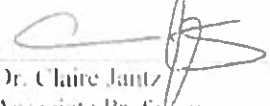


Shippensburg University's Application to Join the Chesapeake Watershed Cooperative Ecosystem Studies Unit


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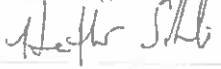
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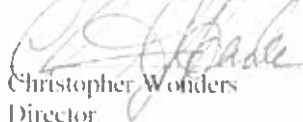
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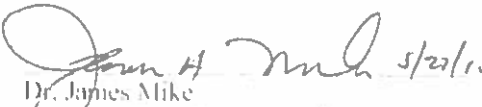
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1.0 Introduction

Shippensburg University seeks membership in the Chesapeake Watershed Cooperative Ecosystem Studies Unit (CW CESU). We currently have a broad range of faculty across the departments of Geography-Earth Science, History, Political Science and Biology who are interested in participating in projects through the CW CESU. Faculty in these departments have a strong track record of interdisciplinary collaboration, and a commitment to involving undergraduate and graduate students in research, internships, and service learning. As presented in this application, Shippensburg University has much to offer the CW CESU in terms of location, expertise, facilities, and undergraduate and graduate education.

2.0 Who are we and what is our mission?

Shippensburg University of Pennsylvania is a regional state-supported institution. It is part of the State System of Higher Education of Pennsylvania, which is made up of 14 universities located in various geographic regions throughout the Commonwealth. Founded in 1871, Shippensburg University serves the educational, social, and cultural needs of students primarily from south central Pennsylvania, but also enrolls students from throughout the Commonwealth of Pennsylvania, the Mid-Atlantic region, the United States, and various foreign countries.

Shippensburg is a comprehensive university offering bachelor's and master's degree programs in the Colleges of Arts and Sciences, Business, and Education and Human Services. The curricula are organized to enable students both to develop their intellectual abilities and to obtain professional training in a variety of fields. The foundation of the undergraduate curriculum is a required core of courses in the arts and sciences. These courses prepare students to think logically, read critically, write clearly, and verbalize ideas in a succinct and articulate manner; they also broaden students' knowledge of the world, past and present.

The University's primary commitment is to student learning and personal development through effective and innovative teaching and a wide variety of high-quality out-of-class experiences. The ultimate goal is to have students develop to their utmost the intellectual, personal, and social capabilities they need to perform as competent citizens prepared to embark on a career immediately upon graduation or after advanced study. The personal attention given each student at Shippensburg is reflective of the strong sense of community that exists on campus and the centrality of students within it. The University encourages and supports activities that give students many opportunities to apply the theories and methods learned in the classroom to real or practical situations, such as faculty-student research and student internships. Student life programs and activities complement the academic mission and further assist students in their personal, social, and ethical development.

Committed to public service and community-centered in its relationships to the region, the University works closely and collaboratively with other organizations at institutional, programmatic, and individual levels to develop common goals, share resources, and invest cooperatively in the future of the region.

3.0 Where are we located?

Shippensburg University is located in Shippensburg, PA, a small town in south central Pennsylvania. Shippensburg is located on the I-81 corridor, roughly 40 miles southwest of Harrisburg, PA. The population of the borough and township of Shippensburg is 11,070 according to the 2009 American Community Survey. We are located in the Cumberland Valley, the local name for this part of the Great Valley that stretches from Quebec to Alabama. Situated in a predominantly rural landscape, Shippensburg is within a 2-hour drive of both Baltimore, MD and Washington, DC and is roughly 2.5 hours from Philadelphia, PA.

Shippensburg is also located within the Chesapeake Bay watershed. Due to the predominance of agriculture in our immediate region, and our location on the rapidly changing exurban fringe of the Baltimore-Washington metropolitan area, our situation affords many unique opportunities to study watershed processes, management, and policy across a variety of landscapes, ranging from urban, to agricultural, to forested. Indeed, several faculty focus specifically on Chesapeake Bay-related research.

