Contract amount: $8,119
Awarding agency: Pennsylvania Department of Environmental Protection

Faculty member: Eric Hörst (Director of Weather Information Center)
Title of Contract: Winter Forecasting for PennDOT District 8
Contract amount: $22,000 (2nd consecutive year)
Awarding agency: Pennsylvania Department of Transportation-District 8

Faculty member: Todd D. Sikora
Title of contract: Spaceborne Ocean Intelligence Network
Contract amount: $14,500 FY 07-09
Awarding agency: Bedford Institute of Oceanography

Grants pending:

Faculty members: Sepideh Yalda and Richard Clark (Earth Sciences) with Gary Zoppetti (Computer Science)
Title of Grant: GEOPOD: Geosciences Probe of Discovery
Grant amount: $499,000
Awarding agency: National Science Foundation: Advanced Learning Technology

Faculty members: Lynn Marquez and Nanette Dietrich (Educational Foundations)
Title of Grant: No Teacher Left Inside: Transforming undergraduate science instruction for a new generation of teachers.
Grant amount: $125,000
Awarding agency: National Science Foundation: CCLI

Contracts pending:

Faculty members: Todd Sikora
Title of Contract: Spaceborne Ocean Intelligence Network
Contract amount: $9500
Awarding agency: Bedford Institute of Oceanography
Professional Development:

- Clark, R. D., 2009 Unidata Triennial Workshop: Using operational and experimental observations in geoscience education, Boulder, CO, 8-12 June 2009
- Marquez, L. L., 21st International Conference on the First-Year Experience, Dublin Ireland, July 2008
- Marquez, L. L., National Conference on the First-Year Experience and Students in Transition, Orlando, FL, 9-11 February 2009

Major Service to Scientific and Science Education Communities:

- Faculty member: Richard D. Clark
  Organization: University Corporation for Atmospheric Research
  Committee: UCAR Board of Trustees
  Status: Trustee (elected via full UCAR membership), 2009-2012

Organization: American Meteorological Society
Committee: Council of the American Meteorological Society
Status: Member (elected via national election of full membership), 2008-2011
Organization: American Meteorological Society  
Committee: *Space Weather Policy Statement Drafting Team*  
Status: Member (appointed), Ad hoc

Organization: American Meteorological Society  
Committee: *Green Statement Drafting Team*  
Status: Member (appointed), Ad hoc

Organization: University Corporation for Atmospheric Research (UCAR)  
Committee: *UCAR Academic Affiliates Program*  
Status: Millersville University Representative

Organization: Unidata Program Center  
Committee: *Unidata Policy Committee*  
Status: Member, 2006-2009

- Faculty member: **Alex C. DeCaria**  
  Organization: National Assessment of Educational Progress  
  Committee: *Science Standing Committee*  
  Status: Member

Organization: Pennsylvania Science Olympiad  
Committee: *Organizing Committee*  
Status: Host institution site coordinator

- Faculty member: **Ajoy Kumar**  
  Organization: Marine Science Consortium  
  Committee: *Academic Council*  
  Status: Millersville University Co-Director

- Faculty member: **Jason Price**  
  Organization: Geological Society of America 2007 Annual Meeting  
  Committee: *Technical Session*  
  Status: Convener and Chair

- Faculty member: **Todd D. Sikora**  
  Organization: American Meteorological Society  
  Committee: *Air-Sea Interaction Scientific and Technological Activities Commission Committee*  
  Status: Committee Chair

Organization: American Meteorological Society  
Committee: *Sixteenth Conference on Air-Sea Interaction Program Committee*  
Status: Member

Organization: American Meteorological Society
Committee: 16th Conference on Air-Sea Interaction, 8th Conference on Coastal Atmospheric Prediction and Processes, Coastal Mesoscale Circulations-II
Status: Session Chairperson

Organization: American Meteorological Society
Committee: Sixteenth Conference on Air-Sea Interaction Student Award Committee
Status: Member

Organization: American Meteorological Society
Committee: Annual Meeting Oversight Committee
Status: Member

Organization: National Oceanic and Atmospheric Administration
Committee: Sea-Surface Roughness Science Team
Status: Member

- Faculty member: Robert D. Vaillancourt
  Organization: Norrth Museum in Lancaster, PA
  Committee: Global Change and the Polar Environment.
  Status: Participant

- Faculty member: Sepideh Yalda
  Organization: National Science Foundation
  Committee: Panel for TeraGrid XD review (invited, 2008)
  Faculty member: Sepideh Yalda
  Status: Member

