

21st Biennial Conference on Chemical Education

Denton, Texas

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Symposia Topics and Organizers

Adding _____casts to Your Chemistry Teaching Toolbox

Keith Walters, Chemistry, Northern Kentucky University, walterske@nku.edu
Owen Priest, Chemistry, Northwestern University, o-priest@northwestern.edu

With every year new tools are available to create multimedia "casts" (e.g., podcasts, screencasts, vidcasts) and increasing numbers of chemistry educators are using them in their courses. While most people say that producing these "casts" is difficult and time-consuming, producing high-quality "casts" is actually easier and faster than you might think. Presentations in this symposium will share the successes, failures, and new advancements in producing and using "casts" in chemistry coursework, as well as providing lots of tips and tricks for instructors to get started with these in their own classes. Come see how easy it is to add "casts" to your arsenal of chemistry educational tools!

Assessment at the Two-Year College Level: Opportunity and Success

Thomas Jose, Chemistry, Blinn College, tjose72@yahoo.com

Teaching in a two-year college environment has its own set of challenges; however, these challenges have/are often turned into opportunities for novel ideas to be implemented and tested. One area rich in innovation is the assessment of student learning. This symposium will explore the variety of assessment methods used at two-year institutions.

Atoms First in the General Chemistry Curriculum

Jason Overby, Chemistry and

Biochemistry, College of Charleston, overbyj@cofc.edu

A significant recent trend in general chemistry has been the adoption of the atoms first approach. Traditional layouts of general chemistry are being replaced by atoms first where students are exposed to the building blocks of nature first and only after an examination of atoms and their properties are compounds introduced along with stoichiometry and the many facets of how reactions rearrange atoms. This symposium is designed to provide a timely look at the atoms first approach at various institutions. How is atoms first implemented? What topics and what order is covered with your atoms first approach? What benefits/pitfalls are encountered with this approach? How does this layout affect your laboratory course?

Best of Chem Ed

Andrew Cherkas, Science, Stouffville DSS, cherkas@sympatico.ca

If you have never been to a ChemEd conference, come visit this mini ChemEd where presenters will demonstrate their favourite labs, demos and teaching tips learned at a ChemEd conference.

Best of Chemistry Professors' Demonstrations

Jo King, Chemistry, Randall High School, Canyon ISD, jking@canyonisd.net

Tertiary-level chemistry instructors and/or lecture-demonstrators will present a series of chemical demonstrations used to help students with their understanding and learning of the chemical concepts taught in college level chemistry courses including

general, organic, inorganic, and physical chemistry. The demonstrations will be presented as they would be in the classroom. A detailed handout (hard-copy or electronic) that describes the 1) relevant concepts & applications, 2) materials and equipment including resources of less common items, 3) safety and disposal issues, 4) any needed advanced preparation, 5) instructions for performing, 6) pedagogical suggestions, & 7) references. The symposium will be sponsored by Sergeant-Welch (Mark Messaros) who will provide the chemicals needed by the presenters at no cost.

Best Practices with High School Dual Enrollment Courses

Doug Sawyer, Physical Science, Scottsdale Comm. College, doug.sawyer@sccmail.maricopa.edu

Many colleges are offering high school dual enrollment sections of their chemistry courses. These sections are generally offered to advanced level high school students. Instruction takes place on the high school campus, during the regular school day, with a high school teacher who is qualified and is functioning as an adjunct professor of the college. With few exceptions, the college transcript does not distinguish these sections from the on-campus sections. This symposium will examine the factors and practices which make the dual enrollment course "the same" and "different" from the on-campus offering. Dual enrollment policies and factors will also be presented as "successes" and "challenges". A wrap-up segment is planned to summarize and discuss the information. The information may lead to a list of best practices for dual enrollment offerings.

Big 10 Gen Chem Labs: Advances, Innovations, and Challenges

Joe Keiser, Chemistry, Penn State University, jtk1@psu.edu

To provide information regarding the current state of the general chemistry labs at universities in the Big 10 Conference.

Bioanalytical Chemistry: Analytical Applications in Biological Sciences

Harvey Hou, Department of Chemistry and Biochemistry, University of Massachusetts Dartmouth, hhou@umassd.edu

This symposium aims at the broadly defined Bioanalytical Chemistry, which includes the analytical applications in Biochemistry, Biophysics, Environmental Sciences, Forensic Chemistry, Green Chemistry, Chemical Biology, and Biotechnology at undergraduate and graduate levels. This is the third symposium session focusing on the topic of Bioanalytical Chemistry presented in BCCE in the past three years. The previous symposium presenters enjoyed the stimulating interaction and discussion on novel ideas of implementing the Bioanalytical Chemistry components in the existing chemistry classes or developing the complete Bioanalytical Chemistry courses to enhance students learning. It is evident that Analytical Chemistry is increasingly focused on the analysis of biological activity and detection of biological molecules in academia and industry. We believe that Bioanalytical Chemistry is one of the most promising enhancements in chemical education.

Calibrated Peer Review: New Developments and Uses

Arlene Russell, Chemistry and Biochemistry, UCLA, russell@chem.ucla.edu

The symposium addresses research on teaching and learning using CPR and strategies for institutionalizing the program on a campus.

