CHED Newsletter
Spring 2014

DivCHED Travel Award
BCCE 2014, Grand Valley State,
August 3-7, 2014
2014 ACS DivCHED Examinations and
Related Materials
2014 Resources for Excellence Workshop
Schedule

ACS 247th Nation Meeting
Chemistry and Materials for energy
Dallas, TX
March 16-20, 2014

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American Chemical Society
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Letters from the Executive Committee

From the 2014 Chair, Donald J. Wink [dwink@uic.edu]

I am proud to have the opportunity to be the Division Chair this year, and to be part of a process by which many changes—some visible and some behind the scenes—have occurred to move the Division forward. I want to highlight a few things, with particular note of some of the individuals who have done much to lead and support us.

The most important recent change, I think, is the creation of a new committee for the Division: the “Young Chemistry Education Scholars Committee.” This represents a response to a request that the Division support members during their early years of independent academic work. I encourage members to look at the YCES committee and think if we should consider other ways to help the community in a similar way.

As members have noticed, we have twice amended our bylaws in recent years, to change the way the overall management of the Division is done. This includes, for example, making sure that more of those who are doing the hard work of running Division operations, such as our Program Chair, are a proper part of governance. Other changes ensure a more transparent process of making important decisions, such as whom to appoint to different Division Boards. The detailed efforts of the Division Secretary, Resa Kelly, has been critical to this.

In addition, following many years of effort and deliberation, we have moved to a much more modern system of keeping our financial records. With the important leadership of Tom Holme, Director of the ACS Exams Institute, our Treasurer, Anna Wilson, and a string of dedicated Division Chairs, we have now implementing a full electronic accounting system. The implementation efforts are led by Jon Holmes (Managing Editor for JCE). This follows on the work done by a long succession of Division Chairs and Chairs of the Division Boards.

There are also several things to highlight that are part of how the Division works with its members. These of course include the upcoming Biennial Conference on Chemical Education, one of the few examples of an ACS Division providing a well-organized, affordable venue for members and others to learn about the latest ideas in the field. In addition, Division Committees are now engaged in a review of how they can fulfill the components of the Division’s Strategic Plan (http://www.divched.org/CHEDArchives/strategicPlanning/DivCHED2007StrategicPlan.pdf). Members are encouraged to look at the plan and to consider email the Division Committee chairs with suggestions about ways we might consider fulfilling the plan’s suggestions.

Respectfully,
Donald Wink

Know Your Way Around the Division

If you need to pay membership dues, want to make a contribution to the DivCHED Service Award fund, or want to know about money, budgets, etc., contact the Treasurer.

If you want to change your mailing address, want a Division publication, or want to know about official Division actions, etc., contact the Secretary. If you want to receive this CHED Newsletter (or not receive it), contact the Secretary.

If you want to bring an idea before the Executive Committee or want to make an opinion known, contact the Member-at-Large.

If you want to contribute something to CHED News, contact Heather Johnson.
From the Chair Elect, Marcy Towns, [mtowns@purdue.edu]

Welcome to 2014!

I am delighted to be the chair-elect of the ACS Division of Chemical Education. There are many exciting conferences taking place this summer pertaining to chemical education. The International Conference on Chemical Education will take place in Toronto on July 13-18. The Biennial Conference on Chemical Education will take place at Grand Valley State University August 3-7. Finally, the ACS meeting in San Francisco will take place August 10-14. I hope to see you at one of these and please say hello!

Sincerely,

Marcy Towns
Chair Elect

From the Secretary/Councilor, Resa Kelly [resa.kelly@sjsu.edu]

Newly Elected Officers

In the Fall 2013 Election, supervised by Dr. Donald Wink and Ms. Heather Johnson, Dr. Marcy Towns was elected Chair/Chair-Elect, Dr. Jimmy Reeves was reelected as Member-at-Large, Dr. Renée Cole was reelected as Councilor, Dr. Cheryl Frech was elected as Alternate Councilor, and I was reelected as Secretary/Councilor for the Division. Candidates who ran against the newly elected officers were: Dr. Julianne Smist for Chair/Chair-Elect, Dr. Alexander Grushow for Member-at-Large, Mr. Jeff Hepburn and Dr. Kereen Monteyne for Councilor/Alternate Councilor, and Dr. Hannah Sevian for Secretary/Councilor. The Division thanks all who ran and congratulates its newly elected officers.

Bylaw Amendments Passed!

I am relieved to report that members voted to accept the bylaw amendments during the Fall 2013 election. Many modifications were made to provide consistency and clarity, but several major changes were made and are highlighted below:

Bylaw III - Division Business Meetings will be held only at Spring National ACS meetings.

Bylaw VI – Quorum size for Executive Committee meetings was defined. Chair appointments for the standing committees were also defined.

Bylaw X – The Board of Publication will consist of 9 members (3 ex officio and 6 appointed members).

Bylaw XI – The Board of Trustees will also consist of 9 members (3 ex officio and 6 appointed members).

Committee Terms

Ms. Heather Johnson and I sent letters (electronically) to invite members to begin or extend service on Division committees at the beginning of the year. These letters are an important way to recognize your service. Thank you! In addition, those who have completed three terms of consecutive service reaching their term limit will receive letters recognizing this achievement. One gentle reminder to all those who are serving on committees, please be sure to renew your ACS membership in a timely fashion to maintain your position on your committee.

Y’all have a wonderful conference in Dallas!
The View from the Program Chair, Irv Levy [irv.levy@gordon.edu]

As I compose this note for the CHED newsletter I am watching misty, cold rain ever so slowly melting huge piles of snow. I feel a good deal warmer as I check the weather in Dallas today – a stunningly lovely 77°. I do believe I want to turn my attention to Dallas for the rest of the morning!

Many thanks are due to Christine Jaworek-Lopes and Beatriz Rios-McKee who have assembled an impressive array of symposia for this meeting. Recent Conant-award recipient Roxie Allen has worked for over a year assembling the high school program for Sunday during the meeting. I hope that you’ll be able to join us in Dallas and, please, take the time to personally thank Christine, Beatriz, and Roxie for their work on your behalf. Once again we are hosting several sessions of Undergraduate Research Papers in our technical program. The number of students making these oral presentations is significantly up from our initial symposium last spring in New Orleans. Many thanks to Nicole Snyder for bring this lively component into our program.

Also, many thanks in advance go to Amy Cannon and Warner Babcock Institute for Green Chemistry. They have generously organized a Green Chemistry Commitment Reception for Monday in Dallas. This reception is meant to be a time to allow educators who are implementing green chemistry at their institutions to share ideas and to encourage others who are interested to enhance green chemistry at their institutions to seek information from those who have already done so. The Green Chemistry Commitment Reception will take place from noon-1:00PM in the Cotton Bowl room at the Hyatt Regency Dallas.

As always, there are a number of people behind the scenes who provide direct and indirect support for our programming at a national meeting. Many thanks to the ACS staff who are the ones who help us bring it all together: Robin Green, Brenda Philpot, Beverly Johnson, Vernar Beatty, Nikki Fisher and Nancy Bakowski are a great team and I very much enjoy working with them. As always Heather Johnson attends to a host of details that make the job of organizing a meeting so much more convenient. Many thanks are due to all the folks in the Division and ACS who work with our committee to produce a quality meeting.

The fall meeting in Indianapolis was a great success, thanks to the efforts of the co-chairs Julie Smist and Tyson Miller, and their organizers Laura Slocum, worked on this meeting as our High School Program organizer. Laura has been a faithful part of our high school program for a number of years and she organized an excellent program in Indianapolis, along with the assistance of her co-organizer Erica Adams. And, can I just say, Indianapolis was an outstanding host city for the meeting. I do hope that we’ll get back there in the not too distant future.

As is often the case, the rush is on for the fall meeting abstracts even though we haven’t made it to Dallas yet! Abstracts for our division are due no later than the Monday immediately after the national meeting, this time. The meeting co-chairs, Amy Cannon and Cathy Middlecamp have put together an outstanding set of sessions for San Francisco. We will be hosting a number of symposia that are directly in the theme of the meeting “Chemistry and Global Stewardship.”

One particular session at that meeting is very special. We are hosting an invited symposium called “Sustain-Mix: Sustainability Across the Divisions”. We have contacted the Program Chair from each technical division asking for a speaker to address ways that chemists within that division are engaged in sustainability-related pursuits. This will be of value to the educators in attendance as we will be equipped with current topics to share with students in our own classrooms. Please watch for that session in San Francisco and plan to come for all or part of the symposium. We’d love to pack the house as we share sustainability ideas with one another.

Owing to the popularity of the Undergraduate Research Papers combined with the popular destination of San Francisco we are also hosting this symposium in the fall meeting. Be sure to consider the possibility of sending your students to this session that, for many of us, will be during summer break between semesters.

Sometime in the early summer we will publish the Call For Papers for the Spring 2015 meeting in Denver. Now is a great time to contact the meeting co-chairs Wayne Jones and Andy Marsh with your idea for a symposium in Denver. I am delighted that Sally Mitchell has agreed to organize the high school program for both meetings in 2015.

Many thanks are due to Wayne and Andy for agreeing to be the brave souls who will work with you for our first national meeting with our new ScholarOne abstract submission system. Please be patient with them as we all get up and running with a system that promises to be quite a bit more useful than our current PACS.
As I’ve mentioned in past newsletters, beyond meeting planning there are several items high on my agenda as chair of the Program Committee. They are, in a nutshell, a) venue selection for the national meeting, b) Internet connectivity in meeting rooms, and c) the overall volunteer experience in programming.

We have been located in the convention center or directly adjacent to it for a number of our recent meetings. We’re a little more distant in Dallas but still in the same general area – about a 15 minute walk to the convention center. I will continue to work with ACS and others in the division to make the case that our program should be located in the convention center or in an adjacent hotel.

Once again, in Dallas, internet connectivity is an issue. Even though I remain firmly convinced that the venue should provide WiFi connectivity, it’s still not the case in many places. Until the hotels and convention centers join us in the 21st century we will provide our own workarounds. I’m pleased that the division has a number of Verizon WiFi hotspots that can be used during meetings to provide internet connectivity in any room that has a cell phone signal. Organizers can work with their meeting co-chairs to be sure that they have one of the hotspots in their meeting room on an as-needed basis.

Our program in Dallas is technically not within the guidelines of what ACS refers to as “Even Programming”. In the Even Programming rules, we should be offering 3-4 sessions on Thursday morning. We all have experienced very small audiences in Thursday sessions and we have made the case that it would be much better to have one large and well-attended session on Thursday than several sparsely attended ones. I can not claim that we will be given this privilege going forward; however, we will continue to do whatever we can from the Program Committee’s perspective to insure that the Thursday sessions are not only high quality (as they always are) but also well-attended (as they often are not).

Remember that my goal as the chair of your Program Committee is to make it easy for you to say “Yes, I’ll volunteer” by providing any support you might need. I look forward to working with you in the future whether it be as a symposium organizer, a meeting co-chair, or a member of the program committee. We are here to produce national meetings that serve your needs. Please do let us know what those needs are and do consider what role you might be able to play as a volunteer. Drop me a note (irv.levy@gordon.edu) with your ideas or say hello in Dallas!
From the Member-At-Large, Jimmy Reeves [reeves@uncw.edu]

Let me begin by thanking all of you who voted for me in the last ACS election, returning me as At Large Member for another three year term. I am honored to serve as your representative to both the Board of Trustees of the ACS Examinations Institute and the Executive Committee of the Division.

The Board of Trustees is currently working on the language of contracts for both the Director and Assistant Director of the Examinations Institute that more fully reflect their roles and compensation. Although we currently enjoy a cooperative and extremely productive relationship with both Tom Holm, the current director, and Kristen Murphy, our current Assistant Director, we want to be sure that are working under the terms of a legally binding document. There is agreement that the responsibilities be stipulated in the Operations Manual and that any changes that substantively alter them be mutually agreeable and reflected by revisions of the Manual. However, the Board does sometimes pass resolutions, typically with the support of the Director, that impact those responsibilities, and this practice will continue. We are also considering issues like the pending requirement, precipitated by recent actions by the Courts, that we collect sales tax at our e-commerce site. This is a complicated issue which has to be dealt with on a state by state basis, and we are considering hiring a service to help. Finally, a position description for a business manager is being prepared as we consider moving the business portion of the Institute to a private location that would not be subject to the (sometimes volatile) rules of the hosting University and could be permanently located and thus independent of the home institution of the Director.

At the Executive Committee Meeting in Indianapolis, a particularly important issue was raised by members of the Biennial Conference in Chemical Education (BCCE) organizing committee. A victim of its own success, the BCCE is growing in both size and stature, and the task of securing a location and program chair, and dealing with the monumental logistics associated with the event likely require a more formalized structure, possibly modeled after the Exams Institute. Recent conference profits have created opportunities to, for example, resource future Program Chairs and/or their departments, but the organizing committee does not currently have the authority to do so. Members of the organizing committee have expressed their concerns that the current situation is not sustainable, and the Executive Committee Chair agreed to consult with the Chair Elect and the most recent past Chair and consider the issue again at the Dallas meeting.

I remain very impressed with the way the business of the Division of Chemical Education is conducted, thanks to the great volunteers who staff our committees and boards. Nevertheless, the need for new faces with fresh idea remains. I hope you will consider volunteering your time on one of them. If you are interested in serving or have questions about the business of the Division, please contact me or any other member of the Executive Committee and we'll be happy to help you.
247th ACS Meeting & Exposition, Dallas, TX

Theme: Chemistry and Materials for Energy
March 16 - 20, 2014

Meeting Co-Chairs:
Christine Jaworek-Lopes, Emmanuel College, Boston, MA 02115; 617-264-7614; jaworek@emmanuel.edu
Beatriz Rios-McKee, Southern Methodist University, Dallas, TX 75206; 214-768-2445; beatrizmckee@me.com

High School Program Chair:
Roxana Allen, St. John's School, Houston, TX 77019; 713-850-0222 ext (202); rallen@sjs.org

CHED Program Chair:
Irvin J. Levy, Gordon College, 255 Grapevine Road, Wenham, MA 01984. Voice: 978-867-4877,
irv.levy@gordon.edu

GSSPC Organizers:
Katharine Diehl (dkathari@utexas.edu) and others from UT Austin

Undergraduate Poster:
30th Anniversary of Undergraduate Poster Sessions Honoring Dr. Adrienne Kozlowski, Central Connecticut State University

Program Synopsis
(Full abstract list can be found at http://www.divched.org/sites/default/files/CHED_Dallas_abstracts.pdf)

SUNDAY MORNING

High School Program
R. Allen, Organizer; R. Allen, Presiding Papers 1-2

Undergraduate Research Papers
N. Snyder, Organizer; C. Gauthier, Organizer; J. Ruppel, Organizer; J. Ruppel, Presiding Papers 3-14

Undergraduate Research Papers
N. Snyder, Organizer; C. Gauthier, Organizer; J. Ruppel, Organizer; N. Snyder, Presiding Papers 15-27

NMR Spectroscopy in the Undergraduate Curriculum
A. Wallner, Organizer; D. Soulsby, Organizer; L. J. Anna, Organizer; A. Wallner, Presiding; D. Soulsby, Presiding; L. J. Anna, Presiding Papers 28-35

Challenges Faced at Two-Year Colleges: Transitioning Students from Two-Year To Four-Year Institutions or Industry
T. Higgins, Organizer; L. J. Anna, Organizer; T. Higgins, Presiding Papers 36-41

ACS-CEI Award for Incorporating Sustainability into Chemistry Education
K. Peterman, Organizer; K. Peterman, Presiding Papers 42-46

SUNDAY AFTERNOON

High School Program
R. Allen, Organizer; R. Allen, Presiding Papers 47-50

Undergraduate Research Papers
C. Gauthier, Organizer; J. Ruppel, Organizer; N. Snyder, Organizer; N. Snyder, Presiding Papers 51-62

Chemistry Education Research
J. Reed, Organizer; K. Galloway, Organizer; J. Reed, Presiding; K. Galloway, Presiding Papers 63-69, 71, 70

NMR Spectroscopy in the Undergraduate Curriculum
A. Wallner, Organizer; D. Soulsby, Organizer; L. J. Anna, Organizer; A. Wallner, Presiding; D. Soulsby, Presiding; L. J. Anna, Presiding Papers 72-76

Challenges Faced at Two-Year Colleges: Transitioning Students from Two-Year To Four-Year Institutions or Industry
T. Higgins, Organizer; L. J. Anna, Presiding; T. Higgins, Presiding Papers 77-82

General Papers
J. Parr, Organizer; M. Nagel, Presiding Papers 83-91

SUNDAY EVENING

I. Black, Organizer Papers 92-163
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| **ACS Award for Achievement in Research for the Teaching and Learning of Chemistry:** Symposium in Honor of Melanie M. Cooper  
S. L. Bretz, Organizer; S. L. Bretz, Presiding  
Papers 164-171 |
| **Undergraduate Research Papers**  
N. Snyder, Organizer; C. Gauthier, Presiding  
Papers 172-178 |
| **Chemistry and Materials for Energy:** Connecting Research and Development To Curriculum and Teaching  
A. Banerjee, Organizer; A. Banerjee, Presiding  
Papers 179-187 |
| **Process-Oriented Guided Inquiry Learning (POGIL)**  
R. Moog, Organizer; A. Grushow, Presiding  
Papers 188-194 |
| **Green Chemistry: Theory and Practice**  
E. Brush, Organizer; J. Wissinger, Organizer; E. Brush, Presiding; J. Wissinger, Presiding  
Papers 195-202 |
| **Flipping the Chemistry Classroom**  
D. Casadonte, Organizer; D. Casadonte, Presiding  
Papers 203-209 |

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| **Undergraduate Research Posters**  
C. Bradley, Organizer; M. Richards, Organizer  
Papers 254-265 |
| **Undergraduate Research Posters**  
C. Bradley, Organizer; E. Cook, Organizer  
Papers 266-380 |
| **Undergraduate Research Posters**  
N. Bakowski, Organizer; C. Bradley, Organizer; E. Cook, Organizer; M. Richards, Organizer  
Papers 381-542 |
| **Undergraduate Research Posters**  
C. Bradley, Organizer; N. Bakowski, Organizer  
Papers 543-555 |
| **Undergraduate Research Posters**  
C. Bradley, Organizer; M. Richards, Organizer  
Papers 556-620 |
| **Undergraduate Research Posters**  
C. Bradley, Organizer; E. Cook, Organizer  
Papers 621-663 |
| **Undergraduate Research Posters**  
C. Bradley, Organizer; M. Adams, Organizer  
Papers 664-727 |
| **Undergraduate Research Posters**  
C. Bradley, Organizer; M. Adams, Organizer  
Papers 728-729 |
| **Undergraduate Research Posters**  
C. Bradley, Organizer; E. Cook, Organizer  
Papers 730-752 |
| **Undergraduate Research Posters**  
C. Bradley, Organizer; M. Adams, Organizer  
Papers 753-892, 1622 |
| **Undergraduate Research Posters**  
C. Bradley, Organizer; E. Cook, Organizer  
Papers 893-939 |
| **Undergraduate Research Posters**  
C. Bradley, Organizer; M. Richards, Organizer  
Papers 940-993 |
| **Undergraduate Research Posters**  
C. Bradley, Organizer; B. Hietbrink, Organizer  
Papers 994-1264 |
| **Undergraduate Research Posters**  
C. Bradley, Organizer; M. Richards, Organizer  
Papers 1265-1322 |
| **Undergraduate Research Posters**  
C. Bradley, Organizer; M. Richards, Organizer  
Papers 1323-1344 |

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| **ACS Award for Achievement in Research for the Teaching and Learning of Chemistry:** Symposium in Honor of Melanie M. Cooper  
S. L. Bretz, Organizer; N. J. Pienta, Presiding  
Papers 210-216 |
| **Nanotechnology in Undergraduate Education and Research**  
D. Heroux, Organizer; A. Marsh, Presiding; D. Heroux, Presiding  
Papers 224-231 |
| **Process-Oriented Guided Inquiry Learning (POGIL)**  
R. Moog, Organizer; M. Perry, Presiding  
Papers 232-237 |
| **General Papers**  
J. Parr, Organizer; J. Parr, Presiding  
Papers 238-247 |
| **Flipping the Chemistry Classroom**  
D. Casadonte, Organizer; D. Casadonte, Presiding  
Papers 248-253 |
| **Undergraduate Research Papers**  
N. Snyder, Organizer; C. Gauthier, Organizer; J. Ruppel, Organizer; C. Gauthier, Presiding; J. Ruppel, Presiding  
Papers 217-223 |

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| **Sci-Mix**  
I. J. Levy, Organizer  
Papers 339, 320, 317, 480, 268-269, 443, 789, 330, 942, 100-102, 109, 105, 274, 110, 729, 114, 131, 121, 163, 125, 129, 135, 145, 151, 1180 |
| **Successful Student Chapters**  
N. Bakowski, Organizer  
Papers 1345-1461 |
### TUESDAY MORNING

**George C. Pimentel Award in Chemical Education: Symposium in Honor of Thomas J. Greenbowe**  
J. Gelder, Organizer; K. Burke, Organizer; M. Sanger, Presiding  
Papers 1465-1474

**Tools of Chemistry Education Research**  
D. Bunce, Organizer; R. Cole, Organizer; D. Bunce, Presiding  
Papers 1475-1482

**Chemistry Education Research**  
V. M. Williamson, Organizer; W. Schatzberg, Organizer; W. Schatzberg, Presiding  
Papers 1483-1491

**Chemistry Education: International and Multicultural Perspectives**  
S. Sandi-Urena, Organizer; S. Raje, Organizer; S. Sandi-Urena, Presiding; S. Raje, Presiding  
Papers 1492-1497

**Mobile Technology in Undergraduate Chemistry Courses**  
G. Shelton, Organizer; G. Shelton, Presiding  
Papers 1498-1504

**Elements in Transition: Is Chemistry Facing Revolution or Recession?**  
A. Gade, Organizer; A. Gade, Presiding  
Papers 1462-1464

### TUESDAY AFTERNOON

**George C. Pimentel Award in Chemical Education: Symposium in Honor of Thomas J. Greenbowe**  
J. Gelder, Organizer; K. Burke, Organizer; J. Gelder, Presiding  
Papers 1507-1516

**Tools of Chemistry Education Research**  
R. Cole, Organizer; D. Bunce, Organizer; R. Cole, Presiding  
Papers 1517-1522

**Chemistry Education Research**  
W. Schatzberg, Organizer; V. M. Williamson, Organizer; V. M. Williamson, Presiding; W. Schatzberg, Presiding  
Papers 1523-1530

**Chemistry Education: International and Multicultural Perspectives**  
S. Raje, Organizer; S. Sandi-Urena, Organizer; S. Sandi-Urena, Presiding; S. Raje, Presiding  
Papers 1531-1536

**Elements in Transition: Is Chemistry Facing Revolution or Recession?**  
A. Gade, Organizer; V. Cotham, Presiding  
Papers 1505-1506

### WEDNESDAY MORNING

**Microwave-Promoted Synthesis in the Undergraduate Organic Chemistry Laboratory**  
R. Morrison, Organizer; R. Morrison, Presiding  
Papers 1537-1542

**Developing Inorganic Curriculum at the Undergraduate Level**  
R. B. Sears, Organizer; R. B. Sears, Presiding  
Papers 1543-1551

**Mobile Devices, Augmented Reality, and The Mobile Chemistry Classroom**  
A. J. Williams, Organizer; H. Pence, Organizer; A. J. Williams, Presiding; H. Pence, Presiding  
Papers 1552-1557

**Chemistry Education Research**  
W. Schatzberg, Organizer; V. M. Williamson, Organizer; V. M. Williamson, Presiding  
Papers 1558-1565

**The Sweet Side of Chemistry, Candy: Information and Recipes for NCW 2014**  
D. A. Katz, Organizer; D. A. Katz, Presiding  
Papers 1566-1570

**General Papers**  
J. Parr, Organizer; D. Saiki, Presiding  
Papers 1571-1579

### WEDNESDAY AFTERNOON

**Improving Organic Chemistry via Comparison**  
D. Nelson, Organizer; R. Kumar, Organizer; D. Nelson, Presiding; R. Kumar, Presiding  
Papers 1580-1584

**Research on Learning in the Laboratory**  
A. Villalta-Cerdas, Organizer; S. Sandi-Urena, Organizer; A. Villalta-Cerdas, Presiding  
Papers 1585-1590

