

SSI 2008 Post-Institute Implementation Sub-Awardees

Arkansas State University

John Pratte, Tillman Kennon, Steven Green, Jennifer Bouldin, Erik Gilbert

The Arkansas State University team proposes the further development of an undergraduate course centered on an existing high altitude balloon project that is an outreach program with Arkansas 7-12 schools and university researchers. The course teaches university students about the physical and chemical dynamics of the atmosphere by having them design and build research instrumentation that will fly on high-altitude weather balloons. The course involves (1) instruction in the basic science of meteorology and the interplay between the atmosphere and the ocean, (2) design and construction of a variety of instrument and payload modules that will measure and collect atmospheric data, (3) participation in an actual high altitude balloon launch, tracking, and recovery, and (4) analysis and report of data collected. The team aims to offer an opportunity for students to participate in research and at the same time gain knowledge about the atmosphere.

Boise State University

David Wilkins, James Ferguson, Chris Hill, Kenneth Cornell, Kimber Shaw

The Boise State University team plans to work with the Colleges of Arts & Science, Engineering, and Social Science & Public Affairs to support a cohort of faculty members, SENCER alumni, and others to develop courses that integrate the SENCER approach of science and engagement. The Center for Teaching and learning will collaborate with faculty across campus in the effort to create a set of content-linked courses in a learning community. An example of the learning community would involve linking a core chemistry course with an environmental studies course and a history or geography course. Courses would appeal to a wide audience of STEM and non-STEM majors, and will be expanded in scale if successful in the pilot stage.

Butler University

Joe Kirsch, Meredith Belfuss, Bob Holm, Donald Braid

The team from Butler University proposes the development of a new SENCER earth science course with a laboratory component that will be offered by the College of Education. The course will satisfy a requirement of Butler's new Core, a general education program designed around student learning objective rather than just offerings from traditional academic disciplines and the presence of an academic department. The course will discuss major geology concepts as well as natural resource consumption, alternative energy sources, and global climate change. Students will participate in field exercises including soil monitoring and discussing lead levels in playground soils with a representative from the local health department. Reports will then be shared with the community. The Center for Citizenship and Community, a university-based organization that coordinates partnerships with the local community, will assist the team with the incorporation of civic engagement activities.

Christopher Newport University

Andrew Velkey, Bobbye Bartels, Mihaela Dobrescu, Rob Atkinson, Raouf Selim, Michael Meyer

The team from Christopher Newport University plans to hold several faculty development workshops to build institutional capacity for civic science and civic research. Using the Project Kaleidoscope Planning Process approach, participants will identify their individual goals, identify strategies to accomplish those goals, and design tasks that fulfill those strategies. Workshop participants will be led by presenters as well as mentors in the development of their individual plans for integrating the SENCER approach into their teaching. The workshops will be open to all faculty members, but will specifically target junior faculty from all science, technology, engineering, and mathematics departments on the CNU campus. The team also aims to incorporate faculty from other institutions into the workshops, based on a capacity building approach.

College of Staten Island-CUNY

June Como, Mary O'Donnell, Regina Gonzalez-Lama, Eleanor Kehoe

The College of Staten Island-CUNY team will pilot the use of action oriented learning techniques to enhance achievement, retention, and program completion by students in the department of nursing. The team plans to employ the SENCER approach through the introduction of more active learning strategies specifically designed to enhance academic, vocational, and technical skills that incorporate student interaction. The goal of the project is to evaluate the use of clickers, or audience response systems (ARS), within nursing curricula and then to extend the project to the college-wide community. Students in the pilot program will be tracked from Fall 2009 through Spring 2010, Fall 2010, and Spring 2011 to monitor the success or necessary interventions during the program.