Center for Workshops in the Chemical Sciences (CWCS)

Lawrence Kaplan, Chemistry, Williams College, lkaplan@williams.edu
David Collard, School of Chemistry and Biochemistry, Georgia Institute of Technology, david.collard@chemistry.gatech.edu
Patricia Hill, Chemistry, Millersville University, pat.hill@millersville.edu
Cianán Russell, School of Chemistry and

Biochemistry, Georgia Institute of Technology, cianan@gatech.edu
Jerry Smith, Chemistry, Georgia State University, chejcs@langate.gsu.edu

The Center for Workshops in the Chemical Sciences (CWCS) conducts workshops primarily for college and university faculty. The workshops are designed to provide a background of key areas of the chemical sciences along with pedagogical methods to introduce the topics into the undergraduate curriculum. In addition, CWCS develops Communities of Scholars in topical areas derived from workshop activities for the adaptation, implementation and development of high-quality course content and pedagogy, and the propagation of the use of successful teaching strategies. This symposium will include presentations concerning all aspects of the CWCS program including an overview of the workshop program, the content and scope of individual workshops, and the impact participation in the workshop program has had on the ability of workshop alumni to develop new pedagogical material. The CWCS is supported by the NSF, DUE, CCLI Program (DUE-0618678).

ChemEd Bridges: A Retrospective On Its Impact

Thomas Higgins, Physical Sciences, Harold Washington College, tbhiggins@ccc.edu
David Brown, Chemistry, Southwestern College, dbrown@swccd.edu

This symposium will feature alumni of the ChemEd Bridges project, who will speak about their efforts at curriculum reform at their home campuses.

Chemical Education Around the World

John Kotz, Chemistry, SUNY, johnkotz@mac.com

Advances in chemical education occur throughout the world, especially now that we are so interconnected. We invite submissions on innovative programs and on approaches to education of students and teachers in other nations,

particularly in the developing world. A portion of the symposium will also be devoted to the International Chemistry Olympiad program.

Chemical Education Research and the Community

Beverly Barker, Chemistry, University of Alaska, Anchorage, afbdb@uaa.alaska.edu

This symposium will focus on building community networks and leadership through chemical education research and chemistry research projects serving community needs. These include high school-college partnerships to implement innovative pedagogy, bridge program chem ed research projects, chemical education research on supporting diversity in chemistry at the college and high school levels, research on stimulating interest and engagement in the community and/or learning/achievement in the college/high school curriculum in the chemistry of global warming and sustainability.

Chemistry in Learning Communities

Jon Hardesty, Department of Chemistry, Collin College, jhardesty@ccc.edu
Dawn Richardson, Chemistry, Collin College, drichardson@ccc.edu

A Learning Community is a great method of integrating multiple disciplines, and as the central science, chemistry is perfectly situated to be approached via such a multidisciplinary perspective. Learning communities are unique because they are team taught by instructors from two (or more) disciplines allowing students a more expansive view of each field. In this symposium this method of presenting chemistry will be analyzed with the goal of highlighting the endless combinations that chemistry allows with other fields in conjunction with the enticing professional growth opportunities provided to the instructors.

Clickers: From Classroom Practice to Research Tool

Daniel King, Chemistry, Drexel University, daniel.king@drexel.edu

Clickers (or personal response systems, polling systems, etc.) have been increasingly used in classrooms of all sizes and at institutions of all sizes. The real-time feedback and classroom anonymity make these devices a powerful pedagogical tool to increase student engagement in the classroom. Increasingly, clickers are being used as a research tool to investigate student learning. Presentations are requested from clicker users at all levels, from the first-time user to the chemical education researcher. Presenters are particularly encouraged to provide data regarding the effectiveness of the devices, where possible. Presentations are welcome to describe clicker use in all courses, including large enrollment introductory level courses and small enrollment upper (and lower) level courses.

Cognition in Chemistry Education

Daniel Domin, Center for Teaching Excellence, Triton College, ddomin2@triton.edu

Mike Briggs, Chemistry, Indiana University of Pennsylvania, m.w.briggs@iup.edu

This symposium is designed to be a gathering of researchers and educators with an interest in the role of cognition in chemistry education. We will present our findings and discuss the cognitive issues associated with the teaching and learning of chemistry. We invite researchers, graduate students and sponsored undergraduate researchers to join us in the conversation. We solicit scholarship associated with the cognitive processes of learning; the application of research findings to theoretical and practical teaching perspectives and methods; neurological and psychological foundations of learning and cognition; knowledge construction through mental models and other constructs; and other cognitive aspects of the learning/teaching paradigm.

Combinatorial Chemistry in the Undergraduate Classroom

C. Frederick Jury, Chemistry, Collin College, FJury@ccc.edu

A symposium on the interaction of Undergraduates with Combinatorial Chemistry. This could include laboratory experiments, research, or lecture approaches to the topic.