**Mobile Devices, Augmented Reality, and The Mobile Chemistry Classroom**  
H. Pence, Organizer; A. J. Williams, Presiding; H. Pence, Presiding  
Papers 1591-1595

**Chemistry Education Research**  
W. Schatzberg, Organizer; V. M. Williamson, Organizer; W. Schatzberg, Presiding  
Papers 1596-1602

**Enabling Students To Construct and Interpret Chemical Models To Enhance Conceptual Understanding in Chemistry**  
M. Dean, Organizer; K. Linenberger, Organizer; K. Linenberger, Presiding  
Papers 1603-1611

### THURSDAY MORNING

**General Papers**  
J. Parr, Organizer; J. March, Presiding  
Papers 1612-1621

### WEDNESDAY MORNING

**General Papers**  
J. Parr, Organizer; D. Saiki, Presiding  
Papers 1571-1579
Schedule of CHED Committee Meetings and Social Events

Hyatt Regency Dallas
300 Reunion Boulevard
Dallas, Texas, USA, 75207
(214) 651-1234

Saturday, March 15

Exams Institute, Board of Trustees Meeting (open)
7:30AM – 12:00PM
Location: Pegasus Ballroom A

Board of Publications Meeting (open)
8:00AM – 12:30PM
Location: Pegasus Ballroom B

Program Committee Meeting (open)
10:30AM – 12:00PM
Location: Cumberland B

Executive Committee Meeting
Location: Reunion Ballroom F
1:00PM – 1:30PM (closed)
1:30PM – 4:00PM (open)
4:00PM – 5:30PM (closed)

Biennial Conference Committee Meeting (open)
4:00PM – 5:30PM
Location: Pegasus Ballroom A

Sunday, March 15 (continued)

Regional Meetings Committee (open)
12:00PM – 1:00PM
Location: Shawnee Trail #362 A

Chemical Education Research Committee Meeting (open)
1:00PM – 3:00PM
Location: Shawnee Trail #362 A

Long Range Planning Committee Meeting (open)
2:30PM – 4:30PM
Location: Bryan-Beeman A

Young Chemistry Education Scholars Committee (open)
5:00PM – 7:00PM
Location: Gaston A/B

CHED Social Reception (open)
5:30PM – 7:00PM
Location: Hall A202 (Dallas Convention Center)

Monday, March 17

CHED Business Meeting (open)
12:00PM – 12:30PM
Location: Reunion Ballroom B

New Member Committee (open)
12:30PM – 1:00PM
Location: Reunion Ballroom B
American Chemical Society
247th ACS National Meeting & Exposition
March 16-20, 2014

Hotels and Distance to Convention Center

1. Aloft Dallas Downtown
   0.3 miles

2. Crowne Plaza Dallas Downtown
   0.5 miles

3. Homewood Suites Dallas Downtown
   0.5 miles

4. Hotel Indigo Dallas Downtown
   0.85 miles

5. Hyatt Regency Dallas
   0.7 miles

6. Magnolia Hotel Dallas
   0.5 miles

7. Marriott Dallas City Center
   1.2 miles

8. Omni Dallas Hotel
   go to second floor and take the skybridge from the Omni to the Convention Center

9. Sheraton Dallas
   1.0 miles

10. The Adolphus
    0.5 miles

11. The Fairmont Dallas
    0.9 miles
2014 Biennial Conference on Chemical Education
Grand Valley State University, Allendale MI
www.bcce214.org

Theme: Greener on the Grand
August 3-7, 2014

Workshop Chair:
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Preliminary Workshop Abstracts and Schedule of Workshops

W1: A cCWCS Miniworkshop on Computational Chemistry for Chemistry Educators

This workshop will explore various ways that computers can be used to enhance and expand the educational experience of students enrolled in the high school or undergraduate chemistry curriculum. Brief discussions and extensive hands-on laboratory exercises of web-based molecular modeling and visualization software will be presented. No previous expertise with computational chemistry is expected.

Intended Audience: HS/UG; No fee; limit of 24 participants
Monday, August 4, 9:30 AM - 12:30 PM
Monday, August 4, 2:00 PM - 5:00 PM

W2: A Sophomore Organic Lab Research Experience: Distributed Drug Discovery (D3) for Neglected Diseases
Martin O’Donnell, Indiana University Purdue University Indianapolis. Jacob Durrant, University of California, San Diego. Ryan Denton, Indiana University Purdue University Indianapolis. Kathleen Marrs, Indiana University Purdue University Indianapolis. Geno Samaritoni, Indiana University Purdue University Indianapolis. William Scott, Indiana University Purdue University Indianapolis.

This workshop will introduce essential elements of Distributed Drug Discovery. D3 labs enable student engagement in the fundamental research process of observation, hypothesis/prediction and experimentation utilizing computational, synthetic and biological testing lab modules. You will consider known drug leads for the possible treatment of Leishmaniasis, form hypotheses, and computationally select new analogs with potential drug activity. You will then carry out the synthetic steps shown to make these six new compounds using simple, robust, reproducible procedures, and inexpensive equipment. The polymer-bound products will be cleaved and analyzed off-site and the results from your six N-acylated unnatural amino acids will be provided following the symposium. You will also conduct a biological assay to screen potential antibacterials made in a student lab at IUPUI.

Intended Audience: UG; $25 fee; limit of 20 participants
Tuesday, August 5, 9:30 AM - 5:00 PM

W3: Adding a Reflective Process to a POGIL Implementation
Daniel Apple, Pacific Crest.

POGIL and Process Education have been in use for over 20 years by the leaders of the POGIL movement. The growth of transferable skills has always been at the heart of why POGIL produces better learning and growth. Pacific Crest has packaged its 25 years of reflective and self-assessment experiences into a Student Success Toolbox. A copy will be handed out to each participant. Workshop participants will discuss and practice ten of these tools contained in the toolbox (50 tools). Some of these tools include: reading methodology and reading log; engaged learner rubric and learning journal; self-assessment form and self-assessment rubric; team assessment form; concept map; Identify and Correct the Errors; Problem Solving Rubric; as well as others selected by the participants. Besides seeing samples of these forms, filling out a few of them, the workshop facilitator will model giving assessment feedback to improve the learner’s performance in the use of these forms.

Intended Audience: HS/UG; No fee; limit of 50 participants
Thursday, August 7, 9:30 am-12:30 pm

W4: Advanced IONiC/VIPEr: Using and Sharing Inorganic Chemistry Education Resources
Barbara Reisner, James Madison University. Sheila Smith, University of Michigan-Dearborn. Hilary J. Eppley, DePauw University.

Looking for a lively community of inorganic chemists who share teaching ideas and materials, support one another in grant writing and professional development, and laugh a lot? Or maybe you’ve already been to an IONiC workshop (Interactive Online Network of Inorganic Chemists) and want some time to upload new learning materials? Then this workshop is for you!

Intended Audience: UG; No fee; limit of 50 participants
Thursday, August 7, 9:30 am-12:30 pm
objects to the VIPeR site. VIPeR (the Virtual Inorganic Pedagogical Electronic Resource) is a website (www.ionicviper.org) that provides a platform to share content and materials for teaching inorganic chemistry, while building the IONiC community. In this advanced workshop, participants will focus on (1) writing and uploading a learning object, (2) enhancing collaboration between instructors, and (3) fostering virtual interactions with students using technology. Participants will explore the VIPeR forums, where a global audience of inorganic chemists discuss burning issues in inorganic teaching and research.

Intended Audience: UG; No fee; limit of 16 participants
Tuesday, August 5, 9:30 am-12:30 pm

W5: AP Chemistry Inquiry and Forensic Laboratory Manual
Here is an AP lab workshop that will satisfy virtually all of your desires; over forty-five inquiry and forensic based lab activities that parallel those now recommended (or required) by the College Board. The available manual contains detailed teacher notes, pictures of setups and sample data and calculations. All experiments have been correlated to a primary learning objective(s) and science practices as outlined in the College Board Curriculum Framework for AP Chemistry. An appendix now lists additional questions (with answers) teachers can ask students either during a pre-lab session or a post-lab analysis. Participants will have an opportunity to do several of the experiments contained within the lab manual.
Intended Audience: HS/UG; No fee; limit of 24 participants
Monday, August 4, 9:30 AM - 11:00 AM
Monday, August 4, 2:00 PM - 5:00 PM

W6: AP Chemistry: Guided Inquiry Labs Using Probeware
Thomas Loschiavo, PASCO Scientific.
Use the POGIL approach to turn a traditional activity into a guided-inquiry laboratory experiment. With PASCO’s SPARKvue® data acquisition and analysis software, you will explore guided-inquiry labs based on the new Framework for AP Chemistry. Discover firsthand how your students can meet AP lab requirements while gaining a deeper understanding of the required content. The workshop will run for approximately 90 minutes. Two subsequent 90 minute workshops will run in one three hour block.
Intended Audience: HS/UG; No fee; limit of 24 participants
Tuesday, August 5, 9:30 AM - 11:00 AM
Tuesday, August 5, 11:00 AM - 12:30 PM

W7: Atoms, Molecules and Ions, Oh My! Particulate Level Chemistry Inquiry Activities
Debbie Herrington, Grand Valley State University. Ellen Yezierski, Miami University.
This workshop will focus on strategies for incorporating inquiry instruction into your classes with a particular focus on particulate level models. Workshop participants will be introduced to some of the particulate level modeling activities that teachers who have completed the Target Inquiry (TI) program at Grand Valley State University have developed and tested with their students. Topics include physical and chemical change, equilibrium, and balancing equations. Workshop participants will have the opportunity to work through these activities, discuss important considerations for facilitating the activities, and learn strategies for incorporating more inquiry into their own classroom activities. Participants will receive a class set of materials to conduct the activities highlighted in the workshop and will be introduced the Target Inquiry web site where they can access student and teacher guides for over 40 TI teacher designed and tested inquiry-based chemistry activities.
Intended Audience: HS; $40 fee; limit of 30 participants
Tuesday, August 5, 9:30 AM - 12:30 PM

W8: Automotive Energy Needs and Environmental Impacts
Craig Donahue, University of Michigan-Dearborn. Codruta Savu, University of Michigan-Dearborn.
The presenters teach a two-semester General Chemistry course to undergraduates. A high school chemistry major course focused on traditional fuels, alternative fuels (e.g. biofuels, hydrogen, and natural gas) and the pros and cons associated with the use of three batteries – the lead storage battery, the nickel metal hydride battery, and the lithium ion battery. The three afternoon cycles will focus on air pollution, other environmental impacts, and possible case studies. The presenters will provide feedback on how these topics are integrated into their courses and a list of useful resources.
Intended Audience: UG; No fee; limit of 24 participants
Wednesday, August 6, 9:30 AM - 5:00 PM

W9: Before, During and After Class Learning Cycle Activities
John Gelder, Oklahoma State University. Tom Greenbowe, Iowa State University. Michael R. Abraham, University of Oklahoma.
This workshop introduces the instructional tactics and materials of a technology-based inquiry-oriented instructional project. Examples of instructional materials to be used “before”; “during”; and “after” class meetings will be explored. The Before Class Exploration (BCE) is a web-based exercise that students do before class. The BCE requires approximately 15 minutes to complete and upon submission, students receive a copy of their responses and an expert’s response for comparison. The instructor can access all student BCE responses prior to lecture to gain a better picture of the student’s pre-existing knowledge. The During Class Invention (DCI) is designed to be completed by small cooperative groups or instructor led discussion. Students can report their consensus response using “clickers”. The After Class Application (ACA) is a web-based set of questions that allow students to apply their knowledge of the concept introduced by the BCE and ‘invented’ by the DCL. The Project website is http://genchem1.chem.okstate.edu/ BDA/Topics.php.
Intended Audience: HS/UG; No fee; limit of 24 participants
Sunday, August 3, 2:00 PM - 5:00 PM

W10: BeSocratic: A Formative Assessment System Designed to Recognize and Respond to Free-Form Student Input
Sonia Underwood, Michigan State University. Melanie Cooper, Michigan State University. Sam Bryfczynski, Clemson University.
“BeSocratic is a flexible web-based system that gives instructors the ability to elicit, capture, and respond to students free form responses to a wide range of questions and scenarios such as student-generated graphs, simple diagrams and gestures. While instructional technology can be an important component of any course, the limitations of the interface often limit the types of questions and interactions that can be offered. However, there is emerging evidence that having students generate graphs and
representations by hand is an important step in learning. This workshop will focus on the use of BeSocratic where participants will have the opportunity to explore BeSocratic's unique features by creating activities using the system and designing specific feedback for the various types of questions. Participants will need to bring their laptop to use during this workshop and will be provided with access to program for personal use.

Intended Audience: HS/UG; No fee; limit of 20 participants
Monday, August 4, 9:00 AM - 12:30 PM

W11: Building a Lab Manual
Steven Brown, University of Arizona

The workshop is designed for anyone who wants to create their own lab manual for use in their own courses but is unsure of how to proceed. It will begin with a review of the decisions that need to be made regarding the structure and content of the manual and then proceed to the dynamics of manual construction and experiment writing. Participants are asked to bring along an existing experiment they would like to be in their manual. It is expected that each participant will leave with one, usable experiment; a good idea of how to construct more and the basic structure of their future lab manual.

Intended Audience: UG; No fee; limit of 24 participants
Sunday, August 3, 2:00 PM - 5:00 PM

W12: Card Games to Teach Ionic Compound Nomenclature
Janet Coonce, Tennessee Tech University, Twannelle Majors, Tennessee Tech University.

In this workshop, participants will play a multi-level card game designed to help introductory chemistry students learn how to read and write the names and formulas for common acids and ionic compounds. The instructional materials were developed by the workshop organizers for use in their high school and college introductory chemistry courses. After watching a short, 10-min video about the game, workshop participants will divide into groups of 3-4 to play the game. Participants will be asked to critique the card game for use in different educational settings. At the end of the workshop, each participant will receive a complimentary laminated game set. The game set includes the instructional video and the easily-modified document files for reprinting and classroom use.

Intended Audience: HS/UG; No fee; limit of 24 participants
Wednesday, August 6, 9:30 AM - 12:30 PM

W13: Caveman Chemistry
Kevin Dunn, Hampden-Sydney College.

Non-science students often approach chemistry with reluctance and trepidation. This workshop will explore a strategy for engaging students through a series of 28 hands-on chemical projects. We begin in the Stone Age, making fire by friction, arrowheads, and honey wine. We make a ceramic crucible from clay, spin yarn from wool, and extract potash from wood ashes. We smelt bronze in our crucible and dye our yarn with indigo. In later projects we make paper from hay, soap from fat, mauve dye from aniline, and photographs from egg whites and salt. Along the way we learn a history of chemical technology from the Paleolithic campfire, to the crafts of antiquity, to the alchemy of the Middle Ages, to the chamber acid and soda factories of the Industrial Revolution, to the multi-national chemical giants of the twentieth century. The registration fee includes the book, Caveman Chemistry.

Intended Audience: HS/UG; $30 fee; limit of 24 participants
Tuesday, August 5, 9:30 AM - 12:30 PM
Tuesday, August 5, 2:00 PM - 5:00 PM

W14: cCWCS Miniworkshop: Food Chemistry

Exploring Chemistry through Food makes science fun and approachable to a student while providing an endless array of everyday examples to teach chemical concepts to Chemistry majors and non-majors alike. This mini-workshop will provide the participants with hands-on activities, demonstrations, discovery-based lessons, and small experiments that will focus on chemical transformations using food.

Basic chemical concepts such as pH, color, nature of heat & energy will be explored in addition to cutting-edge molecular gastronomy techniques that will excite faculty and students alike. Participants will take home materials they can plug into various courses and labs.

Intended Audience: HS/UG; $20 fee; limit of 24 participants
Monday, August 4, 9:30 AM - 12:30 PM
Monday, August 4, 2:00 PM - 5:00 PM

W15: cCWCS Miniworkshop: Teaching Basic Chemistry Through Artists’ Materials
Patricia Hill, Millersville University. Michael Haaf, Ithaca College.
Jennifer Mihalick, University of Wisconsin Oshkosh.

This workshop will provide college and university faculty with hands on experience and resources that combine the chemistry of artists’ materials with the teaching of basic general organic and analytical chemistry principles. The workshop is a small slice of the intensive 5 day cCWCS Chemistry Collaborations Workshops and Communities of Scholars Chemistry of Art Workshop funded through a grant from the National Science Foundation NSF TUES Type 3 Project 1022895. The half day workshop will consist of 4 ½ laboratory activities facilitated by cCWCS workshop alumni and leaders who have used these lab activities in their teaching. Activities may include light and color XRF analysis of paint and metals metal etching and coloring and synthesis and use of indigo dye.

Intended Audience: UG; $10 fee; limit of 24 participants
Wednesday, August 6, 9:30 AM - 12:30 PM
Wednesday, August 6, 2:00 PM - 5:00 PM

W16: ChemEd Xchange: Be A Contributor
Jon Holmes, University of Wisconsin Madison Deanna Cullen

The Chemical Education Xchange (ChemEd X, www.chemedx.org) welcomes contributions to its growing body of articles, activities, blogs, media, and picks on topics of interest to teachers and learners of the chemical sciences. Contributors create new content, comment on existing content, and share resources and ideas through social media. In this workshop, we will provide training for those who wish to share their unique perspective with the ChemEd X community. Although everyone interested in the chemical sciences is welcome to participate at ChemEd X, we are seeking to involve chemistry teachers in the Xchange of ideas that are unique to the pre-college and two-year college arenas. Many changes are being introduced to early science education such as AP Chemistry reform and the Next Generation Science Standards (NGSS) and ChemEd X seeks to help teachers navigate through this sea of change.

Intended Audience: HS/UG; No fee; limit of 24 participants
Thursday, August 7, 9:30 AM - 12:30 PM

W17: Chemistry, Life the Universe & Everything (CLUE)
Melanie Cooper, Michigan State University. Sonia Underwood, Michigan State University. Michael Klymkowsky

“CLUE is a new NSF supported approach to general chemistry
Based on three learning progressions (structure, properties and energy). The curriculum was developed by answering five questions: 1. What do we want students to know? 2. In what order should they learn it? 3. What do students bring with them? 4. What materials are most appropriate for learning different concepts and skills? 5. How will we measure what students have learned? Participants in the workshop will answer these questions for their own institutional settings and their own students. In addition they will have the opportunity to work with the materials developed for the CLUE curriculum, including online beSocratic activities. Participants will also be provided with CLUE materials, including an electronic version of the text and student activities.

**Intended Audience:** UG; No fee; limit of 20 participants

Wednesday, August 6, 2:00 PM - 5:00 PM

**W18: ChemSource, the NGSS, and the Particle Nature of Matter**
Mary Virginia Orna. College of New Rochelle. Patricia Smith, Air Academy High School, CO (ret.).

In this workshop participants will identify, adapt, and develop classroom-ready templates and lesson plans allied with the NGSS (Next Generation Science Standards). They will select the basic material from the ChemSource module, Basic Chemical Reactions, and utilize the NGSS performance expectations for each grade level constructed by blending ideas from Science and Engineering Practices (Inquiry), Disciplinary Core Ideas, and Crosscutting Concepts. The templates will focus on the introduction of the particle nature of matter into middle school and secondary school chemistry instruction. The participants will learn the decision-making process for what they have to add or omit to existing activities to make them consistent with NGSS. In the process, participants will concentrate on answering three questions for their own grade level: (1) What should students know prior to instruction? (2) What characteristics must be common to learning activities? (3) How will I know if students have learned? And (4) How is this instruction alike and different from traditional instruction? The particle nature of matter and chemical reactions have been chosen for illustrative purposes because of their importance to chemistry education and emphasis in the NGSS which illustrates the development of a core concept or learning progression. Although the NGSS are utilized in this workshop, the process is useful for constructing any standards-based instructional materials. Participants will receive a packet of The New ChemSource material for use in the workshop and for future use. They will be able to exit the workshop with several viable lesson plans in their level of interest.

**Intended Audience:** HS/2Y; $20 fee; limit of 30 participants

Wednesday, August 6, 9:30 AM - 12:30 PM

**W20: ComparingPersonally Written Test Items with ACS Exams Items**
Tom Holme, ACS Exams Institute.

This workshop is designed to allow participants view the developing interface that will allow instructors to compare student performance on their own test items with national samples of student performances on ACS test items on the same topic. The comparison is based on the Anchoring Concepts Content Map (ACCM) for General Chemistry (JCE, 89, 721, 2012). 2000 test items from the past 20 years of general chemistry exams from ACS Exams have been aligned to the ACCM. The interface will help identify probably maps for an entered test item, allow the user to confirm a particular content area, and then provide comparison information about student performance. Feedback from participants will be used to provide features that will enhance the utility of this tool as it is developed. (Note this project is funded by the National Science Foundation.)

**Intended Audience:** UG; No fee; limit of 20 participants

Monday, August 4, 9:30 AM - 12:30 PM

**W21: Constructing Stoichiometric Understanding Through LEGO®**
Kenneth Hoffman, Rockyview Schools, Alberta, Canada. Shirley Ng, Emery Collegiate Institute, Toronto, Canada.

“A 2012 survey of children’s toy usage in the UK showed that 92% of 6 to 12 year old children play with LEGO® building blocks. Although LEGO® building blocks can be assembled in myriad structures there are a limited number of building rules that govern construction. Consequently, the use of LEGO® building blocks as a manipulative presents a powerful knowledge structure that can be readily applied to enhance student learning of stoichiometry. This presentation will outline five hands-on activities that have been developed to leverage student fluency with LEGO® bricks to improve student learning of stoichiometry. The rationale for the use of LEGO® building blocks, the learning theory that underpins their utility and the precedence for them in chemical education will also be addressed:”

**Intended Audience:** HS; No fee; limit of 30 participants

Tuesday, August 5, 9:30 AM - 12:30 PM
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W22: Designing a Distance Learning Chemistry Lab Curriculum Using Carolina Investigations
Mark W. Meszaros, Carolina Biological Supply Company.
Help your online students learn the same critical science process skills as your classroom students. Carolina has transformed the hands-on labs you have used for years into distance learning labs that are reliable, safe, and affordable. Experience for yourself during this hands-on workshop how your students will easily learn the necessary lab skills and reinforce key concepts using Carolina Science Distance Learning kits. This workshop will last for one hour and fifteen minutes.
Intended Audience: HS; No fee; limit of 26 participants

W23: Designing Companion Computational Exercises to Enrich Traditional “Wet” Labs
Richard Lord, Grand Valley State University. Mary Karpen, Grand Valley State University. Christopher Lawrence, Grand Valley State University.
Have you ever wanted a computational module as part of one of your existing experimental labs? Students often have a disconnect between the macroscopic observations in the “wet” lab and what is happening at the microscopic, particulate level. We have found over the past 15 years that a student’s experience in physical chemistry lab is significantly enriched by pairing related computational and experimental laboratories. In this workshop we will discuss strategies for designing such laboratories for not only physical, but also general, organic, inorganic, and biochemistry labs. We encourage participants to contact us ahead of time with specific experimental labs that could benefit from a computational component. During this workshop you will work with several computational chemistry experts to design your own computational lab.
Intended Audience: HS/UG; No fee; limit of 24 participants

W24: Developing a Thematic Approach to Teaching Organic Chemistry Courses
Paul Morgan, Butler University.
We all want our students to develop and use a broadly applicable base of organic chemistry knowledge, and we all know it’s not easy to do. As an expert in organic chemistry your knowledge is broadly based and can be used reliably and flexibly to rationalize plausible answers to novel problems. How can we transfer these abilities to others? The group work in this workshop will be focused on helping you to explore your problem solving process and turn it into a process you can verbalize, teach to others and use to design effective assessment. My approach is to: 1) identify widely applicable concepts or themes within organic chemistry 2) map them to content across the course(s) 3.) turn these concepts into recurrent themes within your course(s) 4.) hold students accountable to properly and flexibly apply these concepts on assessments
Intended Audience: UG; No fee; limit of 25 participants

W25: Energy in Chemistry: From the Macroscopic to the Particulate Levels
Marta Gmurczyk, American Chemical Society. Julie Andrew, University of Colorado, Bonnie Bloom, Hilliard Davidson High School, Shelley Belleau, Mapleton Expeditionary School of Art, Chad Bridle, Grandville High School, Alice Putti, Jenison High School, Vicente A. Talanquer, University of Arizona, Michael Tinnesand, Science Consultant.
“Energy is a cross-cutting concept in all science disciplines and can be used as a framework in chemistry to help students understand the properties and behavior of substances at multiple levels. This is the first session of a two-part workshop designed to analyze, discuss, and reflect on diverse instructional strategies that actively engage students in thinking about energy issues in chemistry at the macroscopic, particulate, and atomic levels, using multiple representations. We will also illustrate how to diagnose and formatively assess student understanding. In this first session of the workshop participants will actively engage in design and modeling activities that can help students deepen their conceptual understanding about energy, heat, and temperature in macroscopic systems, and kinetic and potential energy of particles in models of matter developed to explain physical changes.
This workshop has been developed by the American Chemical Society (ACS) High School Chemistry Professional Development Leadership Group.

