

# SENCER SUMMER INSTITUTE 2007

## NOTES ON THE PROGRAM

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### **Arrival, Transportation, Registration, and the SSI 2007 Office**

Welcome to the SENCER Summer Institute 2007 (SSI 2007).

Registration for SSI 2007 will take place in the lobby of the Abromson Community Education Center on the University of Southern Maine campus on Friday morning, August 3<sup>rd</sup>, from 8:00 a.m. to 9:30 a.m. Please join us at this time for a continental breakfast and a “meet and greet” with the SENCER Senior Associates and other SENCER participants. If, for some reason, you miss registration, please find a member of the SENCER staff later in the day to register and pick up your materials.

Buses will depart from the front of the Institute hotels beginning at 7:45 a.m. and continue shuttling participants to the University of Southern Maine campus until 9:30 a.m. A bus schedule will appear at the beginning and end of each day’s schedule. Shuttle buses will run to all hotels housing participants. Please read the sign on the bus to make sure that you board the correct one.

SENCER staff will maintain an office on the University of Southern Maine campus in room 109 on the Abromson Community Education Center on Friday, Saturday, and Sunday during Institute hours. On Monday, staff may be found on the event floor or in the E.B. White room on the mezzanine level of the Eastland Park Hotel. Staff and SENCER Senior Associates, identifiable by their special name badges, will be present to assist participants. Please don’t hesitate to stop by and ask for help.

Maps of the University of Southern Maine campus and the Eastland Park Hotel meeting rooms are in the “Local Information” section of the SSI 2007 book.

Unless otherwise noted, presentations during concurrent sessions are appropriate for SSI 2007 participants at any level of experience with SENCER.

Following the Institute, all attendees are asked to contribute their thoughts and opinions about SSI 2007 through our online evaluation system. We have provided a paper copy of the questions on the evaluation so that you can keep track of your comments during the Institute. Once you get home, please visit <http://www.sencer.net/Institutes/SSI2007/Evaluations/evaluation.cfm> and complete the online form. All members of teams who wish to apply for Post-Institute Implementation Awards must submit an evaluation to be eligible to apply for the sub-award.

## **WEDNESDAY, AUGUST 1, 2007**

- 4:00-8:30**     **PRE-INSTITUTE WORKSHOP**  
The Scholarship of Teaching and Learning  
*Louise Nevelson and Greenhouse (Eastland Park Hotel)*

## **THURSDAY, AUGUST 2, 2007**

- 8:00-7:00**     **PRE-INSTITUTE WORKSHOP**  
The Scholarship of Teaching and Learning  
*Louise Nevelson and Greenhouse (Eastland Park Hotel)*
- 7:00-9:00**     **MEETING FOR INSTITUTE STAFF AND FACULTY**  
By invitation only  
*Longfellow A (Eastland Park Hotel)*

## **FRIDAY, AUGUST 3, 2007**

*(Shuttle buses will run from all hotels to the University of Southern Maine campus from 7:45 a.m. to 9:15 a.m.)*

- 8:00-9:30**     **REGISTRATION AND BREAKFAST**  
*Lobby (Abromson Community Education Center)*
- 9:45-11:30**   **OPENING PLENARY SESSION**  
*Hannaford Lecture Hall (Abromson Community Education Center)*  
Karen Oates and David Burns, presiding
- “Science and the Engagement of Learners”**  
    Cora Marrett  
    *National Science Foundation*

The opening plenary will feature welcoming remarks by Mel Schiavelli, president of Harrisburg University of Science and Technology, and Joe Wood, president of our host institution, the University of Southern Maine. Karen and David will provide an overview of the Institute’s aims and aspirations. Key staff will be introduced.

Dr. Cora Marrett, Assistant Director of Education and Human Resources for the National Science Foundation, will deliver the opening plenary address.

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- 11:45-12:15**   **HOMEROOMS/TEAM TIME**  
*Rooms as assigned (behind Tab 1 in Program)*
- 12:30-1:30**   **LUNCH**  
*Tent (by Luther Bonney)*

## 1:45-3:00 CONCURRENT SESSIONS I

### A NOTE ON CONCURRENT SESSIONS

Over the course of SSI 2007 there will be seven sets of concurrent sessions. In keeping with our SENCER traditions, many of these sessions are designed to simply give space to members to bring their own expertise, as well as their particular needs, to a group gathered together around similar interests and concerns. Others are more formal workshops, where participants will engage in a process led by the workshop leader. A few sessions will be repeated. Still others are “information” sessions, where participants will have the opportunity to become acquainted with new pedagogical strategies, collaborative opportunities, and up-coming program efforts. We will offer sessions that feature new applications, including new topics for SENCER courses, as well as new targets for SENCER innovations. We’ve asked all session leaders to keep the sessions interactive and lively. Several of the presenters are asking participants to respond to specific evaluation questions in addition to the generic questions posed on the online 2007 Institute evaluation. Please help all of us improve the quality of the Institute by providing your responses to the questions.

### SENCER in Theory and Practice: An Introduction and Orientation

*Abromson 216*

*(Intended for people new to SENCER and the Summer Institute)*

Themes:	Planning Civic Engagement Pedagogy	Theory/Rationale Assessment/Evidence
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Karen Oates, [karen.oates@sencer.net](mailto:karen.oates@sencer.net)

David Burns, [david.burns@sencer.net](mailto:david.burns@sencer.net)

*National Center for Science and Civic Engagement*

**Abstract:** This session is designed for participants who wish to learn more about the SENCER program, its origins, goals, accomplishments, and the theories and ideas that lie behind it. The session will also identify and explore challenges that can arise when implementing SENCER courses. An overview of the approach will be presented in the form of a rubric. This should enable participants to consider how the approach can be applied to subject areas in STEM disciplines as well as others, and to explore strategies for implementation. A brief presentation will be followed by informal discussion session. The session is designed, as well, as a special orientation to the Summer Institute for those who feel they need assistance in making the most of the SENCER experience.

**What will be accomplished:** Participants will be able to situate SENCER within a family of reforms in teaching and learning and developments in cognitive science. They will become more familiar with the six elements of the SENCER design approach (identifying student/faculty interests; choosing the complex, capacious, unsolved civic issue that becomes the “narrative focus” of the course; developing a list of the canonical elements in the STEM discipline(s) to be taught through the course; choosing pedagogical strategies best suited to the course goals; identifying the opportunities for practice/action that the course presents; and designing continuous assessment of the course and learning outcomes.) Participants will receive advice on how to best take advantage of the time we will have together at the Institute.

**Results:** Participants will be positioned to track how their course planning and development “fits” the SENCER rubric and will be able to use that positioning (1) to select learning

experiences and session activities in subsequent concurrent sessions, and (2) to identify SENCER faculty, alumni, and other participants who may be helpful in providing consultation and advice.

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### Creating and Presenting a SENCER Featured Model Course

*Abromson 215*

*(Intended for alumni and people who have already begun creating SENCER courses)*

Themes:	Planning	Dissemination
	Pre-Service Teacher Education	Community Colleges
	SENCER in the Majors	

Eliza Reilly, [eliza.reilly@fandm.edu](mailto:eliza.reilly@fandm.edu)  
*Franklin & Marshall College*

Steven Bachofer, [bachofer@stmarys-ca.edu](mailto:bachofer@stmarys-ca.edu)  
*St. Mary's College of California*

Monica Devanas, [devanas@cat.rutgers.edu](mailto:devanas@cat.rutgers.edu)  
*Rutgers University*

Theo Koupelis, [theo.koupelis@uwc.edu](mailto:theo.koupelis@uwc.edu)  
*University of Wisconsin-Marathon*

**Abstract:** In this session three SENCER model developers and the general editor of the SENCER Featured Model Series will discuss their experiences as project participants, answer your questions about the nomination and selection process for SENCER models, and provide an overview of the role that the model courses and their developers play in the SENCER national strategy. The panelists will invite suggestions and feedback regarding new presentation formats and new possible uses and dissemination strategies for the SENCER models.

**What will be accomplished:** We hope to encourage submissions and gather feedback from users.

**Results:** We hope that participants will have increased interest and confidence in nominating models.

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### Nine Steps to Designing a SENCER Model in About an Hour

*Luther Bonney 302*

Themes:	Planning	Dissemination
	Pedagogy	Course Development

Cathy Middlecamp, [chmiddle@wisc.edu](mailto:chmiddle@wisc.edu)  
*University of Wisconsin-Madison*

**Abstract:** This exercise is to help individuals and teams imagine and design SENCER courses, learning communities or other curricular programs that foster civic engagement by teaching through complex, civic issues to the content of academic disciplines. Such an approach requires a shift of priorities from chapter to chapter content coverage to the investigation of complex issues that foster the acquisition of knowledge (scientific and otherwise) necessary to reveal a problem's solutions. With this approach students learn to see both the efficacy and limitations of scientific knowledge. They are encouraged to apply knowledge from other disciplines to problem resolution. Based on the "Designing a Learning Community in an Hour" heuristic developed by

Jean MacGregor and Barbara Smith ([www.evergreen.edu/washcenter/LChour.shtm](http://www.evergreen.edu/washcenter/LChour.shtm)), this intense, highly-interactive session will encourage teams of participants to work through an interactive, guided exercise to develop their own SENCER model to share with the group.

**What will be accomplished:** Participants will feel empowered to modify and use this exercise at their own institutions to develop actual models that they will implement.

*\* This session was originally designed by Ellen Goldey, who cannot be with us this year.*

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### **Featured Model: Chemistry and the Environment**

*Abromson 213*

Themes:	Environmental Studies	Chemistry
	Community-Based Research	Civic Engagement

Amy Shachter, [ashachter@scu.edu](mailto:ashachter@scu.edu)  
*Santa Clara University*

**Abstract:** Courses can be designed to improve learning in chemistry and to increase student awareness about local and global environmental issues and to help students develop habits of living and decision-making that are more environmentally sustainable. The SENCER featured model course that is the focus of this presentation uses campus-based research projects both as a means for learning science and for implementing sustainable practices on campus. The session will provide an overview of a SENCER model in chemistry and will offer participants an opportunity to consider how they might adapt this approach on their campuses.

**Results:** Participants will be able to: (1) re-think the current approach to teaching chemistry, (2) integrate a research experience as a form of civic engagement into non-majors courses, and (3) consider viewing the campus as a place for civic engagement.

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### **Service-Learning and the STEM Disciplines**

*Luther Bonney 403*

Themes:	Service-Learning	Community-Based Research
	Civic Engagement	Planning

Lynn Leavitt, [lleavitt@gmu.edu](mailto:lleavitt@gmu.edu)  
*George Mason University*

Glenn Odenbrett, [glennodenbrett@aol.com](mailto:glennodenbrett@aol.com)  
*Western Reserve Resource Conservation and Development Council*

**Abstract:** This session describes the basics of designing service-learning and community-based research opportunities in order to enhance student learning in the STEM disciplines. The format includes a presentation of service-learning and community-based research definitions/models, reflective analysis techniques, and guidelines to assess student learning. In addition, participants will have the opportunity to engage in a discussion about how to utilize campus resources and develop partnerships with local nonprofit organizations.

Essential paperwork, such as "Learning Agreements" and "Risk Release Forms," plus guidelines to develop a science course that incorporates service-learning and/or community-based research will be discussed. Web sites where participants may access additional information and materials will be identified.

**What will be accomplished:** Participants will learn definitions and models of service-learning and community-based research; understand the importance of various types of reflective analyses in order to assess student learning; discuss how to utilize campus resources and develop partnerships with nonprofit organizations; and discover materials and web sites that will help in the design and facilitation of service-learning and community-based research projects for science courses.

**Results anticipated:** Attendees will learn definitions and models of service-learning, which will help them understand the importance of various types of reflective analyses in order to assess student learning. They will discuss how to utilize campus resources and develop partnerships with nonprofit organizations.

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### **Improving Assessments of Student Learning: The New SALG and SENCER SALG**

*Abromson 110*

*(Because the use of the SENCER-SALG will be a condition attaching to SENCER sub-awards, teams should designate at least one member to participate in this session. This session is also recommended for current SALG users.)*

Themes:	Assessment Course Design	Planning
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Stephen Carroll, [scarroll@scu.edu](mailto:scarroll@scu.edu)  
*Santa Clara University*

**Abstract:** In 2006, the NSF approved a grant to improve and significantly expand the SALG website. The new SALG is more stable, easier to use, and includes enhanced tools for analyzing results. Most significant for SENCER, the new SALG architecture promotes clearer thinking about learning outcomes and innovative pedagogies for reaching them. The new SALG will also offer departmental and evaluator tools that allow administrators to lock certain questions needed for large-scale evaluation yet preserve instructors' ability to modify other questions to reflect their own specific course goals. The presenter, a co-PI in the new NSF-supported project to enhance the SALG, will provide an overview and demonstration of the new SALG, and explain the reasons for the changes that have been made. He will then offer one possible new SENCER SALG to stimulate discussion of how a new SENCER SALG might take advantage of the new SALG site.

**What will be accomplished:** Attendees will learn enough about the new SALG to take advantage of its new capabilities and to make informed decisions about a new SENCER SALG that would take advantage of those capabilities.

**Results:** Attendees will (1) understand the reasons for the substantive changes made to the SALG site (which will affect the SENCER SALG), (2) use the new SALG site effectively, and (3) make informed choices about how to develop a new SENCER SALG that will take advantage of the new architecture of the SALG site.

## Planning Next Steps in Assessment

Abromson 214

(This session is open to everyone, but has been designed especially for SENCER alumni.).

Themes:                      Assessment    Planning

Richard Keeling, [rich@keelingassociates.com](mailto:rich@keelingassociates.com)  
*National Center for Science and Civic Engagement*

Dave Ferguson, [dferguson@notes.cc.sunysb.edu](mailto:dferguson@notes.cc.sunysb.edu)  
*Stony Brook University*

**Abstract:** The existing portfolio of assessment data on the effectiveness of SENCER approaches, models, and courses includes an overall project evaluation (conducted by Elaine Seymour and Tim Weston), institutional data from the SENCER SALG, and narratives collected through writings, interviews, and self-reports from faculty members and academic administrators. In the coming three year project period, SENCER will enhance that portfolio through (1) a meta-evaluation of the Seymour/Westin report, (2) expansion of use of the SENCER SALG, (3) establishing a Consortium for the Assessment of Student Achievement [CASA], and (4) apply the Carnegie Foundation's Scholarship of Teaching and Learning [SoTL] model to faculty research on five key questions of the long-term efficacy of SENCER courses. Still, important questions of the efficacy of SENCER courses to enhance students' cognitive skills, improve specific elements of scientific literacy, and promote the achievement of desired departmental, major-related, or institutional learning outcomes remain to be addressed. This session, which will encourage robust participation by those attending, anticipates and prepares for a plenary discussion later in the Institute.

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### 3:15-4:15                      POSTER PRESENTATIONS (I) *Abromson Community Education Center*

We are pleased to invite you to attend special poster sessions that feature the work of SSI 2007 participants. This year, there will be two poster presentations: one on Friday, and one on Saturday. As in the past, poster developers will be on hand to share their work, exchange ideas, and answer questions during a designated Poster Session time, but posters will be available for viewing throughout the day. All posters will be displayed in the Abromson Community Education Center.

Posters have been grouped topically for each day. The posters in Friday's session will focus on quantitative literacy, assessment, and the environment as a topic to teach 'through.' The session will also feature posters by University of Southern Maine faculty who have used the SENCER approach in their courses and by a sampling of students who have taken those courses. Saturday's session will feature posters that focus on core curriculum and general education course reform, different kinds of partnerships, and a variety of innovative approaches to courses by SENCER alumni.

You will receive a "Poster Abstracts" booklet with your registration materials that includes descriptions of each project as well as contact information of session contributors. We hope that this booklet will facilitate meaningful exchanges during the institute and opportunities to follow-up after the Institute.

**4:30-5:45      CONCURRENT SESSIONS II**

**SENCER and Introductory STEM Courses: A Way Forward—Session I**

*Abromson 216*

*(This is a four session workshop. The sessions on Friday, Saturday and Sunday are open only to participants who have applied and been invited to attend them. Monday's session—where the deliberations and recommendations from the first three days will be summarized and highlighted—is open to all SSI 2007 participants.)*

Themes:	Planning Course Design SENCER and the Majors	Assessment General Education
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Jay Labov, [jlabov@nas.edu](mailto:jlabov@nas.edu)  
*National Research Council*

Karen Oates, [karen.oates@sencer.net](mailto:karen.oates@sencer.net)  
*National Center for Science and Civic Engagement*

**Abstract:** Large enrollments in introductory STEM courses render laboratory, field, and research experiences difficult or impossible to provide. Because introductory courses for majors historically have been designed to provide these students with all of the prerequisite content for upper-level courses in the discipline, these students may not be exposed to topics and skills that are considered appropriate in non-majors courses unless they enroll in senior-level culminating experiences or capstone courses.