A critical resource for watershed science that Shippensburg University developed and maintains is the Burd Run Interdisciplinary Watershed Research Laboratory (BRIWRL) (http://www.ship.edu/Geo-ESS/BurdRun/Project_Summary/). The Burd Run watershed is an ideal setting for an environmental laboratory due to its proximity to Shippensburg University (the stream flows through campus), its manageable scale (the watershed is 51.8 km²), and its diverse physical characteristics. A stream and wetland restoration project initiated with funding from the National Science Foundation, the BRIWRL represents a cooperative effort among the Departments of Geography-Earth Science, Biology, and Teacher Education. It provides students and faculty with research and training opportunities in watershed science disciplines (hydrology, geology, biology, geotechnology, etc.). Faculty in the Biology and Geography-Earth Science departments are actively engaged in research in Burd Run and numerous other streams in the area that are part of the Chesapeake Bay watershed.

Shippensburg University is also a member of the Marine Science Consortium (MSC) (<http://mscconsortium.org/>). The MSC campus is located in Wallops Island, VA, adjacent to Chincoteague Bay, the Chincoteague National Wildlife Refuge, the Assateague National Seashore, and NASA's Wallops Island Flight Facility. The facilities at the MSC support interdisciplinary teaching and research that focus on the mid-Atlantic coastal region. Faculty in Biology and Geography-Earth Science are actively engaged in teaching field courses on-site at MSC, pursuing research with strong student engagement, and service learning activities. Expanding on these existing research initiatives, the MSC recently entered into a joint research partnership with NASA Wallops Island Flight Facility and the US Fish and Wildlife Service to monitor and investigate shoreline change in the Wallops Island region, including areas within the Chincoteague National Wildlife Refuge and Assateague National Seashore.

4.0 What expertise can we contribute to the CW CESU?

Currently there are four departments on campus with faculty who are interested in actively participating in CW-CESU projects: Geography-Earth Science, History, Political Science, and Biology. The expertise of specific faculty members is presented in section 5.0, but here we describe five broad areas of expertise that cut across departments: undergraduate experiential

learning, cultural resource management and land use, historical and public policy research, ecology and natural resource management, and geotechnology.

4.1 Undergraduate Experiential Learning

Experiential learning is one of the educational cornerstones at Shippensburg University, and is embedded in the mission of the institution. Students are strongly encouraged and, in many programs, required to gain practical work experience directly related to their majors. For example, internships are required for all Geography-Earth Science undergraduate majors, and for graduate students in many of the participating departments.

Field experiences and internships are offered across campus at both the undergraduate and graduate levels. Students gain professional experience directly related to their majors by working part- or full-time during the fall or spring semesters or during the summer. Students earn credit based upon the number of hours worked; they are supervised by a faculty advisor and are expected to develop a rapport with their employer to fully understand and satisfy the duties and responsibilities of their assignment.

In addition to internships, the university is strongly committed to enhancing student-faculty research opportunities. The university offers small grants to support student-faculty research and last year launched the Celebration of Student Research Conference, an annual conference that showcases student research. The State System has also launched the *Keystone Journal of Undergraduate Research*, a peer-reviewed journal to highlight undergraduate research. Undergraduate and graduate student research is also supported through external grants. These efforts are strengthening an already strong culture of student-faculty research.

Finally, the university encourages and supports service learning activities. The university has supported two Alternative Fall Break trips, in 2008 and 2010. In 2008, the Alternative Fall Break was based out of the Marine Science Consortium and service projects focused on Chincoteague National Wildlife Refuge and the Assateague National Seashore. In 2010, students and faculty traveled to the Gulf Coast to assist with Hurricane Katrina relief efforts and to learn about the Gulf oil spill. During freshmen orientation, students are invited to participate in a number of community service projects, exposing students to the service ethic and the learning opportunities afforded by these activities during their first days on campus. In addition to these campus-wide efforts, many faculty and departments incorporate service learning into courses and student club activities.

4.2 Cultural Resource Management and Land Use

The History Department and Geography-Earth Science Department each bring considerable expertise in the areas of cultural resource management and land use planning and research. The History Department's areas of expertise include: historic site research, contexts, and documentation; National Register nominations; cemetery research, preservation and conservation; and historical studies of metropolitan land use and economic development. Within the Geography-Earth Science Department, expertise is in the areas of zoning, subdivision regulation, comprehensive plans, and environmental land use planning. Geography-Earth

Science also has an expertise in the field of land use and land cover change science, including the analysis of change at multiple scales, identification and quantification of land use and land cover change drivers, and spatial modeling of land use and land cover change.