Intended Audience: HS; No fee; limit of 25 participants

Lallie McKenzie, Chem 11 LLC. Peter Mahaffy, Kings University College. Marcy Towns, Purdue University. Ashley Versprille, Purdue University, Mary Kirchoff, American Chemical Society. Brian Martin, Kings University College.
This workshop will explore new learning materials and pedagogical strategies to improve the link between core chemistry curricula and sustainability education, develop faculty expertise to place chemistry content in an interdisciplinary context, and use visualizations and case-based approaches to support an understanding of complex science. In 2014 the NSF-supported Visualizing the Chemistry of Climate Change (VC3Chem) project will release a set of free interactive learning tools to teach core chemistry concepts through the rich context of climate science. Participants in the workshop will investigate, test, and evaluate interactive web-based digital learning objects (DLOs) that connect climate literacy principles and core chemistry content. Specific topics include 1) isotopes and their relevance in determining historical temperature records, 2) IR absorption by greenhouse gases, 3) acid/base chemistry and impacts on changing ocean pH, and 4) thermochemistry and its role in combustion of fuels and the radiation balance of our planet.
Intended Audience: UG; No fee; limit of 24 participants

W27: Engineering-The Missing Piece of the Puzzle!
Greg Dodd, George Washington High School.
Join this “hands on” workshop and learn how to implement STEM instruction in the Chemistry classroom. Our present and future lives are dependent upon making America more competitive by training a STEM-educated workforce. Presently, the STEM subjects are usually taught independently of each other. STEM Instruction must be cross-curricular and make use of 21st Century Skills and Technology. Most teachers have little difficulty integrating science, mathematics, and technology into their courses. The difficult piece of the puzzle is engineering. Many teachers misunderstand and fear engineering. This workshop focuses on Engineering Design—one of the NGSS Science and Engineering Practices. The goal of this workshop is to ease teachers’ concerns by their participation in a “hands on” STEM activity to understand how a colorimeter works and to design and use a simple colorimeter. Spectrophotometry is one of the areas now being emphasized in the AP Chemistry Curriculum. Handouts will be provided.
Intended Audience: HS; No fee; limit of 24 participants

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**W28: Experiential Chemistry: A Hands-On Laboratory-Based Course for Non-Majors**

This workshop will be a hands-on introduction to Experiential Chemistry, a course designed specifically for non-science majors. The approach used in this course reverses the traditional pattern of science education where early mastery of factual material is required before the students are allowed to explore the interesting problems. Students are first presented with a series of exciting experiments and are allowed to experience the excitement of chemistry. Unlike other non-majors course, Experiential Chemistry is taught exclusively in the laboratory, with no lecture component. This workshop will give participants a chance to explore many of the experiences developed for the course and to discuss how the course is implemented. Copies of the course text will also be provided.

Intended Audience: UG; $50 fee; limit of 24 participants
Tuesday, August 5, 9:30 AM - 12:30 PM

**W29: Exploring Great Lakes Issues**
Richard Rediske, Grand Valley State University.

Explore and learn about Great Lakes Issues on a 2.5 hr cruise onboard the research Vessel, W.G. Jackson. Workshop participants will learn about important environmental issues concerning, water quality, harmful algal blooms, invasive species, and pollution from industrial, urban, and agricultural sources. Through guided investigations and hands-on experiments, participants will become familiar with pollution and harmful algal blooms in the Great Lakes.

Intended Audience: HS/UG; No fee; limit of 25 participants
Tuesday, August 5, 9:30 AM - 12:30 PM

**W30: Exploring Vernier Instrumentation in the Chemistry Laboratory**
Melissa Hill, Vernier Software & Technology.

This workshop will highlight experiments for advanced high school, general, and organic chemistry courses. The workshop will feature our popular handheld data-collection solution, LabQuest 2. You will also be able to view and analyze data collected on LabQuest 2 using Graphical Analysis for iPad, or on any device with a supported browser using Vernier Data Share. Rotate through stations to explore instruments including our new Vernier UV-VIS Spectrophotometer, SpectroVis Plus VIS-NIR Spectrophotometer with fluorescence capabilities, Mini GC Plus Gas Chromatograph, Vernier Melt Station, and Chemical Polarimeter. Appropriate for college and high school chemistry. This workshop will run for approximately 90 minutes.

Intended Audience: HS/UG; No fee; limit of 24 participants
Tuesday, August 5, 11:00 AM - 12:30 PM

**W31: From Teaching Props to Learning Tools: Exploring the Polar Nature of Water and Its Impact on Protein Structure and Protein Folding**
Margaret Franzen, Milwaukee School of Engineering. Colleen Conway, Mount Mary University. Kimberly Dirlam-Schatz, University of Wisconsin – Fox Valley. Heather Mernitz, Alverno College.

Molecular concepts are challenging for many students, both because of the new vocabulary and the inability to interact with invisible entities. Accurate physical models allow students to experience these concepts. Participants will explore how water interacts with both polar and non-polar substances using magnetic water models. Next participants will discover how proteins fold in a watery environment, based on chemical properties of amino acids, using Mini-Tooers (foam-covered wires) and plastic sidechains. We will demonstrate 1) how the arrangement of amino acids in a protein influences the final three-dimensional protein structure, 2) how secondary structure stabilizes proteins, 3) how mutations can impact the protein shape and 4) what occurs at the molecular level when proteins denature. Additional models of proteins will be used to explore protein secondary structure, and Jmol tutorials that reinforce the concepts will be demonstrated. All materials are available online or through the MSOE Model Lending Library.

Intended Audience: HS/UG; No fee; limit of 50 participants
Tuesday, August 5, 9:30 AM - 12:30 PM
Tuesday, August 5, 2:00 PM - 5:00 PM

**W32: Get Engaged: Developing and Assessing Effective Activities to Teach Challenging Concepts**
Daniella Fisher, University of Cincinnati Blue Ash College. Amy Gultice, University of Cincinnati Blue Ash College, Bradford Mallory, University of Cincinnati Blue Ash College

This participatory workshop is for educators who teach complex concepts that may be difficult to impart to students using standard lecture techniques. Explore demonstrations and engaging activities that get students out of their seats and thinking about complex concepts - such as factors that affect enzyme activity or how to determine molecular shape and polarity - while using fun props and aids. Participants will take part in an activity, discuss a Top 10 list of tips and strategies for developing effective activities, examine survey tools to assess the effectiveness of an activity, and explore potential pitfalls and strategies to avoid or overcome them. Participants will also share their experiences with in-class activities and collaborate on a new activity to enhance student learning of a challenging chemistry concept. Participants will leave with ready-to-use examples, plans for self-developed activities, and an assessment template for evaluating the effectiveness of their own activities.

Intended Audience: HS/UG, No fee, limit of 24 participants
Sunday, August 3, 2:00 PM - 5:00 PM

**W33: Getting Students to make Evidence Based Claims: Development of Argument Driven Inquiry (ADI) and Science Writing Heuristic (SWH) Laboratory Materials**

“Inquiry and argumentation are complementary goals that make laboratory experiences more scientifically authentic and educative for students (Berland & Reiser, 2009; Jimenez-Aleixandre, 2008; Osborne, 2010; Walker & Sampson, 2013). This workshop focuses on preparing laboratory materials for two specific approaches to laboratory instruction: Argument Driven Inquiry (ADI) and the Science Writing Heuristic (SWH).

Participants are asked to bring an experiment that they want to adapt to ADI or SWH. Workshop leaders have extensive experience with each of the instructional models and will provide professional development on implementation of the two approaches, including investigation design, logistics of the lab report, and how to conduct argumentation sessions. Finally, participants will receive suggestions for convincing others to adopt one of these instructional models. While participation in the Principles of Running an ADI or SWH Laboratory workshop is not required, workshop leaders strongly recommend familiarity with at least one approach before registering for this workshop.”

Intended Audience: HS/UG; No fee; limit of 25 participants
Monday, August 4, 9:30 AM - 12:30 PM

**W34: Getting Students to make Evidence Based Claims: Principles of Running an Argument Driven Inquiry (ADI) or a Science Writing Heuristic (SWH) Laboratory**
Inquiry and argumentation are complementary goals that make laboratory experiences more scientifically authentic and educative for students (Berland & Reiser, 2009; Jimenez-Alexandre, 2008; Osborne, 2010). Currently, there is an emphasis in laboratory instruction to move students toward making evidence based claims through instructional models that give a more central place to argumentation and its role in the social construction of scientific knowledge. This is not a simple adjustment for students or instructors given that challenges still exist even when implementing an inquiry-based laboratory. This workshop will focus on two specific approaches to laboratory instruction: Argument Driven Inquiry (ADI) (Walker & Sampson, 2013) and the Science Writing Heuristic (SWH) (Pookc, et al., 2007). Participants will be introduced to each approach, engage in activities that compare the approaches and lead mock ADI and SWH discussion sessions to practice elements of these two instructional methods.

Intended Audience: HS/UG; No fee; limit of 25 participants
Monday, August 4, 2:00 PM - 5:00 PM

**W35: Hands on Workshop on Proteopedia: A Powerful Tool for Biomolecular Communication and a 3D Web Encyclopedia of Biomolecules**

“Proteopedia is an interactive resource that facilitates understanding the role of 3D protein structures in their biological function [http://proteopedia.org](http://proteopedia.org). Proteopedia is widely used in scientific research, in the preparation of papers for publication and teaching from secondary level to post-graduate. The workshop is aimed at researchers, teachers and students, who will learn how to: To browse the > 100,000 pages in Proteopedia, e.g. [http://proteopedia.org/w/HIV-1_protease](http://proteopedia.org/w/HIV-1_protease) http://proteopedia.org/w/Ribosome [http://proteopedia.org/w/Group:SMART:A, Physical_Model_of_the_β2-Adrenergic_Receptor](http://proteopedia.org/w/Group:SMART:A, Physical_Model_of_the_β2-Adrenergic_Receptor) To create your own pages in Proteopedia, including Adding 3D interactive scenes via a user friendly GUI for Jmol Adding text to Proteopedia pages, with hyperlinks to the interactive scenes.

This Proteopedia workshop smoothly blends with two other workshops offered in this same BCCE 2014: Jmol for Beginners and Ultimate Jmol.

Intended Audience: HS/UG; No fee; limit of 24 participants
Wednesday, August 6, 9:30 AM - 12:30 PM
Wednesday, August 6, 2:00 PM - 5:00 PM

**W36: Hands-On Models for Solids**
George Liesensky, Beloit College.

The spatial arrangement of atoms is central to the understanding of structure and properties. Hands-on manipulation of physical models is fundamental to understanding the three-dimensional atomic nature of materials, even with the availability of increasingly sophisticated computer displays. During the workshop we will make use of four different physical model kits based on hub and spoke (especially useful for covalent bonding), sphere packing (especially useful for ionic structures), polyhedral coordination (especially useful for oxides and environmental chemistry), and magnetic attraction (especially useful for showing the energetics of bond formation and addressing the common misconception among students that all bond formation requires energy.) Is a tetrahedron four spokes from a central atom, the space between four close-packed spheres, or a structural unit used to assemble larger structures? Multiple representations provide complementary views. We will also use some online models that allow switching between representations.

Intended Audience: UG; $15 fee; limit of 32 participants
Monday, August 4, 9:30 AM - 12:30 PM

**W37: Hands-On NMR Activities for Undergraduates**

This workshop will provide you with both theoretical and applied approaches to teaching NMR principles at the undergraduate and two-year college levels. A brief introduction to several NMR topics will be followed by hands-on activities where workshop participants will run several NMR experiments and interpret results. The aim is to encourage novel use of NMR instruction for undergraduate classes as well as levels. Topics will include investigating "alternative nuclei" other than 1H and 13C, and an introduction to heteronuclear 2-dimensional NMR.

Intended Audience: UG; No fee; limit of 24 participants
Sunday, August 3, 2:00 PM - 5:00 PM

**W38: Hey! You Can’t teach It That Way! Overcoming Obstacles to Curricular Reform.**

At CSB/SJU, we received NSF funding for “Connected Chemistry: An Inorganic, Organic and Biological Chemistry Approach” in which integrated foundation courses were developed. As we implemented cross-disciplinary courses, many shareholders were resistant to change. It was necessary to negotiate with faculty firmly embedded in their traditional disciplines as well as the biology department, education department, pre-health advisors, and the administration to ensure that our new courses fit the needs of various student groups. This workshop will cover aspects of the implementation of a new integrated curriculum, including faculty teaching cohorts, coordination of assessment plans, administrative collaborations, availability of resources and the use of differing pedagogical approaches. The CSB/SJU dean will help attendees brainstorm strategies for their home institutions. Workshop coordinators will use breakout sessions to catalyze discussion between people with similar curricular goals. Attendees will receive samples of activities from our courses and potential resources for supporting substantial curricular revision.

Intended Audience: UG; No fee; limit of 30 participants
Sunday, August 3, 2:00 PM - 5:00 PM

**W39: I Teach AP Chemistry-Are Inquiry Labs Necessary?**
Greg Dodd, George Washington High School.

Research shows that students learn best through discovery. While cookbook labs are effective in verifying concepts, they are not as effective for student learning as Inquiry. The new AP Chemistry Curriculum mandates six Inquiry labs. The workshop goal is to provide participants with a "hands on" experience of moving from Cookbook thru Guided and, finally, towards Open Inquiry. Inquiry provides students the opportunity to develop their critical thinking skills to better prepare them for the challenges of the 21st Century. This goal can best be reached by realizing that this is a step-wise process that must be approached sequentially with adequate student preparation of laboratory and technology skills. The use of technology is another necessary piece of the puzzle since technology allows students to spend more time on actual Inquiry and less time with gathering, graphing, and analyzing
collected data. The workshop will focus on two areas of Chemistry-spectrophotometry and Thermochemistry.

**Meetings**

**W40: Improving Labs with Formative Assessment**
Melissa Hemling, Beaver Dam High School.

Student misconceptions dealing with the invisible particulate-level world of chemistry is well documented in research. Misconceptions in lab are inevitable since the observations students see in lab are caused by the invisible particulate-level of chemistry. This workshop will model techniques to help identify and address misconceptions during lab. Remediating during lab is crucial because it provides instructors additional tools to overcome misconceptions that a class discussion does not. Classroom research will be shared. Participants will perform an AP Chemistry inquiry-style lab using probe ware and engage in techniques to address misconceptions during lab.

Intended Audience: HS; No fee; limit of 24 participants
Sunday, August 3, 2:00 PM - 3:30 PM

**W41: Infusing the Science of Learning into Your Chemistry Classroom: Cognitive Principles**
Sam Pazicni, University of New Hampshire.

"Much research suggests that certain instructional strategies are particularly effective at promoting student learning and attitudes towards science. Yet, incorporating the latest evidence-based instructional practices into an existing lecture-focused classroom can be difficult.

In this workshop, participants will discuss several cognitive principles applicable to everyday use in chemistry courses. Topics such as testing effects, self-explanation, expertise reversal, distributed practice, and illusions of competence will be emphasized. Workshop participants will learn about these cognitive principles as well as the experimental evidence supporting these learning principles, and will be guided in the development of interventions and assessment protocols for several course-related learning issues.

We strongly encourage participants who are interested in how these learning principles apply to several specific instructional strategies to attend our subsequent ""Infusing the Science of Learning into Your Chemistry Classroom: Evidence-Based Instructional Strategies"" workshop."

Intended Audience: HS/UG; No fee; limit of 30 participants
Wednesday, August 6, 9:30 AM - 12:30 PM

**W42: Infusing the Science of Learning into Your Chemistry Classroom: Evidence-Based Instructional Practices**
Marilyne Stains, University of Nebraska-Lincoln. Sam Pazicni, University of New Hampshire. Travis Lund,

"Much research suggests that certain instructional strategies are particularly effective at promoting student learning and attitudes towards science. Yet, incorporating the latest evidence-based instructional practices into an existing lecture-focused classroom can be difficult.

In this workshop, participants will discuss several research-based, active-learning instructional strategies that can be easily added to any chemistry course. These strategies build directly on the cognitive principles presented in the associated morning workshop. The specific techniques of Peer Instruction, Predict-Observe-Explain (also known as interactive lecture demonstrations), and Jigsaw will be emphasized. Workshop participants will learn about the evidence supporting these strategies, will experience them from a student's perspective, and will be guided in the development of personalized materials ready for implementation in their own classrooms.

We strongly encourage participants not already familiar with cognitive principles such as testing effects, self-explanation, expertise reversal, distributed practice, and illusions of competence to attend our preceding ""Cognitive Principles"" workshop."

Intended Audience: HS/UG; No fee; limit of 40 participants
Wednesday, August 6, 2:00 PM - 5:00 PM

**W43: Inquiry Based AP Chemistry Experiments with Vernier**
Jack Randall, Vernier Software & Technology

If you teach AP Chemistry, you won't want to miss this workshop. In this hands-on session, you will gain practice in conducting inquiry-based chemistry investigations using sensors and instruments with our LabQuest 2 - our popular stand-alone data-collection device. The workshop will feature experiments that correlate with the new lab guidelines for AP Chemistry, including Beer's Law, kinetics, and acid-base titrations. This workshop will fun for approximately 90 minutes.

Intended Audience: HS; No fee; limit of 24 participants
Tuesday, August 5, 3:30 PM - 5:00 PM

**W44: Inquiry-Based Activities Exploring Light and Atomic Structure**
Laura Eisen, George Washington University. Samantha Glazier, St. Lawrence University. Jennifer Schmeisser, St. Lawrence University.

The purpose of this workshop is to provide teachers of first year college chemistry and advanced high school chemistry with some inquiry-based activities designed to help students explore the nature of light, how light interacts with matter, and how this interaction helps us to understand the structure of atoms and molecules. We will begin with activities that explore the wave nature of light, providing evidence that light is a wave, that blue light has higher frequency than red light, and that the energy of light is proportional to frequency. We will then examine the particle nature of light. Finally, we will extend the wave-particle duality of light to electrons, and consider how electron waves confined in atoms lead to quantization of electron energies, atomic orbitals and atomic spectra. The workshop will model inquiry-based learning by having participants complete the activities and then discuss them.

Intended Audience: HS/UG; $10 fee; limit of 30 participants
Wednesday, August 6, 9:30 AM - 12:30 PM

**W45: Integrating a Learning to Learn One-credit course with General Chemistry**
John Goodwin, Coastal Carolina University. Daniel Apple, Pacific Crest.

Pacific Crest has redesigned its intensive Learning to Learn Camp into a one-credit course that produces the same outcomes that the Learning to Learn Camp produces. This workshop will illustrate how by combining this one-credit course with a first term general chemistry course or with a Principles of Chemistry course, those students who consistently struggle with learning chemistry can improve the skills that excellent POGIL students exhibit: self-directed learning, critical thinking, generalization, problem solving, communication, writing to learn, teamwork, and self-assessment. The workshop will share a syllabus, stories, outcomes, and guidelines for structuring this integration.

Intended Audience: UG; No fee; limit of 26 participants
Sunday, August 3, 2:00 PM - 5:00 PM
W46: Interactive Experience with Microwave Technology in the Teaching Lab

"Microwave technology has become a common tool for chemical synthesis and many academic institutions are incorporating microwave-assisted experiments into their teaching and research labs. Early introduction to innovative instrumentation, such as microwave reactors, teaches students to embrace ideas on the cutting edge of chemistry, better preparing them for technologies they will encounter in their careers. This workshop will begin with a review of microwave theory, provide a pedagogical comparison of both single and multimode technologies available for the teaching lab, and highlight several examples of experiments that have been adapted for microwave technology with an emphasis on green chemistry principles. Participants will then run a reaction in both microwave technologies to gain a hands-on understanding of how microwave-assisted chemistry can fit into any teaching lab. This workshop will be 90 minutes long."

Intended Audience: HS; No fee; limit of 24 participants
Wednesday, August 6, 9:30 AM - 11:00 AM
Wednesday, August 6, 2:00 PM - 3:30 PM

W47: FTIR Spectroscopy and Permanent Magnet NMR in the Undergraduate Curriculum
Bill Mohar, Thermo Fisher Scientific.

We present an overview of the importance of providing students hands-on experience with FTIR spectrometers as well as permanent magnet NMR and a hands-on workshop performing experiments with the instrumentation.

Intended Audience: HS/UG; No fee; limit of 24 participants
Tuesday, August 5, 2:00 PM - 5:00 PM

W 48: Interdisciplinary Chemistry: Tissue Engineering Scaffolds and Materials Science
Elaine Smith, Marion High School

In this hands-on workshop, participants will experience five guided inquiry activities related to ongoing research at Furman University that involves the development of ionomeric composites for nerve tissue engineering scaffolds. The activities include exploring alginate as a substitute for an extracellular matrix, producing a conductive polymer, measuring physical properties such as strength and viscoelasticity, and 3D printing. The discussion will include ways to foster a self-directed, research-oriented approach in students who lack experience with open inquiry. The activities incorporate the science practices from A Framework for K-12 Science Education.

Intended Audience: HS/UG; No fee; limit of 24 participants
Tuesday, August 5, 9:30 AM - 11:00 AM

W50: Introduction to Vernier Technology for Chemistry
Elaine Nam, Vernier Software & Technology.

“If you’re new to data collection with Vernier, or would like a basic refresher, this workshop is for you. Join us for hands-on practice using LabQuest 2—a popular stand-alone data-collection device. You will also be able to view and analyze data collected on LabQuest 2 using Graphical Analysis for iPad, or on any device with a supported browser using Vernier Data Share. Rotate through stations to conduct a selection of experiments from our three lab books, Chemistry with Vernier, Advanced Chemistry with Vernier, and Investigating Chemistry through Inquiry using the pH Sensor, our redesigned Drop Counter, Temperature Probe, Gas Pressure Sensor, Conductivity Probe, and Colorimeter. By the end of this workshop, you’ll be a pro at data collection and analysis with Vernier. Appropriate for college and high school chemistry. This workshop will run for approximately 90 minutes.”

Intended Audience: HS/UG; No fee; limit of 24 participants
Tuesday, August 5, 9:30 AM - 11:00 AM

W51: Jmol for Beginners
Tuesday August 5, 9:30 AM – 11:00 AM
Intended Audience: HS/UG; No fee; limit of 24 participants

W52: Leapfrog learning - Diagnosing and surmounting obstacles to students’ development of more sophisticated chemical thinking

Do you struggle to understand what your students are thinking about chemistry? Come learn about a powerful formative assessment technique called 'cognitive interviewing' and practice using this technique to make sense of student thinking around
foundational ideas in chemistry that students rely upon to determine how to identify matter and differentiate between kinds of matter. You will learn about the stepping stones that middle school, high school and college students traverse as they gain conceptual sophistication, and how you can move your students toward more expert understanding of chemical identity (the idea that every substance is unique). The workshop will utilize the ‘GoKart Interview Protocol’, a tool co-developed by a team of Boston middle and high school teachers, university faculty, and graduate students. Participants will leave with copies of the protocol and a learning progression map derived from our research study that characterizes productive stepping stones along the progression. 

Intended Audience: HS/UG; $25 fee; limit of 36 participants 
Wednesday, August 6, 9:30 AM - 12:30 PM

W53: Learning Chemistry at the Molecular Level with Advanced Visualization and Simulation Techniques (Part 1) 
Jurgen Schnitker, Wavefunction Inc.