What about future science and mathematics teachers? What do they need from the courses? Is it different than what other students should be learning? What kinds, if any, of postsecondary educational experiences should colleges and universities provide to students who have already placed out of introductory courses when they enroll?

This year, the SENCER Summer Institute offers participants an opportunity to participate in a multi-day workshop that will be conducted during four regular Institute concurrent sessions. This opportunity is directed to faculty and administrators who are interested in considering the state and future of introductory STEM courses.

## What Do We Mean by Civic Engagement?

Luther Bonney 403

Themes: Civic Engagement

David Burns, [david.burns@sencer.net](mailto:david.burns@sencer.net)  
*National Center for Science and Civic Engagement*

Eliza Reilly, [eliza.reilly@fandm.edu](mailto:eliza.reilly@fandm.edu)  
*Franklin & Marshall College*

Pamela Proulx-Curry, [pamela.proulx-curry@uwp.edu](mailto:pamela.proulx-curry@uwp.edu)  
*Wisconsin Campus Compact*

Liz McCabe Park, [epark@bates.edu](mailto:epark@bates.edu)  
*Maine Campus Compact*

**Abstract:** There's a good deal of talk about civic engagement these days. Some of it arises from indictments of today's students as apathetic and uncaring, while still other talk contemplates grandiose schemes like deploying platoons of students to improve conditions in a broad variety of communities. But what does any of this have to do with learning, and learning in the STEM disciplines, especially? In this session, a brief presentation of how civic engagement figured in the creation and development of the SENCER project will be followed by a case study in application from Wisconsin. Following a brief response and comment by the director of Maine Campus Compact, participants will be invited to develop a continuum of civic engagement elements that can be used to organize college level courses in STEM and other areas of inquiry.

**What will be accomplished:** The session will offer a critical overview of civic engagement and will develop elements of a continuum of civic engagement curricular elements.

**Results:** Civic engagement will be considered within the context of democratic theory, described within the larger educational missions of institutions, defined as a pedagogical strategy, and articulated within a series of curricular and non-curricular activities and options.

## Mathematical and Statistical Reasoning in Compelling Contexts

Luther Bonney 410

Themes:	SENCER in the Majors Disciplinary-Based Learning Learning Theory	Quantitative Studies Mathematics Pipeline Issues
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David Ferguson, [dferguson@notes.cc.sunysb.edu](mailto:dferguson@notes.cc.sunysb.edu)  
*Stony Brook University*

Cindy C. Kaus, [cindy.kaus@metrostate.edu](mailto:cindy.kaus@metrostate.edu)  
*Metropolitan State University*

Prabha Betne, [pbetne@lagcc.cuny.edu](mailto:pbetne@lagcc.cuny.edu)  
*LaGuardia Community College*

**Note:** Participants who have expressed interest—or who would be interested—in participating in the National Center for Science and Civic Engagement’s proposal to create a community of practice to connect quantitative and mathematical learning with compelling contexts are especially urged to attend this session.

**Abstract:** Many students with interests outside of "quantitative fields" perceive much of school and college mathematics as dull, difficult, scary, and totally irrelevant. For these students, mathematics is a necessary evil, or a dreaded game, rather than a subject to be enjoyed and integrated into their personal and professional lives. What, then, are the challenges of bringing mathematical and statistical reasoning into richer contexts so that students with multiple interests, strengths, purposes and world-views might see the beauty and understand the uses and abuses of quantitative approaches? Such a reformed view of mathematics and its place in our culture would not only benefit individual students, but also support our civil society that is becoming increasingly dependent on advances in mathematics, science, engineering and technology.

The facilitator will discuss a SENCER backgrounder (available on the SENCER website, [www.sencер.net/pdfs/Backgrounders/FergusonBackgrounderFINAL.pdf](http://www.sencер.net/pdfs/Backgrounders/FergusonBackgrounderFINAL.pdf)) that begins to paint a new vision for mathematical and statistical reasoning that takes advantage of the SENCER approach of contextualizing learning. This contextualized learning departs from the more traditional and stately cumulative, hierarchical and linear learning that has been one hallmark of mathematics education. The question, “Can math be successfully taught this new way?” will be one special focus of this discussion.

In their responses, a SENCER alumna and developer of a statistics in compelling context project will summarize her experiences and make recommendations for improving campus programming, especially as it relates to engaging part time faculty in teaching SENCER courses. Then a professor of mathematics will describe a college-wide effort, supported by FIPSE, that aims to apply the SENCER approach to the teaching of remedial mathematics.

**What will be accomplished:** The session is designed to help participants (1) think about and understand why many of the current approaches to the learning and teaching of mathematics and statistics leave students with shallow understanding and limited ability to apply knowledge in new contexts, (2) identify key features of a context-based approach to the learning of mathematics/statistics, and (3) begin to consider tentative plans for reformulating an existing course or designing a new course that uses understanding about how people learn in creating a context-based and collaborative learning environment.

**Results:** Participants will learn more about a proposed national community of practice and will be given opportunities to stay connected to this developing initiative. Participants will be better able to (1) analyze the causes and articulate the shortcomings of many of the current approaches to the learning and teaching of mathematics and statistics, and (2) think reflectively so as to generate new ideas for reformulating existing courses or developing new courses that deepen students' understanding.

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**Featured Model: Biomedical Issues of HIV/AIDS**

*Luther Bonney 236*

Themes:	Civic Engagement Biology Global Learning Adult Students	Disciplinary-Based Health Large Classes
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Monica Devanas, [devanas@cat.rutgers.edu](mailto:devanas@cat.rutgers.edu)  
*Rutgers University*

**Abstract:** *Biomedical Issues of HIV/AIDS* teaches the biology of infectious diseases, immunology, and virology through the questions that surround HIV/AIDS: What is it? Is it true that you cannot “die” from AIDS? How easily is it spread? Is there “cure”? Such driving questions motivate students to learn complex scientific content in microbiology and immunology. Challenging assignments and guest lectures help students understand that these questions cannot be answered using biomedical principles alone, but are related to questions of economics, politics, education, human emotion, and psychology.

This course began as a large (400+) lecture course for non-science majors that emphasized active learning through online discussion groups, guest lectures, and peer-review strategies. More recently, new versions of the course have been taught on a smaller scale and in programs designed for “adult learners.” The presenter, a microbiologist and the director of faculty development and assessment programs at Rutgers, will explain the development of the model and will also discuss how to use technology to incorporate student research and writing into large classes and will discuss other methods that motivate students to persist in learning difficult concepts.

**Results:** Participants will learn to evaluate areas of content to focus on those most critical for teaching the capacious topic of concern. They will be asked to consider how they might redesign their own course to do this. Participants will review the models for student engagement and select activities that may be adapted for their own programs. Participants will also assess the strategies for “evolving” course models as interest in issues and knowledge of content change over time.

## Featured Model: Superfund Site Redevelopment: The RETUrN Learning Community

Luther Bonney 310

Themes:	Civic Engagement Community-Based Research Chemistry	Environmental Studies Learning Communities
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Steven Bachofer, [bachofer@stmarys-ca.edu](mailto:bachofer@stmarys-ca.edu)  
Saint Mary's College of California

**Abstract:** Superfund site redevelopment requires a collaborative approach by scientists, engineers, regulators, and community members. The RETUrN learning community focuses on the redevelopment of the Alameda Point where numerous scientific and sociological challenges must be addressed. Since the Superfund redevelopment process requires community input, two courses, a sociology course (taught by Phylis Martinelli) and a general science course (taught by the presenter) were linked together as a learning community. The linkage makes the chemical science aspects more approachable and relevant and the students and faculty are learning with a community that is in transition. The model features two field experiments and a formal civic engagement event along with other labs. The students and faculty have compiled a Website as an educational project that will serve as a resource for the community. The Website includes excerpts from a focus group with Restoration Advisory Board members (a committed group of community members), student summaries on a specific environmental issue for the site, links to more specific information on Alameda Point, plus information on this learning community. The presenter will give a brief overview of the two courses and invite participants to discuss challenges and opportunities involved in studying similar sites.

**What will be accomplished:** In presenting and discussing this model, I hope to encourage colleagues to develop curricular materials that support initiatives they wish to pursue.

**Results:** The session will help enable participants to undertake community-based science learning projects that take considerable effort but also yield big payoffs for faculty, students, and institutions.

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## The Basics of Community-Based Research

Abromson 213

Themes:	Pedagogy Theory/Rationale	Community-Based Research Assessment/Evidence
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Amy Shachter, [ashachter@scu.edu](mailto:ashachter@scu.edu)  
Santa Clara University

**Abstract:** This session will explore the basic tenets and practices of undergraduate Community Based Research for both science and non science and majors alike. Together we will discuss the practice as it relates to the National Research Council's guidelines for best practices in science teaching and as it supports the missions of many of our colleges and universities. We will review the aims and objectives of this experiential learning practice and provide time to work on connecting curriculum to authentic discovery-based research practices and assessment.

**What will be accomplished:** Participants will (1) formulate a working definition of undergraduate research and community-based research, (2) relate the research experiences to civic engagement, and (3) propose ways to integrate research into the undergraduate experience at their institution.

**Results:** Relating to their own courses and institutions, participants will be able to (1) describe the value of research opportunities to the undergraduate experience in the context of national standards, (2) outline learning outcomes related to research experiences, and (3) design assessment strategies including measures of success and student self-assessment of learning gains.

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### **SENCER and the Education of Science Majors**

*Luther Bonney 327*

Themes:	SENCER in the Majors Theory/Rationale Assessment/Evidence	Genetics Pedagogy
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Terry R. McGuire, [mcguire@biology.rutgers.edu](mailto:mcguire@biology.rutgers.edu)  
*Rutgers University*

**Abstract:** Some may believe that SENCER approaches that feature “context” are incompatible with information-rich, so-called “content”-based, courses for science majors. “Content” must be redefined as the information that students retain and not simply as the information to which they have been exposed, or on which they were tested. Teaching approaches that work for non-majors are also extremely effective in teaching science majors. Topics to be discussed include rearranging the textbooks, engaging the students, and soliciting and responding to student concerns through on-going formative assessment. Reinventing courses increases student achievement.

**What will be accomplished:** By talking about and critically examining work at Rutgers University, I hope to encourage changes in how courses for science majors are designed and taught elsewhere.

**Results:** Participants will begin or accelerate a process of changing science courses for majors into courses that are relevant and challenging. The session will encourage professors to make at least one tiny change in their courses to improve learning.

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### **SENCER Courses & The Intellectual Challenge of Diversity**

*Luther Bonney 302*

Themes:	Theory/Rationale Design	Pedagogy
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Cathy Middlecamp, [chmiddle@wisc.edu](mailto:chmiddle@wisc.edu)  
*University of Wisconsin-Madison*

**Abstract:** What do race, ethnicity, and gender have to do with teaching science? This question, when posed to me almost 15 years ago, marked the beginning of a personal journey of examining what I taught, who my students were, and what they were learning. In this presentation, we will explore how questions of race, ethnicity, and gender can move from the margins of a course to its center. Participants will (1) learn how the SENCER model offers possibilities for designing science courses that meet general education requirements for diversity, (2) try their hand at designing an instructional pathway of their own, and (3) take home a packet of useful materials.

**What will be accomplished:** To actively involve participants in a discussion that can offer them a tool to design their own course in a way to give issues of race, ethnicity, and gender a legitimate and meaningful place in the science curriculum.

**Results:** As a result of participating in this session, I hope that attendees will be better able to (1) conceptualize how public policy can bridge issues relating to science and communities of people, (2) extend the repertoire of ways to incorporate race, ethnicity, and gender into their own courses, and (3) take a model for course design that relates people, culture, and science and apply it to meet their own curricular needs.

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### Getting Started with the SENCER-SALG

*Abromson 110*

*(Because the use of the SENCER-SALG will be a condition attaching to SENCER sub-awards, teams should designate at least one member to participate in this session. To achieve widest possible exposure to the SENCER-SALG, teams are advised to give this opportunity to someone who did not attend the first SALG session.)*

Themes:	Assessment	Planning
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Stephen Carroll, [scarroll@scu.edu](mailto:scarroll@scu.edu)  
*Santa Clara University*

**Abstract:** This workshop will introduce attendees to the SENCER-SALG (Student Assessment of their Learning Gains) and how to use it to assess student learning in their classes. We will begin with some basic principles of the SENCER-SALG's design, and how understanding those principles can help you use it effectively. We will then spend most of our time working directly with the SENCER-SALG website. You will learn how to set up a survey instrument for your own class, how to administer it, and how to interpret the results. You will also learn how to customize the instrument to include your own course goals as well as SENCER's programmatic goals. (If you bring a laptop, you can set up your own SENCER-SALG during the workshop.) This workshop is especially geared for those new to the SENCER-SALG.

**What will be accomplished:** Attendees will become comfortable with the SENCER-SALG and motivated to use it to help them understand in more detail what (and how) students are learning in their classrooms.

**Results:** Attendees will be able to (1) understand basic principles of assessing student learning (especially as they are manifested in the SENCER-SALG) (2) use the SENCER-SALG to assess student learning in their classes and (3) customize the SENCER-SALG to include their own course goals as well as SENCER's.

## **Publishing in Science Education and Civic Engagement: An International Journal**

Abromson 214

*(This session is open to all participants, regardless of the level of involvement in the SENCER project. Participants who have ideas for possible articles are invited to bring abstracts, drafts, and other similar materials to this session. The presenter, a co-editor of the Journal, will arrange for individual discussions with potential contributors during the Institute.)*

Themes:	Dissemination	Civic Engagement
	Contributing to the STEM Knowledge Base	

Richard Keeling, [rich@keelingassociates.com](mailto:rich@keelingassociates.com)  
*National Center for Science and Civic Engagement*

**Abstract:** This session describes a recently-launched peer-reviewed professional journal that is inspired by the SENCER project and published by the National Center for Science and Civic Engagement. The journal serves as a forum for publishing creative work at the interface of science education and civic engagement. We invite contributions that focus on using unsolved, complex civic issues as a framework to develop students understanding of the role of scientific knowledge in personal and public decision making, along with examining how such knowledge is embedded in a broader social and political context. Since many pressing issues are not constrained by national borders, we encourage perspectives that are international or global in scope. Submissions will be organized under the following categories: Topical reviews, research articles, science education and public policy project reports, points of view, teaching and learning, and reviews of books and media. During the session we will review the goals of the journal and discuss the process of developing the first issue. We also welcome suggestions on how this journal can best serve the needs of the SENCER community, reach a broad readership, and make a significant contribution to the scholarship of teaching and learning.

**What will be accomplished:** The presentation aims to disseminate the goals of the new journal and develop professional scholarship of teaching and learning within the SENCER community.

**Results:** Participants will understand the educational goals of the new journal, consider translating educational practice into research on teaching and learning, know what is expected of those who submit papers to the journal, and be inclined and feel invited to make a submission.

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## **Inquiring into Our Students' Learning –The Scholarship of Teaching and Learning**

Luther Bonney 326

Themes:	Assessment	Course Design
	Planning	

Matt Fisher, [matt.fisher@email.stvincent.edu](mailto:matt.fisher@email.stvincent.edu)  
*Saint Vincent College*

Spencer Benson, [sbenson@umd.edu](mailto:sbenson@umd.edu)  
*University of Maryland*

**Abstract:** The scholarship of teaching and learning (SoTL) has been elegantly described as “inquiring into our students’ learning.” But what does this mean and what does this look like in real life? How does SoTL work help to make teaching public and community property? How does this form of scholarship connect to the concerns of faculty involved in SENCER? This session will provide an overview of the scholarship of teaching and learning through the work of three faculty, all Carnegie Scholars, who have also been actively involved in SENCER. Matt

Fisher focused on teaching biochemistry through the use of public health issues as a means of creating opportunities for students to make connections across courses and disciplines. Spencer Benson focused on using videos as the informational platform for content material in a general education biology course. Jacqueline Dewar (a SENCER alumna whose work will be described by Fisher and Benson) focused on changes in how math majors understand the concept of proof. Through examination of the above projects and related work by these three faculty, participants will develop an understanding of important characteristics of the scholarship of teaching and learning. The session will also provide information about resources and tools for engaging in this work.