Edison State College

Peggy Romeo, Linda Weinland, Lyman O'Neal, Rona Axelrod, Theo Koupelis

Edison State College faculty plan to implement changes in undergraduate courses by focusing on environmental sustainability and the "greening" of the curriculum. The team will introduce the concept of sustainability to students in *Environmental Biology*, the college community at large, and the surrounding tri-county community. Two teacher education students will participate in course planning and will help disseminate methods across campus. *Environmental Biology* students will participate in a hands-on, community-based project of their choosing. The data generated by students' work on assigned projects will be analyzed by students in *Introductory Statistics*, thus exposing other students to the concept of sustainability and encouraging interdisciplinary links. The team hopes to incorporate colleagues from local research organizations, county biologists doing research on harmful algal blooms on local beaches, and educators from organizations to serve as an advising and supporting role.

Fairmont State University

Pamela Huggins, Carolyn Crispip-Tacy, Ann Shaver

The Fairmont State University team will offer *Obesity in Appalachia*, a course designed to actively engage non-science majors in the recognition and remediation of this serious public health concern in Appalachia, the region that contributes the largest percentage of students to Fairmont State University. The course will present a broad overview of the issues of obesity in Appalachia, provide specific information about the basic family and community concerns, and will culminate in a civic engagement project. The overall goal of *Obesity in Appalachia* is not simply to educate students regarding the causes and effects of obesity, but rather to help them develop proactive strategies to manage obesity at the individual, family, and community levels.

Harold Washington College

Sanghamitra Saha, Irene Yashina, Uletta Jackson

The Harold Washington College team proposes to offer a course titled *GMOs: Genetically Modified Organisms and Us* for undergraduate students who choose to enroll in Introductory General Biology to fulfill their general education requirements. A key focus of the curriculum will be an in-depth study of the impact, implications, and presence of genetically modified organisms in our lives. This will be accomplished by supplementing and enhancing the standard curriculum of the introductory biology course with the most current knowledge available on the presence of GMOs in our lives. The course curriculum will include surveys, research, and hands-on experiments to enrich the learning experiences of students. Students will collect and survey foods from different sources and determine if they are genetically modified or not using molecular biology techniques. The overall goal is to better educate and increase scientific awareness of the student community about GMOs.

Lipscomb University

Ben Hutchinson, Marcia Stewart, Alan Bradshaw, Jim Arnett, Linda Phipps, Autumn Marshall

The Lipscomb University team will implement their two-semester SENCER general education science course, *Integrated Science: The Power of Science*, during the 2008-2009 academic year. The emphasis in the course will be using case studies involving physics and nutrition, and the primary audience will be non-science students with a special focus on elementary and middle school education majors. Students will be required to participate in service-learning as part of their course requirements by working with the community involved in the Harpeth River Watershed Society. The team expects to directly impact 40 students, five faculty members currently involved in the project, and members of the community associated with the Harpeth River Watershed Society.

Metropolitan State University

Cindy Kaus, Sarah Hansen, Rikki Wagstrom

The team from Metropolitan State University plans to continue the work and collaboration needed to place a strong emphasis on civic engagement and public issues in the mathematics curriculum at Metropolitan State University. The team will be collaborating with two major goals in mind: (1) to initiate the development of a general education course called *Math for Social Justice* and (2) to enhance an on-line college algebra course with a civic engagement focus on microlending. *Math for Social Justice* will satisfy the general education requirement in Mathematics and Logical Reasoning and possibly the general education requirement in Ethical and Civic Responsibility. Modules with different civic issues as themes will be used. Possible civic issues to be examined include the political process and voting, the financial exploitation of the quantitatively illiterate, and statistical misconceptions and their consequences in politics and policy. The online college algebra course will be redesigned with a focus on the use of real-world data and models from microfinance programs as well as from projects where students will develop a microlending plan using models from college algebra. The team will collaborate with economics and finance faculty as well as area microlending institutions.

