Program for the Division of Chemical Education Salt Lake City, March 22-26, 2009

ARTICLE *in* JOURNAL OF CHEMICAL EDUCATION · MARCH 2009

Impact Factor: 1.11 · DOI: 10.1021/ed086p286

3 AUTHORS:

Julianne M. Smist

Springfield College

11 PUBLICATIONS **4** CITATIONS

SEE PROFILE

William S. Harwood

University of Northern Iowa

37 PUBLICATIONS **468** CITATIONS

SEE PROFILE

Irvin J. Levy

Gordon College

15 PUBLICATIONS **154** CITATIONS

SEE PROFILE

ACS National Meeting

Program for the Division of Chemical Education Salt Lake City, March 22–26, 2009

by Julianne M. Smist, William S. Harwood, and Irvin J. Levy*

CHED technical sessions will be held in the Salt Lake Marriott City Center Hotel, 220 South State Street (location #10 on the ACS map). Exceptions are the Sunday evening Reception and Social Event, the Sunday evening poster session, Undergraduate Program, Undergraduate Research Posters, and Sci-Mix, all of which will be held at the Salt Palace Convention Center. Be sure to check the on-site program for any last-minute changes in time or location. Unless otherwise noted, morning sessions begin at 8:30 a.m. and afternoon sessions at 1:30 p.m. Symposia that are related to the over arching multidisciplinary theme "Nanoscience: Challenges for the Future" are noted *cosponsored by NANO*.

photo by Alan Yorgason

Salt Lake skyline at night. Courtesy Salt Lake Convention & Visitors Bureau.

Sunday, March 22

Morning

A. Plagiarism: What Is It? What Can We Do about It?
George M. Bodner, Organizer
Thomas R. LeBon, Organizer, Presiding

Cosponsored by CHAL, ETHC, and CINF. The National Institutes of Health's Office of Research Integrity (ORI) defines plagiarism as "appropriating another person's ideas, processes, results, or words without giving appropriate credit". This symposium will include a discussion of efforts to educate undergraduates and graduate students in the meaning of "plagiarism" and advances being made in the detection and handling of cases of plagiarism in the academic environment. It will also examine changes in the ways professional societies handle plagiarism within the context of their journals and other publications.

B. Outstanding Outreach Is Elemental: The Helen Free Award Symposium, Part I
Pamela Kerrigan, Organizer
Cheryl Baldwin Frech, Organizer, Presiding

Outreach to the public with programs in science and chemistry is elemental in attracting new students to the field, engaging and informing the public, and communicating the importance of science. The Helen Free Award for Public Outreach was established in 1995 to recognize ACS members who have demonstrated an outstanding record of public outreach. This symposium will spotlight past winners of this award and introduce the 2009 winner.

C. Advances in Teaching Organic Chemistry, Part I
Susan F. Hornbuckle, Organizer, Presiding

This symposium will allow chemistry educators to share their experiences with the design and/or utilization of various pedagogical techniques for organic chemistry courses. Individual or departmental efforts in this area are essential in the endeavor to educate our next generation of scientists. Papers involving different approaches for teaching organic chemistry concepts in the classroom or laboratory will be presented.

D. Integrating Nanoscience into the College and High School Classroom, Part I: High School Classroom
Andrew E. Greenberg, Organizer, Presiding

Cosponsored by NANO. The focus of the symposium will be on the integration of nanotechnology into college and high school classrooms. Speakers include college faculty and instructors who develop and/or teach nanoscience topics in their lecture or laboratory courses, high school teachers who teach nanoscience in their classroom or have participated in an nanofocused RET program, and developers of nano-focused professional development programs for educators.

Teaching Chemistry to a Diverse Student Body

Sponsored by CMA; cosponsored by CHED, WCC, and YCC.

Encore! Be there!

CHED Reception and Social Event

Sunday, March 22: 6:15–7:15 p.m.

Salt Palace Convention Center
Ballroom J

Wasatch Mountain hors d'oeuvres and a cash bar

Open event—no ticket needed!