**What will be accomplished:** Participants will gain an overview of the characteristics of SoTL and will become acquainted with resources and tools for engaging in SoTL.

**Results:** Participants will be able to identify questions arising in their own teaching that would be suitable starting points for a SoTL project and will be able to identify appropriate tools and resources to use in carrying out a SoTL project.

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### **Science and the Engagement of Learners: A Conversation with Dr. Cora Marrett**

*Abromson 215*

Themes:	Contributing to the STEM Education Knowledge Base	Planning
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Cora Marrett, [cmarrett@nsf.gov](mailto:cmarrett@nsf.gov)  
*National Science Foundation*

**Abstract:** This will be an informal session to encourage discussion and dialogue stimulated by Dr. Marrett's plenary presentation. It is a SENCER tradition to invite our participants to engage with plenary speakers to pursue topics and ideas that arise in the plenary sessions and/or to take advantage of the presenter's expertise. Dr. Marrett will also be interested in receiving suggestions and comments on NSF's mission, goals and programs.

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### **5:45-8:30 RECEPTION & WELCOME DINNER** *Tent by Luther Bonney*

We invite you to a reception (cash bar) to be followed by a gala welcome dinner featuring some of Maine's most renowned victuals—that means lobsters and lots of good things for vegetarians and those who do not eat shellfish, as well. (All of SSI 2007 food service events feature vegetarian and non-vegetarian selections.)

*(Shuttle buses will run from the University of Southern Maine Campus in front of the Abromson Community Education Center to SSI 2007 hotels from 6:45 p.m. to 8:45 p.m. Please check to make sure you board the correct bus before leaving.)*

## SATURDAY, AUGUST 4, 2007

(Shuttle buses will run from all hotels to the University of Southern Maine campus from 6:45 a.m. to 8:30 a.m.)

**7:00-8:30**      **BREAKFAST BUFFET**  
*Tent by Luther Bonney*

**8:45-9:15**      **HOMEROOMS/TEAM TIME**  
*Rooms as assigned (behind Tab 1)*

**9:30-10:45**      **CONCURRENT SESSIONS III**

### **Asking Questions about Public Health: A SENCER Strategy for Community Engagement** *Abromson 215*

Themes:	SENCER in the Majors Service-Learning	Civic Engagement Health
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Marion Fass, [fassm@beloit.edu](mailto:fassm@beloit.edu)  
*Beloit College*

**Abstract:** When is a problem a public health concern? This question draws students into broad interdisciplinary and quantitative analysis and problem solving. It also encourages science students to consider social implications of their studies. The methods of public health encourage students to be intellectually daring. SENCER public health courses build upon a framework of science, quantitative reasoning and social justice. In this session, we will use the tools of public health to identify problems, set course goals, explore the complexity of community concerns and build courses that enable students to engage with important questions such as asthma, influenza preparedness, obesity, HIV/AIDS and others in a way that brings together community problems with existing data sets and background science. Participants will be able to apply epidemiology and community based research in course design to enhance decision making in civic life and empower students to go on in statistics, biology and public health.

**What will be accomplished:** Participants will broaden their visions for their classes, be able to connect the science with the concerns of the community, and apply public health analyses to vexing issues.

**Results:** Attendees will be able to connect science with community concerns, design engaged activity for students, and link divergent disciplines.

## The Application of SENCER Values to Curricular Reform and Implementation: UNC Asheville's Integrative Liberal Studies Topical Clusters

*Luther Bonney 502*

Themes:	General Education Reform Civic Engagement Service-Learning	SENCER in the Majors Alumni Case Report
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Edward Katz, [ekatz@unca.edu](mailto:ekatz@unca.edu)

Keith Krumpe, [kkrumpe@unca.edu](mailto:kkrumpe@unca.edu)

*University of North Carolina at Asheville*

**Abstract:** This presentation examines the curricular review and reform process at UNC Asheville (UNCA), in particular the development of the ILS Topical Clusters, which integrate natural science, social science, humanities and the arts, within the liberal arts curriculum. Stepping away from traditional approaches to general education, cluster faculty construct course-level curricula around complex, unresolved public issues, addressing them from disciplinary perspectives while strengthening cross-disciplinary connections. Faculty members engage in collaborative curriculum development, often enriching the classroom experience with a variety of co-curricular opportunities. Clusters leverage the strengths of learning community pedagogies, while providing a cost-effective means for curricular development and delivery. Session participants will examine the advantages of UNCA's approach to curriculum reform, successful recruitment of faculty, the use of curricular structure to leverage departmental support, methods for faculty development, and other topics critical to successful implementation.

**What will be accomplished:** Presentation participants will (1) examine the advantages of UNC Asheville's curriculum reform process, (2) explore the benefits of cluster approaches for encouraging SENCER-style curricular reform, (3) begin to develop their own sample cluster topics and courses, (4) generate guiding concepts, activities, and co-curricular enrichments to support their clusters, (5) discuss their own reform efforts with colleagues from other institutions and (6) explore practical solutions to common implementation problems.

**Results:** Participants will (1) have a strategy for beginning a faculty-based discussion on interdisciplinary general education reform in the sciences, (2) be able to generate topical cluster ideas appropriate for their own institution, and (3) be able to generate core concepts in the sciences, social sciences, and the humanities, necessary for the development of their clusters.

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## Getting Started with the SENCER-SALG

*Abromson 213*

*(This session repeats a session given during Concurrent Session II.)*

Themes:	Assessment	Planning
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Stephen Carroll, [scarroll@scu.edu](mailto:scarroll@scu.edu)

*Santa Clara University*

**Abstract:** This workshop will introduce attendees to the SENCER-SALG (Student Assessment of their Learning Gains) and how to use it to assess student learning in their classes. We will begin with some basic principles of the SENCER-SALG's design, and how understanding those principles can help you use it effectively. We will then spend most of our time working directly with the SENCER-SALG website. You will learn how to set up a survey instrument for your own class, how to administer it, and how to interpret the results. You will also learn how to customize the instrument to include your own course goals as well as SENCER's programmatic goals. (If

you bring a laptop, you can set up your own SENCER-SALG during the workshop.) This workshop is especially geared for those new to the SENCER-SALG.

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### SENCER 101

*Luther Bonney 327*

*(This session is recommended for people who need a refresher course on the SENCER project and for those who want to learn the basics from an experienced SENCER practitioner.)*

Themes:	Theory/Rationale	Planning
	Civic Engagement	Service-Learning

Theo Koupelis, [theo.koupelis@uwc.edu](mailto:theo.koupelis@uwc.edu)  
*University of Wisconsin-Marathon*

**Abstract:** In this session we will describe the SENCER project, the need for such a dissemination project, our efforts to establish regional networks, and ways for anyone interested in civic engagement and service-learning to get involved and contribute.

**What will be accomplished:** This session will familiarize Institute attendees with SENCER's mission and operation.

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### Featured Model: Uranium and American Indians

*Abromson 214*

Themes:	SENCER in the Majors	Chemistry
	Knowledge Transfer	Physics

Cathy Middlecamp, [chmiddle@wisc.edu](mailto:chmiddle@wisc.edu)  
*University of Wisconsin-Madison*

**Abstract:** This course brings together two stories, almost on a collision course. One is the story of the Dineh (Navajo), the other that of the uranium boom in the 1950s. Both stories connect to issues that still face those living in the U.S. southwest today. Students in this SENCER model course learn about the connections between people and radioactivity in this one context and then they apply what they have learned to a new context of their own choosing. Similarly, I hope that participants in this session will learn something in the context of thinking about this course and then be able to apply it to their own course development.

**What will be accomplished:** As a July 2006 article in *The Arizona Republic* points out, many people are curious about Native American culture and wish to learn more about it. Similarly, radioactivity is a topic that can immediately catch a person's attention. Given that this presentation is about a course that interweaves both Native American culture and radioactivity, I hope that those attending will be intrigued by the possibilities for student learning that topics such as these can offer.

**Results:** As a result of participating in this session, I hope that you will be able to (1) visualize how science and culture can connect through issues of public policy, (2) see how a higher-level learning goal can be successfully achieved in one course, and then (3) apply a similar higher-level learning goal in your own course.

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### Active Learning Techniques for Large and Small Classes

*Luther Bonney 403*

Themes:	Pedagogy Planning	SENCER in the Majors Assessment
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Laurie Fathe, [lfathe@gmu.edu](mailto:lfathe@gmu.edu)  
*George Mason University*

**Abstract:** For more than a decade, national leaders in STEM education, including the National Research Council and the National Science Foundation, have been extolling the value of teaching science through active learning. Most of us who teach in the sciences appreciate the value of hands-on learning, and incorporate this in our courses through laboratory experiences. But there has been less incorporation of active learning in the lecture portions of our classes. This session will demonstrate a number of techniques that foster active learning in science classes. Ways to adapt the techniques to different sized classes will be discussed. Participants will experience a number of the techniques, and have the opportunity to reflect on how they could be used in their own classes.

**What will be accomplished:** Participants will gain knowledge of and some experience with a variety of active learning techniques they could use in their own teaching. They will also be motivated to do so.

**Results:** Attendees will be able to envision places in their teaching where active learning would facilitate student learning, design active learning activities that fit the learning goals of their courses, and engage students in active learning activities in any size class.

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### Engaging Minority Students in STEM Education

*Luther Bonney 302*

Themes:	Dissemination	Pipeline Issues
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Dave Ferguson, [dferguson@notes.cc.sunysb.edu](mailto:dferguson@notes.cc.sunysb.edu)  
*Stony Brook University*

**Abstract:** Over the last two decades Stony Brook University has developed some highly successful programs for engaging underrepresented minority students in science, technology, engineering and mathematics (STEM) disciplines and careers. Much of that success has come as a result of building sub-communities that allow the special needs of certain groups to be addressed while at the same time engaging students with the vast human and material resources of the broader University.

The facilitator will open the session with a brief overview of the evolution of minority in STEM efforts at Stony Brook University. Quickly, the discussion will turn to individual institutional contexts so that participants can share challenges, successes, and emerging practices. The overarching goal is to have participants begin to develop plans to enhance the participation of minorities within STEM disciplines at their institutions.

**What will be accomplished:** Participants will (1) become familiar with some successful models for enhancing the participation of underrepresented groups, especially under-represented minority students, in the STEM disciplines, and (2) consider successful strategies/models in the context of their own local situations (regional, institutional, departmental, etc.) so as to generate ideas for new structures and processes that might increase the engagement of underrepresented groups.

**Results:** Participants will (1) be able to analyze some of the strengths and weaknesses of various approaches to enhancing the participation of underrepresented groups, especially underrepresented minority students, in STEM fields, and (2) be able to reflect on their own local situations with a view towards developing tentative ideas for a plan to enhance the participation of underrepresented groups.

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### **Our Students as Partners in SENCERizing the Curriculum**

*Luther Bonney 402*

Themes:	Theory/Rationale Planning	Course Design
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Eliza Reilly, [eliza.reilly@fandm.edu](mailto:eliza.reilly@fandm.edu)  
*Franklin & Marshall College*

Steve Bachofer, [bachofer@stmarys-ca.edu](mailto:bachofer@stmarys-ca.edu)  
*Saint Mary's College of California*

**Abstract:** Where do we find the creativity, energy, and fresh insight to revitalize our courses and programs? Who are the role models that motivate students to become more active learners? Who can provide unique insight into the mind and lives of students? The answer to these questions should be obvious, but it is often overlooked. Our undergraduates possess a variety of talents, but they are rarely given an opportunity to apply these talents to curriculum reform. When we invite our leading students to partner with us in this effort, the effects can be rewarding and far-reaching. Facilitators of this session will describe specific ways in which they have partnered with students to seek external funding, plan and implement new courses, enrich mentoring and support services, facilitate classroom discussions, develop experiential and service learning activities, assess learning outcomes, market effective programs to various constituencies, and more. The students in the partnership develop confidence, maturity, pedagogical understanding, and communication skills, and they also inspire higher performance from their peers. Professors learn from, and are energized by, these partnerships as well. Participants will be encouraged to compare experiences as we consider the ways and means to partner with talented students to further SENCERize our curriculum.

**What will be accomplished:** Participants will be inspired to partner with students in developing and implementing new programs at their home institution.

**Results:** Participants will establish new types of working relationships with students.

*\* Ellen Goldey had been one of the original presenters and session organizers. Unfortunately, she is unable to be with us this year.*

## Embedding Math Diagnostic and Remedial Assistance in PowerPoint Lectures

Luther Bonney 410

Themes:	Pre-Service Teacher Education Community Colleges	Disciplinary-based Mathematics
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Garon Smith, [garon.smith@umontana.edu](mailto:garon.smith@umontana.edu)  
*University of Montana*

**Abstract:** Students who have doubts about their mathematical abilities often face their required quantitative science courses with great trepidation. This workshop will illustrate how to design PowerPoint slide sequences that (1) diagnose precisely where a student encounters a math block, and (2) provide remedial hand-holding tutorials to help the student work through a step-by-step, detailed analysis of how a specific sample problem is worked/solved. A series of examples employing this technique will be presented, drawing from PowerPoint sequences used in The University of Montana's Chemistry 151, a required SENCER course in introductory chemistry for applied science majors (forestry, wildlife biology, nursing, etc.). After showing selected sequences, the presenter will take you behind the slide show to demonstrate how to create these sequences expeditiously using built-in PowerPoint tools. Sequence design elements include (1) color mapping of word problems into an accompanying formal mathematical expression, (2) color-coded unit analysis, (3) rest frames, (4) personal response system (clicker) tricks, and (5) computational baby-stepping.

**What will be accomplished:** The presenter hopes that, as a result of attending this session, (1) participants will consider adopting this strategy in their own courses, and that (2) those interested in this approach will form an informal group to share ideas and success stories, and enlarge the collection of tutorials by exchanging PowerPoint sequences for engaging problems.

**Results:** Three things are anticipated: (1) Participants will recognize the diagnostic power of the technique to instantly focus on the exact step that blocks a student who is struggling through a complex quantitative problem, (2) participants will recognize the value of PowerPoint sequences to provide remedial assistance to students who need these tutorials in a manner that does not slow content delivery for the rest of the class who are mathematically more competent, and (3) participants will be able to efficiently use PowerPoint's existing tools to capture sequence design elements of color mapping, color-coded unit analysis, rest frames and computational baby-stepping.

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## Forum on Honors Programs and Interdisciplinary Science Lab and Field Experiences

Luther Bonney 326

Themes:	Honors Courses
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Robert Sanford, [rsanford@usm.maine.edu](mailto:rsanford@usm.maine.edu)  
Blake Whitaker, [blakew@usm.maine.edu](mailto:blakew@usm.maine.edu)  
*University of Southern Maine*

**Abstract:** In this informal discussion session we will explore the relationship between Honors programs and courses and SENCER-influenced interdisciplinary science courses that use active learning techniques. Focus will be given to the issue of creating shared laboratory space for interdisciplinary learning in Honors. The presenters will also address the questions: What are the special issues and challenges in having honors program and other interdisciplinary laboratories? What strategies are needed to promote cooperative efforts in obtaining, managing, and using shared laboratory space?

**Results:** A gathering of faculty who teach and/or administer Honors programs will lead to sharing experiences and the improvement of strategies. Attendees of this session will be able to identify colleagues they may consult or collaborate with in the future concerning the integration of SENCER in Honors programs. We hope to arrive at a consensus on the opportunities and challenges in implementing science labs for honors programs. Participants will leave the session with renewed commitment to the value of developing interdisciplinary science courses with a civic component and the knowledge of how to begin.

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**New Pedagogies, New Problems: When You Listen to Your Students, Will You Like What You Hear?**

*Abromson 110*

Themes:	Theory/Rationale SENCER in the Majors Assessment/Evidence	Disciplinary-Based Pedagogy
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Patricia Wilson, [pjw1176@earthlink.net](mailto:pjw1176@earthlink.net)  
*La Salle University*

Robin Freyberg, [freyberg@yu.edu](mailto:freyberg@yu.edu)  
*Stern College for Women, Yeshiva University*

Terry McGuire, [mcguire@biology.rutgers.edu](mailto:mcguire@biology.rutgers.edu)  
*Rutgers University*

**Abstract:** SENCER-style courses increase the overall learning for many students. However, in implementing the SENCER ideals, we have discovered new problems with plagiarism, cheating, and lack of originality by otherwise good students. When we see these things we are inclined to ask: What were these students thinking when they did this? Perhaps we should be focused on the more vexing question: Is there anything about our educational approach that encourages students to act in ways we consider unethical? Are some of the very behaviors that we find troubling in our new courses actually rewarded in more traditional courses? Other problems arise because students are faced with moral dilemmas. The manner in which one thinks about moral issues—that is, the level of one’s moral judgment—changes over time. A particular level depends on cognitive structures that also impact the student’s understanding of material. What can we adjust about our teaching that, especially in the case in late adolescents, recognizes their general level of moral judgment and cognitive capacity? This session will review some problems uncovered when we restructure our courses by using progressive pedagogies. Our overall goal, however, is to create an opportunity discuss the unintended consequences of SENCER-style courses and some strategies for dealing with these new problems.