Organization: American Meteorological Society
Committee: Board on Women and Minorities
Status: Chairperson

Organization: American Meteorological Society
Committee: History of Atmospheric Sciences
Status: Chairperson

Organization: University Corporation for Atmospheric Research, Cooperative Program for Operational Meteorology, Education, and Training (COMET)
Committee: COMET Advisory Panel
Status: Chairperson

Organization: National Environmental Education Foundation
Committee: Advisory Committee
Status: Appointed member
Organization: American Meteorological Society
Committee: Battan Book Award
Status: Appointed member

Organization: American Meteorological Society
Committee: Anderson Award Committee
Status: Appointed member

Organization: American Meteorological Society
Committee: AMS Teaching Excellence Award
Status: Appointed member

Organization: American Meteorological Society
Committee: Minority Scholarship Program
Status: Appointed member

Organization: American Meteorological Society
Committee: AMS Graduate History of Science Fellowship Committee
Status: Appointed member

**External Graduate Committees:**

Faculty member: Richard D. Clark
Cory Demko: Ph.D. Dissertation Committee, University of Wyoming Department of Atmospheric Science, Laramie, WY. Research advisor: Dr. Bart Geerts

John Yorks: M.S. Thesis Committee, Pennsylvania State University, Department of Meteorology, State College, PA. Research advisor: Dr. Anna Thompson.

Faculty Member: Todd D. Sikora
Dustin Swales: M.S. Thesis Committee, Pennsylvania State University, Department of Meteorology, State College, PA. Research advisor: Dr. George S. Young.

**Volunteer-in-Service Activities**

Charles K. Scharnberger: Professor Emeritus, Volunteer-in-service

Yin S. Soong: Professor Emeritus, Volunteer-in-service

**Present faculty/staff community service.**
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<tr>
<th>Name</th>
<th>Event</th>
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<td>Todd Sikora</td>
<td>Manor House Tour of the Weather Center</td>
<td>11/7/09</td>
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<td>Jason Price</td>
<td>Invited talk at the University of Delaware entitled, “Long-Term Average Chemical Weathering Rates in the Periglacial Piedmont Physiographic Province of Southeastern Pennsylvania.”</td>
<td>9/26/2008</td>
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<td>Jason Price</td>
<td>Science Fair Judge, Hempfield Middle School</td>
<td>4/3/2009</td>
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<tr>
<td>Richard Clark</td>
<td>Guest Speaker - PA Sci. Teachers Assoc. Conference</td>
<td>12/14/2008</td>
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<tr>
<td>Richard Clark</td>
<td>Guest classroom speaker at Palmyra HS</td>
<td>10/7/2008</td>
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<tr>
<td>Ajoy Kumar</td>
<td>Manor House Tour of the Oceanography laboratory and conducted experiments using non-rotating and rotating tanks for the students</td>
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<td>Lynn Marquez</td>
<td>North Museum of Natural History Science Fair Judge</td>
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<td>Lynn Marquez</td>
<td>Science Olympiad Judge</td>
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<td>Lynn Marquez</td>
<td>First Presbyterian Church: Charles Darwin and Evolution Theory</td>
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<td>Sepideh Yalda</td>
<td>ST&amp;Me, Girls Scouts: Millersville University</td>
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C. Student achievements – awards, graduate and professional school, job placement, presentations at regional/national meetings (student name, faculty name, title).

Student Awards:

- **AMS Student Chapter of the Year Award**: All student officers and members of the Millersville University Student Chapter of the American Meteorological Society. This is the second consecutive year that the Chapter received this award.

- **2nd place for Chapter Poster at the 89th Annual Meeting of the AMS**: All student officers and members of the Millersville University Student Chapter of the American Meteorological Society

- **Adam R. Gonsiewski**: 2009 Ernest F. Hollings – NOAA Undergraduate Scholarship (national competition)

- **Shawn Gray**: 1st place in the WxChallenge, national collegiate forecasting contest competition.

- **Stephen Baxter**: NOAA Student Career Experience Program (SCEP); only one awarded by the Center for Climate Prediction (CPC), Camp Springs, MD.