“The arguably biggest problem for student comprehension of chemistry is that molecular-level explanations depend on mental images rather than direct observation. In other words, teachers and students must resort to models in order to rationalize chemical phenomena. Unfortunately, the quality of models found in textbooks, animations, and online learning tools varies greatly. This workshop is about working with computer-based models that not only offer compelling three-dimensional visualization, but that are 1) fundamentally science-based (rather than ad hoc illustrations), and 2) explorable (rather than limited to singular messages).

From the viewpoint of students and teachers, the scientific basis for the models can be a complete black box that matters is that a lot of mathematics makes a model behave realistically. The fact that the models are explorable, however, is of direct interest as it allows for guided inquiry learning in a most natural way. Working with state-of-the-art software for molecular modeling, the attendees will address a few topics from the general chemistry curriculum (complementing the topics from the first workshop in the series). The workshop will conclude with a Top Ten list for using molecular models in the classroom.

Hands-on workshop—please bring your own laptop (Windows or Mac OS X) if you can.”

Intended Audience: HS/UG; No fee; limit of 30 participants 
Tuesday, August 5, 9:30 AM - 12:30 PM

W55: Learning Chemistry at the Molecular Level with Advanced Visualization and Simulation Techniques (Part 2) 
Michelle Corrigan, Wavefunction Inc.

“(Part 2) The arguably biggest problem for student comprehension of chemistry is that molecular-level explanations depend on mental images rather than direct observation. In other words, teachers and students must resort to models in order to rationalize chemical phenomena. Unfortunately, the quality of models found in textbooks, animations, and online learning tools varies greatly. This workshop is about working with computer-based models that not only offer compelling three-dimensional visualization, but that are 1) fundamentally science-based (rather than ad hoc illustrations), and 2) explorable (rather than limited to singular messages).

From the viewpoint of students and teachers, the scientific basis for the models can be a complete black box that matters is that a lot of mathematics makes a model behave realistically. The fact that the models are explorable, however, is of direct interest as it allows for guided inquiry learning in a most natural way. Working with state-of-the-art software for molecular modeling, the attendees will address a few topics from the general chemistry curriculum (complementing the topics from the first workshop in the series). The workshop will conclude with a Top Ten list for using molecular models in the classroom.

Hands-on workshop—please bring your own laptop (Windows or Mac OS X) if you can.”

Intended Audience: HS/UG; No fee; limit of 24 participants 
Monday, August 4, 9:30 AM - 5:00 PM 
Tuesday, August 5, 9:30 AM - 5:00 PM

W54: WebMO Hands-On Workshop 
William Polik, Hope College.

“WebMO is a web-based interface to modern computational chemistry programs (GameSS, Gaussian, Molpro, Mopac, NWChem, PQS, PSI, Quantum Espresso, VASP, Q-Chem, Tinker). Using just a web-browser, users can draw 3-D structures, run calculations, and view results. WebMO is simple enough for novice users (reasonable defaults are provided, and result are presented graphically) but flexible enough for experts (full access to input and output files is provided, and job types can be customized).

Workshop topics will include:
Overview of WebMO features and capabilities Drawing molecules using the WebMO Editor Running various job types 
Visualization of results using the WebMO Viewer Importing and exporting structures and jobs Customization WebMO job types 
Installation and administration of WebMO

This is a hands-on workshop, so participants are encouraged to bring their own Windows, Mac, or Linux laptop or Apple iPad. In addition to workshop activities, the WebMO developers will be available for questions and individual consultation.”

Intended Audience: HS/UG; No fee; limit of 36 participants 
Wednesday, August 6, 9:30 AM - 12:30 PM

W56: Learning to Learn Chemistry Camps 
Daniel Apple, Pacific Crest.

Pacific Crest has facilitated over 70 Learning to Learn Camps for over the last 20 years. Recently we have contextualized these camps - Calculus Learning to Learn Camp (SUNY Buffalo State University), SMART GRID Learning to Learn Institute (Stony Brook University), POGIL STEM Up Learning to Learn Camp Integrating and Algebra Learning to Learn Camp (Hinds CC), and Scholar's Institutes for the Honors College and Academic Success Institutes for Freshmen Academy (Grand Valley State University). These camps are designed to help students become successful learners and faculty learn to facilitate POGIL activities more effectively. Participants will receive sample materials used to run a Chemistry Learning to Learn Camp, a sample agenda, access to a facilitator's manual, principles of why the camp works, sample outcomes and guidelines for implementing this camp. Our mission is to increase success of STEM students and advance use of Process Education and POGIL practices.

Intended Audience: UG; No fee; limit of 50 participants 
Tuesday, August 5, 2:00 PM - 5:00 PM

W57: Microscale Chemistry from the United Kingdom 
Bob Worley, CLEAPSS (UK)

“The session will show how qualitative and quantitative microscale techniques in practical chemistry, can tease out of the students a greater understanding of the particulate model of molecules and 1ons interacting with each other; how chemists interpret the visible with the invisible.

It will feature redox and precipitation reactions, volumetric and gravimetric analysis, electrolysis, a Hofmann voltameter, environmental, gas and organic chemistry. Using equipment such as plastic folders, Petri dishes, crown bottle
build several models from the following list: alpha helix, beta sheet, structure printed on standard weight paper, along with lines for inspired by Pauling's paper model of an alpha helix and Hanson's allow educational activities that are impossible with other kits. With paper. These models are affordable, easy to construct, and workshop will learn a method for modeling large biomolecules of proteins, carbohydrates, lipids, and DNA? Participants in this Would your students enjoy building their own accurate models inspired by Washington College.


Would your students enjoy building their own accurate models of proteins, carbohydrates, lipids, and DNA? Participants in this workshop will learn a method for modeling large biomolecules with paper. These models are affordable, easy to construct, and allow educational activities that are impossible with other kits. Inspired by Pauling's paper model of an alpha helix and Hanson's book "Molecular Origami", the models start with a molecular structure printed on standard weight paper, along with lines for cutting and folding. Pairs of numbers guide alignment of hydrogen bonds, which are secured with transparent tape. Participants will build several models from the following list: alpha helix, beta sheet, Rossmann fold, leucine zipper (pictured), collagen, cyclodextrin, amylose, amylopectin, cellulose, chitin, heparin, sphingomyelin, cardiolipin, glycolipids, and DNA.

Intended Audience: HS/UG; $20 fee; limit of 30 participants Wednesday, August 6, 2:00 PM - 5:00 PM

**W61: New Bite-Sized Chemistry Teaching Resources that use Real 3D Crystal Structures**

Susan Henderson, The Cambridge Crystallographic Data Centre. Peter Hoare, Newcastle University.

"Fundamental chemistry concepts such as conformation, stereochemistry, chirality and the geometrical shapes of metal coordination spheres cannot be properly understood without knowledge of the three-dimensional nature of chemical compounds. Rather than using molecular modelling kits to aid student learning, with their limitations and misconceptions, how about using real crystal structures? The Cambridge Structural Database (CSD) stores the published results of small molecule organic and organometallic X-ray diffraction studies: real structures and not idealised models, thus an ideal resource for teaching chemistry. This hands-on workshop will familiarise you with the free teaching subset of the CSD, the WebCSD online platform that accesses the subset and to new materials that introduce key chemistry concepts that frequently require visual aids to ensure full concept comprehension. Supervised by an academic with over 20 years teaching experience in UK high schools, these exercises have been written by students for students and have wide applicability."

Intended Audience: HS/UG; No fee; limit of 24 participants Wednesday, August 6, 9:30 AM - 12:30 PM

**W62: Nitinol, the brainy wire**

Al Hazari, University of Tennessee.

Come and learn about Nitinol, the interesting nickel-titanium alloy that's got memory, and about its several everyday life applications. Participants will do several hands-on activities that demonstrate the various properties of this alloy. A discussion of this and of other common alloys (samples will be shared) will be presented.

Intended Audience: HS/UG; $20.00; limit of 26 participants Tuesday, August 5, 2:00 PM - 5:00 PM

**W63: Non-Visual Methodologies for Teaching Multi-Sensory Chemistry Lab Activities**

Cary Supalo, Independence Science.

This workshop will feature methodologies and techniques for teaching chemistry lab activities in a hands-on way without the use of vision. The activities are valuable to all learners, though they are designed for students with visual impairments. Multi-channel sensory feedback through tactile, olfactory, and hearing in addition to vision will be discussed and featured in the various activities as part of this workshop. Concerns related to laboratory safety regarding students with visual impairments and other disabilities will also be addressed. A combination of high tech and low tech solutions for science access for all learners will be featured. This workshop will demonstrate aspects of the Science Activities for the Visually Impaired (SAVI) curriculum published by the Laurence Hall of Science from the 1970s, and how these techniques are valuable in today's science curriculum. Further, commercially available technologies of audible and talking lab tools will also be presented.

Intended Audience: HS/UG; $10 fee; limit of 26 participants Monday, August 4, 9:30 AM - 11:30 AM Monday, August 4, 2:00 PM - 4:00 PM

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**W58: Microwave Chemistry in Instructional Organic Laboratories**

Shaun Murphree, Allegheny College. Leah Eller, St. Mary's College of Maryland.

“Dedicated microwave reactors have become standard equipment in industrial labs, and microwave-assisted organic synthesis (MAOS) is increasingly well represented in the chemistry education literature. Thanks to the very short reaction times afforded by MAOS, organic lab curricula can be designed to incorporate inquiry-based approaches while still maintaining a broad synthetic repertoire.

In this workshop, participants will gain hands-on experience using dedicated microwave reactors to complete organic laboratory protocols, and can immediately determine the outcomes using a variety of analytical instruments (HPLC, FT-IR and/or NMR). The workshop will explore strategies for adapting conventional lab experiments to MAOS conditions. Curriculum design parameters and implementation factors will also be discussed.”

Intended Audience: UG; No fee; limit of 24 participants Monday, August 4, 9:30 AM - 5:00 PM

**W59: Misconceptions in chemistry**

Al Hazari, University of Tennessee.

Students develop their own understanding of how “nature really works.” These pre-concepts are brought to school and teachers have to reflect and act on them for better instruction. In addition, there are “school-made misconceptions” which originate from inappropriate curriculum and instructional materials. This workshop is aimed to help teachers and professors diagnose and cure the pre-concepts. Participants will do several key hands-on activities that expose learner’s misconceptions, this will also be followed by discussion of ideas, criticizing prior knowledge and finally presenting the correct chemical concepts.

Intended Audience: HS/UG; $30.00 fee; limit of 24 participants Thursday, August 7, 9:30 AM - 12:30 PM

**W60: Molecular Origami for Biochemistry: Accurate Paper Models of Proteins, Carbohydrates, Lipids, and DNA**


Would your students enjoy building their own accurate models of proteins, carbohydrates, lipids, and DNA? Participants in this workshop will learn a method for modeling large biomolecules with paper. These models are affordable, easy to construct, and allow educational activities that are impossible with other kits. Inspired by Pauling’s paper model of an alpha helix and Hanson’s book “Molecular Origami”, the models start with a molecular structure printed on standard weight paper, along with lines for cutting and folding. Pairs of numbers guide alignment of hydrogen bonds, which are secured with transparent tape. Participants will build several models from the following list: alpha helix, beta sheet, Rossmann fold, leucine zipper (pictured), collagen, cyclodextrin, amylose, amylopectin, cellulose, chitin, heparin, sphingomyelin, cardiolipin, glycolipids, and DNA.

Intended Audience: HS/UG; $20 fee; limit of 30 participants Wednesday, August 6, 2:00 PM - 5:00 PM
W64: Open-source teaching materials: Tailoring the text and other teaching materials to meet the needs of your classroom.
Kelly Neilies, St. Mary’s College of Maryland.
Open source materials provide an instructor with the opportunity to have more control over the texts required for their course by allowing them to fit the textbook to their course rather than being forced to make the course fit the textbook. These materials also provide instructors with a method to lower the cost of textbooks for their students. This workshop will give participants the opportunity to learn more about what open source materials are all about. The first part of the workshop will be a discussion of open source materials including the following questions: What does open source mean exactly? What types of open source materials are available? How can we be confident in the quality of open source materials (are they peer reviewed)? How will students access these materials? In the second portion of the workshop, instructors will work to investigate and integrate open-source content into their curriculum.
Intended Audience: HS/UG; $5 fee; limit of 24 participants
Wednesday, August 6, 9:30 AM - 12:30 PM

W65: Permanent Magnet NMR in the Undergraduate Curriculum
Bill Mohar, Thermo Fisher Scientific.
We present an overview of the importance of providing students hands-on experience with NMR and a hands-on workshop performing experiments with the instrumentation.
Intended Audience: HS/UG; No fee; limit of 24 participants
Tuesday, August 5, 9:30 AM - 12:30 PM

W66: PhET Interactive Simulations Supporting Materials: Develop Inquiry-Based Learning Activities
Julia Chamberlain, University of Colorado Boulder.
The PhET Interactive Simulations project (http://phet.colorado.edu) has developed over 30 chemistry simulations (sims), which support student learning through scientist-like exploration and experimentation. Sims make the invisible visible, incorporate multiple representations, and emphasize connections between real life phenomena and the underlying science. PhET sims are designed to be flexible tools, and can be used for classroom demonstrations, clicker questions, guided inquiry activities, laboratory exercises, and homework. In each context, the supporting materials (eg. an activity sheet) can target specific process and content learning goals using the sims. In this workshop, participants will use guidelines and existing activities to develop supporting materials and facilitation plans to couple with sims in their teaching. This workshop is appropriate for those new to PhET, as well as seasoned sim users looking to design and receive feedback on new supporting materials. This symposium is sponsored by the ACS CHED Committee on Computers in Chemical Education, http://www.cccce.divCHED.org/.
Intended Audience: HS/UG; No fee; limit of 24 participants
Sunday, August 3, 2:00 PM - 5:00 PM

W67: Preparing High-Quality Proposals for NSF Division of Undergraduate Education Programs
Dawn Rickey, National Science Foundation. David Brown, Nicole Bennett.
The National Science Foundation’s Division of Undergraduate Education (NSF’s DUE) promotes excellence in undergraduate science, technology, engineering, and mathematics (STEM) education for all students, and provides opportunities for faculty to obtain funding for projects that address current challenges and opportunities in undergraduate chemistry education. In this workshop, NSF DUE program officers will lead activities and discussions focused on important aspects of preparing high-quality proposals for projects designed to improve undergraduate chemistry education. The workshop will include an overview of DUE programs, as well as activities designed to assist participants in developing their skills for planning evidence-based and evidence-generating chemistry education projects; designing evaluation and dissemination plans; understanding the proposal review process; and considering the NSF/IES Common Guidelines for Education Research and Development.
Intended Audience: UG; No fee; limit of 45 participants
Monday, August 4, 9:30 AM - 5:00 PM

W 68: Promote Inquiry Using Chemistry Demonstrations from Flinn Scientific
David Jones, Flinn Scientific.
Looking for more ways to incorporate inquiry-based experiments into your chemistry classroom? Asking questions is the heart of inquiry, and there is no better way to get students asking questions than by presenting exciting, engaging demonstrations! Join us as we present classic demonstrations and describe a series of inquiry-based activities that were developed based on those demonstrations. We will model the inquiry process and share a strategy that allows you to easily develop safe and meaningful inquiry labs on a variety of topics. Handouts included for all attendees! This will be a 60-75 minute workshop.
Intended Audience: HS; No fee; limit of 75 participants
Sunday, August 3, 3:30 PM - 5:00 PM

W69: PSI4 Education: Open Source Computational Chemistry
Tricia Shepherd, St. Edward’s University.
Ashley Ringer McDonald, California Polytechnic State University. Ryan Fortenberry, Georgia Southern University. Mathew Kennedy, Georgia Institute of Technology.
PSI4 is an open-source suite of ab initio quantum chemistry programs ideal for both research and education. Pairing PSI4 with the WebMO graphical user interface, students can easily build molecules and set up computations to explore various chemical concepts such as polarity, molecular orbitals, and spectroscopy. In this workshop, we will present a variety of lab activities for beginner, intermediate, and advanced chemistry students using the PSI4/WebMO interface. Participants will not only receive hands-on experience using PSI4 and WebMO, but will also have time to develop their own lab activity in the presence of expert PSI4 software developers available for consultation. Each participant will receive a flash drive containing a lab manual with all activities presented at the workshop, the PSI4 software, and detailed information for setting up and using PSI4 and WebMO in a context similar to their home institution.
Intended Audience: UG; $10 fee; limit of 24 participants
Tuesday, August 5, 9:30 AM - 12:30 PM
Tuesday, August 5, 2:00 PM - 5:00 PM

W70: Putting the Green in the Next Generation Science Standards
Dalila Kovacs, Grand Valley State University. Kate Anderson, Kathe Blue Hetter, Erika Fatura, Thomas Pentecost, Grand Valley State University.ennifer Sherburn, Sarah Williams, Ryan Schoenborn, Amy Cannon.
Join us for an interactive hands-on workshop on how to
incorporate and align green and sustainable chemistry with the new generation science standards in your daily teaching. Learn from a team of high school teachers involved in 'Putting the Green in the Next Generation Science Standards" a project organized by the Michigan Green Chemistry Clearinghouse, GVSU Chemistry Department, and the Regional Math and Science Center, and by Beyond Benign, an organization known world-wide for its vision to revolutionize the way chemistry is taught and learned. Be prepared to walk away with useful tools and resources to bring back to your classrooms and laboratories.

Intended Audience: HS; No fee; limit of 20 participants
Thursday, August 7, 9:30 AM - 12:30 PM

W71: Research Experiences for Teachers: Models that Work (Panel Discussion)
Elaine Smith, Marion High School

Research experiences for teachers vary widely, from short-term, highly defined summer research projects to complete graduate programs. What are the goals and expected outcomes of such experiences? Our panelists will present a variety of models and discuss the impact of teachers' research experiences on (1) teachers' growth as science practitioners, (2) the formation of collaborative partnerships, and (3) their students' scientific reasoning. Finally, we will discuss the potential for broadening teachers' access to research opportunities, along with corresponding practical concerns such as teacher compensation, K-12 curriculum flexibility, and variance in teachers' interests and experience levels.

Intended Audience: HS/UG; No fee; limit of 24 participants
Wednesday, August 6, 9:30 AM - 12:30 PM

W72: Resources for Excellence: Using ACS Resources to Enhance Effectiveness at your Institution
Candice McCloskey, Georgia Perimeter College

Two-year college participants work in groups to identify challenges at their institutions, and learn about and use ACS resources specifically for two-year colleges to solve them. Bring your business cards!

Intended Audience: 2Y; No fee; limit of 45 participants
Tuesday, August 5, 2:00 PM - 5:00 PM

W73: Scientific Soapmaking
Kevin Dunn, Hampden-Sydney College.

In the past 20 years a cottage industry has grown around the production of soap on a relatively small scale. Only a minimal physical plant is needed to produce custom-formulated soaps on a scale from 10-100 lbs per batch. This cottage industry is made up primarily of women producing soap and selling it at craft fairs, boutiques, on the internet, and to hotels desiring private-label soap. The science of soapmaking touches on many chemical topics, including stoichiometry, equilibrium, and the properties of acids, bases, alcohols, esters, and oils. This workshop would be appropriate for high school and college faculty desiring to teach a course for students interested in handcrafted soap as a business or hobby. It would also be appropriate for faculty wanting to include a soapmaking module as part of another course. Workshop fee includes a copy of the book, Scientific Soapmaking.

Intended Audience: HS/UG; $30.00 fee; limit of 26 participants
Wednesday, August 6, 9:30 AM - 12:30 PM
Wednesday, August 6, 2:00 PM - 5:00 PM

W74: Share Your Teaching Resource Online: Join the Open Access Community!
Patricia Kreke, Mount St. Mary’s University. Stephanie Brouet

Do you have a teaching resource that you want to share online? Join the iCollaborative community! Bring your teaching resource (class activity, lab, quiz, video lesson or just an idea) to this session for feedback from peers and iCollaborative representatives then receive help submitting your resources for publication on the iCollaborative site. This workshop will have four parts: brief introduction to iCollaborative; review of the iCollaborative's resources and peer feedback tools; peer-mentoring session for potential submissions; and overview of the submission process. The AAMC-sponsored Pre-health Collection within MedEdPortal's iCollaborative (www.mededportal.org/icollaborative/pre-health) includes teaching resources geared for undergraduate courses populated by pre-health students. The collection provides a searchable online repository of recommended instructional resources that target pre-health competencies like those on the revised MCAT exam. Many of the open access resources feature real-world contexts and active learning. Join the iCollaborative community of dedicated teachers/professionals and help shape this initiative!

Intended Audience: HS; No fee; limit of 20 participants
Thursday, August 7, 9:30 AM - 12:30 PM

W75: Spectroscopy for your Computer and Tablet
Thomas Loschiavo, PASCO Scientific.

New from PASCO, a wireless spectrometer and fluorometer that allows you to easily connect to a computer or a tablet. The PASCO Spectrometer was designed for educational use and built around the new PASCO App: Spectroscopy software. Use the PASCO spectrometer and software to intuitively perform spectroscopy experiments including light source emission studies, determination of the concentration of unknown solutions using Beer’s law, and rates of reactions. The workshop will run for approximately 90 minutes.

Intended Audience: HS/UG; No fee; limit of 24 participants
Wednesday, August 6, 9:30 AM - 11:00 AM

W76: Student Directed Chemistry with Vernier
Jack Randall, Vernier Software & Technology

“Do you need to add inquiry labs to your chemistry course? Vernier has done the work for you with our lab book, Investigating Chemistry through Inquiry. In this hands-on workshop, you will learn how to conduct a chemistry inquiry investigation using sensors with our LabQuest 2. You will also be able to view and analyze data collected on LabQuest 2 using Graphical Analysis for iPad, or on any device with a supported browser using Vernier Data Share. Appropriate for college and high school chemistry. This workshop will run for approximately 90 minutes.”

Intended Audience: HS/UG; No fee; limit of 24 participants
Tuesday, August 5, 2:00 PM - 3:30 PM

W77: Successful Inquiry Labs for AP Chemistry
Carolina Teaching Partner

Bring inquiry to your classroom with new Carolina chemistry activities and see your classroom come alive. Carolina’s new labs help students develop essential chemistry practices, understand Big Idea chemistry concepts, and learn chemistry through inquiry per the new AP Chemistry curriculum. Experience 3 different activities in this hands-on workshop. Handouts/free giveaways. This workshop will last for approximately one hour and 15 minutes.

Intended Audience: HS; No fee; limit of 40 participants
Tuesday, August 5, 2:00 PM - 3:30 PM

W78: Teaching and Learning Inquiry in Chemistry Using Bonding
This workshop is designed to help participants develop an understanding of scientific inquiry in the high school chemistry classroom. Participants experience the structures that support the implementation of inquiry-based lessons in their chemistry classrooms by engaging in a lesson on chemical bonding. The inquiry strategies that will be illustrated in this workshop include aspects of the scientific process such as making simple observations, developing models, data collection, making evidence-based claims, and refining models and defending claims in a classroom discussion. The workshop will include opportunity to discuss common concerns about the implementation of inquiry in high school chemistry classrooms and strategies for overcoming common barriers.

Intended Audience: HS/2Y; No fee; limit of 26 participants
Tuesday, August 5, 9:30 AM - 12:30 PM
Tuesday, August 5, 2:00 PM - 5:00 PM

W79: The Automobile and the Periodic Table
Craig Donahue, University of Michigan-Dearborn Codruta Savu, University of Michigan-Dearborn.

The presenters teach a two-semester General Chemistry course to undergraduate engineering majors using the overarching theme of Chemistry and the Automobile. This workshop will explore automotive materials (morning) and automotive-related compounds (afternoon). Participant breakout groups will be asked to identify specific examples related to these themes and to suggest ways of integrating them into the chemistry curriculum. This cycle will be repeated three times in the morning and afternoon. The three morning cycles will focus on defining broad categories of automotive materials, the issue of lightweighting the automobile and possible case studies. The three afternoon cycles will focus on redox reactions that can be connected to the automobile and ways to categorize these reactions into manageable subsets, automotive-related metal compounds, and automotive-related nonmetal compounds. The presenters will provide feedback on how these topics are integrated into their courses and a list of useful resources.

Intended Audience: UG; No fee; limit of 24 participants
Tuesday, August 5, 9:30 AM - 5:00 PM

W80: The Fabulous World of Beaded Molecules: Constructing Arbitrary Fullerenes with Beads
Bih-Yaw Jin, National Taiwan University.