**What will be accomplished:** We plan to highlight and discuss the importance of developmental psychology in understanding our students. In open discussion we would like to “brain storm” about what could be done to reduce the incidences (or prevalence) of plagiarism, cheating, and lack of originality.

**Results:** This session is intended to be a discussion. We hope to draw on the collective experience of interested faculty to suggest possible solutions to the new problems that arise in interactive courses. If we can begin to develop strategies to cope with these new challenges, the session will have achieved its purpose.

## SENCER and the Greening of an American Campus

Abromson 216

Themes:	Alumni Case Report Civic Engagement	Environmental Science
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Amy Shachter, [ashachter@scu.edu](mailto:ashachter@scu.edu)  
Santa Clara University

**Abstract:** Santa Clara University incorporates the ideals of sustainability into its academics and the operation of buildings on campus. This session will introduce participants to one university's approach to integrating the ideas of sustainability into both areas, from ensuring that new constructions on campus are designed to meet LEED (Leadership in Environmental and Energy Design) guidelines, to implementing a "Comprehensive Sustainability Policy" which has goals of educating the whole person, promoting a dialogue on sustainability, and encouraging local development in sustainable ways. It will also explore some of the new and tenured courses that reflect SCU's initiatives. *Chemistry and the Environment*, for example, is a course for non-science majors that uses campus and community-based environmental assessment projects to connect students with the effects on the community. Two topics used to address the fundamentals of chemistry are air quality (chemistry: atomic structure, nuclear chemistry, etc.) and the quality contrast between tap and bottled water (chemistry: water purification, organic molecules, methods of analysis). Participants will learn how to incorporate environmental awareness into course design and campus initiatives.

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**11:00-12:15**    **PLENARY SESSION**  
*Hannaford Lecture Hall (Abromson Community Education Center)*  
Debra Meyer, presiding

### "SENCER and New Thinking about Interdisciplinary Research and Learning"

Robert Full  
Chancellor's Professor  
*University of California at Berkeley*

**12:30-1:30**    **LUNCH**  
*Tent by Luther Bonney*

**1:45-3:00**    **POSTER PRESENTATIONS (II)**  
*Abromson Community Education Center*

**3:15-4:30**    **CONCURRENT SESSIONS IV**

**New Thinking About Interdisciplinarity—A Follow-Up Conversation with Robert Full**  
*Abromson 110*

Themes:	Pedagogy	Interdisciplinary Learning
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Robert Full, [rjfull@berkeley.edu](mailto:rjfull@berkeley.edu)  
*University of California at Berkeley*

**Abstract:** This will be an informal session to encourage discussion and dialogue stimulated by Professor Full's plenary presentation. It is a SENCER tradition to invite our participants to engage with plenary speakers to pursue topics and ideas that arise in the plenary sessions and/or

to take advantage of the presenter’s expertise. Dr. Full will welcome a chance to work with participants on how they can adopt and adapt the suggestions made in his plenary to their own local conditions and circumstances.

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**“Our Remedies Oft In Ourselves Do Lie”: Figuring Out What Works in Your Lectures and How to do More of It**

*Abromson 213*

Themes:	Learning Theory Lecture Presentations	Pedagogy
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Patricia deWinstanley, [patty.dewinstanley@oberlin.edu](mailto:patty.dewinstanley@oberlin.edu)  
*Oberlin College*

**Abstract:** Lecturing as a tool for classroom instruction in the sciences is ubiquitous. Many of us lecture at least some of the time, and in our large introductory courses, most of us lecture most of the time. Even though we may believe that lecturing is antithetical to active learning, cooperative learning, and the other types of pedagogy that we are hearing about here at the SENCER Summer Institute, we continue to lecture because lecturing is sometimes indispensable, particularly when teaching background facts and knowledge. Fortunately, through careful consideration of how to structure our lectures and by applying principles of cognitive science, lecturing can be a successful method of teaching—compatible with active-learning pedagogies. In this session, you will learn about seven critical principles of learning and memory distilled from decades of cognitive science research.

**What will be accomplished:** Participants will learn about seven critical principles of learning and memory and will develop ideas about how best to apply these principles when designing lectures.

**Results:** Following this session, participants will be able to (1) identify what they already do in their lectures that results in effective learning, (2) match the design of their lectures with the principles of memory and learning, and (3) develop ideas for incorporating more of the principles of memory and learning into their lectures.

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**The Effects of Online Classes on Engagement**

*Abromson 216*

Themes:	Assessment Civic Engagement	Planning Environmental Studies
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John Pratte, [jpratte@astate.edu](mailto:jpratte@astate.edu)  
*Arkansas State University*

**Abstract:** The results of a two-year study on the effect of an online learning environment on student attitudes and perceptions will be presented. In the study, students in a general education energy course were allowed to enroll in either a traditional or an online section. Both section types used identical classroom and online materials and were assessed using identical assignments, quizzes, and tests. Students in the course were civically engaged by measuring and analyzing their energy usage, its impact upon the environment, and ways to shrink their ecological footprint. Student attitudes and perceptions about science and community involvement were assessed using the SENCER-SALG instrument. While most of the responses are similar between the different section types, key differences exist in student interests that indicate a problem with using an online environment to civically-engage students.

**What will be accomplished:** The results of the study will be presented to a broad audience, and the group will engage in a dialogue about the value of online learning.

**Results:** Participants will (1) learn some of the problems of using an online environment to civically engage their students, (2) analyze data from the SENCER-SALG instrument, and (3) use the activities from the ESA21 Project (an NSF-supported resource in environmental education).

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### Teaching Urban Health Towards Socials Justice

*Luther Bonney 410*

Themes:	Interdisciplinary Alumni Case Report Quantitative Literacy	Planning Health
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Heide Hlawaty, [hhlawaty@metropolitan.edu](mailto:hhlawaty@metropolitan.edu)  
Richard Grallo, [rgrallo@metropolitan.edu](mailto:rgrallo@metropolitan.edu)  
*Metropolitan College of New York*

**Abstract:** Teaching *Urban Health Toward Social Justice* allows students to examine the interface between health and environment in the urban setting. Taught in conjunction with *Introduction to Applied Statistics*, the course offers systematic opportunities for students to interpret scientific and statistical information in the context of experiential learning. Our college’s mission is to organize interdisciplinary learning that prepares students to be agents of change in their future respective fields. Our students are required to develop “constructive action” projects that promote advocacy, social justice, and equitable education (empowerment) of underserved populations. Our courses emphasize substantive research, writing, and critical thinking activities to foster mature capacities for independent inquiry and problem-solving. The presenters will discuss the development of a project that centers on critical urban health concerns. They will also review results from the SENCER-SALG and other assessment activities and will outline future SENCER work in science and mathematics courses and in purpose-centered constructive action courses specific to the Metropolitan College model of education.

**What will be accomplished:** We would like the participants to come away with ideas about how they can reframe our models of constructive action projects for their courses. We will demonstrate how experiential learning interacts with civic engagement as a course component. We will provide guidance on how to document and assess these two components.

**Results:** Participants will be able to list three key factors in the application of SENCER ideals to the purpose-centered educational program at Metropolitan College of New York and will be able to envision developing similar courses focused on metropolitan or regional health issues that enhance scientific and quantitative literacy and prepare graduates for effective engagement in their communities.

## Implementing SENCER Ideals in the Majors

Luther Bonney 310

Themes:	Disciplinary-Based Presentations Civic Engagement Alumni Case Report	SENCER in the Majors Service-Learning
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Kristen Leckrone, [kleckron@roosevelt.edu](mailto:kleckron@roosevelt.edu)  
Robert Seiser, [rseiser@roosevelt.edu](mailto:rseiser@roosevelt.edu)  
Kelly Wentz-Hunter, [kwentzhunter@roosevelt.edu](mailto:kwentzhunter@roosevelt.edu)  
*Roosevelt University*

**Abstract:** This session describes efforts of Roosevelt University science and mathematics faculty to incorporate SENCER ideals into core science and math courses taken by most STEM majors. Current and planned courses targeted for SENCER modification include general and organic chemistry, probability and statistics, science reasoning and quantitative methods, and molecular and cellular biology. In each course, a Roosevelt faculty member is working from the existing curriculum to implement best teaching practices and civic engagement opportunities into pre-existing courses. Some of our approaches include large-scale redesign of courses around a unifying topic, smaller-scale inclusion of science and society threads in lectures and assignments, service learning experiences, applications-oriented laboratories, and use of the SENCER-SALG assessment tool to gauge attitudinal and specific content outcomes.

**What will be accomplished:** Goals of this session are to discuss potential benefits of—and barriers to—implementing SENCER ideals in courses for majors, present case studies demonstrating approaches to implementing SENCER ideals in a variety of majors-level courses, and present initial SENCER SALG assessment data for those courses

**Results:** Participants will (1) discuss challenges, benefits and approaches for implementing SENCER ideals in content-intensive majors level courses, (2) develop approaches for assessing the impact of curricular change both on student attitudes and on specific content knowledge and skills, and (3) generate ideas for institutionalizing and sustaining course-level and curricular level change in majors level courses.

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## Featured Model: Science, Society and Global Threats

Luther Bonney 327

Themes:	Civic Engagement Team Teaching Physics	Quantitative Studies Community Colleges
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Theo Koupelis, [theo.koupelis@uwc.edu](mailto:theo.koupelis@uwc.edu)  
*University of Wisconsin-Marathon*

**Abstract:** This course is but one example of a SENCER model course. It is a team-taught, interdisciplinary course that focuses on the nature, excitement, and role of scientific inquiry as a means of solving real-world problems through research and collaboration. By using the fundamental unifying principles of the natural sciences, it puts in scientific context important public issues such as past and possible future catastrophes that did and can affect our environment (e.g., plagues, extinctions, global warming, ozone depletion, nuclear winter, collisions with space debris, etc.). The historical, scientific, and social aspects of each theme are examined from different perspectives, and solutions are proposed and analyzed. The course emphasizes the

different approaches to scientific knowledge and the importance of being an informed user of this knowledge as a responsible citizen.

**What will be accomplished:** I hope that we will have a good discussion about how team-taught SENCER courses can be developed and sustained with minimal support and that participants will leave the session excited about the possibility of creating such a course at their institution.

**Results:** Participants should be able to use some of the materials and ideas we developed in their courses. They will learn how to overcome obstacles they may encounter as they plan to create SENCER courses at their institution. Thus, they will be in better positions to create courses that fit the needs of their students.

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### Featured Model: The Power of Water

*Abromson 214*

Themes:	Pre-Service Teacher Education General Education	Interdisciplinary Alumni Case Report
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Alix Fink, [finkad@longwood.edu](mailto:finkad@longwood.edu)  
*Longwood University*

**Abstract:** *The Power of Water* (POW) is an interdisciplinary science course that engages students in considering significant social issues related to global water resources and in learning basic chemistry, physics, biology, and earth science concepts that underlie those issues. POW, a product of Longwood University's SENCER involvement, supports our general education science goal and is a recommended goal course for our pre-service K-8 teachers. In this session we will discuss the evolution of this SENCER course from inception to its current form, identify the resources and strategies used in the continued development of this course, and review the challenges faced along the way.

**What will be accomplished:** This session will introduce one of the new SENCER model courses to the community and give attendees an idea of how a course centered on water resources can be structured for pre-service teachers and the general education curriculum.

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### Teaching for Critical Thinking

*Luther Bonney 326*

Themes:	Pedagogy
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Laurie Fathe, [lfathe@gmu.edu](mailto:lfathe@gmu.edu)  
*George Mason University*

**Abstract:** More than 90% of all college faculty members state that teaching students to think critically is one of the major tasks of a college education. Unfortunately, often students aren't taught Critical Thinking (CT), but expected to "pick up" this skill along the way in their college experience. Yet research has demonstrated that those who do not receive direct training in CT do not significantly improve their abilities. This session will help participants define what CT is, determine what aspects of CT are most pertinent to their disciplines, and present ways to help students improve their CT ability.

## Expanding Students' Understanding of Civic Issues: Integrating the Sciences with Other Disciplines

Luther Bonney 302

Themes:	Interdisciplinary Learning Dissemination Pedagogy	New Applications Learning Communities Alumni Report
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Steve Bachofer, [bachofer@stmarys-ca.edu](mailto:bachofer@stmarys-ca.edu)  
*Saint Mary's College of California*

Monica Devanas, [devanas@cat.rutgers.edu](mailto:devanas@cat.rutgers.edu)  
*Rutgers University*

Edward Katz, [ekatz@unca.edu](mailto:ekatz@unca.edu)  
Keith Krumpe, [kkrumpe@unca.edu](mailto:kkrumpe@unca.edu)  
*University of North Carolina at Asheville*

**Abstract:** Big problems rarely have single-discipline solutions. Therefore, the purposeful integration of multiple perspectives and disciplines in courses, learning communities and other curricular and non-curricular programs helps learners embrace holistic approaches to problem solving. We will offer an overview the diverse ways that such integration has been achieved at a variety of institutions, and we will briefly cover how our work in team-taught learning communities has enhanced student learning and enriched our professional lives. Then, using a theme-based approach, participants will work through an interactive, guided exercise to develop their own SENCER-ized, interdisciplinary model to share with the group. We will also overview the research documenting the success of this type of work, and share strategies for assessment and faculty development that support it.

**What will be accomplished:** Participants will understand the various ways in which courses, learning communities, and programs can be designed to help students integrate scientific knowledge and modes of thinking with that of other disciplines. Ideally, participants will be encouraged and empowered to incorporate these strategies at their own institutions.

**Results:** Participants will identify how perspectives of colleagues from other disciplines on their own campus (or experts from off campus) might enhance the understanding of a topic or problem, choose which structure of course, learning community, or program that would work best for them on their own campus, and plan their strategy for implementing the project.

*\* Ellen Goldey had been one of the original organizers and presenters. She is unable to be with us this year.*

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## Dramatic Demonstrations to Engage Science Audiences

Luther Bonney Talbot Lecture Hall

Themes:	Pre-Service Teacher Education SENCER in the Majors Disciplinary-Based	Community Colleges Civic Engagement
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Garon Smith, [garon.smith@umontana.edu](mailto:garon.smith@umontana.edu)  
*University of Montana*

**Abstract:** A fun way to underscore the process in which science is done is to simulate its practice within a classroom presentation setting. The presenter (in the guise of G. Wiz) will share with

participants several of his favorite potions that promote audience participation in observing physical phenomena, formulating a hypothesis and then testing the hypothesis. Part of the lesson's value is revealed in deliberately choosing a wrong hypothesis to test. In repeating the demonstration, even though the hypothesis is totally off base, most audience members quickly identify a better explanation the second time through. It is important to help students understand that in performing experimental replications, the brain is subconsciously processing information at a sophisticated level. Planned demonstrations include an ink making spell, a freezing spell, and a magical mathematics trick.

**What will be accomplished:** The presenter hopes that, as a result of attending this session, (1) participants will employ similar classroom activities to more effectively engage their science audiences, and that (2) those interested in this approach will form an informal group to share ideas and success stories, and enlarge the collection of useful demonstrations.

**Results:** Three things are anticipated: (1) participants will recognize the efficacy of using live demonstrations to illustrate the scientific method, (2) participants will share other classroom demonstrations likely to evince the same dramatic flare, and (3) participants will recruit new students to science careers by piquing their interests with the demonstrations.

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### Is it “OK” for Every Student to Earn an “A”? Reinventing Teaching

*Luther Bonney 326*

Themes:	Theory/Rationale Pedagogy	Assessment/Evidence SENCER in the Majors
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Terry R. McGuire, [mcguire@biology.rutgers.edu](mailto:mcguire@biology.rutgers.edu)  
*Rutgers University*

**Abstract:** This session will provide an opportunity for participants to discuss with Terry McGuire his SENCER Backgrounder, “Reinventing Myself as a Professor: The Catalytic Role of SENCER.” In the backgrounder (available on the SENCER website at <http://www.sencer.net/pdfs/Backgrounders/McGuireBackgrounderFINAL.pdf>), the author describes “the drunkard’s walk” that he has traveled since first attending the SENCER Summer Institute. While doing so, he enumerates the many effects that work with colleagues at the Institute and other faculty members have had on his teaching. Perhaps most of all, what has changed for the presenter is his view of, and relation to, his students. In essence, it has now become important to McGuire that all his students do “A work” and that they really learn what the course aims to teach. In the session, he will discuss how his changed view and the strategies he has adopted to improve learning by majors have now produced results—tangible evidence of improved learning in the sciences—that are inspiring to him as a teacher and deeply gratifying for students. While the presenter will offer some suggestions and conclusions that participants might find useful, the overall goal is to provide an opportunity for others to talk about their own experiences and to join in the process of reinvention.