- **McArthur Jones**: SOARS Program Scholarship, Boulder, CO
• Alexis Nawotka: Northeast Geological Society of America Student Research Grant
• Stephen Baxter: MU Student Research Grant
• Nathaniel Wardle, Travis Toth, and Elmer Bauers: MU Student Research Grant
• Courtney F. Benedetti: The William and Lois Jordan Scholarship
• Stephen R. Baxter: The Henry Franklin Bitner Science Award in Physical Science
• Adrienne K. Veilleux: Dr. William B. McIlwaine Scholarship
• Nathaniel A. Wardle: Paul H. Nichols Scholarship
• Karlton K. Kohr: Rettew Associates Scholarship in Geology
• Earth Sciences Award for Academic Excellence
  - Stephen R. Baxter - Liberal Arts
  - Laura A. Vogel - Secondary Education

2008 – 2009 Graduates

Department of Earth Sciences

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<tr>
<th>Fall 2008 Graduates</th>
<th>Name</th>
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**Student Job Placement and Advanced Studies (partial):**

- **Baum, Geoffrey:** Graduate Studies, University of Delaware
- **Cecelski, Stefan:** Graduate Studies, University of Maryland
- **Edwards, Brian:** Position with AccuWeather, State College, PA
- **Junod, Robert:** University of Alabama in Huntsville – Atmos. Sci
- **Kerschner, Brian** University of Delaware, M.S. Geography Program
- **Kurdzo, James** University of Oklahoma, M.S. in Meteorology
- **Potter, Brittany:** Graduate Studies, University of Nebraska
- **Poterjoy, Jon** Pennsylvania State University, M.S. in Meteorology
- **Russo, Edward** Broadcast Meteorologist, Fargo, North Dakota
- **States, Sean:** Graduate Studies, North Carolina State University
- **Sturtevant, Thomas:** Graduate Studies, University of Wyoming
Valentine, L. Chris: NAVAIR; Putuxent Naval Air Station, MD

Student Internships:

Student name: Alan Auglis
Internship title/site: Weather Intern, WJLA ABC 7, Arlington, VA

Student name: Samuel DeAlba
Internship title/site: Weather Works, Hackettstown, NJ

Student name: Kyle Dennis
Internship title/site: Meteorology Intern, WGAL-TV, Lancaster, PA

Student name: Cindy Engle
Internship title/site: Meteorology Intern, WGAL-TV, Lancaster, PA

Student name: Michele Frank
Internship title/site: Summer Intern Assisting with the Dinosaur Hall Exhibit, The Academy of Natural Sciences, Philadelphia, PA

Student name: Daniel Johnson
Internship title/site: Student Intern, Weather Center, WUSA-TV, Washington, DC

Student name: MacArthur Jones
Internship title/site: The SOARS Experience and A Statistical Comparison of Vertical Total Electron Content from Three Ionospheric Models, UCAR-SOARS Program, Boulder, CO

Student name: Amanda Kibbe
Internship title/site: Weather Intern, WJLA ABC 7, Arlington, VA

Student name: Patricia Lawston
Internship title/site: Weather Intern, WJLA ABC 7, Arlington, VA

Student name: Concetta Laskey
Internship title/site: Summer Intern, Lancaster County Department of Parks and Recreation

Student name: Erik Pindrock
Internship title/site: Meteorology Intern, WGAL-TV, Lancaster, PA

Student name: Matthew Potter
Internship title/site: Meteorology Intern, AccuWeather, State College PA

Student name: Anna Salvaggio
Internship title/site: U.S. Navy’s Bachelor Degree Completion Program (BDCP) at San Diego, CA.

Student name: Joseph Moore
Internship title/site: The Cadets, a World Class drum corps that participates in the Drum Corps International (DCI) circuit

Student name: Samantha McGraw
Internship title/site: CMMAP (Center for Multiscale Modeling of Atmospheric Processes), Colorado State University, Fort Collins

Student name: Heather Morgan
Internship title/site: CMMAP (Center for Multiscale Modeling of Atmospheric Processes), Colorado State University, Fort Collins

Student name: Justin Gilchrist
Internship title/site: POSE (Physical Ocean Science and Engineering), University of Delaware/Dr. Dana Veron (Advisor)

Student name: Alex Davies
Internship title/site: Detiding Codar data, NASA Wallops Facility.

Student name: Justin Gilchrist
Internship title/site: Detiding ADCP data. University of Delaware.