Communicating Chemistry: Demonstrations in the Classroom and Beyond

Bassam Z. Shkhashiri, chemistry, UW-Madison, bassam@chem.wisc.edu

Jerry Bell, Education Division, American Chemical Society, j_bell@acs.org

The purpose of this symposium is to share a range of views regarding the use of chemical demonstrations in classrooms and in other settings and to spark interest in old and new demonstrations. Learner attitudes can be influenced by watching teachers do experiments in classroom settings. Lecture demonstrations help focus students' attention on chemical behavior and properties, and increase students' awareness and knowledge of chemistry. To approach demonstrations simply as a chance to impress students with the "magic" of chemistry is to fail to appreciate the opportunity they provide to teach scientific concepts. Lecture experiments generally involve more student participation through greater reliance on "what if" questions and suggestions from students as the teacher manipulates the chemical system. In principle and in practice, every lecture demonstration conveys the teacher's attitudes about the experimental basis of chemistry, and through them teachers can motivate their students to conduct further experimentation and lead them to understand the interplay between theory and experiment. Lecture demonstrations should not, of course, be considered a substitute for laboratory experiments, where students work directly with chemicals and equipment at their own pace and make their own discoveries. Demonstrations presented in public settings and through print and electronic media will be discussed.

**Community College and University:
Sharing Funding, Research,
Students, Faculty, Instruments and
Expertise**

*Carolyn Judd, Chemistry, Houston
Community College,
carolyn.judd@hccs.edu*

Houston Community College, with no formal history of research, has just had a very successful summer research program with the University of St. Thomas in Houston. This effort was funded by a \$2.4 million 2-year Department of Education CCRAA Grant. Both faculty and students from both institutions formed five joint research groups. The grant also funded instruments for HCC that were twins of those at the University of St. Thomas. HCC students and faculty learned how to use our new instruments by doing research with the same instruments at the University of St. Thomas. Throughout the year, members of both institutions meet monthly for training, planning, and collaboration, forming a bond between the institutions.

**Computational Chemistry in the
Undergraduate Curriculum**

*Craig Teague, Chemistry, Cornell
College, CTeague@cornellcollege.edu*

This symposium will bring together those who use computational chemistry in undergraduate classrooms or laboratories. Computational chemistry can be used in a variety of ways, including as a classroom activity, as a stand-alone lab, as a lab supplement, as the subject for an entire course, as a demonstration or simulation in lectures, and in research with undergraduates. Presentations on these and other uses of computational chemistry are welcome, as are presentations on uses of computational chemistry at all levels of the undergraduate curriculum.

**Creating Effective Learning
Environments in Large Enrollment
Chemistry Courses**

*John Sibert, Chemistry, The University of
Texas at Dallas, sibertj@utdallas.edu
Gregg Dieckmann, Chemistry, The*

*University of Texas at Dallas,
dieckgr@utdallas.edu*

*Loraine Dieckmann, Graduate Programs
of Nurse Anesthesia, Texas Wesleyan
University, ldieckmann@txwes.edu*

This symposium will focus on integrating proven methodologies and innovations to better serve students in large enrollment chemistry courses.

**Designing Innovative Chemistry
Classrooms: Architecture and
Pedagogy**

*Kimberly Woznack, Chemistry & Physics,
California University of Pennsylvania,
woznack@cup.edu*

We have reached an age during which many schools around the country are redesigning their chemistry classroom and their chemistry curricula. In the interest of sharing objectives, ideas and outcomes we invite talks about redesigning physical classroom spaces or redesigning or updating curricula. Many institutions have embraced an integrated lab/lecture course that sometimes requires a new space to work in and a new style of teaching. Other institutions have chosen to update their space and modernize a fairly "traditional" curriculum, while still others have implemented a new curriculum in a "traditionally" designed classroom and lab space. We invite talks from individuals in all of these situations.

Educating Future Forensic Scientists

*Sue Salem, chemistry, Washburn
University, sue.salem@washburn.edu*

Planned for high school through university educators, this symposium is designed to address both forensic chemistry education and new techniques in forensic science research and practice. Educators of students high school through university are encouraged to present, as are those educators who work on the cutting edge of forensic science research.

**Educating the Next Generation:
Green and Sustainable Chemistry**

Loyd Bastin, Chemistry & Biochemistry,

Widener University, lbastin@widener.edu

This conference will highlight the incorporation of green and sustainable chemistry across the curriculum. Papers are sought that will assist educators in providing students at all age levels with course materials (lecture and laboratory) that illustrate the integration of green and sustainable chemistry throughout the chemical enterprise. Topics of significant interest include the relationship between the practice of green chemistry and its impact on designing a sustainable civilization, pedagogical activities that instill in students the knowledge and practice of green chemistry, laboratory exercises that facilitate the incorporation of green chemistry across the curriculum, the impact of green chemistry on chemical hygiene issues, and resources that facilitate the incorporation of these materials into the curriculum.

Electronic Homework: What Have We Learned?

Margaret Asirvatham, Chemistry & Biochemistry, University of Colorado-Boulder, asirvath@spot.colorado.edu

Electronic homework in general and organic chemistry offers an online tool to keep students on track in the course. In this symposium, instructors and graduate students are invited to share their experiences in regard to pedagogical efficacy, student accountability, assessment, and impact on student learning and knowledge retention.