There will be brief introductions of DivCHED members and officers as well as the individuals who will receive the ACS awards that are related to chemical education: Alex Johnstone (Award for Research in Teaching and Learning of Chemistry), Henry Heikkinen (Pimentel Award), and Sally Mitchell (Conant Award). Cosponsors are Cengage Learning, DivCHED Exams Institute, and the *Journal of Chemical Education*. See page 292 for more award information. (There will be *no* DivCHED banquet.)

Afternoon

A. Computers in Chemical Education, Part I
Clyde Metz, Organizer
Shawn C. Sendlinger, Organizer, Presiding

Presenters will share ideas for introducing various aspects of computational chemistry into the chemistry curriculum, seeking answers to questions such as "What works?", "What doesn't work?", "How do I start?", "How do I convince colleagues to participate?", and "How do I assess the outcome?".

B. Microwave-Assisted Chemical Synthesis and Transformations
Rajender S. Varma, Organizer, Presiding

Microwave heating is increasingly being used in chemical syntheses as well as in materials processing. This technology is gaining interest in the field of synthetic processes where enhancements in terms of yield, product purity, and reaction time have already been assessed. The novelties brought in by microwave heating during chemical processes include reduction of reaction time, high selectivity, and greener attributes such as reactions that are solvent-free or use benign media. The effect on laboratory procedure has dramatically increased over the years as more chemists are now using this technique as evidenced by the number of scientific publications. Papers will describe the use of microwave energy in promoting the synthesis of organic molecules and functional group transformations, organic–inorganic complexes, nanomaterials, ceramics, and polymer synthesis with particular emphasis on applications to research and laboratory experiences in the undergraduate curriculum.

C. Advances in Teaching Organic Chemistry, Part II
Susan F. Hornbuckle, Organizer, Presiding

D. Integrating Nanoscience into the College and High School Classroom, Part II
Andrew E. Greenberg, Organizer, Presiding

Cosponsored by NANO.

Evening, Salt Palace Convention Center

DivCHED Reception and Social Event, 6:15–7:15 p.m., Ballroom J

This CHED social event (replacing the CHED banquet) is a non-ticketed event open to all.

General Posters, 7:30–9:30 p.m., Exhibit Hall 1
MaryKay Orgill, Organizer

Monday, March 23

Morning

A. Computers in Chemical Education, Part II
Shawn C. Sendlinger, Organizer
Clyde Metz, Organizer, Presiding

B. Outstanding Outreach Is Elemental: The Helen Free Award Symposium, Part II
Cheryl Baldwin Frech, Organizer
Pamela Kerrigan, Organizer, Presiding

C. Process-Oriented Guided Inquiry Learning (POGIL): POGIL Across the Curriculum
Richard S. Moog, Organizer
Frank J. Creegan, Presiding

Process-Oriented Guided Inquiry Learning (POGIL) is a student-centered and research-based instructional paradigm that utilizes an inquiry approach structured around the learning cycle. In a POGIL learning environment, students work in self-managed groups on specially designed activities, with the instructor serving as a facilitator. This symposium will include presentations describing the implementation of the POGIL approach in a variety of chemistry courses (including laboratory) at all levels, the design and construction of POGIL activities, and studies on the effectiveness and impact of POGIL.

D. Research in Chemical Education: K–12 Teaching and Teachers
Gautam Bhattacharyya and Dawn I. Del Carlo, Organizers
Thomas C. Pentecost, Presiding

This symposium, sponsored by the CHED Committee on Chemical Education Research, is a forum for research conducted on the teaching and learning of chemistry at any level. Presentations will address: the motivation for the research and the theoretical bases in which it is grounded; the methods used to gather and interpret data; and the findings and their significance interpreted in light of theory and method. This session focuses on elementary school through high school.

E. Online Resources for Chemical Education: Web 2.0 and Digital Objects
Robert E. Belford, Organizer
John H. Penn, Organizer, Presiding

Cosponsored by CINF. This symposium brings presentations from both developers and educators on Internet resources and the ways they can be utilized for teaching and learning chemistry. What opportunities do open source programs like Jmol and MOODLE provide? How are Java and Shockwave applications or digitized video files and podcasts being used? What downloadable compiled programs can be obtained over the Internet; how can they be used in the classroom? What are the options, opportunities, and potential pitfalls of using social networking sites? How can wikis be used in lecture and laboratory? What are the roles of digital libraries? What are new and novel resources? The objective is to provide opportunities for educators and developers to share resources and experiences.