“Constructing a three-dimensional physical model for a complicated molecule is important for students to visualize the spatial arrangement of different parts in that molecule. We developed systematic strategy for making cage-like fullerene without any hole based on the spiral code of the corresponding fullerene and other exotic graphic structures using the technique of mathematical beading.

In this workshop, we will give the participants hands-on experience on how to make beaded models for several important fullerenes such as C60 or C70 and give the correct interpretation based on the valence sphere model developed by Prof. Henry Bent. In the first project, we will make beaded model for the hypothetical molecule C20, which consists of twelve pentagons. Participants will learn the basic techniques of weaving for other fullerene compounds in about half hour. With this experience, we will move on to the next structure C60 or C70 in the next project:”

Intended Audience: HS/UG; No fee; limit of 30 participants
Monday, August 4, 2:00 PM - 5:00 PM

W81: Workshop Using the ChemConnections Workbook

How does a nuclear reactor work? How is nylon formed? What is in my blood? This session will introduce activities from the new ChemConnections Activity Workbook that includes 59 classroom tested activities written in the context of societal and environmental issues. Derived from the ChemConnections modules, the collection of individual activities and laboratories allow real-world problems to be integrated into a broad range of teaching environments including lectures, recitations, and workshop based courses. Designed with attention to pedagogy and student learning styles, these activities introduce real-world applications utilizing a variety of methods including data analysis, laboratory, guided inquiry, and discovery. Ultimately these activities assist students in not only learning general chemistry, but also in understanding how chemistry relates to modern issues such as acid rain, nuclear energy, nutrition, and technology.

Intended Audience: HS/UG; No fee; limit of 30 participants
Monday, August 4, 9:30 AM - 12:30 PM
Monday, August 4, 2:00 PM - 5:00 PM

W82: The Future of the General, Organic, Biochemistry Course Sequence: An Ideas Lab Workshop for Responding to Upcoming MCAT Changes
Jeffrey R. Raker, University of South Florida. LaKeisha McClary, George Washington University.

Recently, the American Medical Association proposed changes to the Medical College Admissions Test (MCAT) based on recommendations from the Howard Hughes Medical Institute and its own survey research in an effort to revise the MCAT to best assess the knowledge and skills necessary for success in medical school. Pertinent to chemical educators, these recommendations emphasize a portion of the curricula of the traditional full-year general chemistry and full-year organic chemistry courses, adding more emphasis on biomolecules and biochemistry. The chemical education community has begun to discuss the changes via the July 2013 issue of the Journal of Chemical Education. However, the discussion in response to these changes is far from finished. The purpose of this workshop will be: (1) to discuss the changes to the MCAT that impact chemistry instruction, and (2) to generate ideas as how chemistry instructors and departments can best prepare premedical students.

Intended Audience: UG; No fee; limit of 30 participants
Tuesday, August 5, 2:00 PM - 5:00 PM

W83: The POGIL Project Workshop: Classroom Facilitation
Tricia Shepherd, St. Edward's University. Michael Bruno.

There is no single way to implement POGIL -- each time there are unique characteristics that can influence how particular goals are achieved. Facilitating a POGIL classroom effectively involves more than student groups and collaborative activities; it requires careful planning and effective classroom management through reflective facilitation techniques. This workshop is designed to provide participants with an introduction to facilitating POGIL activities. Through this experience, participants will reflect on how facilitation can enhance or interfere with student learning, as well as how facilitation strategies can be critical in the development of student process skills. After attending this session, participants will be able to: (1) name different components of classroom facilitation, (2) explain how the actions of the instructor can promote or inhibit development of student process skills, and (3) propose facilitation
strategies for classroom use.

**Intended Audience:** HS/UG; $25 fee; limit of 36 participants

**W84: The POGIL Project Workshop: Implementation of Guided Inquiry Experiments for Physical Chemistry**

Rob Whitnell, Guilford College. Maria Pacheco,

The NSF-funded POGIL-PCL project implements the principles of Process Oriented Guided Inquiry Learning (POGIL) in order to improve student learning in the physical chemistry laboratory (PCL) course. Tested POGIL principles are being used to develop inquiry-based physical chemistry experiments that emphasize macroscopic and molecular models of chemical phenomena. The goal of the POGIL-PCL project is to make available a wide range of physical chemistry experiments with training materials and practitioner support so that instructors may assess their needs and resources and choose from a variety of turn-key experiments that best enhance their students learning. This workshop will introduce the structure of a POGIL physical chemistry experiment through a classroom-tested, hands-on example, providing participants with both the POGIL-PCL experience from the student perspective and an illustration of what makes an effective guided inquiry experiment. Workshop participants will have the opportunity to discuss how to use the POGIL-PCL principles to write new experiments, how to convert existing physical chemistry experiments, and how to participate further in the POGIL-PCL project.

**Intended Audience:** HS/UG; $25 fee; limit of 36 participants

**W85: The POGIL Project Workshop: Development and Implementation of Guided Inquiry Experiments for Physical Chemistry**

Rob Whitnell, Guilford College. Maria Pacheco,

The NSF-funded POGIL-PCL project implements the principles of Process Oriented Guided Inquiry Learning (POGIL) in order to improve student learning in the physical chemistry laboratory (PCL) course. Tested POGIL principles are being used to develop inquiry-based physical chemistry experiments that emphasize macroscopic and molecular models of chemical phenomena. The goal of the POGIL-PCL project is to make available a wide range of physical chemistry experiments with training materials and practitioner support so that instructors may assess their needs and resources and choose from a variety of turn-key experiments that best enhance their students learning. This workshop will introduce the structure of a POGIL physical chemistry experiment through a classroom-tested, hands-on example, providing participants with both the POGIL-PCL experience from the student perspective and an illustration of what makes an effective guided inquiry experiment. Workshop participants will have the opportunity to discuss how to use the POGIL-PCL principles to write new experiments, how to convert existing physical chemistry experiments, and how to participate further in the POGIL-PCL project.

**Intended Audience:** HS/UG; $25 fee; limit of 36 participants

**W86: The POGIL Project Workshop: Facilitating Upper Level POGIL Courses in Analytical Chemistry**

Juliette Lantz, Drew University. Caryl Fish,

Implementing POGIL in an upper level course such as analytical chemistry presents some unique challenges that differ from implementing POGIL in general and organic chemistry sequences. The goals of this workshop are to introduce faculty to the collection of POGIL materials available to teach analytical chemistry principles, as well as the facilitation and assessment strategies that are useful for a successful implementation of these materials. This workshop will a) introduce users who are already familiar with POGIL to newly developed classroom materials for analytical chemistry, b) help instructors develop implementation strategies that lead to effective use of these materials in an upper-level classroom and c) discuss assessment strategies an instructor could use to gauge the success of POGIL materials in upper-level courses. Interactive sessions where participants will work through selected POGIL analytical chemistry classroom materials and begin to develop a syllabus will be included.

**Intended Audience:** UG; $25 fee; limit of 36 participants

**W87: The POGIL Project Workshop: Introduction to POGIL**

Gina Frey, Washington University in St. Louis. Brandon Fetterly,

This session is designed for those with limited or no previous exposure to POGIL. Participants will have the opportunity to engage in POGIL activities, observe facilitation strategies firsthand, learn about POGIL classroom implementation, and discuss common barriers to implementation. After attending this session, participants will be able to: (1) name essential elements of POGIL pedagogy and philosophy, (2) list student learning outcomes supported in a POGIL classroom, and (3) create plans to begin implementation of POGIL in their own classrooms.

**Intended Audience:** HS/UG; $25 fee; limit of 36 participants

**W88: The POGIL Project Workshop: Climate Change Concepts in General Chemistry**

Daniel King, Drexel University. Gail Webster, Guilford College.

This workshop will a) introduce users who are already familiar with POGIL that are useful for a successful implementation of these materials. The goals of this workshop are to introduce faculty to the collection of POGIL materials available to teach analytical chemistry principles, as well as the facilitation and assessment strategies that are useful for a successful implementation of these materials. This workshop will a) introduce users who are already familiar with POGIL to newly developed classroom materials for analytical chemistry, b) help instructors develop implementation strategies that lead to effective use of these materials in an upper-level classroom and c) discuss assessment strategies an instructor could use to gauge the success of POGIL materials in upper-level courses. Interactive sessions where participants will work through selected POGIL analytical chemistry classroom materials and begin to develop a syllabus will be included.

**Intended Audience:** UG; $25 fee; limit of 36 participants

**W89: The POGIL Project Workshop: Introduction to POGIL in GOB/Allied Health or Prep Chem**

Ashley Mahoney, Bethel University. Michael Garoutte,

Process Oriented Guided Inquiry Learning (POGIL) is a student-centered, team-based learning approach based on constructivism and the learning cycle. Teams of 3 or 4 build their understanding while working through content-based material and developing targeted process skills, such as teamwork, critical thinking, management, and problem solving. This workshop will provide an introduction to the principles and practice of POGIL, utilizing published activities for a GOB or prep-chem course as examples. Participants will experience a model POGIL classroom, analyze the structure of an activity, and discuss implementation strategies for beginning students. Attendance at this workshop will provide appropriate background for those interested in attending other POGIL Project workshop sessions.

**Intended Audience:** HS/UG; $25 fee; limit of 36 participants

**W90: The POGIL Project Workshop: POGIL in High School Chemistry Courses**

Amanda Zullo, Saranac Lake High School. Mahesh Alur,

This session is designed for high school teachers with limited or no previous exposure to POGIL. With a focus on high school classrooms, participants will have the opportunity to engage in
POGIL activities, observe facilitation strategies firsthand, learn about POGIL classroom implementation, and discuss common barriers to implementation. After attending this session, participants will be able to: (1) name essential elements of POGIL pedagogy and philosophy, (2) list student learning outcomes supported in a POGIL classroom, and (3) create plans to begin implementation of POGIL in their own classrooms.

Intended Audience: HS; $25 fee; limit of 36 participants
Monday, August 4, 2:00 PM - 5:00 PM

W91: The POGIL Project Workshop: Student-Centered Learning in the Laboratory: The POGIL and the Science Writing Heuristic Approaches
Tom Greenbowe, Iowa State University. Steve Gravelle, POGL (Process-Oriented Guided Inquiry Learning) and SWH (Science Writing Heuristic) are two complementary approaches to laboratory work that follow a three-stage learning cycle and involve active learning and guided inquiry. In response to a question posed by the instructor (POGL) or questions developed by the students (SWH), students work in teams to gather data from experiments run under a variety of conditions. They examine the pooled data from which they construct theories and make claims that can be backed up by the experimental results. Group discussions, reflective writing, and in some cases additional experiments are used to further develop the concepts. Participants in this workshop will examine model experiments, work with student-generated data in a simulated laboratory setting, and convert existing and currently used lab activities to POGL or SWH experiments. Workshop participants should bring copies of two of their lab activities for conversion to POGL or SWH experiments.

Intended Audience: HS/UG; $25 fee; limit of 36 participants
Wednesday, August 6, 9:30 AM - 12:30 PM

W92: The POGIL Project Workshop: Writing POGIL Activities - Advanced

In this session participants will review the learning cycle, the qualities of good learning objectives, and the characteristics of a robust model. Ample time will be given to begin writing an activity, including a structured brainstorming session for participants to share ideas for activities. After attending this session, participants will be able to: (1) write a set of content and process learning objectives for a POGIL activity, (2) develop a robust model for a POGIL activity, (3) categorize questions in a POGIL activity according to the learning cycle, and (4) use the author scaffold to outline a POGIL activity they would like to write.

Intended Audience: HS/UG; $25 fee; limit of 36 participants
Wednesday, August 6, 2:00 PM - 5:00 PM

W93: The POGIL Project Workshop: Writing POGIL Activities - An Introduction
Amy Hanson, Denver Public Schools. Laura Trout, Lancaster Country Day School.

This session is an introduction to the essential characteristics and structure of high-quality POGIL activities. Participants will also examine the value of developing content and process objectives for POGIL activities, and create a draft or outline of an activity based on these learning objectives. After attending this session, participants will be able to: (1) identify the basic components of a POGIL activity, such as a model and critical thinking questions, (2) classify questions in an activity according to the following types: directed, convergent, or divergent, (3) classify questions in a learning cycle activity according to the following types: exploration, concept invention/term introduction, or application, (4) use both the Learning Cycle and question types to critically analyze activity structure and guide construction of quality POGIL activities, and (5) write, or begin to write, a POGIL activity focused on specific learning objectives.

Intended Audience: HS/UG; $25 fee; limit of 36 participants
Wednesday, August 6, 9:30 AM - 12:30 PM

W94: Transferability Among Postsecondary Institutions: Past, Present, and Future
Kishore Bagga, Drexel University College of Medicine. Joan Sabourin, American Chemical Society.

“An interactive workshop will be held on student transfer and its related aspects. Through breakout and group discussions, participants will address challenges and concerns, as well as models that have been successfully used by institutions to aid student transfer. The workshop is designed for faculty and administrators of two- and four- year colleges.

The workshop will identify opportunities within ACS to raise awareness of student transfer among postsecondary academic institutions. The following questions will be discussed:

What challenges do students and institutions face with regard to student transfer?
What resources currently exist, both inside and outside of ACS, to facilitate student transfer? What models for successful student transfer currently exist?
What unique role, if any, can/should ACS play in disseminating resources for successful student transfer?
Participants can expect to shape their ideas, learn about effective practices at other institutions, and inform current ACS discussions with regard to facilitating student transfer.”

Intended Audience: UG; No fee; limit of 60 participants
Monday, August 4, 2:00 PM - 5:00 PM

W95 Ultimate Jmol
Robert Hanson, St. Olaf College. Dean Johnston, Otterbein University.

In this workshop for experienced users of Jmol, we will focus on more advanced aspects of Jmol and JavaScript scripting, including what’s new for Jmol 14.0, the issue of Java vs. HTML5, and cross-browser compatibility. Participants should bring examples of pages using Jmol or at least be prepared to go behind the scenes with ones provided in order to work on some of the more challenging aspects of using Jmol on the web. The JSmol framework will be described. Participants will learn how to coordinate Jmol with other apps, including JSpecView (NMR, IR, UV/Vis, Raman, MS) and JSME (2D drawing). Presented by the principal developer of Jmol.

Intended Audience: HS/UG; $10 fee; limit of 12 participants
Sunday, August 3, 2:00 PM - 5:00 PM

W96: Using design-based activities to uncover students’ understanding of chemistry at different educational levels
Students often have difficulty applying classroom skills to a real life context. A method to address this issue is to engage students in design-based problems in which they must apply the core practices of chemistry -- synthesis, analysis, and transformation of matter. Using design-based problems in the classroom can enable instructors to identify how students are thinking about a chemical problem in order to better move them forward in their learning. In this workshop, participants will engage in a design-based lab experience to create and optimize an explosion in a Pringles can and reflect on student understandings that can be revealed through questioning during the laboratory activity. Participants will also learn how to improve their methods of asking questions to elucidate students’ underlying assumptions about chemical entities and processes. Finally, participants will have the opportunity to modify currently used lab activities to include a design component.

**Intended Audience:** HS/UG; $25 fee; limit of 24 participants

**W97: Using Doceri to Teach Wirelessly, Annotate on the Projector, and Record Screencasts**

Andrew J. Grall, University of Arizona.

“Teaching traditionally, particularly in large classes, limits an instructor’s access to students throughout the classroom. An iPad app called Doceri allows an instructor to move freely around the room during a class - while still controlling a computer, highlighting important concepts, drawing or annotating on the projector - and even recording screencasts of the lecture. Participants in this workshop will practice using the Doceri app in many of its capabilities for classroom management and student engagement.

Participants are strongly encouraged to bring their own iPads with them to the workshop. The workshop will run twice (ninety minutes each) in one three hour block.”

**Intended Audience:** HS/UG; No fee; limit of 25 participants

**W98: Using Learning Catalytics to Facilitate Peer Instruction in a Flipped Classroom**

Matthew Stoltzfus, The Ohio State University. Brian Lukoff, Andrew J. Grall, University of Arizona.

“Learning Catalytics is a “bring your own device” student engagement, assessment, and classroom intelligence system allowing instructors to assess students in real time, using open-ended tasks to probe student understanding. Instructors can engage students by creating open-ended questions that ask for numerical, algebraic, textual, or graphical responses - or just plain multiple choice.

Participants of this workshop will first experience Learning Catalytics from the student perspective, as the facilitators will demo the various question types. They will then be given time to create their own questions in the Learning Catalytics platform. Finally, participants will deliver the questions they wrote to the rest of the group allowing them to become familiar with the question delivery and data analytics. The goal of the workshop is to provide the necessary background and best practices for participants to use Learning Catalytics in their chemistry classroom.

Participants will need to have a laptop for this workshop.”

**Intended Audience:** HS/UG; No fee; limit of 26 participants

**W99: Using Threshold Concepts to Improve Student Learning in Undergraduate Biochemistry**

Jennifer Loertscher, Seattle University. Vicki Minderhout, Seattle University.

Threshold concepts are concepts that when mastered, represent a transformed understanding of a discipline, without which the learner cannot progress. They are therefore essential for learning. By focusing on threshold concepts, instructors can maximize the impact of instruction. During this workshop, participants will be introduced to what is known about threshold concepts in biochemistry and how these concepts relate to prerequisite coursework. Workshop participants will contribute to a community-based effort to create instructional and assessment tools to support undergraduate students in gaining a deeper understanding of selected biochemical threshold concepts. Participation in this process will provide faculty the resources and skills needed to begin to change their instruction to better address learning of these vital concepts. Those who teach undergraduate biochemistry as well as those who teach prerequisite courses for biochemistry (general chemistry, organic chemistry, general biology) are encouraged to attend the workshop.

**Intended Audience:** HS/UG; No fee; limit of 40 participants

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**Meetings**

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**W100: Utilizing Individualized and Active Learning to Demonstrate Student Gains**

Terry Haugen, Pearson Education.

“This workshop will facilitate a collaborative development of strategies for integrating adaptive and active learning techniques in chemistry courses. Workshop participants will work together to discuss, present and analyze various techniques and tools that increase student preparation, student self-awareness, and student engagement including Learning Catalytics, an advanced, cloud-based learning analytics and assessment system developed by Eric Mazur, Brian Lukoff, and Gary King of Harvard University. Research shows that instant feedback and peer-to-peer engagement lead to improved student comprehension and this workshop will explore the most effective ways to determine which concepts require further exploration and how to group students accordingly for additional discussion and problem solving”

**Intended Audience:** UG; No fee; limit of 24 participants

**W101: Beyond the Homework: Authoring Interactive Tutorials In the WebAssign System**

Steven Matchett, Grand Valley State University. Jason Justice, WebAssign.

On-line homework has become a familiar feature of most introductory college courses. Now they do the homework, but are they doing the assigned reading? Imagine a world where the students were assigned an interactive reading that you created. With students reading and answering questions prior to coming to class, you start the lecture on firm ground or can even flip part of the class. What does this cost the student? If you are already using WebAssign, the answer is nothing. This workshop will show how the WebAssign homework system can be used to write interactive tutorials. Topics will include formatting to give a professional look, inclusion of figures, videos, randomization and more. Examples will be drawn from a privately authored general chemistry textbook written entirely in WebAssign, but the applications go well beyond chemistry. The workshop is most beneficial to those with some experience writing questions in WebAssign. Time will be provided to work on a project of your design.

**Intended Audience:** HS/UG; No fee; limit of 24 participants

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Spring 2014 Newsletter-27
248th ACS Meeting & Exposition, San Francisco, CA

Theme: Chemistry & Global Stewardship
August 10-14, 2014

Meeting Co-Chairs:
Christine Jaworek-Lopes, Emmanuel College, Boston, MA 02115; 617-264-7614; jaworek@emmanuel.edu
Beatriz Rios-McKee, southern Methodist University, Dallas, TX 75206; 214-768-2445; beatrizmckee@me.com

High School Program Chair:
Roxana Allen, St. John's School, Houston, TX; 713-850-0222 (202); rallen@sjhs.org

CHED Program Chair:
Irvin J. Levy, Gordon College, 255 Grapevine Road, Wenham, MA 01984. Voice: 978-867-4877, irv.levy@gordon.edu

GSSPC Organizers:
Katharine Diehl (dkathari@utexas.edu) and others from UT Austin

Undergraduate Poster:
30th Anniversary of Undergraduate Poster Sessions Honoring Dr. Adrienne Kozlowski, Central Connecticut State University

Symposia List

Active Learning in the Chemistry Classroom
Jodye Selco - jiselco@csupomona.edu

Advances in Teaching Organic Chemistry
Susan Hornbuckle - susanhornbuckle@clayton.edu

Advancing Chemistry and Communicating Chemistry: Looking Around and Looking Ahead with Bassam Shakhashiri
Bassam Shakhashiri - bassam@chem.wisc.edu
Jerry Bell - j_bell@acs.org
Rodney Schreiner - schreiner@chem.wisc.edu

An International Student Summit on Global Climate Change
Gregory Foy - gfoy@ycp.edu
Keith Peterman - peterman@ycp.edu
Cosp�权: CEI; MPPG

An International View on Chemistry Education
Cynthia Larive - clarive@ucr.edu

And they are off! Fast tracking the undergraduate research experience
Elvin Aleman - ealeman@csustan.edu
Koni Stone - kkstone@me.com

Assessing Student Success in Chemistry
Nancy Peters - nancy.peters@liu.edu

Chemistry and Global Stewardship
Steven Bachofer - bachofer@stmarys-ca.edu

Chemistry Education Research: Implications for Practice
Melanie Cooper - cmelani@clemson.edu
Teresa Larson - tclarson@wisc.edu

Citizens First! Using real-world contexts for engaging students in learning chemistry
Catherine Middlecamp - chmiddle@wisc.edu
Patrick Daubenmire - pdauben@luc.edu

Curricular Innovation and the New ACS Guidelines
Alicia Peterson - apeterson@csbsju.edu
Chris Schaller - cschaller@csbsju.edu
Cosp�权: CPT

Flip, Blend, and Globalize: Teaching Sustainable and Green Chemistry in the Era of Rising MOOC's and a Changing Landscape of Higher Education
Dalila Kovacs - kovacs@gvsu.edu

General Papers
Steven Fleming - steve.fleming@temple.edu

General Posters
Deborah Bromfield-Lee - dblee-acs@melifera.com

Global Perspectives in Chemical Education: Research and Practice
Carmen Gauthier - cgaubert@fisouthern.edu
Resa Kelly - resa.kelly@sjsu.edu

Global Stewardship by Increasing Climate Science Literacy
Gregory Foy - gfoy@ycp.edu
Keith Peterman - peterman@ycp.edu
Cosp�权: CEI; MPPG

High School Program
Kate Anderson - kate_anderson@beyondbenign.org

Innovative Laboratory Experiments and Programs
David A Katz - dakatz45@msn.com

IMPORTANT DATES
Attendee Registration and Housing will open May 2014
Abstract deadline: March 24, 2014
International Collaborations with International Impact: Chemistry for Global Change
Kimberly Hartstein - harts@uw.edu
Charles Barrows - cbarrow@artsci.wustl.edu
Cosponsors: ANYL; ENFL

New Career Paths in Green and Sustainable Chemistry
Jennifer Young Tanir - jtanir@hesiglobal.org

NSF-Catalyzed Innovation in the Undergraduate Curriculum
Cindy Ann Burkhardt - caburkha@radford.edu
Robert Boggess - rboggess@radford.edu

Perspectives on Graduate Education in the Chemical Sciences
Joe Z. Sostaric - joesostaric@hotmail.com
Mary Kirchhoff - m_kirchhoff@acs.org
Cosponsors: CPT; SOCED

Questioning the Unquestionable: What Should Students Learn in General Chemistry?
Melanie Cooper - cmelani@clemson.edu
Thomas Holme - taholme@iastate.edu

Reaching Out: Chemistry Outreach Programs for High School and Community College Students
Hala Schepmann - schepmah@sou.edu

Sci-Mix
Science Education and Civic Engagement: The Role of Undergraduate Research
Richard Sheardy - rsheardy@mail.twu.edu

Successful Student Chapter Posters

Sustain-Mix: Sustainability Across the Divisions
Irv Levy - irv.levy@gordon.edu
Cosponsors: CEI

Teaching Analytical Method Transfer
Irene Kimaru - wamuyuik@yahoo.com
Kimberly Chichester - kchichester@sjfc.edu
Marina Koether - mkoether@kennesaw.edu

Undergraduate Research Papers
Nicole Snyder - nsnyder@synderglycosciencelgroup.org
Carmen Gauthier - cgauthier@flsouthern.edu
John Miecznikowski - jmiecznikowski@mail.fairfield.edu
Joshua Ruppel - jvruppel@gmail.com

Undergraduate Research Posters: Agricultural and Food Chemistry

Undergraduate Research Posters: Analytical Chemistry

Undergraduate Research Posters: Biochemistry

Undergraduate Research Posters: Biotechnology

Undergraduate Research Posters: Chemical Education

Undergraduate Research Posters: Computational Chemistry

Undergraduate Research Posters: Environmental Chemistry

Undergraduate Research Posters: Geochemistry

Undergraduate Research Posters: Green Chemistry and Sustainability

Undergraduate Research Posters: Inorganic Chemistry

Undergraduate Research Posters: Medicinal Chemistry

Undergraduate Research Posters: Nanochemistry

Undergraduate Research Posters: Organic Chemistry

Undergraduate Research Posters: Physical Chemistry

Undergraduate Research Posters: Polymer Chemistry
ConfChem Online Conference: Flipped Classroom

May 2014

Among educational practice there has been significant attention on the flipped classroom, which is an innovative pedagogical method used by K-12 to college and university educators. There are many different approaches to implementing a flipped classroom. In particular, some educators pre-record lectures of themselves presenting material, others use screen casts to convey information to students before attending class in order to facilitate more peer-to-peer learning, and some teachers use a flipped classroom approach that does not involve videos. Ultimately, the shift in learning is focused on changing the classroom from passive to active.