Engaging Students in Organic Chemistry

Barbara Murray, Chemistry, University of Redlands, barbara_murray@redlands.edu

Presentations of a variety of methods for engaging students in organic chemistry. These could range from individual creative activities to yearlong methods of teaching using new pedagogies and anything in between.

Evidentially-Based Curriculum Development for Undergraduate Chemistry

Stuart W Bennett, Chemistry, Open University, s.w.bennett@open.ac.uk

Tina Overton, Chemistry, University of Hull, t.i.overton@hull.ac.uk

Curriculum development for junior and high schools has long been a preoccupation of federal and state government, of teachers, educators and researchers with resultant broad changes being implemented. In contrast, the chemistry undergraduate curriculum has evolved somewhat piecemeal with the main inputs from academics and, to some extent, employers and professional bodies. There is an emerging body of research that provides evidence of the most effective areas for development within the undergraduate curriculum and pedagogies involved. In addition, we are becoming more aware of not just employer needs but employee needs and how these can be incorporated into the undergraduate experience. In spite of this evidence-base, the undergraduate curriculum has proved remarkably resistant to change. This symposium has two aims: to present information that materially informs the development of the undergraduate curriculum and to examine innovations in the curriculum (both large and small) that can be demonstrated to be successful.

Featured Research in Chemistry Education

Bill Robinson, Chemistry, Purdue University, wrrobin@purdue.edu

Douglas Mulford, Chemistry, Emory University, dmulfor@emory.edu

This is an experimental symposium was suggested by the DivCHED Committee on Chemistry Education Research. The symposium will feature presentations of completed chemical education projects that address: 1) the motivation for the research and the type of problem investigated, 2) the methodology chosen to both gather and interpret the data collected, and 3) the findings and significance of their interpretation. Participants will be invited to participate

after a blind review of a 1000 word abstract of their presentation. The abstract should be submitted to one of the organizers by January 1, 2010. If your presentation is accepted we will ask for a brief abstract for the program so your ability to publish the material is not compromised.

Food and Cooking in the Chemistry Curriculum

Raymond Shively, Chemistry, Baldwin-Wallace College, rshively@bw.edu

The symposium is designed to share ideas, topics, innovations and approaches to the teaching of the chemistry of food and cooking. The topic is growing in popularity in courses for non-chemistry majors. Presentations are welcomed in areas that serve non-majors, majors, and undergraduate research.

From Educator to Advisor, The Multiple Facets of Academic Positions

Charlie Cox, Department of Chemistry and Biochemistry, Georgia Institute of Technology,

charlie.cox@chemistry.gatech.edu

Carrie Shepler, Chemistry and Biochemistry, Georgia Institute of Technology,

carrie.shepler@chemistry.gatech.edu

The goal of the symposium is to provide an environment to discuss different advisement methods, current research in advisement methods, and new ideas and methods for equipping both advisors and students with the highest quality information possible. The symposium will include discussions on how to advise large quantities of students accurately and effectively, how to advise students on careers from pre-health to pre-professional including graduate school, and finally how to advise students on undergraduate research opportunities and careers. Discussions of the incorporation of social networking systems and balancing the roles of educator, mentor, and advisor.

General Papers- Oral Presentations

Tyson Miller, Chemistry, University of Connecticut, tyson.miller@uconn.edu

General Papers- Poster Presentations

Jeff Hepburn, Chemistry, Central Academy, jhepburn@mchsi.com

Mark Freilich, Chemistry, The University of Memphis, mfreilch@memphis.edu

George R. Hague, Jr. AP/IB Chemistry Symposium

Chuck Mills, Science, Gibson Southern High School (Retired), ccmills@wowway.com

Harvey Gendreau, Science, Framingham High School, hgendreau@rcn.com

This symposium is designed as a forum for AP/IB chemistry teachers to share ideas concerning effective teaching of the AP/IB chemistry course. Major areas to be explored will be laboratory activities, the latest developments in the AP chemistry curriculum, effective ways of teaching thermodynamics, equilibrium, acid-base chemistry, and electrochemistry. Presenters will be experienced AP or IB chemistry teachers including some who are readers of the AP Chemistry test.

Green Chemistry Education - What, Why, How

Deborah Exton, Chemistry, University of Oregon, dexton@uoregon.edu

This symposium will address the importance of introducing students to the concepts of green chemistry and sustainability and will highlight the various ways that green chemistry is being incorporated across the undergraduate curriculum. Presentations will focus on the teaching and implementation of green chemistry principles in both the classroom and the laboratory.

Green Chemistry in the Organic Laboratory

Andrew Dicks, Chemistry, University of Toronto, adicks@chem.utoronto.ca

This symposium focuses on novel

methods of teaching green chemistry concepts in the organic laboratory. Have you designed practical experiments showcasing some of the Twelve Principles of Green Chemistry at any undergraduate level? Come and share your exciting green teaching experiences!

Guided Inquiry

Steven Brown, Chemistry, University of Arizona, sbrown@u.arizona.edu

Teaching guided inquiry labs is difficult even for the most experienced teachers. For new teaching assistants it can be an impossible assignment. The symposium will discuss methods for teaching teaching assistants to run guided inquiry labs, problems associated with using teaching assistants to guide guided inquiry labs and possible solutions.