Afternoon

A. ACS Award for Achievement in Research for the Teaching and Learning of Chemistry: Symposium in Honor of Alexander Henry Johnstone
Melanie M. Cooper, Presiding

Alex H. Johnstone is a pioneer in the field of chemical education research, and the importance of his work is difficult to over state. He was one of the first researchers to combine chemistry content knowledge with emerging research in cognitive science, providing a much richer understanding of teaching and learning in chemistry. When turning to a new area of research, new investigators would be wise to review his contributions because it is almost inevitable that he has made significant contributions to the field. Whether it be multi-level representations, problem solving, laboratory learning, information processing, or investigations into the affective domain, Johnstone has provided fundamental insights. This symposium brings together friends and researchers who will discuss his work and how it has affected their own research. [See p 292 for more information.]

ACS National Meeting

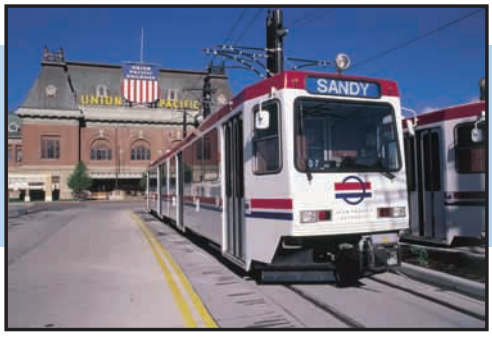


photo by Alan Yorgason

Trax light-rail. Courtesy Salt Lake Convention & Visitors Bureau.

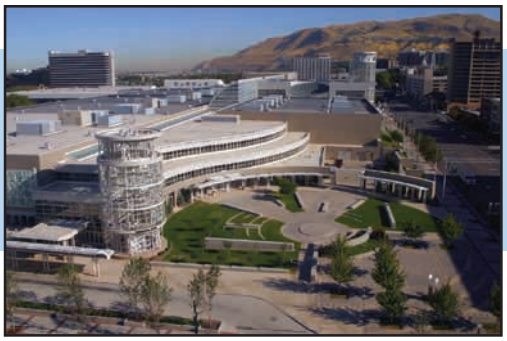


photo by Eric Schramm

Salt Palace Convention Center. Courtesy Salt Lake Convention & Visitors Bureau.

B. NSF-Catalyzed Innovations in the Undergraduate Curriculum
Susan Hixson, Organizer
Bert E. Holmes, Presiding

This symposium will feature speakers from projects funded by NSF that are developing educational materials or strategies aimed at improving the learning of chemistry by undergraduates with diverse backgrounds and career aspirations.

C. The *Journal of Chemical Education:* Celebrating Classroom Activities, Part I
John W. Moore, Organizer
Erica K. Jacobsen, Presiding

During the past dozen years the *Journal of Chemical Education* has undergone significant transformations in many areas. One of these changes is a reinvigoration of the *Journal*'s efforts to address the needs of high school teachers. A major part of that effort is the publication of *JCE* Classroom Activities and Classroom Activity Connections. This symposium celebrates the publication of the 100th *JCE* Classroom Activity in the February 2009 *JCE*. Invited speakers will describe all aspects of *JCE* Classroom Activities: how the column was conceived and developed, what kinds of activities are appropriate, how the activities can be used in outreach programs, in high school and middle school classrooms, how *JCE* articles can be adapted to make excellent activities, and how *JCE* Classroom Activities and Classroom Activity Connections will develop in the future. Come find out more about this aspect of the most highly regarded journal in chemical education.