Student Name: Brittany Potter
Internship title/site: Research Internships in Science and Engineering (RISE), German Academic Exchange Program, GKSS Research Institute, Hamburg, Germany

Student Name: Jonathan Poterjoy

Student Name: Edward Russo
Internship title/site: Meteorology Intern, WGAL-TV, Lancaster, PA

Student Name: Adrienne Veilleux
Internship title/site: Meteorology Intern, NBC-25, Hagerstown, MD

Student Name: Nathaniel Wardle
Internship title/site: Meteorologist Intern, WHP-TV 21/WLYH 15, Harrisburg, PA
Student name: Megan Wise  
Internship title/site: Weather Internship, WTAE-TV, Pittsburgh, PA

Student name: Tim Runkle  
Internship title/site: Consulting internship; GeoEnvironmental Engineering Consulting at SAIC, Exton, PA

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<tr>
<th>STUDENT FIRST NAME</th>
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<th>ADVISOR FIRST NAME</th>
<th>ADVISOR LAST NAME</th>
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<td>Elmer</td>
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<td>Pamela Heinselman</td>
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<td>Richard Clark Todd Sikora</td>
<td>Convective Initiation Over Chesapeake Bay</td>
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<td>Nicole Wilson</td>
<td>Lynn Marquez</td>
<td>Nature of Science</td>
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**Student Research Grants:**

**Adam R. Gonsiewski:** 2009 Ernest F. Hollings – NOAA Undergraduate Scholarship (national competition)

**Alex Davies:** USRP NASA Fellowship, summer 2009 (national competition)

**Stephen Baxter:** NOAA Student Career Experience Program (SCEP); only one awarded by the Center for Climate Prediction (CPC), Camp Springs, MD.

**McArthur Jones,** SOARS Program, University Center for Atmospheric Research, National Center for Atmospheric Research, Boulder, CO
**Alex Nawotka**, Northeast Geological Society of America Student Research Grant, regional award by the Northeast GSA that includes 11 states and the District of Columbia.

**MU Student Research Grants:**

Stephen Baxter; Advisor: S. Yalda  
Nathaniel Wardle, Travis Toth, and Elmer Bauers; Advisors: T. Sikora/R. Clark  
Alex Davies; Advisor: A. Kumar  
Justin Gilchrist; Advisor: A. Kumar

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

- # of Students: 24  
  Conference: 89th Annual AMS Meeting, Phoenix, AZ

- # of Students: 14  
  Conference: Northeastern Storms Conference, Springfield, MA

- # Students: 1  
  Conference: Northeast Regional Meeting of the Geological Society of America

**Student presentations at regional or national conferences –**

Student(s) name: Stephen Baxter and Robert Junod  
Faculty mentor: Sepideh Yalda  
Poster paper/presentation title: A Climatology of the Mid-Atlantic Winter-time Jet Stream  
Conference: Annual Meeting of the American Meteorological Society, 10 Jan 2009

Student(s) name: Sean States, Brian Kerschner, Robert Junod, Stefan Cecelski, Kristin Ketchell, Robert Carp, and James Kurdzo  
Faculty mentor: Sepideh Yalda and Richard Clark  
Poster paper/presentation title: Integrating Linked Environments for Atmospheric Discovery Research into Education  
Conference: Annual Meeting of the American Meteorological Society, 10 Jan 2009

Student(s) name: Sean States, Brian Kerschner, Robert Junod, Stefan Cecelski  
Faculty mentor: Sepideh Yalda and Richard Clark  
Poster paper/presentation title: A Demonstration of an Instructional Pathway for Undergraduate Meteorology Education Using a Science Gateway  

Brown, R. A. (NOAA/NSSL), Norman, OK; and J. Kurdzo and P. L. Heinselman, 2009: Evolutionary characteristics of a tornadic supercell thunderstorm: Comparisons


D. Progress toward department goals/5-year review

The Department of Earth Sciences conducted its five year review in 2006-2007. Four external reviewers were invited to campus to evaluate the programs, curricula, equipment, and facilities and to interact with students and faculty to glean perspective. A copy of the internal departmental review and the report by external reviewers is attached to this annual report. As part of the five-year review the department developed a “Strategic Plan for 2007-2012,” which is included as part of the attached review document. In summary, the department has revised its mission and vision statements, and has identified three key themes for the next five year period.

**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, and meaningful opportunities for students to engage in extra-curricular activities, and by attentiveness to inter- and cross-disciplinary trends and opportunities for student engagement.

**Department of Earth Sciences Vision Statement**

Our vision is to provide a learning experience in the Earth Sciences disciplines that is second to none.

**Key Themes for 2007-2012**

The members of the Department of Earth Sciences have approved the following strategic goals for the period 2007-2012. This document contains our action plans.