**What will be accomplished:** Participants will reflect on their own journeys as a faculty members and teachers.

**Results:** Participants will reflect on how they teach their courses now and commit to change at least one thing in at least one course to make learning more enjoyable for the students and themselves.

## **SENCER and Introductory STEM Courses: A Way Forward—Session II**

*Abromson 215*

*(Open only to those who have applied and been invited to attend.)*

Themes:	Planning	Assessment
	Course Design	General Education
	SENCER and the Majors	

Jay Labov, [jlabov@nas.edu](mailto:jlabov@nas.edu)  
*National Research Council*

Karen Oates, [karen.oates@sencer.net](mailto:karen.oates@sencer.net)  
*National Center for Science and Civic Engagement*

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**4:45-5:30**      **TEAM TIME**

**5:30-7:15**      **RECEPTION**  
*Tent by Luther Bonney*

Join your colleagues for rather substantial hors d'oeuvres and a cash bar at this opportunity to socialize with one another following a very full day of work.

*(Shuttle buses will run from the University of Southern Maine Campus in front of the Abromson Community Education Center to SSI 2007 hotels from 6:00 p.m. to 8:00 p.m.)*

**7:30-10:00**      **ALUMNI RECOGNITION DINNER**  
(By Invitation)  
*Ballroom (Eastland Park Hotel)*

## SUNDAY, AUGUST 5, 2007

(Shuttle buses will run from all hotels to the University of Southern Maine campus from 6:45 a.m. to 8:30 a.m.)

**7:00-8:30**      **BREAKFAST BUFFET**  
*Tent by Luther Bonney*

**8:30-9:15**      **HOMEROOMS/TEAM TIME**  
*Rooms as assigned (behind Tab 1)*

**9:30-10:45**      **CONCURRENT SESSIONS V**

### **Featured Model: Chemistry of Daily Life: Malnutrition and Diabetes**

*Abromson 216*

Themes:	General Science Literacy “Just-In-Time” Teaching	Civic Engagement
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Matt Fisher, [matt.fisher@email.stvincent.edu](mailto:matt.fisher@email.stvincent.edu)  
*Saint Vincent College*

**Abstract:** *The Chemistry of Everyday Life* uses two contrasting but related global health problems, the lack of food and the over-consumption of food, to teach basic concepts in chemistry, including metabolism and metabolic regulation, the chemical structure of fats, carbohydrates, and proteins, enzyme function, DNA structure, and drug toxicity. These topics are explored in relation to the policy questions generated by rising incidence of malnutrition and hunger, genetic testing, drug development and approval processes, risk assessment for food additives and drugs, and rising medical costs due to obesity and its medical consequences. Student comments indicate that they see immediate and important implications of the course material to decisions that they make on a daily basis, particularly in regards to food. The presentation will also discuss the use of “Just-In-Time Teaching” to provide continuous and immediate assessment of student progress.

**What will be accomplished:** Participants will become more familiar with how particular issues were utilized to transform an existing course into a SENCER course. Participants will become more familiar with the use of “Just-in-Time Teaching” in a course for non-science majors.

**Results:** After participating in this session, attendees will be able to (1) describe steps they could take to rework an existing course into a SENCER course, and (2) describe specific ways that they could incorporate “Just-in-Time Teaching” into a SENCER course.

## Featured Model: Science on the Connecticut Coast: Investigations of an Urbanized Shoreline

Luther Bonney 208

Themes:	Environmental Studies	Non-Majors
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James Tait, [taitj1@southernct.edu](mailto:taitj1@southernct.edu)  
Southern Connecticut State University

**Abstract:** *Science and the Connecticut Coast* is course that fulfills the laboratory science requirement for non-science majors in the Honors College at Southern Connecticut State University. The course is divided into four modules covering geology, coastal processes, coastal pollution, and climate change and addresses key environmental questions, including: How have past harbor sediment contamination affected the quality of New Haven Harbor ecosystems? How can we assess hurricane preparedness and potential impact? What are the potential consequences of climate change on Connecticut residents and how can the emission of greenhouse gasses be minimized? Lectures and labs are accompanied by weekly field exercises where students collect data and record observations which are posted on-line. Results of the HON 270 analyses have contributed to a GIS data base of sediment metal analyses in New Haven Harbor and have been presented at regional Long Island Sound Research Conferences

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## Teaching and Communicating Controversial Topics in Science: Ongoing Challenges and Opportunities

Abromson 213

Themes:	SENCER in the Majors Theory/Rationale	Civic Engagement Planning
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Jay Labov, [jlabov@nas.edu](mailto:jlabov@nas.edu)  
National Research Council

**Abstract:** One method for engaging students in learning about science is to deliberately present them with issues that are controversial. Other issues may generate controversy both inside and outside of science classes with little prompting from the instructor. This session will focus on (although not be limited to) current controversies surrounding the teaching of evolution and attempts by various groups to introduce alternative perspectives into science courses in both K-12 and higher education. We will examine the strategies that have been employed in this nationwide effort and what may be on the horizon. We also will explore how science faculty from all disciplines might address them both in their classrooms within the context of SENCER.

**What will be accomplished:** Participants will become more aware of both local and national challenges to teaching of controversial scientific subjects and how they might be addressed.

**Results:** Participants will (1) understand more deeply how political and other considerations are influencing the teaching and learning of science and the conduct of science courses at both the local and national levels, (2) become more aware of ways that they, both individually and collectively, can begin to address such challenges both before and when they are presented in science courses and in other forums, and (3) think more about the pre- and misconceptions that students bring with them to class about evolution in particular and the processes, nature, and limits of science more broadly.

## The Urban Asthma Program – A SENCER Project for a Learning Community and Community Learning

Luther Bonney 327

Themes:	Disciplinary-Based Presentations SENCER in the Majors Service-Learning	Community Colleges Civic Engagement Alumni Case Report
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Floyd Bednarz, [fbednarz@ccc.edu](mailto:fbednarz@ccc.edu)  
Donyel Williams, [dwilliams173@ccc.edu](mailto:dwilliams173@ccc.edu)  
Dennis Lehman, [dlehman@ccc.edu](mailto:dlehman@ccc.edu)  
*Harold Washington College*

**Abstract:** Are you looking for ways to foster student interest in the sciences and civic engagement? Then learn how one college tackled these issues. This SENCER-sponsored project, with an urban asthma focus, was established at Harold Washington College (Chicago) in Fall 2006 with goals to (1) get more students interested and engaged in STEM courses, (2) help students connect STEM learning to their other studies, and (3) strengthen students' understanding of science and their capacity to be informed and responsible citizens. To capture and maintain student interest, the social and scientific issue of urban asthma was chosen as a focus topic. A learning community classroom of students was established to foster a supportive learning environment. And to enhance the learning experience and bring relevancy to the classroom discussions, students participated in community learning programs and projects with two outside organizations involved with urban asthma issues the American Lung Association of Metropolitan Chicago (ALAMC) and the Sierra Club. Learn what happened.

**What will be accomplished:** Facilitators will present a program designed to address several learning issues (including the development of writing and analytical skills) and how the learning outcomes of the students were positively affected. They will also provide an example that can be emulated at other institutions and with other topical foci. The presenters will offer practical advice on how to establish similar programs including the how-to's and the pitfalls. Attendees will learn about the outcomes of the program and the lessons learned.

**Results:** Participants will be better able to recognize how to establish a multi-disciplinary program of classes centered on a theme, understanding both the lessons learned and pitfalls of such a project. They will be encouraged to implement similar programs at their own institutions, to take chances and experiment, as long as the basic educational goals are met.

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## Wetter, Wilder and Deeper: An Update on Interdisciplinary Linked Courses

Luther Bonney 326

Themes:	Disciplinary-Based Presentations Alumni Case Report	Civic Engagement Assessment
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Michael Bacon, [mrbacon@uscsuinter.edu](mailto:mrbacon@uscsuinter.edu)  
Mary Ellen Bellanca, [bellanca@uscsuinter.edu](mailto:bellanca@uscsuinter.edu)  
Pearl Fernandes, [pefernan@uscsuinter.edu](mailto:pefernan@uscsuinter.edu)  
John Logue, [jlogue@uscsuinter.edu](mailto:jlogue@uscsuinter.edu)  
*University of South Carolina Sumter*

**Abstract:** At USC Sumter we have developed linked interdisciplinary courses focusing on a common theme, Wetlands and Natural History. Environmental Science 101 and an associated section of English 102 are being offered as linked courses designed to reinforce and integrate the

skills of each discipline through this common theme. The presenter will address how innovative pedagogies such as reflective readings, case studies, field trips and guest speakers can be used to provide the student with an understanding of the natural environment and its interconnections with life and human society. The objectives are to provide the student with information and experience that enables participation in civic processes that help determine environmental policies and how such policies are enforced and monitored. Participants will also learn about qualitative and quantitative assessment tools that the team is using to measure the learning objectives in the courses. The presenter will invite discussion and review of their assessment instrument.

**What will be accomplished:** We hope to invite discussion, suggestions and improvements on content and assessment of our linked English and Biology courses.

**Results:** Attendees will learn (1) how a non-science (English) and science (Environmental Biology) course can be linked through a common theme, (2) about assessment tools used in these courses, and (3) how to involve students in civic engagement.

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**Designing, Delivering, and Assessing Franklin Pierce University's First SENCER Course Sequence**

*Luther Bonney 403*

Themes:	Disciplinary-Based Presentations Assessment Planning	Civic Engagement Alumni Case Report
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Frederick Rogers, [rogersfs@fpc.edu](mailto:rogersfs@fpc.edu)

Frank Hubacz, [hubaczf@fpc.edu](mailto:hubaczf@fpc.edu)

*Franklin Pierce University*

**Abstract:** This past (2006-07) academic year, our Integrated Science I and II teaching team at Franklin Pierce University (FPU) redesigned and assessed our course sequence along the lines of the SENCER model as it was being taught (real time formative work). Our experience thus serves as a case report in the day-to-day realities of introducing the first SENCER course sequence to a general education curriculum. Integrated Science I and II fulfill the laboratory science core requirement for non-science majors at FPU. The course sequence was redesigned around the theme of global change: *Global Change – The Atmosphere* (a.k.a. Global Warming), for the fall semester, and *Global Change – The Oceans*, for the spring semester. The most important feature of the SENCER model to be incorporated into the new course sequence was the student civic engagement component, centering on our students' oral presentations and written term papers for their mid-term and final projects. Based on student feedback about the course sequence via our own in-house, beginning-of-semester and end-of-semester assessment instruments, the pre-SENCER-SALG and post-SENCER-SALG instruments, and formal, end-of-semester conversations with our students, there are a number of changes to the course sequence that we will make for the coming (2007-08) academic year. Of these changes, the most important will be reversing the order of the sequence. *Global Change – The Oceans* now will run during the fall semester, and *Global Change – The Atmosphere* now will run during the spring semester. In each case, the course will be enhanced by field trips. The civic engagement component will be ramped up, as well, by requiring our students to formally present their research results to the larger community beyond the confines of the classroom.

**What will be accomplished:** We hope that knowledge of the day-to-day nuts-and-bolts of our experience in introducing our university's first SENCER course sequence will be directly useful

to teams from other colleges and universities who are about to introduce their own SENCER courses to their institutions.

**Results:** We hope that participants in our session will come away from that session with a working model for (1) designing a SENCER course, (2) assessing a SENCER course, and (3) revising a SENCER course based on the feedback they receive.

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### **Greed and Responsibility: Science, Ethics, and Society**

*Luther Bonney 310*

Themes:	Planning SENCER in the Majors Service-Learning	Environmental Science Civic Engagement
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Frank Catano, [f.catano@snhu.edu](mailto:f.catano@snhu.edu)  
Eleanor Dunfey-Freiburger, [e.dunfey-freiburger@snhu.edu](mailto:e.dunfey-freiburger@snhu.edu)  
Kevin Degnan, [k.degnan@snhu.edu](mailto:k.degnan@snhu.edu)  
Karen Erickson, [k.erickson@snhu.edu](mailto:k.erickson@snhu.edu)  
*Southern New Hampshire University*

**Abstract:** This interactive presentation focuses on the first part of a course we are developing to explore fundamental causes of environmental degradation. Greed, we contend, is the problem. However, GREED (Globally Responsible Ecological and Economic Decisions) is also the solution. The problem and the solution are the two parts of a course at Southern New Hampshire University, but the focus of this session will be on the first half of the course, namely, greed as a problem. This covers, among other topics, the place of greed in society and its relationship to the individual, the true cost of consumption, and the relationship of greed to survival. The session will explore the genesis of a team-taught, interdisciplinary course that integrates biological, economic, sociological, ethical, and ecological perspectives to address a global issue.

**What will be accomplished:** Attendees will (1) develop appropriate learning outcomes for proposed course, *Greed and Ecological Design*, (2) suggest venues of service-learning as well as civic engagement to foster deeper understanding of the connection between greed and ethics greed and the economy greed and the environment, and (3) discuss tools of assessment for a course aimed at an intergenerational student group.

**Results:** Participants in this session will be able to (1) name three ways in which greed critically affects our culture and society, (2) construct a cost analysis of one capacious example of consumption, and (3) show how, through science, we can teach that non-material needs are not met by material goods.

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### **Science for All Students: Creating a Positive Environment for Core Science**

*Abromson 215*

Themes:	General Education Pre-Service Teacher Education Alumni Case Report	Planning Civic Engagement
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Kraig Steffen, [lsteffen@mail.fairfield.edu](mailto:lsteffen@mail.fairfield.edu)  
*Fairfield University*

**Abstract:** Fairfield University has developed a Core Science process that incorporates the principle ideals of SENCER. We have developed guidelines for the delivery of courses designed

for majors outside the sciences that emphasize science as a way of knowing, the key role that data acquisition and analysis plays in science, and the value of connecting science courses to social concerns. Participants will get a snapshot of one approach to creating a positive institutional environment for creative core science. We will discuss challenges faced including how to increase the number and diversity of core science courses, how to negotiate the tricky depth vs. breadth issues, and how to encourage faculty participation. The discussion will be deliberately broad, ranging from overarching ideas such as why we need a core science requirement, to the particular, like what types of laboratory experiences are best suited for these courses.

**Accomplish:** Participants will learn about the particular experience we have had at Fairfield University as we have reviewed and revised our core science curriculum. Our experience will then be considered in the broader context of efforts across the country to increase science literacy.

**Results:** Attendees will be able to (1) compare and contrast the Fairfield experience with their home institution, (2) develop guidelines for core science courses, and (3) recognize common roadblocks to change for core science efforts.

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### **Civic Engagement and Democracy: The Classroom as a Civic Space**

*Abromson 214*

Themes:	Theory/Rationale Pedagogy	Civic Engagement Planning
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David Burns, [david.burns@sencer.net](mailto:david.burns@sencer.net)  
*National Center for Science and Civic Engagement*

Eliza Reilly, [eliza.reilly@fandm.edu](mailto:eliza.reilly@fandm.edu)  
*Franklin & Marshall College*

**Abstract:** What do we, the organizers of the SENCER project, mean by civic engagement? What are some other possible conceptions of civic engagement? What do our ideas of civic engagement have to do with democracy and civil society? How can we translate democratic ideals into practical arrangements in the college classroom and campus? Are there specific democratic pedagogical practices? What do we mean by a civic space? There are lots of kinds of civic spaces, some democratic, some not: Can the classroom be a democratic space? Should it be? In what ways are scientific practices identical/sympathetic to democratic practices? In what ways are they different/antagonistic kinds of enterprises? Confronted with the job of organizing a course and a classroom, how do our choices determine the kinds and quality of civic space we create? This discussion session is designed to solicit participants' experiences, thoughts, and recommendations for how we can transform SENCER courses into "models" of the kinds of civic engagement and democratic practice we desire in the larger world.

**What will be accomplished:** Participants will have developed a thicker, more precise and more nuanced understanding of civic engagement, will have considered the relationship of classroom practice to democratic citizenship formation, will have explored how studying science advance democratic practice, and will have identified choices to be made in course development that either undergird or undermine civic education.