Inquiry Activities for High School Teachers

Julie Henderleiter, Chemistry, Grand Valley State University, henderlj@gvsu.edu

This symposium is for high school teachers who have tested inquiry activities they wish to share with their peers. The activity along with classroom results demonstrating its strengths are expected. Handouts or electronic copies of both student and teacher materials are encouraged.

Integration of Nanotechnology into the Chemistry Curriculum

Jason Montgomery, Chemistry, Florida Southern College, jmontgomery@flsouthern.edu

Advances in nanotechnology are impacting almost every facet of our lives, and whether a student is seeking a post-graduate degree in Chemistry, a degree in medicine, a position in industry, etc., he or she will surely encounter some manifestation of nanotechnology. The proposed purpose of this symposium is to attempt to address two primary questions. To what extent do students graduating with degrees in Chemistry need to have been exposed to nanoscience, and how can a

Department successfully integrate nanotechnology and nanoscience, from theory to experiments, into the Chemistry Curriculum. In particular, how can the important topics revealed in the former question be addressed by Departments that may be limited by resources, faculty, equipment, and/or students? Presentations that can address these issues or give insight into the successful integration of nanotechnology and the Chemistry Curriculum are encouraged.

International Experiences for Undergraduate Students

Joanne Smieja, Chemistry and Biochemistry, Gonzaga University, smieja@gonzaga.edu

International experiences enable students to gain a global perspective, a valuable attribute for today's workforce. Submissions are invited from faculty who have developed and implemented chemistry courses or chemistry research projects that include an international experience.

Interviews as a Data Collection Method

Stephanie Cunningham Ryan, Learning Sciences, University of Illinois at Chicago, s.a.cunningham@gmail.com
Sonia Underwood, Chemistry, Clemson University, sunderw@clemson.edu

Chemical education research often includes interviews to collect student data. Student interviews, however, are highly complex situations where interviewing skills are important. This symposium is a venue for researchers to discuss their own experience in designing and conducting interviews in chemical education research. This will be a venue for discussion, sharing, and suggestion. The emphasis will be on data collection methods not for data analysis.

Learning in the Laboratory: Evidence and Assessment

Santiago Sandi-Urena, Chemistry, University of South Florida, ssandi@cas.usf.edu
Melanie Cooper, Chemistry, Clemson

University, cmelani@clemson.edu
Daniel Domin, Chemistry, Tennessee
State University, ddomin@tnstate.edu
Todd Gatlin, Chemistry, University of
South Florida, tgatlin@mail.usf.edu
Jacob Schroeder, Chemistry, Iowa State
University, jds4097@iastate.edu

While most chemists agree that laboratory work is an important part of introductory science courses, there is scant evidence for the relationship between laboratory work and learning, particularly at the college level. The objective of this symposium is to create a space to present and discuss evidence and assessment for the effectiveness of laboratory environments in promoting learning, skills (technical and intellectual) and other types of gains in participants (students and teaching assistants). Studies of diverse laboratory formats and academic levels are welcomed.

Mentoring Faculty: Lengthening and Strengthening the Chain

Luis Montes, Chemistry, University of
Central Oklahoma, lmontes@uco.edu
Cheryl Frech, Chemistry, University of
Central Oklahoma, cfrech@uco.edu

Every member of the academic unit is involved in mentoring faculty. In the most traditional situation, new faculty are mentored by more senior colleagues, but there are many variations of this theme. Senior faculty are mentored by their emeritus colleagues. Women and minority faculty or faculty with non-traditional lifestyles often mentor each other. In each case, the chain of formal and informal knowledge about teaching and survival in academia is lengthened and strengthened. In this symposium we seek input from all levels of faculty on their mentoring successes and experiences.

Micropublishing

Roy Jensen, Chemistry, Grant MacEwan
University, JensenRH@MacEwan.ca

A new paradigm in publishing. Faculty members and departments are

abandoning traditional publishers and moving to developing their own instructional material, from laboratory manuals to course packs to textbooks. This symposium explores the mechanics of getting started and getting published and also showcases the products of these micropublishing initiatives. Presenters are encouraged to share their experiences, strategies, wisdom, and successes.

Modernizing Teaching about Molecules and Bonding in General Chemistry Courses

David Woon, Department of Chemistry,
University of Illinois at Urbana-
Champaign, davidewoon@gmail.com

Much of the current material on molecules and the nature of chemical bonding that is presented in general chemistry textbooks and courses is dated and fails to reflect the mature state of knowledge on the topic, particularly from the perspective of modern quantum chemistry. Better options are available than Lewis structures, Pauling hybridization, and VSEPR theory. This symposium will allow presenters to describe alternate strategies for teaching the subject matter that are in development or already in use. While the primary emphasis of the symposium will be on new approaches to the material itself, talks that address misconceptions about molecules and bonding and related pedagogical issues will also be appropriate.