D. Research in Chemical Education: Conceptions and Misconceptions
Gautam Bhattacharyya and Dawn I. Del Carlo, Organizers
Rachel A. Morgan Theall, Presiding

Undergraduate Research Poster Session, Salt Palace Convention Center, Exhibit Hall 5, 12–3 p.m.
Nancy Bakowski, Organizer

E. Analytical Chemistry
Posters 197–278

F. Biochemistry
Posters 279–440

G. Chemical Education
Posters 441–502

H. Environmental Chemistry
Posters 503–553

I. Inorganic Chemistry
Posters 554–643

J. Medicinal Chemistry
Posters 644–686

K. Nanotechnology
Posters 687–716

L. Organic Chemistry
Posters 717–928

M. Physical Chemistry
Posters 929–1009

N. Polymer Chemistry
Posters 1010–1029

Evening

A. High School Program, Part I, Olympus Ballroom, 4–8 p.m. (See pp 292–293 for more information.)
Tom Richmond, Organizer
Laya Kesner, Organizer, Presiding

A wide range of topics will be addressed, highlighted by the award address by Sally B. Mitchell, recipient of the James Bryant Conant Award in High School Chemistry Teaching.

B. Successful Student Affiliates Chapter Poster Session, Salt Palace Convention Center, Exhibit Hall 5, 8–10 p.m.
Nancy Bakowski, Organizer

Papers 1036–1145.

C. Sci-Mix, Salt Palace Conv. Ctr., Exhibit Hall 5, 8–10 p.m.
Julianne M. Smist, Organizer

Papers 14–16, 33–34, 45–46, 61, 70, 80, 91, 95, 100–101, 110, 114, 116, 118, 123–124, 139, 144, 160, 168-169, 182, 193, 1161, 1163, 1201, 1219, 1223, 1229, 1236-1237, 1267, 1282–1283, 1290, 1308. See final program for descriptions.

Utilizing the X Factor: Empowering the Next Generation of Women Chemists

Sponsored by WCC; cosponsored by PROF and CHED.

Tuesday, March 24

Morning

A. Public Outreach: Better Living through Chemistry, 8–10 a.m.
Sapna Gupta, Organizer, Presiding

We will showcase successes and challenges with public outreach in chemistry. Topics range from kids and chemistry

to public access outreach to community service in Navajo communities—not forgetting toys, polymers, magic, and food. Learn about these and other activities and find ideas to take back to your own outreach programs.

B. Naturally Nano, Part I
Nausheena Baig, Eric Fallows, Karah E. Knope, Jennifer D. Herdman, Badri Shyam, and Nicholas Deifel, Organizers

Cosponsored by PRES, NANO, BIOT, IEC, and INOR. This symposium will feature talks from leading scholars with an interest in biological- and nature-inspired nanotechnology. This research, driven by a co-dependent relationship between humans and nature, includes self-assembled molecular architectures, bio-engineered nanomaterials, biomimetics, and drug delivery. Because of the field's rapid emergence, potential environmental and public risks as well as ethical concerns will also be addressed. Discover new connections between nature, engineering, and nanotechnology and engage in discussions concerning science, safety, ethics, and policy that surround this rapidly growing field.

C. Process-Oriented Guided Inquiry Learning (POGIL): The POGIL Project–Activities and Assessment
Richard S. Moog, Organizer. Jeffrey R. Pribyl, Presiding

D. Research in Chemical Education: Organic and Biochemistry
Gautam Bhattacharyya and Dawn I. Del Carlo, Organizers
David P. Cartrette, Presiding

E. Online Resources for Chemical Education: Green and Organic Chemistry Applications
Robert E. Belford and John H. Penn, Organizers
Robert M. Hanson, Presiding

Cosponsored by CINF.

Undergraduate Research at the Frontiers of Inorganic Chemistry: Bioinorganic and Biomimetic Chemistry

Sponsored by INOR, Cosponsored by CHED.

Noon, Salt Palace Convention Center, Booth 825

Let Them Eat Cake! Celebrating 75 Years of the ACS Division of Chemical Education Examinations Institute
Thomas A. Holme, Organizer, Presiding

Sponsored by the Examinations Institute, CHED. Birthday cake will be served at noon, in celebration of the 75th anniversary of the Examinations Institute. Come to Expo Booth 825 in the Salt Palace Convention Center to meet Tom Holme, director, and others involved with the Exams Institute. Find out about other CHED activities such as *Journal of Chemical Education,* outreach, programming, Biennial Conferences, and more.