**Results:** At the end of the session, participants will be able to analyze their courses and teaching methods with the view of understanding the kind of civic space they represent and they will have created a catalog of pedagogical practices that, when implemented, will help students understand the scientific process and advance their civic educations, as well.

## Global Opportunities

Luther Bonney 302

Themes:	Partnerships Global Education	Dissemination Planning
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Butsiko Chkhartishvili, [butsikoc@yahoo.com](mailto:butsikoc@yahoo.com)  
*Georgian State University*

Lali Ghogheliani, [lali\\_gtu@gtu.ge](mailto:lali_gtu@gtu.ge)  
Nana Japaridze, [nadia\\_japaridze@yahoo.com](mailto:nadia_japaridze@yahoo.com)  
*Georgian Technical University*

Debra Meyer, [debram@uj.ac.za](mailto:debram@uj.ac.za)  
*University of Johannesburg*

Karen Oates, [karen.oates@sencer.net](mailto:karen.oates@sencer.net)  
*National Center for Science and Civic Engagement*

Ia Zhvania, [sxgeorgia@sigmaxi.net](mailto:sxgeorgia@sigmaxi.net)  
*I. Beritashvili Institute of Physiology*

**Abstract:** SENCER courses are often organized around topics that know no national borders or that have very special, and scientifically interesting, manifestations within specific nations and cultures. Science, itself, rests on an assumption of “universality” and science educators and researchers around the globe have many needs to collaborate with one another. We at SENCER have noted how the presence of international scholars at the Institute has had the effect of making our American colleagues take the enterprise of reforming science education even more seriously. While rhetorical support for transnational science collaboration remains high, funding support lags far behind. The exigencies of the world situation have made scholarly exchange even more challenging. So what do we do? In this interactive session, using case studies and anecdotes, we will explore the realities and rewards of working across international borders. Participants will develop a rough draft of a personal or campus-based global collaboration project (including an action plan that moves from idea stage to implementation phase). Participants will then overlay their action plans with an inventory of the competencies and skills they will need to complete a successful international collaboration. Some of the issues we will explore together in developing plans, include (1) how to ensure that all parties to an international collaboration come to the table as full collaborators, (2) how to prepare for the research trip so that a shared vision is maintained, (3) how to sustain collaboration and communication open once collaborators return to their homes, (4) where the products of these collaborations can be disseminated and published, (5) how students can be involved students, and (6) where funding can be obtained. In answering each of these questions, we will, in effect, be identifying some “best practices” for international collaboration.

**What will be accomplished:** Participants will leave the session with a rough draft of an action plan for an international collaboration; the session will have generated a list of best practices.

**Results:** Participants will be prepared to initiate or strengthen plans for international collaboration to be undertaken in the coming year and the SENCER national office will have a better understanding of the interests and needs of the SENCER community in regard to international collaboration and can plan more systematically to support transnational engagements.

## Financing SENCER and Other Science Reforms

Abromson 110

Themes:	Planning Implementation	Dissemination
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Myles Boylan, [mboylan@nsf.gov](mailto:mboylan@nsf.gov)  
National Science Foundation

**Abstract:** The session will provide an overview of NSF programs and funding opportunities. The current status of application success rates will also be discussed. In place of the usual approach of offering a "catalog" of program possibilities, the presenter will invite participants to identify specific ideas they have for projects requiring support. With that sense of "need" in mind, the presenter will identify specific program support possibilities, where they exist. Particular emphasis will be paid to how NSF programs can be accessed to support SENCER campus innovations.

**What will be accomplished:** SENCER has a goal of increasing assistance in adaptation and innovation at the campus level (through, for example, the acquisition of Phase 1 CCLI support for developing SENCER courses and programs), with the view to disseminating local innovations as part of the continuing national program of SENCER. The session should help participants identify possibilities for such support and acquire advice on what can be done to improve a proposal's chances for success.

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## Assessing Inquiry-Based Courses Taught in the Virtual Classroom

Luther Bonney 410

Themes:	SENCER in the Majors Assessment	Civic Engagement Alumni Case report
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Joseph Liddicoat, [jl42@nyu.edu](mailto:jl42@nyu.edu)  
New York University

**Abstract:** NYU faculty have been SENCER observers, team members, and alumni since 2004. From that involvement, four courses were developed for adults who are completing the bachelors degree in Liberal Arts. To allow students who do not live in the NYC metropolitan region to take two of the courses, *Global Ecology* and *Stars, Planets and Life*, are taught online in partnership with NYU's Virtual College. Two other courses, *New York Harbor* and *Environmental Restoration*, are seminars in which environmental topics are discussed among professionals who live in NYC. *Environmental Restoration* is enhanced by classroom activities in the SENCER Model *Brownfield Action*. I will share my experience developing, teaching, and assessing the NYU courses and *Brownfield Action*. An evaluation of online learning is timely because administrators and faculty recognize the opportunities and limitations of offering science and mathematics courses to a global community.

**What will be accomplished:** The presenter will explain the benefits of online learning of science elective courses, including methods of assessing the information retained by students who receive this type of instruction.

**Results:** Participants will be able to design and teach science electives that are offered online or that contain activities that students can do the virtual world. Examples of the activities that could be used in an introductory environmental science course are parts of the SENCER model *Brownfield Action*. Session participants will explore the benefits and limitations of teaching

science and mathematics courses online to non-science majors. They will learn how to assess student retention of course material that is presented online.

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## 11:00-12:15 CONCURRENT SESSIONS VI

### Featured Model: Slow Food

*Abromson 215*

Themes:	Civic Engagement Alumni Case Report	Service-Learning
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Marion Fass, [fassm@beloit.edu](mailto:fassm@beloit.edu)

*Beloit College*

**Abstract:** We are what we eat, and what we eat shapes the environment around us. In this session we will discuss a model SENCER course on *Slow Food* that explores the connections of food, culture and corporations, looks at issues of food, biodiversity and sustainability, to explore local food and paradox of increasing rates of obesity and increasing rates of food insecurity.

We will focus on activities that engage students with the local community, its “foodshed,” its farmer’s markets, and the problems of hunger.

The Slow Food movement promotes good taste, eating local and preserving biodiversity. As the basis for a course, Slow Food offers students an optimistic perspective for analyzing a challenging set of issues. Participants in this session will work together to build further linkages to adapt the *Slow Food* course curriculum that bring together the sciences of nutrition, agricultural and ecology with an understanding of the economic and cultural factors that shape how we eat in the United States and possible strategies to build more sustainable practices. Participants will discuss service learning projects for their communities that enable students to respectfully use their skills, to contribute to community needs, and to enhance their understanding of local issues.

**What will be accomplished:** This session aims to help participants (1) develop a comprehensive approach to food, hunger and science, (2) develop course outlines that can be applied, and (3) identify respectful and beneficial service-learning activities.

**Results:** Participants will work together to develop curricula that bring together the sciences of nutrition and agricultural sustainability with an understanding of the economic and cultural factors that shape how we eat in the United States. They will develop service learning projects for their communities that enable students to respectfully use their skills, to contribute to community needs, and to enhance their understanding of local issues.

## Featured Model: Geology and the Development of Modern Africa

*Abromson 213*

Themes:	Geosciences Student Involvement	Global Education SENCER in the Majors
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Barbara Tewksbury, [btewksbu@hamilton.edu](mailto:btewksbu@hamilton.edu)  
*Hamilton College*

**Abstract:** *Geology and the Development of Modern Africa* is a writing-intensive laboratory course in introductory geology that has been taught at Hamilton College since 1994. The course teaches geology and geologic processes through the exploration of the how geology impacted the history, culture, politics, and economy of Africa. Some of the many complex topics explored during the semester include: long-term fluctuations in fluvial activity and the rise and fall of dynasties along the Nile, the role of climate change and bedrock geology in the location and timing of development of Egyptian civilization, the economic implications and environmental consequences of damming the Nile at Aswan, and the relationship between geological resources, such as gold and diamonds, and the oppression of the people of South Africa. A centerpiece of the course is a month-long diamond exploration project where students are organized into virtual teams of geologists prospecting for diamonds in different areas of southern Algeria. Because each group is dealing with a different exploration area and different material conditions, they must make choices and decisions based on their data, and there is no single “correct” result.

**What will be accomplished:** This course presents a model of the use of role-play and simulations and of the benefits of involving undergraduates in the course-design process. The presenter, a professor of geology, will also discuss why she believes that “depth begets breadth” in learning and how courses like the one selected to be a SENCER model can lead to increased interest by students to become majors in STEM fields.

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## Knowing What Your Students are Learning

*Luther Bonney 302*

Themes:	Assessment Community Colleges	SENCER in the Majors Pre-Service Teacher Education
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Laurie Fathe, [lfathe@gmu.edu](mailto:lfathe@gmu.edu)  
*George Mason University*

**Abstract:** Do you use active learning, cooperative learning, or peer teaching in your class? Have you incorporated online discussions, computer-based problem sets, or other technology-assisted activities into your teaching repertoire? If so, have you wondered how well these techniques are working? Are they making any difference in student learning? Most faculty and students agree that these changes have improved education. But often we have not measured this, nor have we considered how these different approaches have changed student learning. This session will explore the scope of learning, from acquiring content, to building skills, to shifting attitudes, all fostered by the new approaches. More importantly, it will offer ways to measure the richness of learning that accompanies varied approaches to education.

**What will be accomplished:** Participants will learn more about assessment and how it can help to enhance student learning.

**Results:** Participants will be able to design a specific learning outcome for their course, use pre- and post-testing to better understand where students are when they enter a course and when they

exit, and incorporate a variety of formal and informal assessments into their courses to support student learning.

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### **Adding Depth to Debate: Pedagogical Strategies to Enhance Meaning of Controversial Issues**

*Luther Bonney 326*

Themes:	Pedagogy Planning	Civic Engagement Assessment
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Brian Hagenbuch, [bhagenbuch@hcc.mass.edu](mailto:bhagenbuch@hcc.mass.edu)  
*Holyoke Community College*

Joan Mikalson, [jmikalson@spfldcol.edu](mailto:jmikalson@spfldcol.edu)  
*Springfield College*

**Abstract:** Debates and role-playing exercises are popular active teaching strategies that can help students develop insight to various sides of controversial problems. In this workshop, we will introduce stakeholder mapping and narrative analyses as pedagogies to provide more depth to the learning process and engage students in better understanding the complex dynamics that often surround issues. Stakeholder mapping is a process that identifies and assesses the different positions involved in the controversy. These positions, or stories, exist within larger interdisciplinary contexts where science merges with cultural and economic norms to form public policy. Narrative analysis begins with the conventional sides of the debate and pulls out the contradictions, asks deeper questions that recast and redefine the problems, and extracts new meanings to create more insightful and democratic decision-making. We will introduce participants to these pedagogical strategies through a small group role-playing exercise and discussion. Our goal is to integrate these teaching methods into a conceptual framework that expands opportunities for teaching and learning about complex civic and scientific issues.

**What will be accomplished:** We will show a short video on a controversial issue (spotted owls and old growth forests). Participants will assume roles as stakeholders in the debate and complete a stakeholder map of the different positions. Using the map, we will identify the underlying issues that represent sources of conflict. We will also explain how narrative analysis can introduce new patterns of meaning that can contribute to a more collaborative decision-making process. Finally, we integrate these components into a pedagogical framework that includes assessment strategies and can be adapted to the participants' courses.

**Results:** Participants will be able to (1) undertake stakeholder mapping and narrative analysis exercises, (2) draw connections between stakeholder stories and the value systems embedded in scientific and civic issues, and (3) adapt these pedagogical tools to their own curriculum.

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### **General Studies at Richard Stockton College – A SENCER-like Model**

*Luther Bonney 208*

Themes:	General Education Alumni Case Report	Planning Institutional Support
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Tim Haresign, [tim.haresign@stockton.edu](mailto:tim.haresign@stockton.edu)  
*Richard Stockton College of New Jersey*

**Abstract:** Creating courses using SENCER ideals is an important goal, and there is strong support showing that these types of classes enhance student learning. To encourage these sorts of

courses it is useful to have an institutional framework and philosophy that supports the development of these types of courses. The General Studies Program at The Richard Stockton College of New Jersey provides one model of an environment that is open and encouraging of SENCER type courses. This presentation will focus on aspects of the Stockton program that might be transferable to other institutions. Strategies for creating institutional “buy-in” and implementing institutional change will be discussed. The audience members will be encouraged to share their experiences and tips for institutional change.

**What will be accomplished:** I hope that I can share an example of institutional structures that I think support the development of SENCER type courses, and that that leads to a discussion involving the audience members about how we can institutionalize the great ideas that are coming out of the SENCER group.

**Results:** Participants will (1) understand what we do at Richard Stockton College that supports the development of SENCER type courses, (2) have some ideas about how to implement change at the institutional level, and (3) begin to build a network of other people who are interested in institutional change.

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### **Impact of Concept Mapping, Service-Learning, and Assessment Strategies on Learning Outcomes in a Community-Based Non-Majors Biology Course**

*Abromson 402*

Themes:	Civic Engagement Service-Learning	Concept Mapping Alumni Case Report
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Gary Booth, [gary\\_booth@byu.edu](mailto:gary_booth@byu.edu)  
*Brigham Young University*

**Abstract:** Concept mapping and other pedagogical strategies were compared in two non-majors Biology classes of Freshman Academy students. The treatment was a cohort of 120 students while the control was a group of 90 freshman students with similar ACT scores and gender differentiation. Both control and treatment classes were assigned pre- and post-assessments weekly surveys, and weekly recitation sections. The treatment cohort was additionally trained to use concept mapping strategies in making connections between and among biological concepts. Learning outcomes were assessed by comparing examination scores, interviews with randomly selected students on their understanding of biological principles, and their ability to answer open-ended essay questions. Preliminary data analysis between the two groups suggests that learning outcomes may be partly or totally related to the connected understanding of the learner and how the learning environment is constructed. The data strongly suggest that concept mapping works particularly well for struggling students in the lower quartile of our class. Concept mapping can therefore help bolster and encourage learning outcomes from the group of students who need it the most.

**What will be accomplished:** We hope to show that concept mapping, service-learning, pre-assessments, and post-assessments all work together to engage students in a better learning experience in an undergraduate biology course. Furthermore, we believe that concept mapping helps struggling students in the lower quartile perform better on various assessments.

**Results:** Attendees will (1) see the value of a collected and integrated approach to using a number of pedagogies in a single class experience, (2) understand that concept mapping can actually help engage students who struggle in the lower quartiles of our classes, and (3) learn that pair-share

learning and other interactive exercises in the classroom can actually enhance student learning outcomes.

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### **The Interdisciplinary Bridge Model to Promote Science Education and Civic Engagement**

*Luther Bonney 403*

Themes:	Civic Engagement Planning	Interdisciplinary Learning Alumni Case Report
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Eugene Allevato, [eugene.allevato@woodbury.edu](mailto:eugene.allevato@woodbury.edu)  
*Woodbury University*

**Abstract:** The departmentalization of knowledge into academic disciplines is an artifact of our education system. It is necessary to build bridges, however, among the various disciplines to cope with real-world issues. When a learning environment enjoys the freedom of assimilation from different disciplines, students can find an organizing principle that allows them to connect the classroom to the real world. Our intent is to promote civic engagement among students. Solving a real-world problem relies on the expertise from different yet complementary disciplines. Accordingly, a coordinated project between two different areas, Physical Science and Statistics, was proposed and will be discussed. Students from the physical science class explored the scientific aspects, while statistics students prepared surveys to monitor public opinion. This model showed to be effective to promote motivation within the students and engagement in scientific and social issues. In this paper, projects are described as case studies and SALG results are discussed.

**What will be accomplished:** The presenter will (1) report the success of combining two disciplines in solving a real world problem, (2) show that the model engages students on science through civic issues, and (3) report that this model promotes intrinsic motivation in students.

**Results:** Attendees will be able to (1) contribute to the academic community by developing similar models, (2) offer feedback to the presenter, and (3) establish collaboration with other members and the presenter.