The purpose of the symposium is to present papers on the flipped classroom and its development of flipped learning. Although some authors are invited to discuss the technical aspects of the flipped classroom, the focus of our symposium will be about how teachers use the face-to-face class time gained by changing from a completely lecture based classroom. Please join the discussion during this symposium as we explore the wide variety of approaches with the authors and other members of the chemical education and flipped classroom communities.

Tentative List of Papers:

1. **Improving Student Engagement in Organic Chemistry Using the Inverted Classroom Model**, Robert Rossi, Gloucester County College
3. **Student Engagement with Flipped Chemistry Lectures**, Michael Seery, Dublin Institute of Technology
4. **Just-In-Time Teaching**, Steven Slezak, California Polytechnic State University
5. **Support for Experiments in Flipping: Time-Saving Resources Aligned with Cognitive Science**, Eric Nelson, Fairfax County Public Schools (retired)
6. **Flipping at an Open-Enrollment College**, Kelly Butzler, Pennsylvania College of Technology
7. **Using a Blog to Flip the Classroom**, January Haile, Centre College
8. **Just-In-Time Teaching in Organic Chemistry**, Jennifer Muzyka, Centre College

Co-organizers:

Chris Luker, Highland Local Schools (cluker@highlandschools.org)
Jennifer Muzyka, Centre College Jennifer L. Muzyka (jennifer.muzyka@centre.edu)
ConfChem Online Conference: Interactive Visualizations for Chemistry Teaching and Learning

May & June, 2015

Visualizations in chemistry education – animations and simulations – provide powerful resources to support students’ conceptual understanding, as well as the representational fluency needed to envision the particulate level world, communicate through chemical symbols, and make connections to the observable world. Advances in technology and access to technology in classrooms have allowed for increasingly interactive visualizations to emerge. With the rise of the tablet, putting interactive visualizations in the hands of students creates tremendous opportunities for engagement with pedagogically rich interactions and interfaces as well as challenges for visualization design and understanding of student learning.

For this virtual conference, we seek submissions focused on the following components of research into educational interactive visualizations for chemistry:

- **Design.** What challenges have been faced when designing interactive visualizations, and what has been learned so far? What are emerging design principles that meet the needs of teachers and students of chemistry?
- **Learning.** What is known about how students learn from specific components of interactive visualizations? What research methodologies and assessment techniques provide insight into student learning with visualizations?

After the conference, contributors will have the option of submitting communications of their papers to the JCE ConfChem Feature for peer review.

Anyone interested in submitting a paper should contact Emily Moore at the University of Colorado, emily.moore@colorado.edu.

Relevant Dates:
- January 15, 2015: Titles and abstracts due (1 page maximum)
- March 15, 2015: Full papers due
- May 8, 2015: Conference starts

### Future ACS National Meetings

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<th>Meeting</th>
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<td>248th ACS National Meeting &amp; Exposition</td>
<td>August 10-14, 2014</td>
<td>San Francisco, California</td>
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<td>249th ACS National Meeting &amp; Exposition</td>
<td>March 22-26, 2015</td>
<td>Denver, Colorado</td>
<td>Chemical Resources: Extraction, Refining and Conservation</td>
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<td>250th ACS National Meeting &amp; Exposition</td>
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<td>251st ACS National Meeting &amp; Exposition</td>
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<td>253rd ACS National Meeting &amp; Exposition</td>
<td>April 2-6, 2017</td>
<td>San Francisco, California</td>
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### 2013 ACS Regional Meetings

- **Northwest (NORM)** June 22-25 Missoula, MT
- **Southeast (SERMACS)** Oct. 16-19 Nashville, TN
- **Central (CERM)** Oct. 29-Nov. 1 Pittsburgh, PA
- **Midwest (MWRM)** Nov. 12-15 Columbia, MO
- **Southwest (SWRM)** Nov. 19-22 Fort Worth, TX

### 23rd International Conference on Chemistry Education (ICCE 2014)

- July 13-18, 2014
- Tororo, Canada
- Program Theme: Developing Learning Communities in the Chemical Sciences

### Biennial Conference on Chemical Education

- Grand Valley State University, Allendale, MI, August 3-7, 2014
- University of Northern Colorado, Greeley, CO, July 31-August 4, 2016

### ConfChem Online Conference

- Flipped Classroom
- May, 2014
- Interactive Visualizations for Chemistry Teaching and Learning
- May - June, 2015
Jerry first became involved in CHED governance as a member of the Task Force on Chemical Education for Health Professions, which subsequently became a committee. He served as Secretary of that committee from 1981-89. He was on the Examinations Institute General Chemistry Exam writing teams that prepared the 1985, 1987, 1989 and 2011 exams. In 1993, Jerry became Secretary of CHED and served in that role through 2004. He was also a member of the Board of Publication during that period. Jerry represented CHED as Councilor from 1993 to 2010. He has served various other positions including committee membership on Personnel and Nominations, and the task force that led to the establishment the Division Office. Jerry served as Workshop Chair for the 19th BCCE (Purdue, 2006). He currently is a member of the Regional Meetings Committee and served as the CHED representative at NORM 2013. He has also organized a number of symposia and workshops over the years, especially for Teaching Science with Toys and Peer Led Team Learning, PLTL.

Jerry consolidated a lot of information about Division members and the Division in electronic form. He was very thorough and complete with keeping records of meetings. He was the go-to person for information about the Division and its activities through the terms of quite a few Division chairs and committee chairs. Obviously Jerry went about his job very quietly and competently and established a tradition for continuity with regard to the Division's business.

CONGRATULATIONS JERRY!!

The Dorothy and Moses Passer Education Fund, Deadline April 1, 2014

Applications Being Accepted for The Dorothy and Moses Passer Education Fund.

This Fund was established by a generous donation of Dorothy and Moses Passer. Moses (Mike) Passer was for many years the head of the ACS Education Division. The Fund grants for teachers at two- and four-year colleges or universities that do not have any advanced degree programs in the chemical sciences.

The awards support continuing education activities that must be directly related to the applicant’s teaching and must take them away from their campus.

The applicant must be a full time faculty member at his or her institution. The applications are reviewed by a committee. There is no application form but the application must include a description of the proposed activity and how it relates to his/her teaching with dates, locations, titles and contacts; a brief description of the applicant’s institution and department; a short curriculum vita; an itemized estimate of expenses, amount of aid requested and sources of all supplemental funds. No support will be given for general attendance at national, regional or local ACS meetings or for any sabbatical support.

Closing dates are three times each year: January 1, April 1, and September 1. All applications must be received electronically. For further information or inquiries contact Sue Nurrenbern, nurrenbe@purdue.edu; Mailing Address: 4266 Calle de Strellas, Las Cruces, NM 88012.

Division of Chemical Education Travel Award, Application Deadline is September 15, 2014

DivCHED provides this service to members to grant financial support for travel to meetings. Up to 12 members will receive the award each year. The DivCHED Travel Award provides up to 80% of travel expenses for one meeting with a limit of $1,000 for the BCCE or Spring National ACS Meeting. To be considered for this award, you must be in at least your third year as a member of the Division of Chemical Education at the time of application. The award application deadline is September 15, 2014. Visit http://divched.org/content/division-chemical-education-travel-award-application for more information and to apply.
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**Deadline is September 15, 2014**

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From the 2012 Awardees....

“Interspersed amongst these symposia and talks, I attended several poster sessions, primarily in the Division of Chemical Education and met and exchanged ideas with colleagues from every different stage in my career.”

“Attending the DivCHED meeting was also very enlightening and I enjoyed meeting with officers of the Division.”

“I made connections with colleagues at this meeting that provided avenues for mentorship and collaborations. The meeting was incredibly useful for expanding contacts in chemical education and my chemical research projects with undergraduates.”

“I attended a Division of Chemical Education meeting where I met several people who are very involved in the division’s activities. From these knowledgeable souls, I was able to discover some of the other areas that I might be able to contribute to DivCHED remotely.”

“My goals were all met in that I was able to participate in discussions, attend talks and poster sessions, network with my colleagues and meet so many others.”

“It is also amazing to see the chain of events that occurred from attending a single meeting. I thank the Division for the travel award that allowed me to attend this meeting.”

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Visit [http://divched.org/content/division-chemical-education-travel-award-application](http://divched.org/content/division-chemical-education-travel-award-application) for more information and to apply.
Resources for Excellence Workshops 2014

The 2014 schedule of Resources for Excellence workshops has been announced. These interactive workshops guide two-year college chemistry programs through the development of customized strategies to address specific concerns at their home institutions.

Developed in 2010, the Resources for Excellence workshops are managed jointly by the CHED Committee on Chemistry in the Two-Year College (COCTYC) and the ACS Office of Two-Year Colleges.

In the Resources for Excellence workshops, a series of group and breakout discussions are used to help participants develop strategies to address areas of program growth identified at the beginning of each workshop. Participants also identify portions of the ACS Guidelines for Chemistry in Two-Year College Programs and other resources that can support their strategies.

Participants in Resources for Excellence workshops
• Develop customized strategies and action plans to address specific challenges at individual two-year colleges
• Create a network of supportive two-year college colleagues
• Identify and implement resources to foster excellence in two-year college chemistry education

Workshops are planned for the following conferences and will be free for conference participants:
• 204th Conference of the Two-Year College Chemistry Consortium, Collin College - Central Park Campus (CPC) in McKinney, TX, March 14-15, 2014
• 205th 2YC3 Conference, University of Wisconsin-Fox Valley, Menasha, WI, May 16-17, 2014
• 206th Conference (BCCE), Grand Valley State University, Allendale, MI, August 2014
• 207th Conference, Florida State College at Jacksonville, Jacksonville, FL (Early Fall 2014)
• 208th Conference, San Jacinto College - Central Campus, Pasadena, TX, November 14-15, 2014

Requests to host Resources for Excellence workshops at other conferences or individual opportunities are welcome. The flexible format of the workshops is adaptable to a variety of venues and audiences. Please contact the ACS Office of Two-Year Colleges (2YColleges@acs.org; 1-800-227-5558, ext. 8281) or visit www.acs.org/2YColleges for more information.

Call for nominations for the Division of Chemical Education 2014 Outstanding Service Award.

The Recognition Committee of the Division of Chemical Education, Inc. is charged with conducting a yearly solicitation of nominees for the CHED “Outstanding Service Award” which is presented at the fall National ACS meeting during the CHED reception. This call for nominations will allow all members of the division to submit names. The award will consist of a token of appreciation.

The guidelines for this award are that the awardees be members of CHED and have contributed outstanding service to CHED. Individuals who currently hold office or chair a committee in CHED would not be eligible for this award until their term of office has expired.

Help the committee in this first phase of our work by submitting up to 3 names of worthy individuals for this award. Please include a list of activities including dates for which these individuals should be honored. Efforts on behalf of the division are to be the main focus and should be given in some detail. Please send your suggestions to me by e-mail no later than April 30. After this date the committee will confer to determine the recipient. Public announcement of the one award winner will be made by June 1 to give that person time to plan for the Fall 2014 National ACS meeting.

Names placed in nomination and not selected will be held and resubmitted for three more years. The nominator will be notified of the person’s status and allowed to update the information for the next year if they wish.

Anna Wilson, Chair Recognition Committee
annawilson40@gmail.com
2225 S. Earl Avenue
Lafayette, IN 47905
Educational events for the International Year of Crystallography 2014 and beyond

In July 2012 the UN General Assembly, following a proposal from Morocco, adopted the resolution 66/284 and proclaimed 2014 as the International Year of Crystallography (IYCr2014). In their declaration, the UNGA recognizes that humankind’s understanding of the material nature of our world is grounded, in particular, in our knowledge of crystallography, and stresses that education about and the application of crystallography are critical in addressing fundamental challenges.

IYCr2014 commemorates the centennial of the birth of X-ray crystallography, thanks to the works of Max von Laue, who was awarded the Nobel Prize in Physics in 1914, and William Henry and William Lawrence Bragg, who were awarded the same prize in 1915. IYCr2014 also falls on the 50th anniversary of the Nobel Prize in Chemistry awarded to Dorothy Hodgkin for her determinations by X-ray techniques of the structures of penicillin and vitamin B12. For crystallographers, IYCr2014 is the well-deserved celebration of the many successes and advances that crystallography has brought to almost all branches of science (e.g., chemistry, biology, physics, pharmaceutics and medicine, mineralogy, materials science, mathematics, cultural heritage and art sciences, and all related technologies) in the last century, as well as of its long and exciting history. In addition, and probably foremost, IYCr2014 is a new starting point, the birth of the second century of modern crystallography, with new challenges and frontiers to be explored.

Even though crystallography underpins all the sciences today, it remains relatively unknown to the general public. Moreover, fundamental courses on crystallography are disappearing from most academic chemistry degree curricula and are almost absent in the developing countries. IYCr2014 is then a unique opportunity for promoting education and increasing public awareness about the importance of crystallography in advancing science, through a variety of activities.

The International Union of Crystallography (IUCr, http://www.iucr.org) is partner of UNESCO for the implementation and coordination of the activities for IYCr2014. The IUCr and UNESCO have undertaken a wide ranging program of activities, all described on the official web site: http://www.iycr2014.org.

A worldwide crystal-growing experiment (http://www.iycr2014.org/participate/crystal-growing-competition) for school children will show that science — and especially crystallography — is fun! This competition will be accompanied by educational material (brochures, videos, etc.) to explain the basic concepts of crystals and crystal growth and the importance of crystallization techniques in many fields, from pharmaceuticals to materials science.

Among the activities offering educational opportunities to young students and researchers from the developing regions is the IUCr-UNESCO OpenLab project (http://www.iycr.org/openlabs), a network of operational crystallographic laboratories in selected universities in Africa, Latin America and South-East Asia. This project will take advantage of the scientific and educational expertise of the IUCr, the diplomatic and educational channels of UNESCO, and the partnership of crystallographic instrumentation manufacturers.

Another great educational resource, made freely available to anyone, is the “Timelines of Crystallography” (http://www.iycr2014.org/timeline), containing a rich source of historical notes sorted in different categories and linked to original documents, pictures, and so on.

Several other tools and online educational resources are available through the IYCr2014 (http://www.iycr2014.org) and IUCr (http://www.iucr.org) web sites.
**Cheminformatics OLCC**

In collaboration with ACS CINF (Division of Chemical Information) the CHED Committee on Computers in Chemical Education (CCCE) is organizing an intercollegiate OnLine Chemistry Course (OLCC) in cheminformatics and chemical information sciences. This will be the 6th OLCC the CCCE has organized since 1996 and will be offered twice, in the Spring of 2015 and the Spring of 2016. OLCCs are actually hybrid courses involving collaborative teaching between expert online guest lecturers and local faculty facilitators (instructors of record— the class being part of their teaching assignment). Prior to offering the course, the faculty facilitators will have a chance to work with cheminformaticians and experts in chemical information sciences to develop customized instructional content, and then the experts will be available to interact directly with their students when the course is offered. We are looking for faculty facilitators who would like to offer this course at their home institutions. If you are interested in this project we ask you to contact the chair of the CCCE, Dr. Robert E. Belford (rebelford@ualr.edu), or Dr. David J. Wild (djwild@indiana.edu), the director of the Indiana University Cheminformatics Program. Further information is available at our development site, [http://olcc.ccce.us/](http://olcc.ccce.us/).

Briefly, our objectives are to:

- Use social web technologies to develop course content, where faculty facilitators interact with cheminformaticians to develop customized and repurposable instructional material.
- Use social and semantic web technologies to disseminate course content where multiple schools can offer content customized to the needs of their students/institution. Cheminformaticians will function as online guest lecturers and directly interact with students. This will be an intercollegiate experience.
- Archive course content in a discoverable fashion that lends to repurposing.
- Create content focused on essential cheminformatic and information science skills that are missing in the traditional chemistry curriculum, and would be an asset to graduates in today’s evolving STEM workplace.

We believe this is an appropriate topic for an OLCC because recent advances in Information and Communication Technologies are changing how our society represents, preserves and communicates information, and these advances in turn are impacting chemical education and the practice of science. Through this course educators will have a chance to interact with experts in cheminformatics and chemical information sciences, while their students will be exposed to the latest cheminformatic techniques and technologies, and learn skill sets that will be an asset when they graduate.

**Call for Nominations: The 2014 James Flack Norris Award for Outstanding Achievement in the Teaching of Chemistry**

Applications for the 2014 James Flack Norris Award for Outstanding Achievement in the Teaching of Chemistry Deadline are due April 15, 2014. Nominations are invited for the 2014 James Flack Norris Award, which consists of a certificate and an honorarium of $3,000 and is given annually by the Northeastern Section (NESACS). The presentation will take place at a ceremony and dinner in November 2014, and will include a formal address by the awardee. The Award was established in 1950 by NESACS to honor the memory of James Flack Norris (1871-1940), a professor of chemistry at Simmons College and M.I.T., chair of NESACS in 1904, and ACS President in 1925-26.

Nominees should have served with special distinction as teachers of chemistry at any level: secondary school, college, and/or graduate school. With the presentation of the first Award in 1951, awardees have included many eminent teachers at all levels whose efforts have had a wide-ranging effect on chemical education. The recipient will be selected from an international list of nominees who have served with special distinction as teachers of chemistry with significant achievements.

A nomination in the form of a letter should focus on the candidate's contributions to and effectiveness in teaching chemistry. The nominee's curriculum vitae should be included and, where appropriate, a list of honors, awards, and publications related to chemical education. Seconding letters may also be included; these should
show the impact of the nominee’s teaching for inspiring colleagues and students toward an active life in the chemical sciences, and attest to the influence of the nominee’s other activities in chemical education, such as textbooks, journal articles, or other professional activity at the local, national, and international level.

The nomination materials should consist of the primary nomination letter, supporting letters, and the candidate’s curriculum vitae. Reprints or other publications should NOT be included. The material should not exceed thirty (30) pages, and should be submitted electronically in Adobe PDF format through April 15, 2014 to Ms. Anna Singer, NESACS Administrative Secretary. For more information about the Award, see www.nesacs.org/awards_norris.html. Questions about the Award or the nomination process should be directed to the Norris Award Committee, Professor Doris Lewis.

**ChemSource Gems of Eastern Europe Study Tour: Cracow, Bratislava, Budapest**

September 28 – October 9, 2014

Once again, ChemSource will be offering a scientific study tour, this time to the magnificent Habsburg cities of Eastern Europe. Starting in Cracow, we will visit the Jagiellonian University where Copernicus was a student and which houses one of the most complete historic scientific instrument collections in the world. We will visit the brilliant pharmacy museum, housed in a 15th century “palazzo” and displaying full-scale reproductions of ancient apothecary shops and many other objects of scientific interest. We will also visit the Wieliczka Salt Mine, a world-class attraction listed as a UNESCO World Heritage Site. Our accommodations will be in the picturesque and historic “Old Town” not far from the Old Cathedral and Castle. Our stop in Bratislava will include a walking tour of the city, a visit to the Apponyi Palace Wine Museum, and a visit to the pharmacy museum. In Budapest, we will be welcomed by the Hungarian Chapter of the American Chemical Society and plan some interesting lectures on famous Hungarian scientists. The locked-in price for 2014, $1996.50, includes accommodations in 3 or 4 star hotels, all ground transportation except transfer to the Budapest airport, two meals per day, all admissions to program sites, city tours, and public transportation, plus airport transfer in Cracow. Transatlantic airfare is not included. This tour, ending in Budapest, lends itself to optional extensions such as Danube cruises and visits to other cities of interest in the vicinity such as Vienna and Prague. Please indicate your interest as soon as possible.

For more information email either chemsource.info@gmail.com or maryvirginiaorna@gmail.com.
Committee Reports

Biennial Conference Committee, Thomas J. Greenbowe [tgreenbo@iastate.edu], Chair

Purpose

The purpose of the Biennial Conference Committee (BCC) is to provide guidance, oversight, and financial accountability to the General Chairs and Program Chairs of upcoming Biennial Conferences on Chemical Education (BCCE); to review evaluations and financial reports of past BCCEs; to solicit, evaluate bids, conduct site visits, decide on the location of future BCCEs and the General Chair for future BCCEs; to closely evaluate BCCE contracts/Memorandum of Understanding (MoU); and to provide fiduciary responsibility for the Division of Chemical Education’s BCCE enterprise. At any point in time, the BCC is working with four BCCEs (immediate past BCCE, immediate up-coming BCCE, and two future BCCEs) representing a total financial footprint of $2.5 million. One goal of the BCC is to have three General Chairs and three BCCE sites identified six years in advance of the current BCCE. The BCC meets at every national ACS meeting and every BCCE. BCC meetings are open to all ACS members, members of the BCCE committee, and individuals invited to attend the meetings. Portions of a BCC meeting may be closed during an Executive session for discussing specific financial issues in contracts/MoUs or personnel actions.

The Biennial Conference Committee Biennial Conference Governance

The Biennial Conference Committee request to the Executive Committee of DivCHED to consider a change in the governance structure for Biennial Conferences Committee was presented to ExComm at the ACS National meeting in Indianapolis, September 2013. In essence the BCC is requesting ExComm to create a Board of Auctoris. As a result of this document, ExComm has appointed a Task Force to review the details of the proposal, to write an operations manual for the scope of Board, to write governance rules, and to write proposed changes to the DivCHED By-Laws to accommodate a new DivCHED Board and potentially a new member of ExComm.

Rotation of Committee Members

Dwaine Eubanks, Amina El-Ashmawy, Cheryl Frech have rotated off the BCC. The Members of the BCC thank Dwaine, Amina, and Cheryl for their service. Together they represent a wealth of knowledge about the BCCEs. They have provided guidance to three BCCEs. Their expertise will be missed. The BCC welcomes new members Seth Anthony (Oregon Institute of Technology), Mark Freilich (University of Memphis) and Marian DeWane (University of California – Irvine).

The 22nd BCCE at Penn State University, University Park, PA July 29 - August 2, 2012 www.2012bcce.com

The BCC commends Dan Sykes General Chair and Co-Program Chairs Kent Crippen (University of Florida) and MaryKay Orgill (University of Nevada) for producing an outstanding BCCE. Dan Sykes’ final report to the BCC was accepted.

The 23rd BCCE at Grand Valley State University, Grand Rapids, Michigan August 3 - August 7, 2014 www.bcce2014.org

Scheduled workshops abstracts are due February 28, 2014. Early registration opens March 3 and ends June 2, 2014. The GVSU BCCE website is fully functional, and answers to common questions and FAQs are available. The website is www.bcce2014.org. If one still has questions about how the organizers plan to “empower chemical educators for a greener tomorrow,” you can contact the Conference General Chair, Sherril Soman (somans@gvsu.edu) or the Program Chair, Julie Henderleiter (henderlj@gvsu.edu). Sherrill and Julie have been working with the BCC since August 2008. Members of the BCC has faith the 23rd BCCE will be successful.