Middle Tennessee State University

Judith Iriarte-Gross, Martha R. Weller, Kevin Smith, Diane Miller

The team plans to develop a SENCER model course for non-science majors based on research on issues of interest to students. Once an issue has been identified, the team will use specific case studies and collaborative learning exercises for the lecture and the activity sections of the course, *Contemporary Issues in Science*. The cases studies and lab activities will engage students by connecting the science in the course with topics of interest in their lives. The computer-based problem solving exercises, once designed, will be able to be used in future courses. The team will work in collaboration with the liberal arts, business, and education colleges as well as fellow STEM faculty to teach a wide range of topics from agriculture to environmental science to medical physics to zoology.

New York University

Joseph Liddicoat, Peter Bower (Barnard College), Saugata Datta (Kansas State University), David Eastzer (City College of New York), Arthur Kney (Lafayette College)

The multi-institutional team, led by Joe Liddicoat, will implement the SENCER Model Brownfield Action II in the undergraduate science curriculum at their institutions. During the award period, new science electives also will be developed at New York University and City College of New York that contain the SENCER objectives, and Barnard College is exploring a partnership with the NYC Board of Education and Teagle Foundation to teach Brownfield Action II to high school students in Harlem. It is anticipated that the results of the collaboration among the participating institutions will be presented as a colloquium at the 2009 and 2010 SENCER Summer Science Institutions.

Northeastern Illinois University

David Rutschman, John Kasmer, Sargon Al-Bazi, Ken Vogelsonger, Abhijit Banerjee, Greg Anderson

Northeastern Illinois University plans to develop an interdisciplinary major in Environmental Science that will combine biology, chemistry, geography, environmental studies, mathematics, physics, and earth science. Courses in the major will focus on environmental issues that abound in the campus community, including energy, air, water, urban sprawl, transportation, waste, and industrial contamination. The team plans to SENCERize courses that are already in place at the University to build students' awareness of the environmental challenges, to connect them to global issues, and to provide them with tools needed to make informed decisions. Faculty will recruit current STEM majors and incoming first year students.

Northland College

Annette Nelson, Wendy Gorman, Alan Brew, Rick Fairbanks

Northland College faculty will focus on curriculum change for the required elementary education course, *Methods of Teaching Science*. To take advantage of its proximity to Lake Superior and its watershed, the lake will serve as the basis of the course. During the first two semesters, students will learn about components of the lake such as biology, life, environmental, physical, earth, and space sciences. For each of these components, students will be required to use the Internet to locate appropriate websites and teaching materials which will later be compiled onto a CD and distributed to local area school districts and classroom teachers. Upon completion of the course, students will be able to (1) locate and identify grade-appropriate resources to teach science relating to Lake Superior and its watershed, (2) modify the content of the elementary classroom science topics to include civic engagement and environmental emphasis by concentrating on Lake Superior and its watershed, (3) utilize higher-order thinking skills in the teaching of elementary classroom science topics, and (4) engage elementary classroom pupils in respect for and appreciation to our their place on Lake Superior and in the watershed.

Oglethorpe University

Keith Aufderheide, Michael Rulison, John Nardo, Lynn Gieger, John Cramer, Lawrence Schall, Tamara Nash, Lucy Leusch, Philip Peroune

The team will develop a 4-way course intersection between students in General Chemistry Lab, General Physics Lab, General Biology Lab, and Statistics with a theme of water analysis. Two biologists who have performed water analysis, insect and wildlife studies, and native and invasive plant studies with the Blue Heron Nature Preserve will train their lab students in sample collection. The biology students will then train the chemistry and physics students and the entire team will embark on a longitudinal study of water from various wetlands areas in the Blue Heron Nature Preserve. Each sample will be analyzed for turbidity, conductivity, temperature, pH, dissolved oxygen, selected metals, various anions, and some microbiologicals. The analyses will be conducted by the chemistry and physics lab students (and possibly to some extent by the biology lab students). The statistics students will help model the data and develop and test hypotheses. The entire team will compile results into a final report that will be shared with the larger University community during an annual spring symposium.