Afternoon

A. George C. Pimentel Award in Chemical Education: Symposium in Honor of Henry W. Heikkinen
Rob Milne, Organizer
Diane M. Bunce, Organizer, Presiding

Henry Heikkinen's contributions are numerous and varied: as an innovator in curriculum design starting with Interdisciplinary Approaches to Chemistry (IAC) to *ChemCom: Chemistry in the Community;* as a prime author of the National Science Standards for the National Academy of Sciences. His influence has touched pre-college and college chemistry students throughout the country and the world. He is also honored for contributions to the field of chemical education and its placement as a sub-discipline within chemistry departments, starting with the University of Maryland and including the University of Northern Colorado. His contributions as curriculum innovator, chemical education pioneer, mentor, colleague, and friend will be described by those who have worked with him through the years. [See p 292 for more information.]

B. Naturally Nano, Part II
Nausheena Baig, Eric Fallows, Karah E. Knope, Jennifer D. Herdman, Badri Shyam, and Nicholas Deifel, Organizers

Cosponsored by PRES, NANO, BIOT, IEC, and INOR.

C. The *Journal of Chemical Education:* Celebrating Classroom Activities, Part II
John W. Moore, Organizer, Presiding

D. Sustaining Research at a Predominately Undergraduate Institution: Faculty Departmental and Institutional Strategies for Success: Undergraduate Research
Tom Wenzel, Organizer, Presiding

Predominantly undergraduate institutions (PUIs) increasingly value faculty participation in research. Sustaining productive research programs at PUIs is a difficult process given the substantial classroom and laboratory teaching responsibilities, the emphasis on availability to help students with advising and other activities, and the lack of suitable infrastructure and technical support. Individuals, departments, and the institution all have an important role in creating a culture of research at a PUI. This session will have talks by faculty members and administrators representing diverse institutional types who will provide tips and insights from their experiences for successfully integrating research into the teaching responsibilities at a PUI, and creating a departmental and institutional culture that supports research. The session ends with a panel discussion with all presenters.

Undergraduate Research at the Frontiers of Inorganic Chemistry: Inorganic Materials

Sponsored by INOR, Cosponsored by CHED.

Evening

A. High School Program, Part II, Olympus Ballroom, 4–8 p.m. (See p 293 for more information.)
Laya Kesner, Organizer
Tom Richmond, Organizer, Presiding

This second evening of programming for high school teachers will present another outstanding line-up of speakers in diverse areas: from the chemistry of rockets to greenhouse gases and global warming. Speakers will also present teaching tools available through the *Journal of Chemical Education* and quick and insightful demonstrations for the classroom. Come join us!

Wednesday, March 25

Morning

A. High School Chemistry Teacher Professional Development: What Works and How We Know
Deborah G. Herrington, Organizer
Ellen J. Yezierski, Organizer, Presiding

Improving science education is not a new topic. Teacher professional development is a widely accepted method for improving instruction; however, many professional development programs do little to improve teachers' content knowledge and their teaching skills to effectively teach science. This symposium

ACS National Meeting

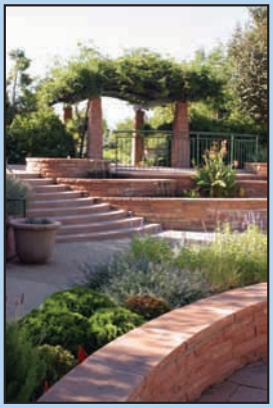
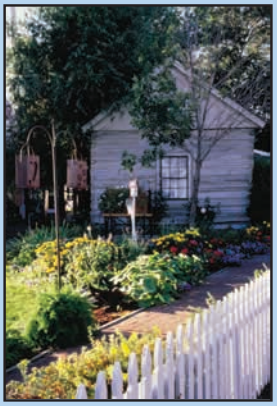


photo by Eric Schramm

photo by Steve Greenwood



Scenes from Salt Lake City. Red Butte Gardens (left). Salt Palace lobby concourse (above). Gardner Village (right). All courtesy Salt Lake Convention & Visitors Bureau.

will highlight professional development programs and models that have been shown to have important effects on teachers or their students. Presentations will address the key elements of the professional development experience including data that demonstrate impacts on teachers or their students.