Plan Ahead for 24th BCCE at the University of Northern Colorado in 2016

Conference General Chair Richard Schwenz (richard.schwenz@unco.edu) and Program Co-Chairs, Julie Smist (jsmist@spfldcol.edu) and Matt Miller (matt.miller@sdsstate.edu), are hard at work planning for the best use of the facilities at Greeley and are planning an interesting conference. The MOU to host the 22nd BCCE was signed by the Division of Chemical Education and by Richard Schwenz representing the University of Northern Colorado in March of 2012. Chemistry educators who plan to travel to Greeley, Colorado in 2016 should make special note
of the weather in July. Participants may need to reserve hotel rooms earlier than usual due to an increase in fracking in the area. It seems more people are fracking in Greeley than ever before. These frackers are overloading the available hotel rooms in Greeley. UNC’s BCCE web site is undergoing development and will be going public with their plans and release of due dates for workshops proposals, abstracts, exhibitors, etc. shortly after the conclusion of the BCCE at Grand Valley State.

Letters of intent and bids for 2018, 2020, 2022, and 2024 BCCEs

The BCC is encouraging any and all interested or half-interested teams or individuals to submit a letter of intent to host a BCCE in 2018, 2020, or 2022. The BCC has a package of information ready to be sent explaining what facilities are needed to host a BCCE and what experience is needed to serve as a BCCE General Chair or Program Chair. Anyone interested in hosting a BCCE should be in good physical and mental health. Any member of the BCC is available for discussion about the parameters of a BCCE. At the ACS National meeting in Dallas, the BCC is anticipating reviewing and evaluating letters of intent to host a future BCCE from chemical educators representing two Mid-west institutions, one institution in the Southeast, and one institution in the Pacific Northwest. At the Dallas meeting, the BCC will review a MOU/Bid from a well-known chemistry educator representing a well-known University to host the 2018 BCCE. The BCC would like to receive a letter of intent from chemical educators at an institution in the Atlantic Northeast to host the 2020 or 2022 or 2024 BCCE.

Issues facing future BCCEs

If you have suggestions for improving the BCCEs, please let the BCC know. The BCC will be discussing several issues of concern impacting future BCCEs. The BCC believes each future BCCE should be able to host 2,000 chemical educators. We need strong programming. The BCC believes more can be done to promote the BCCEs to high school chemistry teachers. BCCE program chairs have made strides in having appropriate programming at the BCCEs for high school chemistry teachers, but more needs to be done. With the economy currently stabilized, the BCC is concerned about the availability of travel funds for chemical educators to attend the BCCEs. The BCC will be discussing using technology to allow for remote viewing of some BCCE sessions. The BCC will be discussing ways to digitally store and then share presentations and content from each of the BCCEs. A new online abstraction submission system will be implemented at the 2014 BCCE. If it works well, it may be deployed with the 2016 BCCE.

Committee on Computers in Chemical Education, Robert E. Belford [rebelford@ualr.edu], Chair

The Committee on Computers in Chemical Education is a standing committee of the Division of Chemical Education, which according to the bylaws “seeks to encourage, publicize and support the development, implementation and assessment of computing technologies in chemical education”. The CCCE runs an annual Fall online newsletter, and as a service to the general chemical education community hosts the online ConfChem conferences, both of which can be accessed through our web site, http://www.ccce.divched.org.

The Spring 2014 ConfChem will be on the Flipped Classroom (organized by Jennifer Muzyka and Chris Lurker) and the Spring 2015 ConfChem on Interactive Visualizations for Chemistry Teaching and Learning (organized by Emily Moore). Additional information on these conferences are available in the ConfChem section of this newsletter.

The CCCE received an ACS Innovative Projects Grant to develop folksonomic indexing of the ConfChem/Newsletter archives. The objective of this is to bundle ConfChem papers and Newsletter articles around themes defined by social generated tags. We have created a Drupal 7 site in the Bluehost cloud to develop this technology and there are currently 331 papers dating back to 1984 posted at the development site http://confchem.ccce.us/. We are also attempting to find and digitize printed journals from 1978-2000, and would appreciate your contacting us if you have any issues which are not on the list at the development site.

In collaboration with ACS CINF the CCCE is organizing the first OLCC since 2004, and this will be on Cheminformatics. We plan to offer this intercollegiate course in the Spring of 2015 and 2016, and are looking for faculty who would be interested in offering this course at their home institutions. We have created a development site, http://www.olcc.ccce.us/ and further information can be found in the Cheminformatics OLCC section of this Newsletter.
The CCCE will hold an open meeting at the Biennial Conference on Chemical Education and we welcome your participation. Please contact Bob Belford if you are interested in any of these projects, would like to organize a ConfChem, submit an article to our Fall 2014 Newsletter or join the committee.

Upcoming CCCE Sponsored Symposium:

**247th ACS National Meeting, March 14-20, 2014 Dallas, Texas**

*Mobile Devices, Augmented Reality, and The Mobile Chemistry Classroom*
Organizers: Harry E. Pence & Antony J. Williams

**Abstract:** Web-enabled mobile devices such as smartphones and tablet computers are now in the hands of the majority of students in the classroom and already have shown inroads into the teaching and learning process. Since most students always carry their smartphones, these devices provide constant access to web pages, podcasts, videos, and other instructional materials during lectures. Mobile devices are also a powerful vehicle for both marked and markerless augmented reality applications. While such devices may be seen as a significant source of distraction some teacher are starting to maximize the utility of these powerful learning devices while dealing with the challenge of minimizing the opportunities for students’ minds to wander onto Facebook, other social networking sites and text/emailing. This symposium invites presentations that will review the present successes of the mobile-based classroom and discuss what the future may bring.

**2014 International Conference on Chemistry Education (ICCE), Toronto, Canada, July 13-18, 2014**

**Symposium**

*Online Resources for Chemical Education*
Organizers: Robert E. Belford & John H. Penn, rebelford@ualr.edu, John.Penn@mail.wvu.edu

**Abstract:** This symposium seeks presentations on resources that can be obtained over the Internet, and ways they can be utilized for the teaching and learning of chemistry. We are seeking presentations that address perspectives of development and implementation of web based technologies. Topics such as how the open access nature of the web, and how social networking and semantic web technologies are influencing chemical education are also encouraged. The objective of this symposium is to provide educators and developers opportunities to share resources and experiences. This symposium is sponsored by the ACS-CHED Committee on Computers in Chemical Education, http://www.ccce.divched.org/.

**Workshop**

*Using PhET Interactive Simulations to Support Chemistry Learning Workshop*
Organizers: Yuen-ying Carpenter, and Emily B. Moore, University of Colorado Boulder, contact Emily.Moore@Colorado.EDU for further information. Participants are encouraged to bring a laptop (preferred) or tablet to the workshop, if possible.

**Abstract:** The PhET Interactive Simulations project at the University of Colorado Boulder develops free online interactive simulations designed to promote student engagement, exploration, and inquiry (http://phet.colorado.edu/). The existing suite of over 30 chemistry simulations supports students from middle school to undergraduate levels in developing conceptual models of macroscopic and microscopic phenomena through inquiry. In this workshop, participants will explore several PhET simulations. We will introduce the research-based design of PhET simulations, and strategies for effective use for teaching and learning – highlighting specific teaching approaches that target common student difficulties and scaffold student understanding. Participants will then work in small groups to discuss how different uses of PhET simulations can address a variety of learning goals in the classroom, lecture, or laboratory. Additionally, we will provide guidance and feedback to participants for writing effective questions and activities around PhET simulation use that will allow them to integrate these unique tools into their learning environment.

*ChemCollective Virtual Laboratory Workshop*
David Yaron, Michael Karabinos & Robert E. Belford Carnegie Mellon University, yaron@cmu.edu, mk7@andrew.cmu.edu, rebelford@ualr.edu

**Abstract:** This “hands on” workshop will provide chemistry teachers an opportunity to gain experience with the ChemCollective Virtual Laboratory (http://www.chemcollective.org) and ways to use this free software in their classrooms and labs. This Java-based Virtual Laboratory allows students to design and carry out their own
experiments. Participants will learn how to incorporate any of the nearly 100 existing experiments into their class as either homework or pre/post lab activities. Training with the authoring capabilities will also be provided so that interested participants can develop activities for their own needs. An overview of results from research on learning in the virtual lab will be provided to aid instructors in using the lab in ways that are most effective for learning. Other materials freely available in the ChemCollective, including scenario-based learning activities and online tutorials, will also be covered in the workshop.

Navigating an Internet of Chemistry via ChemSpider and other Cheminformatics Services for Educators
Organizers: Antony J. Williams & Robert E. Belford, WilliamsA@rsc.org, rebelford@ualr.edu
Abstract: The internet has provided new global portals to chemical information and this hands-on workshop will introduce educators to the Royal Society of Chemistry’s numerous eScience projects including Chemspider, an online chemical information and curation service utilizing web 2.0 technologies and the Learn Chemistry website for educators and students. Participants will acquire accounts within ChemSpider, learn several compound search techniques to perform compound structure and substructure based searches, and search methods employing structural drawing packages. Participants will gain an understanding of the ChemSpider data curation services, how to upload and obtain spectral and other data over the internet, and how they can use these in their classrooms for teaching purposes. They will also learn how gaming can be wrapped around chemistry data for the purpose of teaching and data curation. Participants will also be introduced to an international intercollegiate OnLine Cheminformatics course that they can offer at their home institution in the Fall of 2015. This workshop is sponsored by the ACS DivCHED Committee on Computers in Chemical Education and further information can be obtained at http://www.ccce.divched.org/ICCE2014Workshops.


Symposium:

Flipped Classroom
Organizers: Chris Luker & Jennifer Muzyka, cluker@highlandschools.org, jennifer.muzyka@centre.edu
Abstract: The flipped classroom is a new hybrid model of teaching that allows active engagement between students and faculty members during class time, usually through the use of technological tools to present lecture material to students before the concepts are discussed in class. Recently there has been significant media attention on the flipped classroom, which is an innovative pedagogical method used by educators ranging from elementary school through colleges and universities. There are many different technological tools used to implement this pedagogical method. In particular, some educators pre-record lectures of themselves presenting material, others use screen casts to convey information to students before attending class in order to facilitate more peer-to-peer learning, and some teachers use a flipped classroom approach that does not involve videos. Ultimately, the shift in learning is focused on changing the classroom from passive to active. The focus of our symposium will be about how teachers use the face-to-face class time gained by changing from a completely lecture based classroom. This symposium is sponsored by the CHED Committee on Computers in Chemical Education.

Interactive technology in the classroom: Innovation, challenges, and best practices for student engagement and learning
Organizer: Julia Chamberlain & Ingrid Ulbrich, Julia.M.Chamberlain@Colorado.EDU
With the growing number of available interactive educational technology resources, chemistry educators are confronted with both new challenges and innovative opportunities when integrating these technologies into classroom practice. This symposium invites presentations on innovative in-class uses of interactive technologies by students, as well as implementation challenges and best practices for effective use. Interactive technologies can include student open-response tools; animations, simulations, and other interactive visualization tools; virtual open inquiry spaces; and others. Presentations can focus on the use of interactive technologies to foster a more student centered classroom, enhance student engagement and learning, or provide formative assessment to students and instructors. Research on technology use, discussion of implementation challenges in high school and university settings, and best practices for technology-specific facilitation are welcomed. This symposium is sponsored by the ACS CHED Committee on Computers in Chemical Education, http://www.ccce.divched.org/. Submissions should include a description of the interactive technology being discussed and how it is used by students.
**Web-Based Resources for Chemical Education**
Organizers: Robert E. Belford, John H. Penn & Jonathan H. Gutow, rebelford@ualr.edu, John.Penn@mail.wvu.edu, Gutow@uwosh.edu
Abstract: This symposium seeks presentations on resources that can be obtained over the Internet, and ways they can be utilized for the teaching and learning of chemistry. We are seeking presentations that address perspectives of development and implementation of web based technologies, and their applications to classroom, hybrid and online learning environments. Topics such as the application of mobile devices, and how social networking and semantic web technologies are influencing chemical education are also encouraged. The objective of this symposium is to provide educators and developers opportunities to share resources and experiences. This symposium is sponsored by the ACS CHED Committee on Computers in Chemical Education, http://www.ccce.divched.org/.

**Workshop:**

*PhET Interactive Simulations supporting materials: Develop inquiry-based learning activities*
Organizer: Julia Chamberlain, julia.m.chamberlain@colorado.edu.
Abstract: The PhET Interactive Simulations project (http://phet.colorado.edu) has developed over 30 chemistry simulations (sims), which support student learning through scientist-like exploration and experimentation. Sims make the invisible visible, incorporate multiple representations, and emphasize connections between real life phenomena and the underlying science. PhET sims are designed to be flexible tools, and can be used for classroom demonstrations, clicker questions, guided inquiry activities, laboratory exercises, and homework. In each context, the supporting materials (eg. an activity sheet) can target specific process and content learning goals using the sims. In this workshop, participants will use guidelines and existing activities to develop supporting materials and facilitation plans to couple with sims in their teaching. This workshop is appropriate for those new to PhET, as well as seasoned sim users looking to design and receive feedback on new supporting materials. This symposium is sponsored by the ACS CHED Committee on Computers in Chemical Education, http://www.ccce.divched.org/.

**High School Committee, Jeff Hepburn [jhepburn@q.com], Chair**

Much has happened this year with the High School Committee or in ACS in connection with the committee. Some of the topics that are of importance to our members include:

ACS has discussed the formation and approval of the National Association of Chemistry Teachers (NACT). ACS has provided ONE MILLION DOLLARS for three years of support. ACS will start on formation and logistics. This will follow along the lines of NABT or AAPT. This will be an important resource for our members. Our committee is also working to take a more active role in the programming for National High School Day. We are looking for chairs to serve a two meeting term. We are in need of a person to chair the 2016 meetings. Please work on finding someone to assume the role for 2016. The large majority of the expenses to attend will be covered. We are also looking for someone to chair the 2017 meetings.

We are also looking at what our committee needs to do to better serve our members. We discussed many topics and came up with topics to start for our members. The topics chosen were: Member Benefitts, Curricular Items such as POGIL, Lab and Classroom Safety, Chem Clubs, Grants and Classroom Programs, Regional and National Awards, National High School Days, and Utilizing Research to Practice in the classroom.

We hope you are planning on attending a chemical conference this year. They always provide great networking, tremendous workshops, and a great way to revitalize your teaching. You could attend one of the Regional ACS meetings this year or the Spring meeting in Dallas. A possible source of funding for a national meeting could be the DivCHED and their new Travel Awards which are awarded so winners can attend a national ACS meeting or a Biennial meeting.

The 2014 BCCE (Greener on the Grand) will be held at Grand Valley State University in Western Michigan, August 3 - 7 2014. The website www.bcce2014.org is already up and running and would provide an outstanding summer opportunity.

The High School Committee is always looking for suggestions so contact any of the members listed on the DivCHED website.
Committee Reports

International Activities Committee, Carmen Valdez Gauthier [cgaouthier@flsouthern.edu], Chair

The International Activities Committee would like to thank two longtime members for their invaluable service to the committee: Zafra Lerman and Mort Hoffman. We will miss Zafra and Morton’s expertise and their wise counsel in organizing international symposia. I would like to welcome Conrad Bergo as our new member.

The committee continues its effort to organize and co-sponsor symposia at national and International Conferences. Santiago Sandi-Urena (University of South Florida) and Sonali Raje (Towson University) have been organizing a series of symposia “Chemical Education: International and Multicultural Perspectives” at the spring ACS National Meetings. The goal of these symposia is to promote and to foster collaborations in chemical education research and practice among chemical educators from diverse cultural backgrounds. In line with the CHED-IAC and the ACS global initiatives, we believe that these symposia have made an impact on future international collaborations. Other symposia the committee is organizing in the upcoming ACS National meetings are: “Global Perspectives in Chemical Education: Research and Practice” (ACS National Meeting in San Francisco) organized by Drs. Gauthier and Kelly and “Uniting International Chemical Societies Through A Traveling Symposium.” (ACS National Meeting in Denver) organized by Dr. Kelly. Additionally, Drs. Sandi-Urena and Raje have also started organizing similar symposia at international conferences. We are also collaborating with the ACS-IAC committee in co-sponsorship of symposia.

The CHED-IAC completed the Travel Award evaluation for 2014. The recipient of this year’s travel grant is Sarah J. Hansen who is a graduate student in science education with an emphasis in chemistry education at Columbia University in New York. Ms. Hansen will attend the 2014 ICCE in Toronto. She will work on developing an international network to develop innovative learning communities in the Kindergarten through College arena. The committee will continue to work with YCC and 2-year community college groups in seeking their assistance in promoting the CHED-IAC Travel Award.

Upcoming events:

ACS National Spring Meeting, Dallas 2014
Chemistry Education: International and Multicultural Perspectives

The program for this symposium is already finalized with speakers originating from institutions in six countries (Canada, Costa Rica, Finland, Japan, Turkey, and the US) and the talks including experiences (undergraduate research and study abroad) in seven other countries (France, Germany, Malaysia, Saudi Arabia, Spain, Qatar and the UAE). The program also includes talks on aspects related to underrepresented minorities in chemistry education.

IUPAC International Conference on Chemical Education, ICCE 2014, Toronto, Canada, July 13-18, 2014
Chemistry Education: International and Multicultural Perspectives

Abstract submission is currently open and will close January 31, 2014. One aspect of particular interest is that members of the IAC-DivCHED have partnered with chemistry educators from four other countries to organize this event (Argentina, Costa Rica, Mexico, and Spain).

ACS National Fall Meeting, San Francisco, August, 2014
Global Perspectives in Chemical Education Research and Practice

Chemistry Education: International and Multicultural Perspectives

The proposal for this symposium is currently under consideration by the Organizing Committee and it was submitted under the topic area “Connecting Chemistry to Society”. For this proposal, the IAC-DivCHED established a collaboration to co-organize the event with chemistry educators from Korea and New Zealand.
**Committee Reports**

**FLAQ 2014, Lima Peru, October 13-17, 2014**

**International Symposium on Chemical Education Research**

This will be a one-day symposium sponsored in collaboration with the ACS-IAC, FLAQ and the GIDEEQ (Research Group for the Development of Strategies for the Teaching of Chemistry at the Pontifical Catholic University of Peru).

The CHED-IAC meeting will be held from **8:00–9:30 am on Sunday, March 16, 2014**, in the Hyatt Regency-Dallas, Kessler Room. The committee will discuss the 2013 International Travel Award, organization of a symposium at the next Latin American Congress of Chemistry to be held in Peru in 2014, and IAC participation in future national and international meetings. Finally, if you are interested in being part of this committee or you would like us to consider any new ideas, please let me know (cgauthier@flsouthern.edu).

Sincerely,

Carmen Valdez Gauthier

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**Passer Funds Award Committee, Sue Nurrenbern [nurrenbe@purdue.edu], Chair**

The Executive Committee of the Division of Chemical Education approved a motion that an individual must be a member of the Division of Education to be eligible for Passer Award Funds at their most recent meeting.

Membership in the Division of Chemical Education does not require full membership in the American Chemical Society. A Division of Chemical Education enrollment form is available at the website: http://www.divched.org/.

Check the ACS Division of Chemical Education website (http://www.divched.org/awards/dorothy-and-moses-passer-education-fund-0) for details pertaining to the opportunity provided by the Passer Endowment and encourage eligible colleagues to submit a request for professional development support from the Passer Endowment. Funds are still available and the next 2014 submission deadlines are April 1, 2014 and September 1, 2014. Submissions, preferably in pdf format, are to be sent via e-mail to scnurrenbern@gmail.com or nurrenbe@purdue.edu.

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**Regional Meetings Committee, Frank Creegan [fcreegan2@washcoll.edu], Chair**

2013 Awards for Excellence in High School Teaching: Volume 2

The Division of Chemical Education provides financial support to each Regional Meeting through an unrestricted grant of $500.00 to support development of Chemical Education programming at each meeting and a grant of $1,000.00 to be awarded to a high school teacher as an ACS Division of Chemical Education Regional Award for Excellence in High School Teaching. Eight awards were presented in 2013. Two winners were profiled in the Fall 2013 CHED Newsletter; six winners are profiled below.

The winner of the **2013 Division of Chemical Education Northeast Region Award for Excellence in High School Chemistry Teaching** is **Dr. Sharon M. Palmer** of Amherst Regional High School (ARHS), Amherst, Massachusetts.

Sharon teaches 11th grade chemistry (“College Prep” Chemistry”, Honors Chemistry (10th – 11th grade), and is Faculty Advisor for the Chemistry Club and SHArK Project Chemistry. She holds a Ph.D. in Chemistry from Northwestern University with postdoctoral work at the universities of Minnesota and Massachusetts. Before shifting gears and earning her Massachusetts teacher certification about 15 years later, she taught chemistry at Smith College, Williams College, and the University of Massachusetts.

Sharon is described as one of the rare individuals who can successfully bridge the gap between high school and college chemistry, feeling as comfortable working with research chemists as high school teachers and high school students at all levels. She recently joined the Executive Board of the ACS Connecticut Valley Section.

Sharon revived ARHS’s Chemistry Club, obtaining an ACS charter. Her research background made it possible for ARHS students to participate in the nation-wide “SHArK” (Solar Hydrogen Activity research Kit) project, in
which (mostly college) students experiment to find materials to effectively harvest solar energy. Understanding first-hand how exciting true “discovery” is, she ensures that ARHS students have this unusual opportunity to participate in genuine research - on their own campus. Continuing her unwavering involvement with science outreach activities (stemming from graduate school), she co-teaches online courses for teachers through UMass Continuing Education and hosts STEM Institute (UMass) chemistry activities for Girl and Boy Scouts, Scout leaders, and K-12 science teachers.

The winner of the 2013 Division of Chemical Education Great Lakes Region Award for Excellence in High School Chemistry Teaching is **Ann M. Comins** of James Madison Memorial High School, Madison, Wisconsin.

Ann received a Bachelor of Science degree in 1997 from the University of Wisconsin, Madison, with a double major in Chemistry and Mathematics. She has taught course in chemistry and mathematics for the past 16 years at James Madison Memorial High School. She received an MS in Science Education from UW Madison in 2002. She has been a multiple-year participant in the Research Experience for Teachers (RET) programs at UW, Madison. After having carried out research in computational chemistry and nanomaterials, she has integrated these topics into her coursework, and provided a cutting-edge relevance to the content in her courses.

The winner of the 2013 Division of Chemical Education Western Region Award for Excellence in High School Chemistry Teaching is **Michael A Morgan** of Francisco Bravo Medical Magnet High School in Los Angeles, California.

Michael received his B.A. degree at the University of California at Santa Cruz under the direction of Professor Frank C. Andrews. He has served twice as a fellow of the Institute for Chemical Education at the University of Wisconsin Madison working for Professor John W. Moore studying the use of videodiscs and computers in chemical education and the development of lecture demonstrations.

For many years Michael wrote a regular column entitled “Ideas From the Coast” for the now defunct journal “Connecting with Chemistry”. He is heavily involved in the local American Chemical Society section and their yearly “Update for Chemistry Teachers”. He is currently an elected member of the Southern California ACS section’s Executive Committee. He has served since 1992 as a member of the editorial board for the Journal of Chemical Education: Software. In 1997 Michael was invited to join the group headed by the late Glenn Seaborg to write the California State Science Academic Content Standards. Since 2003 he has been coaching academic competition teams for Bravo, which has led to multiple trophies in Science Bowl and in Popsicle Stick Bridge Building. He has coached 34 semifinalists in the academic Olympiads in Chemistry, Biology, Physics, and Math including one member of Physics Team USA.

The winner of the 2013 Division of Chemical Education Southeast Region Award for Excellence in High School Chemistry Teaching is **Brian Corbet, Ph.D.** of Southside High School in Greenville, South Carolina.

Brian holds a doctoral degree in Analytical Chemistry from the University of Rhode Island and has been a teacher at Southside High School (Greenville, SC) since 2008, serving as Science Chair since 2010. As the Honors, AP and IB Chemistry instructor at an urban magnet high school enrolling students from diverse racial, ethnic and socioeconomic backgrounds, Dr. Corbett has developed an outstanding chemistry curriculum - including a unique, year-long organic/analytical chemistry course offered annually that meets in the hour before school. To quote from a statement prepared by Southside students, “Dr. Corbett is an educator in the truest sense of the word. He goes above and beyond in providing us opportunities to learn. (His classroom) is a challenging one; he pushes us to constantly exceed our expectations, to do better, and to grow and mature as people. Many of us who would usually rather flee from Chemistry enjoy these class(es) because Dr. Corbett is so engaged in making sure we learn.”