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

skills across the disciplines, with a special emphasis on strengthening the BSE program.

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

The following action plans emerge from the five year review and Strategic Plan. These actions will guide the department efforts and initiatives for the period 2007-2012 and beyond. During the academic year 2008-09 we made the following progress toward our Five-Year Goals.

Progress Related to Goal #1:

- The Department’s proposal for a new facility has been accepted to the University Master Plan – Phase 2. We plan to seek funding from granting agencies and/or foundations for partial support for bricks and mortar in order to shorten the timeline to Phase 1 for this construction.
- The Department has been allocated $85,000 from the University Technology Fee for the purchase of a DigiCora Rawinsonde System for meteorology research and education.
- The Department is in the process of upgrading its weather map wall. The traditional paper maps are being replaced with an electronic wall of six monitors and a new multiple VGA PC at a cost of $7500. These funds are made available through a contract with the PA Department of Transportation.
- The Department received funding from the University equipment budget for 21 Lenovo PCs. These PCs were distributed in Caputo 400, 401, and 403. The older PCs went to Ocean Sciences (Remote Sensing Lab), Geology (Roddy 161), and the rest were distributed to Nursing, Chemistry, and Biology or meet lab needs in those departments.
- One faculty member (Vaillancourt) is submitting a proposal to NSF-MRI for three Slocum Underwater Gliders for the Ocean Sciences research and education activities at the MSC at Wallop’s Island, VA.
- The Department filled the geology position vacated by the retirement of Dr. Ramama (see next section) with Dr. Sam Earman.

Progress Related to Goal #2:

- One faculty member (Marquez) submitted a proposal to NSF-CCLI to transform undergraduate science instruction for BSE students ($124,750)
- New courses have been approved in meteorology (ESCI 442; ESCI 379 [Perl And Shell Scripting]) and ocean sciences (ESCI 479: Biogeochemical Oceanography) to broaden the curriculum to include areas of importance to student career opportunities.
Progress Related to Goal #3:

- The Ocean Sciences and Coastal Studies Program continues to see gradual increases in student enrollment in the major; from 10 in 2007-08 to 12 in 2008-09.
- One faculty member (Vaillancourt) is submitting a proposal to NSF-MRI for three Slocum Underwater Gliders for the Ocean Sciences research and education activities at the MSC at Wallop’s Island, VA.
- One faculty member (Vaillancourt) is submitting a proposal to NSF-MRI for three Slocum Underwater Gliders for the Ocean Sciences research and education activities at the MSC at Wallop’s Island, VA.

Department Action Plans for 2007-2012

1. The Department of Earth Sciences will continue to aspire to maintain its position as the “flagship” department of Millersville University and continue to build national recognition.

2. Put a new building on the fast track (Phase 1) for funding. The scattering of the faculty offices, the lack of laboratory facilities for teaching and research, and the difficulty in maintaining equipment severely limit the future growth of this very productive Department. Pursue funding conduits for partially financing the cost of construction.

3. Continue to build enrollments in the Ocean Science and Coastal Studies Program.

4. The meteorology program continues to grow. Fall 2009 enrollments are at an all-time high with an increasing number of transfer students. This comes at a time when the program is losing one-half of one complement with Dr. Yalda accepting the position as Director of the Center for Disaster Research and Education. Although we are very excited by the prospect for greater collaboration with the CDRE as a result of this appointment (see Action item #7), we are concerned that we do not have enough meteorology faculty to sustain the program at current levels. **We will work with the University administration to give the department a new one-half complement, which when added to that given up to CDRE will allow us to hire a full-time tenure track meteorology faculty.**

5. In addition to action item #5, at least one new faculty position is definitely needed, especially if the majors continue to grow. New faculty members should have an Earth Systems focus.

6. Expand and enhance collaborations among faculty associated with the Center for Disaster Research and Education (CDRE), and in conjunction with action item #2, incorporate the physical location for the CDRE into the new building plan.

7. Seek funding for two post-doctoral teaching associates to increase the frequency of regular course offerings within the Department. Proposals to educational foundations or government agencies could be the source for these funds, especially if tied to innovative changes to the curriculum or pedagogy (Yalda working on proposal).
8. Strengthen the BSE program by having a dedicated faculty director, as indicated above, and replace some of the survey courses with upper-division major courses to promote higher-order thinking among pre-service teachers.

9. The Brossman facilities are in need of repair. Explore options to renovate Brossman as part of the new building construction.