4.2 Historical and Public Policy Research

The History and Political Science Departments bring expertise in both qualitative and quantitative research that could be applied to both issues of public policy and historical questions.

The History Department's areas of expertise include: women's history, labor history, cultural history, history of sports, history of nineteenth and twentieth century social movements, environmental history, African-American history, Southern history, public history, immigration and ethnicity, United States foreign relations, and the American Civil War. The department also has area specialists in medieval and early modern Europe, Britain, Russia, Germany, Africa, Latin America, East Asia, South Asia, and the Middle East. The department's historians include experts in oral history research, local history research, and historic preservation documentation methods.

The Department of Political Science emphasizes quantitative research and policy analysis in its undergraduate and graduate programs in political science and public administration. Faculty members in the department have expertise in administrative law, eminent domain law, and state and local politics. Faculty members regularly interact with public officials from Pennsylvania and Maryland on public service research projects.

4.4 Ecology and Natural Resource Management

The Biology and Geography-Earth Science departments bring expertise in both ecology and natural resource management. Faculty in both departments conduct research on a diverse array of topics in this area including hydrology and wetland restoration, water quality monitoring, aquatic ecology, herpetology, parasitology, entomology, vertebrate ecology, ornithology, and plant ecology and conservation. Research focuses on both basic and applied aspects of the above areas and faculty regularly work with local, state, and federal agencies. Faculty in both departments conduct research at the Marine Science Consortium, including work on Wallops Island and Chincoteague National Wildlife Refuge.

4.5 Geotechnology

The Geography-Earth Science Department employs geotechnology across its curricula and emphasizes direct field experience and practical application. We have four faculty members with earned Ph.D.s in Geography/Geographic Information Science or Geography/Remote Sensing. Accordingly, we offer 10 separate courses in Geotechnology, including GIS I, GIS II, GIS III, Cartography, Applied GIS, Field Techniques I, Field Techniques II, Mapping Sciences, Remote Sensing, and Image Processing. We also offer additional courses with significant geotechnical content, including Quantitative Methods in Geography, Transport Geography, Field Studies in Geography and Geology, and the Science of Land Use Change. This commitment has been

augmented by internal and external grants totaling nearly \$2 million from a diverse group of granting agencies including Shippensburg University, NOAA, NASA, the National Park Service, and the National Science Foundation.

The Department maintains a large GIS laboratory, a student-faculty research laboratory, and a separate Remote Sensing and Image Processing laboratory. It also maintains an impressive array of field equipment including 4 Topcon Total Stations for digital surveying, 2 Topcon automatic levels, 9 Trimble GeoXM and 2 GeoXH field computers and data loggers with survey-grade antennae, and three separate shallow subsurface imaging packages (Ground Penetrating Radar, Electromagnetic Induction, and Ohm Mapper capacity-coupled resistivity). We thus have the personnel, expertise, facilities, and equipment to carry out a wide variety of geotechnical applications related to environmental management and research.

While the primary expertise in geotechnology resides in the Geography-Earth Science department, these techniques are being applied across campus in many different disciplines, ranging from computer science to archaeology.

5.0 Who are the individuals that we anticipate will be active in CESU projects?

Department of Geography-Earth Science (<http://www.ship.edu/Geo-ESS/>)