Stony Brook University

Gary Halada, Ridha Kamoua, Balaji Sitharaman, David Ferguson, Chad Korach, Mary Frame

The Stony Brook University team will explore nanotechnology engineering education issues involving the disconnect between societal problems and needs on a global scale (particularly in poorer nations) and the emphasis and business of research and development in the United States and other industrialized nations. Selected Stony Brook University courses will have an added emphasis on societal/economic issues and global perspectives in nanotechnology and high technology design, development, and implementation. By enhancing engineering student awareness of global problems and barriers to technological discovery and development in disadvantaged areas of the world, students studying technology related subjects will learn more about applications, possible driving forces for technology adaptation, and the general goals of good global citizenship. The team from Stony Brook University

hopes to help recruit students into the program, enhance engagement of students from underrepresented groups, and help to forge international collaboration in teaching and research.

Texas Woman's University

Don Edwards, Ann Staton, Sarah McIntire, Richard Sheardy, Richard Jones, Cynthia Maguire, Mark Hamner

The Texas Woman's University team has long term goals to engage students in informed, civically responsible, scientific discourse and to increase the integration of civic responsibility into the science and math curriculum. They also would like to attract greater numbers of women and minority students to STEM fields, to incorporate appropriate assessments of student outcomes in science, and to prepare P-12 teachers who are committed to infusing science literacy and civic responsibility into their classrooms. To achieve these goals, the team plans to continue refining their SENCER course *Introduction to Environmental Chemistry*, to SENCERize two additional courses, *Quantitative Literacy* and *Introduction to Statistics*, and to develop a new course, *Climate Change: A Human Perspective*. The TWU team will form a faculty learning community on civic engagement composed of a multidisciplinary group of educators from the College of Arts and Sciences. Finally, the team will form a partnership with Denton Independent School District to introduce SENCER ideals to middle and senior high school faculty.

University of Akron

Justin Brantner, William Donovan, Helen Qammar, Kathleen Ross-Alaolmolki, Gregory Smith, Shane Strand, Ethel Wheland, Bonita Williams

The University of Akron team aims to SENCERize an Exploratory Learning Community explores STEM disciplines through experiential learning and civic engagement. The team will involve STEM faculty, academic advisors, students, and partner institutions in the design, implementation, and evaluation of this new Exploratory Learning Community. They will design a sustainable SENCERized curriculum, engage faculty in the redesign and integration of thematic curricula, and continue to foster administrative support at the college and departmental level for participating faculty. Topics developed for the Exploratory Learning Community will focus on environmental degradation, amelioration of the anthropogenic effects of urban sprawl, and health and quality of life issues. Another topic of strong interest is local water quality, an issue that will engage students in learning while enabling them to actively participate in discussions concerning their own communities.

University of Maryland

In fall 2007, the University of Maryland launched the Marquee courses; a set of general education CORE science courses for non-majors that encourage students to look at science through the lens of the world and personally relevant issues. The team plans to continue the Marquee faculty learning community to disseminate the resulting success of the first year pilot on campus and to colleagues nationally. Team members are also interested in developing tools to further and better assess student learning. Faculty are investigating mechanisms to grow the Marquee courses and to increase the involvement by faculty across the campus.

University of Wisconsin-Fox Valley

Kristin Runge, Joy Perry, Tammy Ladwig, Martin Rudd, Jamie Douglas

The team from the University of Wisconsin-Fox Valley will further the development of their interdisciplinary first-year SENCER learning community, Fox in the Woods. Fox in the Woods examines the issue of sustainability from the perspectives of environmental biology, earth science, and business. At the beginning of the fall semester, 60 students go on a three day/two night capstone research trip in northern Wisconsin. Students visit several sustainable businesses to interview, record, and document practices in agriculture, forestry, and manufacturing. This research is then used to create an original series of case studies that will serve as a basis for independent study research projects to be completed in the second semester of their first year. The team hopes to succeed in helping students understand the trade-offs that occur when science meets business and public policy.