10. Prioritize equipment requested for the acquisition of basic laboratory equipment and a dedicated van for field laboratory experiences.

11. Where possible, link new course development to NSF-CCLI proposals.

12. Build more flexibility into the curriculum in geology and BSE programs.

E. New Faculty, New Facilities/Equipment and more…

1. NEW FACULTY

   **Dr. Sam Earman, Geology**, will join the Department in August 2009.

2. NEW FACILITIES/EQUIPMENT

   - The Department has been allocated $85,000 from the University Technology Fee for the purchase of a DigiCora Rawinsonde System for meteorology research and education.
   - The Department is in the process of upgrading its weather map wall. The traditional paper maps are being replaced with an electronic wall of six monitors and a new multiple VGA PC at a cost of $7500. These funds are made available through a contract with the PA Department of Transportation.
   - The Department received funding from the University equipment budget for 21 Lenovo PCs. These PCs were distributed in Caputo 400, 401, and 403. The older PCs went to Ocean Sciences (Remote Sensing Lab), Geology (Roddy 161), and the rest were distributed to Nursing, Chemistry, and Biology or meet lab needs in those departments.

F. Outcomes Assessment

**Department: 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

**Faculty Member Completing this Form:** Richard Clark on behalf of all Earth Sciences Faculty

**Update on prior years’ application of results:** The Department of Earth Sciences has elected to implement all the intended student outcomes (1 through 5) in 2008-2009 in order to form a consistent statistical database.

**Accomplishments in 2007-2008 based on the Learning Assessment Outcomes Plan**
- See action items for 2008-09 below.

**Notes on Measurable Criteria:** We have made changes to measurable criteria from previous years. ESCI 410 has not yet been developed. The new General Education Curriculum has only recently been implemented (fall 2008) and is still undergoing interpretive adjustments to the exploratory component. Only recently has stability been established for that component. The department still plans to develop an ESCI 410 capstone interdisciplinary course, but only after ESCI 110 is re-designed and offered as a 3-credit UNIV 103, where is can be then taken in the exploratory block. UNIV 103 will likely commence in fall 2009, and with additional curricular reorganization to free up one credit hour, this should allow a slot for ESCI 410 without going over the 120 s.h. mandate.

In addition, although the department still recognizes the potential of portfolios, they have not been successful over the past four years mainly, in our opinion, because it cannot be required in any course beyond ESCI 110. The department has elected to drop the portfolio requirement from the measurable criteria beginning this year. We have not yet addressed the issue of what we plan to substitute for the portfolio.

**Intended Student Outcome 1**
All Earth Sciences graduates exhibit knowledge and understanding of the Earth system specific to their discipline.

**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**
  - G2, L Courses; G3 (scientific reasoning)
  ESCI majors take courses in science and mathematics. Specifically, ESCI majors take required ESCI courses related to their discipline, included among them; ESCI 221, 222, 241, 245 261. ESCI majors also take courses in Physics (PHYS 231, 232), Math (MATH 161, 211), and geography courses such as GEOG 101 and 285.
- **Related Courses**
  ESCI majors take courses in Physics, Mathematics, Chemistry, Biology, and Geography to build knowledge and understanding related to their discipline. Fundamental knowledge and understanding is gleaned in basic Physics courses (131/132 for BA; 231/232 for BS), Chemistry courses (111 and for some degrees 112), degree-specific mathematics courses, among them 161,211,311,365, 235, and Geography courses related to the major such as GEOG 295.
- **Interdisciplinary Component** (new for 2007-08)
Many students (approximately 40%) also earn a minor in one or more of the following: Math; Chemistry; Communications (option); Business; Economics; Government and Political Affairs; Environmental Hazards and Emergency Management.

Measurable Criteria

Measurable Criteria for 2008-09

a. The majority of ESCI majors will indicate confidence in their ability to apply knowledge and understanding of their ESCI discipline on an exiting senior survey.

b. Select test items embedded in benchmark exams are employed to measure discipline specific knowledge and understanding.

Data Source/Results

Data Sources: ESCI faculty members have identified the following data source for this intended outcome.

a. Faculty established guidelines and administer exiting senior survey.

b. Faculty incorporate embedded test items in benchmark exams.