Monitoring, Assessing, and Improving Students' Oral Presentation and Scientific Writing Skills within Chemistry Courses and throughout Science Programs

Joe Shane, Department of Chemistry,
Shippensburg University,
jwshan@ship.edu

Thomas Frielle, Chemistry, Shippensburg
University, tfrielle@ship.edu

Daniel Predecki, Chemistry,
Shippensburg University,
dppred@ship.edu

Curtis Zaleski, Chemistry, Shippensburg
University, cmzaleski@ship.edu

This symposium will focus on methods for improving students' oral presentation and/or scientific writing skills within specific chemistry courses and across multiple years such as a middle- or high-school science sequence and chemistry programs at two- and four-year colleges and universities. In addition to specific activities and assessment criteria, descriptions of how science and other faculty (e.g., from English departments) collaborate in order to improve students' communication skills should be included.

MSPs: How K-12/College Partnerships Have Improved Chemistry Instruction

Martin Brock, Chemistry, Eastern Kentucky University, martin.brock@eku.edu

The establishment of Math and Science Partnership programs in the wake of NCLB has led to many shifts in postsecondary attitudes about K-12 teaching in areas related to chemistry. The purpose of this symposium is to share MSP experiences from college faculty and K-12 teachers and how they have informed: Use of inquiry pedagogy; Learning progressions; High school/college transition and the problems of readiness and retention; Structure of professional development programs; Pre-service science curricula; and other topics of related interest.

Multi-Sensory Science Approaches to Teaching Chemistry to Students with Special Needs

Cary Supalo, Chemistry, Pennsylvania State University, cas380@psu.edu

The symposium will discuss new methodologies for chemical educators to teach chemistry to students with special needs, specifically, to those with disabilities and minority students, among other areas. This symposium can also include specialized hands-on approaches for teaching chemical concepts to students in a multi-sensory approach (i.e., ways that would incorporate innovative techniques outside of the traditional skills set).

Out of the Box: Teaching Chemistry with Case Studies and Applications

Matthew Johll, Chemistry Department, Illinois Valley Community College, matthew.johll@gmail.com

The goal of this symposium is to present the audience with an understanding of how case studies and specific applications of chemistry can be used in their classroom. These methods can enhance student appreciation and understanding of the information and help to further develop their problem solving skills. Presentations from all levels of the chemistry curriculum are encouraged.

Physical Chemistry: Applied, Interesting, and Relevant

Roy Jensen, Chemistry, Grant MacEwan University, JensenRH@MacEwan.ca

Key aspects of student engagement are student interest and the ability of students to see the applicability and relevance of the material to their immediate world and/or their future careers. This symposium explores lecture instructional material and laboratory experiments that make physical chemistry interesting and relevant to students.

POGIL

Tina Mewhinney, Chemistry, Eastfield College and University of North Texas, Tina.Mewhinney@dcccd.edu

Process Oriented Guided Inquiry Learning - papers welcomed for all levels of POGIL use in science - middle school, high school and college. Classroom experiences or research associated with POGIL are encouraged.

Practices and Policies that Foster Excellence in the First Two Years

Jodi Wesemann, Department of Higher Education, American Chemical Society, j_wesemann@acs.org

Cathy Nelson, Office of Professional Training, American Chemical Society, c_nelson@acs.org

The first two years of chemistry education involve much more than learning the facts. As described in the "ACS Guidelines and Evaluation Procedures for Bachelor's Degree Programs" and the "ACS Guidelines for Chemistry in Two-Year College Programs," students need to gain intellectual, experimental, and professional skills, developing the ability to apply knowledge and skills to new situations and transfer knowledge from one context to another. This full day session will explore practices and policies that can advance a chemistry program to the next level of excellence. Presentations and discussions will focus on the programmatic aspects of the curriculum, pedagogical approaches, and the development and assessment of student skills. The importance of faculty development, involvement, and interactions with students will be highlighted. Mechanisms for continuous evaluation and improvement will also be shared.

Problem-Based Learning Design and Utilization in Upper Level Chemistry Courses

Susan Hornbuckle, Natural Sciences, Clayton State University, susanhornbuckle@clayton.edu

This symposium will allow chemistry educators to share their experiences with the design and/or utilization of problem-based learning in upper level chemistry courses. Papers involving problem-based learning techniques for organic chemistry, biochemistry, analytical chemistry, medicinal chemistry, environmental chemistry, forensic chemistry, physical chemistry, and other upper level chemistry courses would be appropriate presentations for this symposium.

Research in Chemistry Education

*Bill Robinson, Chemistry, Purdue University, wrrubin@purdue.edu
Douglas Mulford, Chemistry, Emory University, dmulfor@emory.edu*

This symposium provides a forum for chemical education research. A

submitted presentation should briefly address 1) the motivation for the research and type of problem investigated and 2) the methodology chosen to both gather and interpret the data collected. The presentation should focus primarily on the findings and the interpretation of the data. This symposium is sponsored by the ACS DivCHED Committee on Chemistry Education Research.

Research in Effectiveness of Active Learning Pedagogies

Tina Mewhinney, Chemistry, Eastfield College and University of North Texas, Tina.Mewhinney@dcccd.edu

Papers reflecting studies on the effectiveness of active pedagogies, such as POGIL or PTL, are welcomed.

Science and Civic Engagement: A Curriculum for the 21st Century

Richard Sheardy, Chemistry and Physics, Texas Woman's University, rsheardy@twu.edu

Science Education for New Civic Engagement and Responsibilities (SENCER) began with the support of the NSF in 2001. At Colleges and Universities across the United States, this program continues in developing a community of learners and scholars who demonstrate the connection between science and civic engagement. Come learn how the application of SENCER goals and ideals impacts student retention by learning across the curriculum and engaging them beyond the classroom.