B. Green and Sustainable Chemistry Education: Preparing Students for Challenging and Emerging Careers
Edward J. Brush and Cheryl Schnitzer, Organizers
Lucille A. Benedict and Keith E. Peterman, Presiding

This session covers recent advances in green and sustainable chemistry education and creative ways to prepare students for challenging and emerging careers in teaching, research, industry, and public service. Speakers from several areas of the green and sustainable chemistry enterprise will discuss how they engage students in teaching, research, and outreach initiatives, and the role these experiences play in preparing majors and non-majors for employment in emerging careers.

C. Process-Oriented Guided Inquiry Learning (POGIL): More POGIL across the Curriculum
Richard S. Moog, Organizer
David C. Finster, Presiding

D. Research in Chemical Education: Visualization
Dawn I. Del Carlo, Organizer
Gautam Bhattacharyya, Organizer, Presiding

This symposium details novel technology-based visualization techniques for pedagogy across the undergraduate chemistry curriculum with emphasis on two areas. (1) Novel technology/learning tools created specifically for visualizing chemistry classroom concepts. (2) Software utilization for visualizing molecular structure, mechanistic intermediates, spectroscopic transitions, and quantum concepts as well as dynamic chemical processes calculated at a variety of different computational levels. Within the second area, visualization of equilibrium or transition state chemical structure modeled at the atomic, molecular, macromolecular, and/or supramolecular length scale as well as system dynamics used to model chemical kinetics will be accented.

E. Online Resources for Chemical Education: General Chemistry Applications
Robert E. Belford, Organizer
John H. Penn, Organizer, Presiding
Cosponsored by CINF.

Undergraduate Research at the Frontiers of Inorganic Chemistry: Organometallic Chemistry
Sponsored by INOR; cosponsored by CHED.

Afternoon

A. Novel Applications for Classroom Response Systems: Thinking Outside the Clicker Manual
Richard W. Morrison, Organizer, Presiding

Initially, classroom response systems (clickers) were implemented to quickly sample student understanding of lecture concepts, encourage participation from students who are reluctant to openly contribute, and to monitor lecture attendance. More recently, they have proven useful as tools to present and develop conceptual material and to promote guided inquiry in large lectures. Papers will describe and demonstrate novel applications for clickers, including but not limited to large lecture settings.

B. Green Chemistry Education: Is it an Advantage in Industry?
Richard E. Engler, Organizer
Berkeley W. Cue Jr., Organizer, Presiding

A key consideration when deciding to include green chemistry in a curriculum is: Does that additional training benefit industrial employers? This symposium will explore aspects of green chemistry education, including Green Chemistry Summer School, undergraduate training, graduate training, and continuing education for professionals. The perspectives of both students and industry will be represented.

C. Advances in Teaching Inorganic Chemistry
Keith A. Walters, Organizer, Presiding

Cosponsored by INOR. How do you teach inorganic chemistry—one semester or two? Is physical chemistry required?

What do you end up leaving out in order to fit everything into your course(s)? How are you changing things (or not) with the new ACS guidelines? Have you lost your sanity yet? Come hear about the experiences of cohorts in the trenches as they teach this always complicated, never-fully-appreciated topic. Emphasis will be on utilizing technology to assist in these courses, as well as integrating more current day (e.g., nanotech, environmental) inorganic topics into the traditional main-group and coordination framework of the course(s).

D. Research in Chemical Education: Active Learning
Gautam Bhattacharyya and Dawn I. Del Carlo, Organizers
Laurie S. Langdon, Presiding

Evening

Undergraduate Research at the Frontiers of Inorganic Chemistry: Contributed Posters
Sponsored by INOR, Cosponsored by CHED.

Thursday, March 26

Morning (sessions begin at 8 a.m.)

A. General Papers: Strengthening Programs
Daniel S. Domin, Organizer
Richard C. Bauer, Presiding

B. General Papers: Science Majors
Daniel S. Domin, Organizer
Richard. C. Bauer, Presiding

C. Process-Oriented Guided Inquiry Learning (POGIL): POGIL Laboratory and the Science Writing Heuristic
Richard S. Moog, Organizer
Frank J. Creegan, Presiding

D. Research in Chemical Education, Professional Development
Gautam Bhattacharyya, Organizer
Dawn I. Del Carlo, Organizer, Presiding

Afternoon (sessions begin at 1 p.m.)