- ◆ Dr. William Blewett – Physical geography, glacial geomorphology, geomorphology, soils
- ◆ Dr. Sean Cornell – Physical geology; sedimentology, stratigraphy, and basin analysis; oceanography / paleoceanography, paleoecology and paleoclimatology; geologic hazards; coastal zone management; service learning
- ◆ Dr. Scott Drzyzga – Geographic information science and technology, economic geography, retail geography, transportation, glacial geomorphology, land use
- ◆ Dr. Kurt Fuellhart – Regional economics, transportation
- ◆ Dr. Tim Hawkins – Hydrology, weather, climate, and climate change
- ◆ Dr. Claire Jantz – land use/land cover change analysis and modeling, urban geography, land use, ecosystem services, internship coordinator
- ◆ Dr. George Pomeroy – community, environmental and regional planning; urban geography, regional development
- ◆ Dr. Kay Williams – experiential learning/internships, natural resource management
- ◆ Dr. Christopher Woltemade – Hydrology, flooding, fluvial geomorphology, stream and wetland restoration, water quality, public water supply, water conservation, storm water management
- ◆ Dr. Joseph Zume – Groundwater and surface water hydrology, environmental geophysics
- ◆ Dr. Paul Marr – Transportation, historical geography, geotechnology (GPS, GIS, Electromagnetic Induction, Total Station), material culture and cultural resource management

Department of History (<http://www.ship.edu/history/>)

- ◆ Dr. Steven Burg – U.S. twentieth century social and political history, historic preservation, historical research, cemetery preservation, public history
- ◆ Dr. John Bloom – U.S. cultural history, oral history, public history, graduate internship coordinator

- ◆ Dr. Susan Rimby – U.S. women’s history and labor history, teacher education
- ◆ Dr. Allen Dieterich-Ward – U.S. environmental history, metropolitan history, undergraduate internship coordinator
- ◆ Dr. David Godshalk – U.S. Gilded Age and Progressive Era, Southern history, African American history, research methods
- ◆ Dr. John Quist – U.S. antebellum and Civil War history, Southern history
- ◆ Dr. Robert Shaffer – U.S. diplomatic history, U.S. immigration and ethnic history, teacher education

Department of Political Science (http://www.ship.edu/Political_Science/)

- ◆ Dr. Niel Brasher – Public policy analysis; research methods
- ◆ Dr. Michael Greenberg – Research methods; state and local politics
- ◆ Dr. Sara Grove – Administrative law; state and local politics
- ◆ Dr. Amanda Olejarski – Eminent domain law; public policy analysis

Department of Biology (<http://www.ship.edu/Biology/>)

- ◆ Dr. Pablo Delis – Vertebrate zoology, herpetology
- ◆ Dr. Todd Hurd – Ecosystem ecology, hydrology
- ◆ Dr. Larry Klotz – Botany, wetland vegetation
- ◆ Dr. Theo Light – Aquatic ecology and conservation biology
- ◆ Dr. Tim Maret – Ecology and conservation of amphibians and reptiles
- ◆ Dr. Greg Paulson – Entomology
- ◆ Dr. Heather Sahli – Plant conservation, pollination biology
- ◆ Dr. Richard Stewart – Parasitology, entomology
- ◆ Dr. Nathan Thomas – Ornithology, animal physiology

6.0 How does our institution contribute to the CW CESU mission and vision?

Shippensburg University’s mission and expertise provide a strong complement to the CW CESU mission and vision. The faculty and departments included in this proposal represent a broad range of expertise across multiple disciplines that could be brought to bear on issues related to integrated ecosystem management. Our strong track record of collaboration across departments (e.g. the Burd Run Interdisciplinary Watershed Research Laboratory) provides a mechanism for interdisciplinary research that can address the “the complex and interrelated biological, physical, cultural, and social resources and issues” within the Chesapeake Bay Watershed.

Our location on the exurban fringe of the Baltimore-Washington metropolitan area, and in a landscape of intensive agriculture, as well as our membership in the Marine Science Consortium, makes us well-positioned to conduct research on many of the pressing issues noted in the CW CESU strategic plan: watershed processes, natural and cultural resource management and heritage preservation, ecosystem management of urban and urbanizing landscapes, public lands stewardship, analysis and monitoring of external stresses, and the development of tools for enhancing stewardship. Indeed, as can be viewed in the list of individuals interested in participating in the CW CESU, many faculty have expertise that speak directly to these research themes.

One important area where Shippensburg University can make a particularly strong contribution is in the area of undergraduate education. As a predominantly undergraduate institution, Shippensburg University encourages and supports the involvement of undergraduates in research, internships, and service learning activities. The departments in this proposal all have a strong commitment to these goals, and we anticipate incorporating these experiential learning approaches in CW CESU projects.

7.0 Who is the CW CESU point of contact for your institution?

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