Service-Learning in Chemistry

Joan Esson, Chemistry and Biochemistry, Otterbein College, jesson@otterbein.edu

The purpose of this symposium is to share best practices for the incorporation of service-learning as a teaching pedagogy into the chemistry curriculum. This symposium will build on a workshop that was offered during BCCE 2008, Service-Learning 101, which provided a basic overview of service-learning and some suggestions for creating and

adapting projects into courses. Although open to anyone interested in presenting, this symposium would especially offer a voice to those who have developed service-learning projects out of the BCCE workshop.

Strategies for Student Engagement in General Chemistry

Roy Jensen, Chemistry, Grant MacEwan University, JensenRH@MacEwan.ca

This symposium explores the changing and diverse learning behaviors of today's students and presents the opportunities, challenges, and strategies instructors have developed for engaging students in general chemistry – a mix of chemistry, science, and non-science students.

Student-Centered Learning in Chemistry

Gloria Brown Wright, Chemistry, Central Connecticut State University, brownwrightgla@ccsu.edu

MaryEllen Weimer identifies five key areas where changes are necessary in order to facilitate learner-centered teaching: balance of power, use of content, encouraging student responsibility, the role of the teacher, the purpose and process of evaluation. Presentations will describe curricular innovations that answer to any of the above areas, how they were received by students, and the cognitive and/or affective results.

Supporting and Engaging Two-Year College Programs: Exploring the ACS Role

Jodi Wesemann, Department of Higher Education, American Chemical Society, j_wesemann@acs.org
Margaret Richards, m_richards@acs.org

How can ACS engage and support two-year college programs? Following the release of the "ACS Guidelines for Chemistry in Two-Year College Programs," a task force was formed to answer this question. Discussions will focus on potential frameworks for ongoing evaluation and improvement, identification and communication of

effective practices and critical issues, and recognition of high standards in two-year college programs. Input will also be requested on procedures to 1) Coordinate the preparation, review, dissemination, and updates of supplements for the ACS Guidelines for Chemistry in Two-Year College Programs; 2) Assess the use and impact of the Guidelines, review results, and share them with the community; and 3) Explore how the guidelines could be made more useful, collecting and disseminating examples of how they are used. Questions about the guidelines will also be addressed during this interactive session.

Survivor Skills for 1st to 5th year Chemistry Teachers

Laura Slocum, University High School of Indiana, lslocum@universityhighschool.org
Doug Ragan, Science, Hudsonville High School, dragan@hudsonville.k12.mi.us

National research data claims that one out of every five novice teachers leaves the teaching profession after only three years and 50% leave in the first five years. Often, these teachers are frustrated and feel overwhelmed because they are held to the same accountability standards as veteran teachers. One of the major reasons cited for leaving is the lack of support and guidance from the administration and colleagues. In this symposium, veteran teachers will offer themselves as role models for novice teachers or other educators seeking to improve and fine tune their classroom instruction and management skills. These veteran teachers will share a wide range of resources such as great lesson plans, teaching strategies, activities, projects or demonstrations that can help prevent novice teachers from having to "reinvent the wheel." There will also be a packet and prize drawing for each one-five year teacher attending the symposium.

Teaching Environmental Chemistry

Marina Koether, Chemistry and Biochemistry, Kennesaw State University, mkoether@kennesaw.edu

Authors of papers in this symposium will present their methods and/or their content for their environmental chemistry lecture and/or laboratory course(s). Innovative on-line resources and activities should be highlighted. Environmental chemistry research projects conducted by undergraduate students may also be presented.

Teaching Safety in Chemistry Classes and Programs

Dave Finster, Chemistry, Wittenberg University, dfinster@wittenberg.edu

The 2008 ACS CPT Guidelines for Bachelor's Degree Programs reaffirm that undergraduate chemistry programs must include safety education "as in integral part of the chemistry curriculum" and "throughout their studies students must experience safety procedures and processes." This symposium will include presentations of how different colleges and universities design and implement these CPT requirements, both in individual courses and in curriculum-wide programs. By sharing successful programs, we can all improve what we do on our home campuses and better educate our students for their future careers as safe scientists.

Teaching with Discrepant Events: A Carousel of Activities

John Eix, Science, Upper Canada College - Retired, jeix@sympatico.ca

Bette Bridges, Chemistry, Bridgewater-Raynham Regional High School, babridges@comcast.net

Andrew Cherkas, Science, Stouffville DSS, cherkas@sympatico.ca

Patrick Funk, Chemistry, Pickerington High School Central, rukidding_me@hotmail.com

Harvey Gendreau, Science, Framingham High School, hgendreau@rcn.com

Irwin Talesnick, Faculty of Education, Queen's University,

Irwin@s17science.com

This session is dedicated to the memory of the late Tik Liem. Discrepant events cause students to ask questions,

formulate hypotheses. Each presenter demos 2 or 3 activities. Participants rotate thru the carousel participating in all demos

The Art of Teaching Chemistry at a Community College

Edward Kremer, Chemistry, Kansas City Kansas Community College, ekremer@kckcc.edu

This symposium will focus on the myriad of ways in which 2-year faculty reach out to and teach students at their school.