A. General Papers: Analysis and Synthesis
Daniel S. Domin, Organizer
C. Eric Ballard, Presiding

B. General Papers: High School/Non-Science Majors
Daniel S. Domin, Organizer
Elizabeth A. Gardner, Presiding

Supporting *JCE Online* Material

http://www.jce.divched.org/Journal/Issues/2009/Mar/abs286.html

Abstract and keywords

Full text (PDF) with links to cited URLs

Julianne M. Smist, DivCHED program committee chair, is in the Department of Chemistry/Biology, Springfield College, Springfield, MA 01109; jsmist@spfldcol.edu. *Salt Lake City Meeting Co-Chairs are William S. Harwood, Department of Chemistry, University of Northern Iowa, Cedar Falls, IA 50614,* bill.harwood@uni.edu *and Irvin J. Levy, Department of Chemistry, Gordon College, Wenham, MA 01984;* irv.levy@gordon.edu.

ACS National Meeting

Award Addresses of Interest

Monday, March 23

James Bryant Conant Award in High School Chemistry Teaching

Sally B. Mitchell, Chemistry Department, East Syracuse–Minoa High School, 6400 Freemont Road, East Syracuse, NY 13057; *sbmitchell@aol.com.*

Teaching Chemistry through Food Science. 4:15 p.m.; High School Program. Marriott City Center, Olympus Ballroom.

This talk is designed to introduce chemistry teachers to topics dealing with solution chemistry through cooking, a practical and exciting way to demonstrate the use and importance of chemistry. All students are interested in learning about foods. This talk will discuss different ways to excite students in the laboratory. Topics include: Determination of the authenticity of vanilla samples through paper chromatography, making solutions of varying concentrations and dilutions using Kool-aid, separation of milk into curds and whey and eventually cheese, and the making of food products such as peanut brittle, ice cream, fudge, taffy, mayonnaise, and bread to explain all areas of chemistry. Labs are written at both the general and honors level for high school chemistry classes. Learn how to cook metrically and have virtually no clean up in the kitchen. [*JCE* expects to publish an interview with Sally Mitchell in an upcoming issue.]

Monday, March 23

ACS Award for Achievement in Research for the Teaching and Learning of Chemistry

Alex H. Johnstone, 7 Shirra's Brae Road, Stirling FK7 0AY, Scotland, U.K., *alexjo@btinternet.com.*

You Can't Get There from Here? 4:40 p.m. Marriott City Center, Capitol B Ballroom.

Where are we now and how did we get here? Students are not streaming into our chemistry courses, bursting with enthusiasm and eagerness to learn. Many do chemistry as a necessary evil to be endured on the way to something else. Forty years of the development of clever techniques, flashy textbooks, and cunning computer programs has not been able to alter this. The situation had its origins in the 1960s with the evangelical spread of curricular projects. Why did the enthusiasm they engendered among teachers not transfer to the students? Research, begun in the 1970s, has shown a clear misfit between the content and the way students learn. We need to ask very basic questions about the nature and structure of chemistry itself: what is fundamental, what can be repositioned, and what can be abandoned?

Tuesday, March 24

George C. Pimentel Award in Chemical Education

Henry W. Heikkinen, Emeritus Member, Department of Chemistry & Biochemistry, University of Northern Colorado, Greeley, CO 80639; *heikk2000@comcast.net.*

To Form a Favorable Idea of Chemistry. 3:45 p.m. Marriott City Center, Capitol B Ballroom.

"To confess the truth, Mrs. B., I am not disposed to form a very favorable idea of chemistry, nor do I expect to derive much entertainment from it..." That sentiment by Caroline to her teacher, Mrs. Bryan, appeared on the first page of *Conversations on Chemistry,* Jane Marcet's pioneering secondary-school textbook. First appearing in 1806, Caroline's classic comment foreshadows what many students have expressed since chemistry first appeared as a 19th century school subject. Modern efforts to capture students' interest and engagement—or, in Robert Mager's words, "approach tendencies"—can actually be regarded as contemporary responses to Caroline's views. The goals of projects such as *Chemistry in the Community* (ChemCom), *SourceBook,* and National Science Education Standards focus on making learning more relevant to students' lives and experiences.