Results:

Action Items Related to Intended Outcome #1:

PROPOSED ACTION ITEM FOR 2008-09 based on this previous assessment: We are satisfied with the results of the senior exit survey as they apply to Intended Outcome (IO) 1. We are not satisfied with senior meteorology majors’ ability to synthesize and evaluate on questions related to knowledge and understanding of the Earth Sciences as pertains to their disciplines. Specifically, a large number of students performed unsatisfactorily in their ability to synthesize the relationship between the mesoscale environment and the radar imagery of the same situation; and their inability to evaluate storm-relative velocities. We hesitate to put too much emphasis on a single data point. We intend to monitor this performance in 2008-09 to see if there is a pattern, and to take action, if necessary.

Intended Student Outcome 2

All Earth Sciences graduates can articulate the relationships between hydrosphere, lithosphere, and atmosphere.

Connection to Univ/Dept Mission

MU seeks to prepare its students to live in an increasingly diverse, multicultural and technologically complex society.

Coherence Considerations

See Statement for outcome 1.

Measurable Criteria

a. The majority of ESCI majors will indicate confidence in their ability to articulate the relationships between the hydrosphere, lithosphere, and atmosphere on an exiting senior survey.

b. Growth in the number of students pursuing minors and second degrees.
**Data Source/Results**

a. Faculty established guidelines and administer the exiting senior survey.
b. Trends in the number of students that minor or earn second degrees in other disciplines

**Results:**

**Action Items Related to Intended Outcome #2**

PROPOSED ACTION ITEM FOR 2008-09 based on previous results: We need to develop a stronger alignment between the IO-2 and the exit survey as applies to the relationship between the spheres important to the Earth sciences. The capstone interdisciplinary course, ESCI 410, is intended to address this question directly, but this course has yet to be developed because the new general education curriculum was only recently implemented. Department faculty are debating how we can fit this course into the curriculum and retain 120 s.h. ESCI 410 notwithstanding, we are pleased with the results of the exit survey as they pertain to this question. Moreover, we are especially encouraged by the number of majors pursuing minors and/or second degrees. An action item for 2008-09 will be to gather trend data and continue to encourage students to earn minors.

**Intended Student Outcome 3**

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

**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.

**Coherence Considerations**

See Statement for outcome 1.

**Measurable Criteria**

a. The majority of ESCI majors will indicate confidence in their ability to demonstrate quantitative skills appropriate to their Earth Sciences discipline on an exiting senior survey.
b. A majority of ESCI majors will demonstrate quantitative skills appropriate to their Earth Sciences discipline on benchmark exams.

**Data Source/Results**

a. Faculty established guidelines and administer the exiting senior survey.
b. Faculty members employ embedded test items in final (benchmark) exams at each grade level.

**Results:**

**Action Items Related to Intended Outcome #3**

PROPOSED ACTION ITEM FOR 2008-09 based on previous results: We believe that students are performing at expected levels of competency across this sample of courses, except for ESCI 340. We will look at this course to see if this is an aberration or something more fundamental. We believe that our programs have the appropriate level of rigor and are designed to enhance quantitative skills. The success as measured by job placement, acceptance to graduate school,
and preparedness compared to their peers at other institutions of our graduates is the best litmus
test.

**Intended Student Outcome 4**

All Earth Sciences graduates demonstrate proficiency in the application of tools and skills appropriate to their discipline.

**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.

**Coherence Considerations**

See Statement for outcome 1.

**Measurable Criteria**

a. The majority of ESCI majors will indicate confidence in their ability to demonstrate proficiency in the application of tools and skills appropriate to their discipline on an exiting senior survey.

b. A majority of ESCI majors will demonstrate proficiency in the application of tools and skills appropriate to their discipline on benchmark exams.

**Data Source/Results**

a. Faculty established guidelines and administer the exiting senior survey.

b. Faculty members employ embedded test items in final exams at each grade level.

**Results:**

**Action Items Related to Intended Outcome #4**

PROPOSED ACTION ITEM FOR 2008-09 based on previous results: The department will continue to find ways to maintain and improve the equipment used by students to gain proficiency, and explore options for increasing technology literacy across the disciplines. We will introduce two courses in spring 2009 that will help to enhance these proficiencies. ESCI 442: Advanced Weather Analysis and Forecasting and ESCI 379: Introduction to Perl and Shell Scripting are designated as skills courses. Measurement criteria will be applied in both.

**Intended Student Outcome 5**

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

**Connection to Univ/Dept Mission**

MU seeks to prepare students for the workforce while promoting intellectual development through an exemplary liberal arts-based education.