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### **Engaging Pre-Service Teachers in Threaded Discussions on Science-Technology-Society Issues**

*Abromson 214*

Themes:	Pre-Service Teacher Education	Civic Engagement
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James Rye, [jim.rye@mail.wvu.edu](mailto:jim.rye@mail.wvu.edu)  
*West Virginia University*

**Abstract:** Science-Technology-Society (STS) education offers an approach to learning science that is concerned especially with developing scientific literacy for responsible citizenship. STS education targets issues for which there are multiple perspectives. Through a science education methods course, elementary pre-service teachers were familiarized with STS education by engaging in threaded (asynchronous) discussions about STS issues of their choice. Over the past two years, the majority of issues discussed could be categorized about equally as biomedical or environmental and included the topics of stem cells and genetically engineered foods. Participants in this session will learn about a rubric to guide students in initiating on-line threaded discussions where students set forth the underlying science, controversy, and their stance concerning STS issues. Additional strategies will include creating a concept map for articulating

the science underlying these issues and facilitating student participation in their classmates' threaded discussions and in monitoring their own participation.

**What will be accomplished:** Participants will develop interest in and capacity for utilizing on-line threaded discussions as a means to facilitate science learning and engage their students in critical thinking about science-technology-society (STS) issues.

**Results:** Participants will be able to (1) utilize a rubric to guide and assess students' on-line postings to initiate discussions about STS issues, (2) structure/facilitate robust on-line threaded discussions as part of their teaching, and (3) utilize the concept map as a tool to help students learn and communicate science.

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### **Early Birds and Night Owls: Analyzzing Sleep in Society**

*Luther Bonney 410*

Themes:	Pre-Service Teacher Education SENCER in the Majors Alumni Case Report	Service-Learning Community Colleges
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John Rand, [jrand@hawaii.edu](mailto:jrand@hawaii.edu)

Herve Collin, [herve@hawaii.edu](mailto:herve@hawaii.edu)

Robert Franco, [bfranco@hawaii.edu](mailto:bfranco@hawaii.edu)

Robert Moeng, [moeng@hawaii.edu](mailto:moeng@hawaii.edu)

*Kapi'olani Community College*

**Abstract:** In spring 2007, Kapi'olani courses in Sleep Science and Human Development incorporated new strategies focusing on sleep across the human life span. Eleven students in the Sleep Science course and 17 students in the Human Development course reported gains on multiple SALG items. Two students in the Sleep Science course completed a power-point presentation on Sleep Aids and Sleep Depression, six students completed research on Circadian Rhythms and variability with age, and one student completed research on the relationship between Stress, Gender and Sleep Efficiency. The Human Development curriculum will now be enriched with additional focus on sleep across the lifespan. Participants will gain scientific insights into sleep issues in American society and explore student research opportunities in the science of sleep.

**Accomplish:** Our intention is to be briefly report on *Early Birds...* as a case study, present some exciting examples of student research in sleep science across the lifespan, and then engage groups in planning discussions on further integration of sleep science in pre-service teacher education, community colleges and articulation, SENCER in the majors, and service-learning and civic engagement.

**Results:** Participants will be able to (1) recognize the urgency and severity of unhealthy sleep in American society, (2) develop sleep science across the lifespan research opportunities for their students, and (3) integrate sleep science into supportive campus-based initiatives.

## Lead Poisoning Prevention

Abromson 110

Themes: SENCER in the Majors Service-Learning

Steve Bachofer, [bachofer@stmarys-ca.edu](mailto:bachofer@stmarys-ca.edu)  
Saint Mary's College of California

**Abstract:** The exposure to lead from various sources can produce deleterious effects on humans, especially children. In the US, poorly maintained older housing stock with lead-based painted surfaces can generate inhalable lead dust. Improper re-painting methods, such as unconfined power-sanding, can produce dangerous particulate aerosols. The long term use of leaded gasoline, though now discontinued, has contaminated the urban soils adjacent to major highways and contact with these soils should be minimized. Is lead exposure something to be concerned about given that lead has been banned from both gasoline and residential paints for many years? How could we find out? Educational institutions have the appropriate instrumentation (flame AAS, ICP, and XRF) that can help get these answers. When lead poisoning prevention is added to the curriculum, the questions posed can be answered. This interactive session will describe materials used to educate different student populations and for doing lead poisoning prevention outreach in the community.

**What will be accomplished:** I hope this presentation will encourage colleagues to develop laboratory experiences that highlight this issue. I hope that what students learn in these laboratory explorations will equip and inspire them to perform some public outreach on this issue.

**Results:** Participants will become familiar with government resources that can be used to support learning, laboratory, and community-service activities. Participants will be able to identify potential partners for cross disciplinary collaboration on this issue. Participants will be able to identify opportunities to make students more aware of the issue of lead poisoning prevention.

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## Financing SENCER and Other Science Reforms

Luther Bonney 310

(This repeats an earlier session)

Themes: Planning Dissemination  
Implementation

Myles Boylan, [mboylan@nsf.gov](mailto:mboylan@nsf.gov)  
National Science Foundation

**Abstract:** The session will provide an overview of NSF programs and funding opportunities. The current status of application success rates will also be discussed. In place of the usual approach of offering a "catalog" of program possibilities, the presenter will invite participants to identify specific ideas they have for projects requiring support. With that sense of "need" in mind, the presenter will identify specific program support possibilities, where they exist. Particular emphasis will be paid to how NSF programs can be accessed to support SENCER campus innovations.

**What will be accomplished:** SENCER has a goal of increasing assistance in adaptation and innovation at the campus level (through, for example, the acquisition of Phase 1 CCLI support for developing SENCER courses and programs), with the view to disseminating local innovations as part of the continuing national program of SENCER. The session should help participants

identify possibilities for such support and acquire advice on what can be done to improve a proposal's chances for success.

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### **BioSciEdNet Portal and the National Science Digital Library**

*Luther Bonney 327*

Themes:	Pedagogy Contributing to the STEM knowledge base	Planning Dissemination
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Terry McGuire, [m McGuire@biology.rutgers.edu](mailto:m McGuire@biology.rutgers.edu)  
*Rutgers University*

**Abstract:** The BioSciEdNet (BEN) portal provides access to peer-reviewed, online educational resources from professional societies, educational organizations and educators. Among other resources, teachers can find images and animations, virtual laboratories, problem sets and reviews of books and articles. Similar portals exist for Biology, Chemistry, Physics, Math, Engineering etc. The first part of this session, I will demonstrate the types of resources available for Biological Science instruction. In the second part of the session, I will discuss how individual faculty members can contribute to the National Science Digital Library (NSDL).

**What will be accomplished:** Participants will learn about the valuable resources available through the NSDL and how to contribute their own best teaching resources to the national database.

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### **SENCER and Introductory STEM Courses: A Way Forward—Session III**

*Abromson 213*

*(Open only to those who have applied and been invited to attend)*

Themes:	Planning Course Design SENCER and the Majors	Assessment General Education
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Jay Labov, [jlabov@nas.edu](mailto:jlabov@nas.edu)  
*National Research Council*

Karen Oates, [karen.oates@sencер.net](mailto:karen.oates@sencер.net)  
*National Center for Science and Civic Engagement*

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**12:30-1:30**      **LUNCH/TEAM TIME**  
*Tent by Luther Bonney*

**1:45-3:00**      **PLENARY SESSIONS**

#### **A NOTE ON THE TWO PLENARY SESSIONS**

As a growing national dissemination program, SENCER is now made up of several hundred members whom we consider “alumni.” Indeed, many of your colleagues here have attended a prior Institute. We’re pleased to welcome more than 150 “newcomers” who are beginning their association with us at this year’s Institute. As our project has grown and matured, we’ve begun to envision ways to continue to provide newcomers with a rich learning experience, while, at the same time, offering something new to the alumni.

We are happy that Barbara Tewksbury can be with us again this year. Her plenary on designing a SENCER course, which we have featured for the past four years, is an absolute “must” for anybody who has not experienced it before. (Indeed, you’ll find alumni going back for more, as well!) So, if you are new to SENCER, chances are Barbara’s plenary is what you should attend.

For alumni, the challenge and opportunity we face is to advance and deepen the SENCER project, with a special emphasis on developing what we might call a meta-cognitive approach to our work. This is very much the same spirit as our hopes that students will become aware of how they learn and what they should be doing to advance that learning, taking it to the next level. This year, the National Center for Science and Civic Engagement (NCSCE) was invited to become an affiliate of the Carnegie Foundation for the Advancement of Teaching.

As our first major event in partnership with the Carnegie Foundation, an invitation-only pre-Institute workshop was held this year on the Scholarship of Teaching and Learning (SoTL) as it applies to SENCER work. Matt Fisher (SSI 2002 and onward, and a SENCER Model Developer) and Spencer Benson (University of Maryland) led the workshop. SoTL is one element in SENCER’s proposed three-year assessment plan. This year, we have organized a second plenary that will give participants a look at the three core elements of our new assessment plan and invite participants to help us shape and become engaged in our assessment project. In so doing, participants will also be invited to reflect on their own and their institution’s assessment efforts.

So, which plenary should you attend? Our general inclination towards respecting the choices that our members make keeps us from pretending we should tell our participants what to do. We’ve given our suggestions; you are free to attend either session. If we may be so bold to say, you can’t go wrong!

### **Designing a SENCER Course: Don't Just Beat it to Fit and Paint it to Match**

*Hannaford Lecture Hall, Abromson Community Education Center*

Eliza Reilly, presiding

Barbara J. Tewksbury, [btewksbu@hamilton.edu](mailto:btewksbu@hamilton.edu)  
Hamilton College

**Abstract:** Focusing on articulating and achieving course goals, rather than on building a course around a list of content items, is one practical way of designing a course that is both effective and innovative—one in which students learn significant and appropriate content and skills, gain practice in thinking for themselves and solving problems in the discipline, and leave the course prepared to use their knowledge and skills in the future. The strategy outlined in this plenary session provides a guide for designing SENCER courses that is practical and helps avoid the trap of beating an existing course to fit and painting it to match. The strategy is applicable at all levels of the curriculum and across varied disciplines and focuses on setting goals for students that go beyond mastery of content items. Though participants will surely be able to report many benefits from attending this plenary, one key outcome is desired: Participants will be able to set concrete, achievable learning goals for their SENCER courses and projects.

## **Planning the Further Assessment of the Effectiveness of SENCER**

*Glickman Family Library, University Events Room*

Facilitator: Richard Keeling, [rich@keelingassociates.com](mailto:rich@keelingassociates.com)  
*National Center for Science and Civic Engagement*

Presenters: Terry McGuire, [mcguire@biology.rutgers.edu](mailto:mcguire@biology.rutgers.edu)  
*Rutgers University*

Alix Fink, [finkad@longwood.edu](mailto:finkad@longwood.edu)  
*Longwood University*

Matt Fisher, [matt.fisher@email.stvincent.edu](mailto:matt.fisher@email.stvincent.edu)  
*Saint Vincent College*

**Abstract:** The existing portfolio of assessment data on the effectiveness of SENCER approaches, models, and courses includes an overall project evaluation (conducted by Elaine Seymour and Tim Weston), institutional data from the SENCER SALG, and narratives collected through writings, interviews, and self-reports from faculty members and academic administrators. But important questions of the efficacy of SENCER courses to enhance students' cognitive skills, improve specific elements of scientific literacy, and promote the achievement of desired departmental, major-related, or institutional learning outcomes remain to be addressed.

In this session, three presenters will describe important elements of the planned evaluation of SENCER in the coming three years: (1) expansion of use of the SENCER SALG [Fink], (2) establishing a Consortium for Assessment for Student Achievement [CASA; McGuire], and (3) applying the Carnegie Foundation's Scholarship of Teaching and Learning [SoTL] model to faculty research on five key questions of the long-term efficacy of SENCER courses [Fisher]. After their brief reports, participants will convene in small groups, each facilitated by a presenter or member of the SENCER senior team, to discuss one or more key questions about future assessment and evaluation needs and plans for SENCER. Participants will have an opportunity to join groups that are considering and responding to questions that are of most interest and pertinence to them and their experience.

After the session, SENCER will gather notes from the small group facilitators and synthesize them into an overall planning document that will inform decision-making about assessment of SENCER in the future.

**\*The formal program for Sunday ends at 3:00 p.m. Teams are invited to continue to meet on campus if they wish.**

See Tab 4, "Local Information," for suggestions of what to do around Portland this evening.

*(Shuttle buses will run from the University of Southern Maine Campus in front of the Abromson Community Education Center to SSI 2007 hotels from 3:15 p.m. to 5:15 p.m.)*

## **MONDAY, AUGUST 6, 2007**

*(All sessions will be held at the Eastland Park Hotel. Shuttle buses will run from the La Quinta Hotel and the Sheraton South Portland from 6:45 a.m. to 8:45 a.m.)*

### **7:00-8:45 CONTINENTAL BREAKFAST AND TEAM TIME**

*Ballroom*

### **7:30-8:45 SPECIAL MEETING: NOAA PROPOSAL PREPARATION**

*Greenhouse (Please bring your breakfast with you.)*

This informal meeting will provide an opportunity to discuss the possibility of applying to the National Oceanic and Atmospheric Administration's (NOAA) Environmental Literacy Grant Program. The proposal would utilize the SENCER approach to create courses for pre-service teachers on increasing ocean literacy. Please contact Ellen Mappen or Danielle Kraus if you are interested in attending.

### **7:30-8:45 CONTINENTAL BREAKFAST / SPECIAL MEETING FOR TEAM LEADERS**

*Longfellow A*

#### **A SPECIAL NOTE TO TEAM LEADERS**

We plan to award SENCER Implementation Sub-Awards to meritorious proposals from teams who have attended SSI 2007. We anticipate being able to offer a limited number of awards, probably 20, of approximately \$3,000 each. The awards are designed to support implementation, with special emphasis on developing measurable and achievable goals and innovative plans to acquire evidence of project outcomes.

New and alumni teams with at least four members who actively participated in SSI 2007 are eligible to apply for these awards, though your proposal may include members of your "campus" team who were not able to attend the Institute. If you are eligible and desire to apply for one of these awards, then a representative of your team must attend the meeting held on Monday, August 6 at 7:30 a.m. in Longfellow A.

Only those who have attended this special pre-application meeting will be eligible to apply for an award. At the meeting, David Burns and Danielle Kraus will review our goals and the expectations we have for your work. We will also outline the application process, clarify program objectives, identify eligible and non-allowable expenses, and answer questions.

Please remember to sign in at some point during the meeting next to your institution name.

### **9:00-10:30 CONCURRENT SESSIONS VII**

In this, the last of the Concurrent sessions at SSI 2007, many of the presentations will focus on "looking forward" activities, including dissemination, adaptation of SENCER to new challenges and areas of work, and opening opportunities for participants to become involved in a series of follow-up activities. A member of the SENCER leadership team will be present at each of these sessions. Where their role is as a presenter, their name will be listed accordingly. Where they are a host/observer, their name will be found at the end of the abstract.

## SENCER and Introductory STEM Courses: A Way Forward—Session IV

Wyeth A

(Open to all who wish to attend)

Themes:	Planning Course Design SENCER and the Majors	Assessment General Education
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Jay Labov, [jlabov@nas.edu](mailto:jlabov@nas.edu)  
National Research Council

Karen Oates, [karen.oates@sencer.net](mailto:karen.oates@sencer.net)  
National Center for Science and Civic Engagement

In this, the last of a four session mini-workshop series, participants will participate in planning activities and hear a synopsis of what has been discussed in the mini-workshop.

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### “Taking Science to School”— A Conversation with Richard Duschl

Greenhouse

Themes:	Theory/Rationale Planning	Pre-Service Teacher Education Assessment
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Richard Duschl, [rduschl@rci.rutgers.edu](mailto:rduschl@rci.rutgers.edu)  
Rutgers University

Jean Moon, [jmoon@nas.edu](mailto:jmoon@nas.edu)  
National Academies

**Abstract:** In this informal session, Richard A. Duschl, chair of the National Research Council committee that wrote the report “Taking Science to School: Learning and Teaching Science in Grades K-8” (2007) and professor of science education at Rutgers University, will discuss the main conclusions of the report and highlight the committee’s recommendations. The committee developed “a framework for proficiency that identifies four fundamental strands” that are essential for student learning and also provide a basis for curriculum design. The report indicates that students who understand science:

- know, use, and interpret scientific explanations of the natural world
- generate and evaluate scientific evidence and explanations
- understand the nature and development of scientific knowledge
- participate productively in scientific practices and discourse.

Professor Duschl will offer thoughts on how our increased understanding of cognitive science challenges our assumptions about the level of capability of children to learn science and how this knowledge enables us to develop successful strategies to “engage students [as early as possible] in scientific tasks that explore ideas and problems that are meaningful to them with carefully structured support from teachers.”

Jean Moon, director of the Board on Science Education, National Academy of Sciences, the group that commissioned *Taking Science to School*, will moderate this session and situate this work within the larger context of efforts by the National Academies to improve science learning.