The G, O, Bs of Allied Health Chemistry

Laura Frost, Chemistry, Georgia Southern University, ldelong@georgiasouthern.edu

This symposium invites educators of allied health chemistry using non-traditional formats in either a one- or two-semester General, Organic, and Biochemistry (GOB) course to share their classroom instructional strategies, and/or their organization of course content.

The New ChemSource: Standards, Assessment, and More

Mary Virginia Orna, Chemistry, College of New Rochelle, mvorna@cnr.edu

When ChemSource as a strategy for pre-service and inservice chemistry teachers first appeared in 1994, it was cutting edge. Subsequently revised in 1998, the new 2010 Version addresses issues that became important in the intervening dozen years: assessment, standards (state and national), and inquiry-based activities. The SourceView videotapes will also be available on DVD.

The Science Writing Heuristic in Laboratory Instruction

Dawn Del Carlo, Chemistry and Biochemistry, University of Northern Iowa, dawn.delcarlo@uni.edu

Kathy Burke, Chemistry, Iowa State University, kbrk@iastate.edu

Tom Greenbowe, Chemistry, Iowa State University, tgreenbo@iastate.edu

The Science Writing Heuristic is a pedagogical process incorporating collaborative inquiry activities, cooperative negotiation of conceptual understanding, and individual writing and reflection within the context of laboratory inquiry. Each component is equally as important as the next in successfully achieving the intended goals and outcomes of the process. This symposium serves as a forum for presentations on the development, implementation, and assessment of the use of the SWH at all levels of science education.

Undergraduate Research that Engages Community College Students

Thomas Higgins, Physical Sciences, Harold Washington College, tbhiggins@ccc.edu

David Brown, Chemistry, Southwestern College, dbrown@swccd.edu

This symposium will feature both students and faculty discussing about their research, the impact of the research experience, and practical advice for faculty and students.

Using History in Teaching Chemistry

David Katz, Chemistry, Pima Community College, dakatz45@msn.com

Textbooks are written by chemists who are formalized individuals that deal with the abstractions of our modern chemical science on a daily basis. Although, in most cases, their books present topics in well organized and fairly comprehensive discussions, they do not allow for a graduated learning of the material. A historical approach allows students to see the simplified concepts and the evolution of ideas that lead to our modern theories and principles.

Using Laptop/Cell phone Student Response Systems to Enhance Group Learning Activities

Andrew Grall, Chemistry & Biochemistry, University of Arizona, grallaj@email.arizona.edu

Student response systems, or 'clickers',

have been used for several years to further engage the students and to get feedback on practice problems. Students having to purchase an independent device that may be only used for one class, however, can be difficult to justify. The technology is now available so that students can use their own laptop computers, netbooks, and/or smartphones (iPhone, Blackberry, Windows Mobile, etc.) as their student response devices. In addition, these devices can be used, not only for practice problems and immediate feedback, but also as a means to enhance group activities in large lectures - for students to work together on a problem and to have a 'spokesperson' for their group ready to answer questions.

Views from the Classrooms of Conant and Regional Award Winners

Laura Slocum, University High School of Indiana,

lslocum@universityhighschool.org

Erica K. Jacobsen, Journal of Chemical Education, Univ. of Wisconsin-Madison, jacobsen@chem.wisc.edu

The James Bryant Conant and ACS High School Regional Award winners are some of the best chemistry teachers in the nation. These teachers have much to share with other educators about best practices in the classroom. Winners typically have an opportunity to present an award address at ACS National and Regional meetings. But, how many of us get to hear their actual award presentations and learn from their experience? This symposium will give attendees a chance to meet and benefit from these award-winning teachers, as well as find out more about how to nominate a teacher for one of these awards and how each award selection process works.

Web Based Applications for Chemical Education

Robert Belford, Chemistry, UALR, rebelford@ualr.edu

Robert M Hanson, Chemistry, St. Olaf College, hansonr@stolaf.edu

John H. Penn, Chemistry Department,

*West Virginia University,
John.Penn@mail.wvu.edu*

This symposium seeks to bring developers of web-based applications together with chemical educators to share experiences and innovations. We are looking for presentations from the perspectives of development and implementation of web based applications, along with how the open access nature of the web and social networking technologies have changed the way scientists and educators communicate information, and how that is impacting chemical education. Papers are invited relating to specific web-based applications, creative solutions to web-based issues in the context of chemical education, reports of the impact of web-based applications on pedagogy and learning, or visions of the future.

Where is Chemical Technology Education Headed in 2010?

*John Kenkel, Laboratory Science,
Southeast Community College,
jkenkel@southeast.edu*

From new chem tech programs and new curriculum ideas, to new educational materials, to news and issues regarding voluntary industry standards, to the demise of CTPAS and the ACS Office of Technician Education, to changes in the TECH division of the ACS, to changes in the functions of the ACS Committee on Technician Affairs - this symposium has it all. What is happening in the world of chemical technology education in the beginning of the third millennium? Our symposium will have answers.