**Coherence Considerations**

See Statement for outcome 1.
**Measurable Criteria**

a. The majority of ESCI majors will perform to expectations related to outcome #5 on culminating activities in several courses that integrate presentations (oral communication) and papers (written communication) as part of the course requirements.

b. The majority of ESCI majors will indicate confidence in their ability to demonstrate effective oral and written communication skills appropriate to their discipline on an exiting senior survey.

c. A majority of ESCI majors will demonstrate effective oral and written communication skills appropriate to their discipline on benchmark exams.

**Data Source/Results**

a. Faculty established guidelines and administer the exiting senior survey.

b. Faculty established criteria for the oral and written communication skills in courses across the disciplines, including W courses.

c. Faculty members employ embedded test items in final exams at each grade level.

**Results:**

**Action Items Related to Intended Outcome #5**

PROPOSED ACTION ITEM FOR 2008-09 based on results: The department intends to conduct more formative evaluation of the oral communication and written communication components of appropriate courses. Our students continue to perform at the 450-500 level on the verbal component of the GREs. This continues to be endemic to our discipline and largely unacceptable given the importance of communication skills in the job market. We plan to continue to find ways for students to improve communication skills.
Annual Summary – MU Weather Information Center
(July 2008 – June 2009)

Eric J. Hörst, Director

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

Through our student-operated Campus Weather Service (CWS), more than fifty meteorology majors work to create over 30 local forecasts and weather videos per week. These student meteorologists work 60- to 75-minute shifts, during which they prepare an operational forecast similar to what they may someday issue as professional meteorologists working for the National Weather Service or other private forecasting agency. The forecasts are disseminated over the MU Weatherline, the Snapper newspaper, MU-TV channel 99, and the University’s Internet site.

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

Streaming video (SV) continues as the marquee product of the WIC. Now in its sixth year, the SV initiative provides cutting-edge, engaging content to a local—and global—audience interested in high quality forecasts and expert analysis. A dozen meteorology students participate in the production and broadcast of daily short-term forecast videos. As Director of the WIC, Mr. Hörst broadcasts Extended Outlooks up to three days per week, as well as occasional Storm Outlooks when severe weather threatens. Faculty members participate in generating research videos and other features, including a monthly Climate Review by Dr. Sepi Yalda.

Also notable is a continuation of the “Winter Weather Forecasting” project with the Pennsylvania Department of Transportation (PaDOT). Once again this winter, the WIC was contracted by PaDOT to provide targeted forecasts for eight counties in south-central PA. Managed by Director Horst, this forecasting project employed six meteorology students and brought outside funding and additional recognition to Millersville Meteorology.
Finally, the WIC remains active in outreach and service to the local community. Over the last 12 months, Mr. Hörst has given more than twenty-five weather talks, Weather Center tours, and “shadowing” days. Additionally, the WIC held two Open House events: one for the Annual Science Lectureship and the other being the 9th Annual Open House for the general public.
Annual summary of the Marine Science Consortium (MSC)  
2008-09  
By Dr. Ajoy Kumar

The MSC continues to play an important role in terms of faculty involvement and student participation and research. MU Earth Science students take required courses including ESCI 267, ESCI 466 and ESCI 465 at the MSC during summer. Each semester, ESCI 261 students take a field trip to the MSC as part of their course requirement. Dr. Ajoy Kumar will be teaching the ESCI 267 course this summer at the MSC.

The MSC is undergoing major renovation that includes dormitories and research buildings with state of the art facilities. There has also been a renewed focus on marine research activities with NASA and other contractors at the Wallops flight facilities. This has lead to a USRP NASA fellowship to one of the Ocean Sciences and Coastal Studies major, Alex Davies this summer. There has also been strong research collaborations between NASA scientists; John and Tiffany Moisan and Ajoy Kumar. This has lead to two major projects using the CODAR, BIOME and COBY cruise data analysis. The results from these two studies will be written up as peer reviewed publications this fall. NASA scientists have also encouraged us to use their facilities, computing power and state of the art oceanographic instruments for our use.

Dr. Ajoy Kumar and Dr. Robert Vaillancourt attended two MSC Academic council meetings in Harrisburg. Millersville University has now become a Senior full member institution at the MSC. This allows us more flexibility especially regarding NASA collaborations and research funding opportunities. Millersville University president will serve has the chairman of the board of directors of the MSC from Fall, 2009. A new NASA liason person will be appointed to facilitate the smooth working between NASA, NASA contractors and MSC. MSC continues to grow and become a vital organ for students and faculty of the Earth Sciences department.