Copies of the introduction and conclusions to the report will be available for review before the session on August 6<sup>th</sup>. Professor Duschl will also participate in the afternoon symposium on SENCER and K-12 education.

Ellen Mappen, NCSCE Senior Scholar, will serve as host for this session.

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### **Creating a SENCER Culture on Campus: Advice for Deans and Department Chairs**

*Hawthorne*

Themes:	Leading Change Planning	Dissemination
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DonnaJean Fredeen, [fredeend1@southernct.edu](mailto:fredeend1@southernct.edu)

*Southern Connecticut State University*

**Abstract:** Rome was not built in a day and at times getting faculty to embrace the ideals of SENCER may seem to take longer. How does a campus leader advocate for and implement the ideals of SENCER? The intent of this presentation is to discuss a few strategies which have created a growing acceptance of SENCER on a campus among a faculty with a highly independent mind. Discussion will center around facilitating a change in culture, hiring practices and reward systems. Participants are encouraged to share their successes, failures and advice, and will be provided with an opportunity to design their own plan for SENCERizing their campus.

**What will be accomplished:** Attendees of this session will participate in an exchange of ideas on leadership strategies which create a culture of the SENCER ideals on campus. We hope to encourage a network of support among campus leaders wanting to implement SENCER in their curriculum.

**Results:** Campus leaders will work collaboratively with faculty and colleagues to implement SENCER in courses in the major and general education, and participants will have a network of colleagues on whom they can call to discuss issues which arise on their home campuses.

David Burns, NCSCE Executive Director and SENCER PI, will serve as host for this session.

## Two-Year and Four-Year Schools, STEM Education, and SENCER

Ballroom

Themes:	Community Colleges Planning	Articulation Dissemination
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Robert Franco, [bfranco@hawaii.edu](mailto:bfranco@hawaii.edu)  
*Kapi'olani Community College*

Brian Hagenbuch, [bhagenbuch@hcc.mass.edu](mailto:bhagenbuch@hcc.mass.edu)  
*Holyoke Community College*

Theo Koupelis, [theo.koupelis@uwc.edu](mailto:theo.koupelis@uwc.edu)  
*University of Wisconsin-Marathon*

Dennis Lehman, [dlehman@ccc.edu](mailto:dlehman@ccc.edu)  
*Harold Washington College*

**Abstract:** The session will primarily involve an open discussion among participants on two key issues related to STEM education and SENCER with the following objectives in mind: (1) to create a set of suggested practices and policies related to collaborative efforts between 2-year and 4-year schools, which will act as a catalyst to support and sustain future innovations in STEM education, including curriculum changes influenced by the SENCER ideals, and (2) to create a network of educators from 2-year and 4-year schools whose mission is to become leaders in science education, scholarship and research, to promote seamless science and math education at all levels, and to support the development of meaningful learning experiences for all our students.

Theo Koupelis, a SENCER Senior Associate who is coordinating the development of a new monograph on community colleges for the National Center on Science and Civic Engagement, will host and facilitate this session.

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### CASA – A “Community of Practice” for Formative Assessment

Louise Nevelson

Themes:	Assessment Contributing to the STEM knowledge base	Planning Dissemination
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Terry McGuire, [m McGuire@biology.rutgers.edu](mailto:m McGuire@biology.rutgers.edu)  
*Rutgers University*

**Abstract:** CASA (the Consortium for Assessment for Student Achievement) will be a volunteer group of faculty with an initial target membership of 50 (to be doubled in a year) committed to the use of formative assessment in the classroom. CASA members will (a) substantially increase the use of in-class assessment of learning techniques in their courses, (b) adopt clear learning goals within their courses and continuously adjust these goals to promote higher-order learning objectives, (c) measure learning of core (transferable) STEM principles, (d) record evidence of the effectiveness of these activities, and (e) disseminate these results. This session will serve as an orientation for potential members and will outline plans for developing the consortium. CASA will be coordinated by Terry McGuire (genetics) and Jeannette Haviland-Jones (psychology) of Rutgers University.

**What will be accomplished:** This session will familiarize participants with future plans and tasks for CASA and begin the recruitment of the initial core membership of the group.

## Taking Your Work to the Rest of Your Institution

Wyeth B

Themes:	Planning Contributing to the STEM knowledge base	Dissemination
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Laurie Fathe, [lfathe@gmu.edu](mailto:lfathe@gmu.edu)  
*George Mason University*

**Abstract:** For more than a decade, national leaders in STEM education, including the National Research Council and the National Science Foundation, have been extolling the value of teaching science through active learning. Most of us who teach in the sciences appreciate the value of hands-on learning, and incorporate this in our courses through laboratory experiences. But there has been less incorporation of active learning in the lecture portions of our classes. This session will demonstrate a number of techniques that foster active learning in science classes. Ways to adapt the techniques to different sized classes will be discussed. Participants will experience a number of the techniques, and have the opportunity to reflect on how they could be used in their own classes.

**What will be accomplished:** Participants will gain knowledge of and some experience with a variety of active learning techniques they could use in their own teaching. They will also be motivated to do so.

**Results:** Attendees will be able to envision places in their teaching where active learning would facilitate student learning, design active learning activities that fit the learning goals of their courses, and engage students in active learning activities in any size class.

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## Portfolios for Many Applications

Marsden Hartley

Themes:	Assessment/Evidence Pre-Service Teacher Education Disciplinary-Based	Dissemination Community Colleges
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Monica Devanas, [devanas@cat.rutgers.edu](mailto:devanas@cat.rutgers.edu)  
*Rutgers University*

**Abstract:** This session on portfolios will investigate the flexibility of the portfolio format for describing and documenting many academic functions, i.e., course portfolio, teaching portfolio, student portfolio, and administrative portfolio. The session will illustrate how the three basic components of the portfolio structure—what, why and how well—can be adapted to serve various needs of faculty, students, administrators and others interested in quality and accountability. Formats for these various types of portfolios will be briefly presented followed by discussion and development of portfolio components customized to suit the needs and interests of the participants.

**What will be accomplished:** This session will introduce the elements of portfolios and present a variety of areas for application. The participants will determine the direction and depth of discussion of applications of portfolio structure.

**Results:** Participants will be able to successfully apply the core elements of portfolios—what, why and how well—to their own needs, courses, programs or institutions.

## Using SENCER Strategies to Teach Social Science

*Gallery*

Themes:	Planning Social Science	Theory/Rationale
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Eliza Reilly, [eliza.reilly@fandm.edu](mailto:eliza.reilly@fandm.edu)  
*Franklin & Marshall College*

**Abstract:** From the beginning of the project, SENCER courses have generated high levels of overlap and intersection between STEM disciplines and the social sciences. In fact several SENCER model courses are team taught by science faculty and their colleagues in political science, sociology, psychology, anthropology and other disciplines. This session invites participants to explore the potential of SENCER approaches and strategies to improve learning in the social sciences and to consider what it would take to initiate such a program at a national scale.

**What will be accomplished:** We hope to emerge with examples of basic social science content that can be effectively taught through pressing civic questions, as well as some understanding of the degree to which SENCER ideals would need to be adjusted or adapted for the social sciences.

**Results:** This is intended as an informal, exploratory, discussion session. If it turns into a formal planning/working group and leads to the development of a SENCER project and models in the social sciences, it will have exceeded expectations.

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## Designing a SENCER Course— A Follow-Up Conversation with Barbara Tewksbury

*Longfellow A*

Themes:	Course Design Planning	Pedagogy Assessment
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Barbara Tewksbury, [btewksbu@hamilton.edu](mailto:btewksbu@hamilton.edu)  
*Hamilton College*

**Abstract:** This will be an informal session to encourage discussion and dialogue stimulated by Barbara Tewksbury's plenary presentation. It is a SENCER tradition to invite our participants to engage with plenary speakers to pursue topics and ideas that arise in the plenary sessions and/or to take advantage of the presenter's expertise. Barbara will welcome a chance to work with participants on how they can adopt and adapt the suggestions made in her plenary to their own local conditions and circumstances.

## SENCER and Pre-Medicine: An Exploratory Conversation

*Longfellow B*

Themes:	SENCER in the Majors Planning	Health
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Edward Katz, [ekatz@unca.edu](mailto:ekatz@unca.edu)  
Keith Krumpe, [kkrumpe@unca.edu](mailto:kkrumpe@unca.edu)  
*University of North Carolina at Asheville*

Richard Keeling, [rich@keelingassociates.com](mailto:rich@keelingassociates.com)  
*National Center for Science and Civic Engagement*

**Abstract:** This session is an open-invitation opportunity to explore the current state of pre-med curricula and how innovation in pedagogy and structure might benefit students in their preparation for medical, dental and other pre-health study. What are the pedagogical, conceptual and ethical dimensions for an adequate critique of our present system of facilitating student interest and success in this critical area of study, research and practice? Participants will explore the ways in which curriculum- and course-level reform may impact and improve student acceptance and performance in medical school.

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## Building Community Partnerships

*Sarah Orne Jewett*

Themes:	Partnerships Community-Based Research	Service-Learning
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Francisco Dallmeier, [dallmeierf@si.edu](mailto:dallmeierf@si.edu)  
*Smithsonian*

Melanie Szulczewski, [mszulcze@gmu.edu](mailto:mszulcze@gmu.edu)  
Tom Wood, [twood@gmu.edu](mailto:twood@gmu.edu)  
*George Mason University*

**Abstract:** Collaboration with community partners promotes innovative learning environments with SENCER ideals. We invite discussion of your ideas concerning use of external organizations in courses, including opportunities and limitation. We will use our experience with SENCER derived courses and our latest effort, the development of a Smithsonian Mason Semester, to help promote discussion and convey lessons learned. We encourage discussion of small or large collaborations and will help participants envision value related to civic engagement and experiential learning, including service learning, when using community partners. Alumni teams are encouraged to bring updates of your experiences and new teams are especially welcome.

**What will be accomplished:** We hope to inspire new participants to envision ways to utilize local community partners in innovative learning environments. We also hope to receive updates on existing partnerships involving SENCER courses.

**Results:** Participants will generate new ideas about including a community partner in a course, develop a better understanding of applied experiential learning, and develop an understanding of opportunities and limitations to community partnerships.

**10:45-12:00**    **CLOSING PLENARY**  
*Ballroom*  
David Burns, presiding

**Address: “Recovering What You Know: Some Lessons from LIFE”**  
John Bransford  
*University of Washington*

**Remarks and Reflections: “A View from the National Science Foundation”**  
Myles G. Boylan  
*National Science Foundation*

**Open Microphone**

**Concluding Comments**  
Karen Oates and David Burns  
*National Center for Science and Civic Engagement*

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**12 NOON**        **INSTITUTE ADJOURNS**

**12:15-1:15**    **LUNCH**  
*Ballroom*

**1:30-5:00**      **POST-INSTITUTE WORKSHOPS**

You must be pre-registered to participate in these workshops. To determine if space is remains available, please inquire of a SENCER Staff Member.

**Designing a SENCER Course, Part I (Barbara Tewksbury)**  
*Longfellow B*

Barbara Tewksbury, [btewksbu@hamilton.edu](mailto:btewksbu@hamilton.edu)  
*Hamilton College*

**Abstract:** Focusing on articulating and achieving course goals, rather than on building a course around a list of content items, is one practical way of designing a course that is both effective and innovative—one in which students learn significant and appropriate content and skills, gain practice in thinking for themselves and solving problems in the discipline, and leave the course prepared to use their knowledge and skills in the future. This two-part workshop will give participants a chance to apply a practical and successful goals-based strategy to designing their own SENCER courses. The strategy is applicable at all levels of the curriculum and across varied disciplines and focuses on setting goals for students that go beyond mastery of content items.

## **Developing, Implementing, and Assessing Comprehensive Student Learning Outcomes**

*Hawthorne*

Richard Keeling, [rich@keelingassociates.com](mailto:rich@keelingassociates.com)  
*National Center for Science and Civic Engagement*

**Abstract:** This newly added workshop is ideally designed for participants who would like to spend more time intensively examining their current or proposed assessment strategies. Participants will be able to use what they've gained from other assessment and learning outcomes-oriented presentations during the Institute to complement the information and activities in this workshop.

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### **NSF Grant Writing**

*Greenhouse*

Myles Boylan, [mboylan@nsf.gov](mailto:mboylan@nsf.gov)  
*National Science Foundation*

**Abstract:** SENCER aims to encourage a substantial cohort of our participants to successfully apply for NSF direct support for adaptation and implementation of SENCER courses and programs. This workshop responds to interests and needs expressed by faculty and administrators associated with SENCER, and is designed to help achieve SENCER's national dissemination goal. Participants will receive a briefing on NSF grant reviewing protocols. Then, using real examples, participants will score CCLI applications. De-briefings will permit a review of salient features of a good application and identify common mistakes. Questions about NSF grant opportunities will be fielded. Participants who are interested in becoming NSF grant reviewers themselves will have the opportunity to learn more about these opportunities.

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### **Writing in SENCER Courses – Exploring the Key Issues**

*Sarah Orne Jewett*

Cathy Middlecamp, [chmiddle@wisc.edu](mailto:chmiddle@wisc.edu)  
*University of Wisconsin-Madison*

**Abstract:** In 1999, in response to a new university-wide set of communication requirements, I restructured my one-semester chemistry course (*Chemistry in Context*) as writing-intensive. Over the years, a number of questions emerged that later helped me as I designed and taught my first SENCER course (*Uranium and American Indians*) in 2003. In this workshop, I will share insights that relate to these questions: (1) What is useful to keep in mind as you design a writing assignment? (2) In what ways can you respond to student work? (3) How useful is peer review? (4) How can you create assignments that minimize the chances of plagiarism? (5) How can the SENCER-SALG give you useful feedback? (6) What resources are indispensable as you teach writing?

I hope that participants will engage in some lively discussions about teaching communication skills, gently chuckle at some of the things that we all have tried to no avail, and leave with a more powerful set of tools with which to successfully use writing in SENCER courses. If past years at SSI are any indication, we will accomplish all three.

As participants design or re-design a course, I hope that they will be able to (1) think more clearly about writing assignments might offer both instructors and students, (2) learn strategies that are

likely to work (and not to work) when designing a writing assignment, and (3) leave with a packet of useful materials that they can turn to in the future.

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### **Symposium on SENCER and K-12 Education**

*Longfellow A*

#### Discussants:

John Bransford  
*University of Washington*

Richard Duschl, [rduschl@rci.rutgers.edu](mailto:rduschl@rci.rutgers.edu)  
*Rutgers University*

Stephanie Knight, [s-knight@neo.tamu.edu](mailto:s-knight@neo.tamu.edu)  
*Texas A&M University*

Jay Labov, [jlabov@nas.edu](mailto:jlabov@nas.edu)  
*National Research Council*

Jean Moon, [jmoon@nas.edu](mailto:jmoon@nas.edu)  
*National Academies*

Erin Pittman, [epittman@hbgsd.k12.pa.us](mailto:epittman@hbgsd.k12.pa.us)  
*SciTech High School*

Kevin Varano, [kvarano@hbgsd.k12.pa.us](mailto:kvarano@hbgsd.k12.pa.us)  
*SciTech High School*

Adrienne Wootters, [awooter@mcla.edu](mailto:awooter@mcla.edu)  
*Massachusetts College of Liberal Arts*

#### Facilitators:

David Burns, [david.burns@sencer.net](mailto:david.burns@sencer.net)  
Ellen Mappen, [ellen.mappen@ncsce.net](mailto:ellen.mappen@ncsce.net)  
*National Center for Science and Civic Engagement*

**Abstract:** In this “mapping” session, discussants and participants will examine the topography of implementing SENCER in a K-12 environment, consider the benefits of the model for pre-service education, and discuss some of the issues, such as certification, that arise when one discusses K-12 education.

**TUESDAY, AUGUST 7, 2007**

**9:00-12:00 POST-INSTITUTE WORKSHOP**

**Designing a SENCER Course, Part II**

*Greenhouse and Louise Nevelson*

Barbara Tewksbury, [btewksbu@hamilton.edu](mailto:btewksbu@hamilton.edu)  
*Hamilton College*

**Abstract:** Focusing on articulating and achieving course goals, rather than on building a course around a list of content items, is one practical way of designing a course that is both effective and innovative—one in which students learn significant and appropriate content and skills, gain practice in thinking for themselves and solving problems in the discipline, and leave the course prepared to use their knowledge and skills in the future. This two-part workshop will give participants a chance to apply a practical and successful goals-based strategy to designing their own SENCER courses. The strategy is applicable at all levels of the curriculum and across varied disciplines and focuses on setting goals for students that go beyond mastery of content items.