Beyond his commitment in the classroom, Dr. Corbett provides regular after-school
help sessions for his students, serves on both the Faculty and School Improvement Councils, and leads teacher workshops on the use of computer simulations and technology. In order to bolster the lab experiences of his students, he has solicited and received equipment grants from NIH (via Furman University), the Western Carolinas Section of ACS, Hach, Vernier and Lockheed Martin over the last 3 years. Dr. Corbett is actively engaged in the National Science Teachers Association, STEM Education Coalition and South Carolina Junior Academy of Sciences, where several of his students have received statewide recognition for their research efforts. Under his direction, the Southside Academic Team recently placed first in South Carolina in the Chemistry Division in the annual Science Bowl event, and several of his students presented their research projects at the annual SERMACS Meeting in 2012. Reflecting his character, Dr. Corbett is invested in mentoring not only in his discipline of expertise but in all areas of student development, serving the Assistant Coach on the varsity Baseball team, Faculty Advisor to the Creative Writing Club, and Faculty Advisor for the Creativity, Action and Service (CAS) component of the Southside’s IB Diploma Program. As Principal Carlos Brooks sums up, “Dr. Corbett is the consummate team player... (he) represents what is good about education”

The winner of the 2013 Division of Chemical Education Midwest Region Award for Excellence in High School Teaching in honor of John E. Bauman, Jr. is Michael Amolins of Harrisburg High School in Harrisburg, South Dakota.

Michael, who teaches Chemistry, AP Chemistry, Physics, and an Advanced Topics/Research course at Harrisburg, where he also serves as an advisor for Student Council and The National Honor Society, earned degrees in Chemistry (ACS Certified), Mathematics, and Music from Augustana College (Sioux Falls, SD) in 2007. He completed summertime REU programs at Augustana College, Argonne National Laboratory, and Purdue University. He was awarded a Self Graduate Fellowship in the Department of Medicinal Chemistry at The University of Kansas, where he completed a Master of Science degree in 2009. He is currently pursuing an Ed.D. in Curriculum and Instruction with an emphasis in secondary science education at The University of South Dakota. Throughout his career, Michael has tried to promote K-12 science education by emphasizing student programming, advancement of curriculum, professional development, and continued active involvement in the research laboratory. He currently serves as a research associate in the laboratories of Dr. Jared Mays (Augustana College) and Dr. Pete Vitiello (Sanford Research), and as a director of educational research for the Sanford Science Educator Research Fellowship Program. Michael has spearheaded numerous science enrichment and mentorship programs for elementary, middle, and high school students, and has created curriculum for a number of new applied science and college preparatory courses within the Harrisburg School District. Above all, his emphasis has always been to explore and share his passion for science, and more importantly, his students.

The winner of the 2013 Division of Chemical Education Southwest Region Award for Excellence in High School Chemistry Teaching is Robyn Ford of Denton High School in Denton, Texas.

Robyn earned her BS in Chemistry and Mathematics from West Texas State University (now West Texas A&M University), a M.Ed. in Educational Administration and M.S. in Chemistry from University of North Texas (UNT), and is currently working on a Ph.D. in Chemistry from UNT. She is currently conducting research in forensic chemistry and chemistry education. Ms. Ford taught high school chemistry in Amarillo, TX and five Dallas-Ft. Worth area districts prior to her current position at Denton High School. She has taught Advanced Placement Chemistry since 1995. In 2012 she was the recipient of the R.B. Escue Chemistry Endowment Award for Outstanding Scholarship in Chemistry Education.
Younger Chemists’ Committee, Kim Linenberger [klinenb@iastate.edu], Chair

A lot has been going on in the newly created DivCHED YCC. At the Indianapolis ACS Meeting the DivCHED Executive Committee voted to create the Division’s YCC. The following members were appointed to the committee.

Committee Members
  Mary Beth Anzovino
  Thomas Bussey
  Justin Carmel
  Kelli Galloway
  Jordan Harshman
  Kim Linenberger (chair)
  Emily Moore
  Jessica Reed
  Stephanie Ryan

We have the mission to support graduate students, post docs, and young (1-5 yr) faculty engaged in pursuing chemistry education. In addition, the committee will outreach to undergraduates potentially interested in chemistry education-inclusive graduate programs. Based on this mission here are the following activities of the YCC.

The YCES Blog is still going strong! This site addresses specific questions from undergraduates, graduate students, post docs, and young faculty in CER. Each blog is written by a guest (person from the CER community) blogger. The current blog is written by Erik Epp, Chemistry Product Manager at WebAssign regarding “Chemical Education Research and Education Technology Industry.” Please visit http://www.divched.org/blogs/YCES to check out the latest content and post comments and questions to the author. If you are interested in becoming a guest blogger or have an idea for a post please contact Jessica Reed (jjreed@iastate.edu)

The spring National ACS meeting in Dallas is looking to be quite productive for the YCC. We will continue to foster networking as the DivCHED representatives at the Graduate Student and Postdoc Reception on Monday, March 17 at Dallas Convention Center. Please stop by for free drinks and food. Members of the YCC will also be discussing the possibilities of CER graduate programs with undergraduates at the Graduate School Recruiting Fair on Sunday, March 16 and also with those undergraduates presenting at the undergraduate poster session. The Chemistry Education Research: Graduate Student Research Forum Symposium will be held for the fifth year on Sunday, March 16. This symposium will be organized and presided by Kelli Galloway and Jessica Reed, both graduate students. Finally, the YCC committee meeting which is open to the YCC CER community will be held following the Graduate Student Research Forum at 5:00pm on Sunday, March 16 in Gaston A/B, Hyatt Regency Dallas.

If you are a CER graduate student and are interested in organizing and presiding over the Chemistry Education Research: Graduate Student Research Forum Symposium please contact any of the Task Force members. Also, if you are a graduate student, post doctoral researcher or young faculty member in CER and would like to become involved with the Task Force please contact me at (klinenbe@kennesaw.edu).
Reports & News

News from the Exams Institute, Thomas Holme [taholme@iastate.edu]

Given the nature of weather in the Midwest, it's hard to motivate to write for the “Spring Newsletter”, but it's important to highlight a number of the traditional activities that are ongoing within the Exams Institute. The next several months promise to be quite busy for test development, in particular.

First, and foremost, there are a number of new tests under development as is often true. Some of these are new versions of long standing tests and others are new tests for the Institute. In terms of revisions in process, each of our General Chemistry exams is being revised at this time with Laura Eisen as the Chair. The “flagship” full-year General Chemistry exam will be doing item editing for the trial exams at the ACS Meeting in Dallas. While the timing will be a little tight, the trial tests will be ready for use this spring, so if you are interested in participating in a trial test, here's what's entailed.

- Contact us at chmexams@iastate.edu
- We'll check on how many exams you'll need, and whether or not you want all tests of one form or if you prefer to use both forms.
- We'll check whether you need bubble sheets – generally folks use the sheets they commonly use on their home campus rather than ours, so they can be certain grading will be automated on their own campus. Nonetheless, we're more than happy to send our “custom” bubble sheets if you need them.
- Our office will send you photocopied versions of the exams you need (and bubble sheets if requested) along with general instructions. It’s important to remember that trial tests carry the same security as any ACS exam.
- You use the exams with students in your course and do whatever grading you need to do with them.
- When you are finished, you return the exams and the bubble sheets you used to us, and we process the data along with all the other trial testers.

We are also still trial testing the Second Term General Chemistry exam, so if you prefer to test only the second half of your full-year course, we can use your help as well. The First Term General Chemistry exam is just getting underway, under the leadership of Sharmistha Basu-Dutt of the University of West Georgia. It has it’s first meeting at the Dallas ACS meeting. Finally, the Conceptual General Chemistry exam is also underway. This committee, co-chaired by Jamie Schneider of the University of Wisconsin – River Falls and Tom Greenbowe of Iowa State University, is building a flexible use exam, much like the last conceptual exam. This means that they will be working to have trial tests of the second semester of this conceptual exam available for this coming spring as well. So, if you are teaching the second semester of general chemistry, we have three different versions of ACS Exams in trial testing formats for you to potentially use:

- ACS Full-year general chemistry exam: covers both semesters
- ACS Second-term general chemistry exam: covers only material from the second term with a traditional mixture of test items
- ACS Conceptual general chemistry exam (with content of the second semester) where the items more explicitly test conceptual understanding.
- With all this going on, we would be delighted to hear from you to volunteer as a trial test site.

Beyond general chemistry, we have two new exam committees getting started for High School chemistry as well, both meeting for the first time at the ACS meeting in Dallas. The traditional ACS High School Chemistry exam committee is the first group, chaired by Lauri McDonald of Highland Park High School in Dallas. High school teachers who may be interested in serving on this committee should contact us, as there may still be room for volunteers on the test development committee when this newsletter is published. The second committee is a new exam; the High School Conceptual Chemistry Exam. Laura Slocum from Heathwood Hall Episcopal School is serving as chair of this committee. There is a heritage of high school exams that focus on conceptual understanding associated with the Chemistry in the Community textbook that has been published for many years by the ACS. Another interesting exam to mention is another new exam, this time being built for the sophomore level Inorganic Chemistry. Barbara Reisner of James Madison University is serving as chair of this committee (and she is also chairing the traditional senior-level Inorganic exam committee as well.) We are keenly interested in finding trial testers for this new sophomore level exam because it’s the first time we’ve tried to build a nationally normed test for this course. Finally, we’ll also note that we are working with folks from the Division of Polymer Chemistry to build a new Polymer Chemistry exam. We would be especially happy to hear from folks interested in working with us on this exam, both in terms of contributing to test development and in terms of helping with trial testing of the exam.

We do have a number of other projects going on as well, but we’ll leave a discussion of those to the next newsletter. As always, we try to respond to the needs of the chemistry education community whenever possible. If you have ideas for new tests or products that you think the Institute should consider working on, drop me a note. My email is taholme@iastate.edu and I would love to hear from you. We aren't always able to develop new assessment tools, but we can always look into the possibility.
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**GENERAL CHEMISTRY (CONCEPTUAL)**

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**GENERAL CHEMISTRY (BRIEF Exam for Full-year Course)**

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<tr>
<td>GC06B</td>
<td>General Chemistry–2006 (brief)</td>
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**GENERAL CHEMISTRY (SECOND TERM)**

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**GENERAL CHEMISTRY – PAIRED QUESTIONS**

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**GENERAL CHEMISTRY (ACS TEXTS)**

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**GENERAL–ORGANIC–BIOCHEMISTRY**

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<td>(anticipated release in October 2014)</td>
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**END OF UNDERGRADUATE**

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**INORGANIC CHEMISTRY**

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**PHYSICAL CHEMISTRY**

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**UNDERGRADUATE PLACEMENT**

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**GRADUATE PLACEMENT**

(For graduate placement, use the corresponding end-of-year undergraduate test in analytical, biochemistry, inorganic, instrumental methods, organic, or physical chemistry.)

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**HIGH SCHOOL CHEMISTRY**

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**LABORATORY ASSESSMENT MATERIALS**

Lab assessment exam for General Chemistry is available on a case-by-case basis during the Spring 2014 semester.
News from the Board of Publication, Chris Bauer, Chair [chris.bauer@unh.edu]

It’s time to think ahead.

Your journal -- the Journal of Chemical Education -- has undergone several important transitions in the last half-dozen years. It has moved from the steady editorial leadership of John Moore to the steady leadership of Norb Pienta. It has moved from paper-based submission, review, and delivery to electronic digital format. It has moved from being strictly a publication of the Division to a joint publication of the Division and the American Chemical Society. All of these transitions have been critical for the health of the Journal. We can legitimately say that we have reached the light at the end of the tunnel. To confirm this, at the Indianapolis ACS meeting, the Board re-appointed Norb Pienta to a second five-year term starting fall 2014 as Editor-in-Chief.

Now that we are in the light, we should be asking “Where do we go from here?” The Journal is a product of the American Chemical Society, but there is a big developing world outside the U.S. which JCE has barely touched. Also, the Journal has various stakeholders – the pre-college chemistry teacher, the university instructor, the educational researcher, to name a few – who have different needs and interests. How may the Journal serve them best in the future? The publishing world also continues to change rapidly. Where will it be ten years from now? It is an appropriate time, therefore, for the Board and Editorial Office to engage in thinking ahead. We are starting to plan for that now.

The Board itself has a few changes. We welcome Pratibha Varma-Nelson to the Board, after serving a brief interim appointment at Indianapolis, and the Division approved a By-law change to allow for a sixth appointed member. This simplifies the appointment process: two people are appointed each year for three year terms. That process will also play out at Dallas.

Remember that Division members are welcome as guests at Board meetings, which generally run 8 to noon Saturday mornings before each ACS meeting. If the door is closed, we’re in private executive session. Otherwise, welcome!

Respectfully submitted,

Chris Bauer

Board of Publication Chair

DivCHED Publications

Division Members are involved in a wide variety of activities that lead to publications in the area of chemical education.

The Journal of Chemical Education is the main publication outlet for the division.

DivCHED is also responsible for the publication of the ACS Exams via the Examinations Institute.

Other journals in which Members publish scholarly articles include:

• The Chemical Educator
• Education in Chemistry
• Science Education
• Journal of Research in Science Teaching
• International Journal of Science Education
• Journal of College Science Teaching
• The Science Teacher
• ChemMatters
• Chemistry Education Research and Practice
**Science Education workshop at Malta-VI**

Morton Z. Hoffman (Boston University) [hoffman@bu.edu](mailto:hoffman@bu.edu)

A three-session workshop on *Science Education at All Levels* was one of the events at the sixth biennial “Malta Conference” (Malta-VI) on *Frontiers of Science: Research and Education in the Middle East*, which was held November 10-15, 2013, at the Hilton Hotel on the island of Malta.

These conferences, which are organized by the Malta Conferences Foundation (MCF), a 501(c)(3) charitable organization, are dedicated to the use of science diplomacy as a bridge toward peace in the Middle East. They feature plenary lectures by Nobel Laureates, workshops on topics of importance to scientists and educators from the region, oral and poster presentations by participants from the Middle East, and ample time for everyone to engage in personal and professional networking. Previous conferences were held in Malta in 2003 and 2005, in Istanbul in 2007, in Amman, Jordan, in 2009, and in Paris in 2011 at UNESCO headquarters as part of the celebration of the International Year of Chemistry.

The effects of global climate change, insufficient potable water and food, chemical warfare, and the proliferation of nuclear technology are among the many problems that plague the Middle East. In order for civil societies to be built, these problems must be addressed, but can only be solved by cross-border collaboration and cooperation amid an explosive political environment. For there to be scientists in the future who are capable of solving these problems, science education at all levels must be further developed. Because the demography of the Middle Eastern countries makes education a pressing challenge for the entire region, multinational working groups have been formed within the Malta Conferences to devise more effective science curricula, different methods of teaching, learning, and assessing students, and low-cost laboratory materials for all levels of education. These, and other important topics such as chemical safety and security, and the education of women, are integral parts of the workshops on education.

The science education workshop at Malta-VI, which was organized by Howard Alper (Canada), Rachel Mamlok-Naaman (Israel), and Boshra Mossaad Awad (Egypt), featured the following speakers:

- Dincer Ülkü (Hacettepe University, Turkey), *The Ethics of Scientific Research*
- Saad Hassan (Ain Shams University, Egypt), *The Ugly Face of Chemistry in the Middle East*
- Yoousry Elgamal (Egypt Japan University of Science and Technology, Egypt), *Project-based Learning Approach*
- Rachel Mamlok-Naaman (Weizmann Institute of Science, Israel), *The Characteristics of Inquiry Experiments in Which Argumentative Discussions Were Developed*
- Samira Ibrahim Islam (King Fahd Medical Research Center, Saudi Arabia), *Peaceful Diplomacy: The True Spring for Saudi Women*
- Ameen Fahmy (Ain Shams University, Egypt), *Systemic Assessment as a New Tool for Assessing Student Learning in Chemistry*
- Iyad Dkeidek (Al-Quds University, Palestinian Authority), *Effects of Culture on Students’ Perceptions of the Laboratory Learning Environment*
- Muhamad Hugerat (The Academic Arab College for Education, Israel), *Developments and Emphases in Science Teaching in the Israeli Educational System*
Boshra Mossaad Awad (Ain Shams University, Egypt), *Enhancement of Teaching and Learning Chemistry Through e-Learning*

Vigorous discussions of the interesting and provocative talks resulted in very stimulating workshop sessions. The plans for future action include the continuation of existing collaborations in science education and the development of new ones, the dissemination of the information from the workshop, especially the report on the involvement of women in science in Saudi Arabia, and the preparation of a detailed article to an on-line science and education periodical.

Other workshops at Malta-VI were on *Chemistry and Bio-Medicinal Chemistry; Analytical, Nanotechnology, and Material Science; Energy, Environment, Air and Water Quality; Chemistry Safety and Security.*

Plenary lectures were given by Nobelists Yuan T. Lee (Taiwan), Ada Yonath (Israel), Danny Shechtman (Israel), Claude Cohen-Tannoudji (France), and Roald Hoffmann (U.S.). Plenary presentations were also made by Yvonne Pope (Chemical Abstracts Services, U.K.), Monique Beaudoin (U.S. Office of Naval Research Global, London), and Mustafa Al-Ammar (Earth Ambassador for the Protection of the Planet and Preservation of Peace), who performed songs and ballads from Iraq.

Representatives from 15 Middle Eastern countries (Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Palestinian Authority, Qatar, Saudi Arabia, Syria, Turkey, and the United Arab Emirates) attended Malta-VI, which attracted a total of approximately 80 invited participants, including students and early-career scientists. Greetings were offered at the opening ceremony by Zafra Lerman (President, MCF), George Abela (President, The Republic of Malta), Gina Abercrombie-Winstanley (U.S. Ambassador to Malta), Rob Luke (British High Commissioner to Malta), Henry Frendo (President, Malta National Commission for UNESCO), who read a message from Irina Bokova, the Director General of UNESCO, and Marinda Wu (ACS President). The opening address on “Science for Peace” by HRH Princess Sumaya Bint El Hassan (President, Royal Scientific Society of Jordan), who was unable to attend because of illness, was read by a member of the Jordanian delegation. Evening receptions were held during the week at the residences of Ambassador Abercrombie-Winstanley and High Commissioner Luke.

In addition to Zafra Lerman, other members of the Board of Directors of the MCF were present: Iona Black (Secretary, U.S.), Morton Hoffman (Treasurer, U.S.), Cathy Costello (U.S.), Chuck Kolb (U.S.), Howard Alper (Canada), Leiv Sydnes (Norway), and Stanley Langer (U.K.). More information about the MCF and the Malta Conferences can be found at <http://maltaconferencesfoundation.org/>.

Nomination Form for CHED Committees & Elected Positions

Below are listed the various committees or elected positions of the CHED Division. If you are interested in serving, or if you know of division members who are willing to become involved please fill out this form. For more information, please visit the Division of Chemical Education website at <www.acs.org> or contact the individuals listed below.

Committees
Biennial Conference Committee (BCC)  
Chemistry Education Research Committee (CER)  
Chemistry in the Two Year College (COCTYC)  
Computers in Chemical Education (CCCE)  
Finance (FC)  
High School Chemistry (HSCC)  
International Activities (CIA)  
Long-Range Planning (LRPC)  
New Member  
Passer Portfolio  
Personnel & Nominations (CPN)  
Program (PC)  
Recognition  
Regional Meetings  
Web Committee

Elected Positions (3 year terms)
Chair-Elect (Chair, Immediate Past Chair)  
Secretary/Councilor  
Treasurer  
Member-at-Large (3 positions)  
Alternate Councilor (4 positions)

Boards
Board of Publications (J. Chem. Ed.)  
Board of Trustees (Exams Institute)

Name__________________________________________________________

Institution____________________________________________________________________________________

E-Mail_______________________________________________________________________________________

Committee or Position________________________________________________________________________

Name__________________________________________________________

Institution____________________________________________________________________________________

E-Mail_______________________________________________________________________________________

Committee or Position________________________________________________________________________

Cinzia Muzzi  
2013 Chair, Personnel & Nominations  
De Anza College  
Department of Chemistry  
21250 Stevens Creek Blvd.  
Cupertino, CA 95014  
Tel: 408-864-5790; Fax: 408-864-5468

Donald J. Wink  
2014 Chair, Division of Chemical Education  
University of Illinois at Chicago  
Department of Chemistry  
845 West Taylor Street  
Chicago, IL 60607  
Tel: 312-413-7383; Fax: 312-996-0431
**Division of Chemical Education Teaching Excellence Endowment**

Why are you a chemist? Many of us would agree with Eli Pearce, Past President of the American Chemical Society (ACS), when he said “my excellent high school teacher was definitely responsible for my choosing chemistry as a career.” And now you can join the effort to ensure that the great teachers who launch so many scientific careers are recognized and rewarded by their professional society!

The ACS Division of Chemical Education has stepped forward to establish an endowment that will support awards for high school science teachers in every Region of the ACS. By establishing an effort to solicit funds for the Division of Chemical Education Teaching Excellence Endowment, the Division is making a firm financial commitment to high school science teaching, ACS Regions, and the profession of chemistry. But the project will not be successful without your help.

Our goal is not just a financial one; we are anxious to assemble a lengthy list of donors containing names, of both individuals and collective entities, that will demonstrate to the secondary education community that there is a large number of science professionals who appreciate the value of good science teaching in the Nation’s high schools and who are willing to reward it.

Join other individuals and organizations that have already contributed to the. Most of all join what will be thousands of people who know, without that special teacher, their future would look very different.
Division of Chemical Education Teaching Excellence Endowment!

I want to help ensure that our great teachers are recognized and rewarded!

I am donating $________________ to the Endowment.

Select category:

- Lead up to $99
- Tin $100-249
- Iron $250-499
- Nickel $500-999
- Copper $1000-2499
- Silver $2500-4999
- Gold $5000-9999
- Platinum $10000 or more

NAME(S) to appear on donor's list: ___________________________________________________________

(PLEASE PRINT)

Address ___________________________________________________________________________________

__________________________________________________________________________________

(city) (state) (zip)

Name____________________________________ Email_______________________________

Date ___________________________________

____ My gift is given in honor of ________________________________

____ My gift is given in memory of ________________________________

Select method of payment:

__ Check:
Payable to: The American Chemical Society Division of Chemical Education Teaching Excellence Endowment

__ Credit card (select one):

___ Visa  ___ MasterCard  ___ American Express

Card number ___________________________________________ Expiration date ______________

Cardholder name __________________________________________

Signature ___________________________________________________________________________

__ Stock transfer (call 800-227-5558 ext. 8092 for instructions)

Mail to: The Department of Meetings and Expositions Services/CHED HS Fund
American Chemical Society
1155 16th Street NW
Washington, DC  20036

Thank you for your contribution. All gifts of $250 or more will be acknowledged in writing. Acknowledgment will be sent to others upon request.
Membership Form

Introduce a friend, colleague, or student to the Division of Chemical Education!

I wish to join DivCHED: _____ as a Member, $20/year (for ACS members only)
_____ as an Affiliate, $20/year (for non-ACS members).

Affiliates have all membership privileges except voting for
CHED Councilors and holding elective office.

New members will receive information about CHED in general and about its major activities such as the
Exams Institute, the Journal of Chemical Education/JCE Software/JCE Online, and 2YC₃.

General Information

Your Name: _____________________________________________

Home Address: ❑ Send mailings here

_____________________________________________________________
_____________________________________________________________
_____________________________________________________________
_____________________________________________________________

Work Address: ❑ Send mailings here

_____________________________________________________________
_____________________________________________________________
_____________________________________________________________
_____________________________________________________________

email: _____________________________ email: _____________________________

❑ Send me an ACS Membership Application Form—this form is also available online:
  https://center.acs.org/applications/acsmembership/join.cfm

Did anyone encourage you to become a DivCHED member? ❑ Yes ❑ No
If yes, who? _______________________________

Payment Information

Payment ($20) must be made in U.S. funds on a U.S. bank—by draft or credit card. Purchase orders not
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