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Greetings from the 2017 Conference Organizers

2017 C3 Conference Comes to Toronto

The 44th College Chemistry Canada conference will be held at the University of Toronto from 26th – 28th May inclusive. This is the first time the annual conference has been held in Ontario since 2009, and is timed to run directly before the 100th CSC Conference (28th May – 1st June, csc2017.ca). All academic events will take place on the St. George campus. Accommodation in University of Toronto residences (Victoria College) will be available to give a lower cost housing option.

The overarching theme of the conference is “*Beyond Diversity: Inclusiveness in Chemistry Education*”. Presentations are invited from everyone in the teaching community. The following are some ideas for topics:

- active teaching strategies in the classroom and laboratory
- providing supportive learning environments
- public outreach initiatives
- enterprises bringing disparate groups together (e.g. connecting high school teachers with college instructors)

With the conference theme in mind, two confirmed plenary speakers are *Dr. Deborah Herrington* and *Dr. Cary Supalo*.

Dr. Herrington is a Professor of Chemistry and Associate Chair at Grand Valley State University in Michigan.

She obtained her Ph.D. in chemistry, with a focus on chemistry education, from Purdue University and her M.Sc. in organic chemistry from the University of Waterloo. *Dr. Herrington* teaches general and organic chemistry as well as science methods courses for pre-service teachers. She is also the co-developer and the current GVSU director of the National Science Foundation funded Target Inquiry professional development program for middle and high school science teachers. Her research interests include transforming science education at the middle and high school levels, incorporating active learning in large lecture sections, the use of particulate representations, and understanding how students use of simulations and screencasts in online learning environments.

Dr. Supalo currently works at the Education Testing Service in Princeton, New Jersey. He lost his eyesight in 1982 at seven years old, and after starting as a business administration major, he earned two Bachelor's degrees from Purdue University in chemistry and communications. As a trained scientist, *Dr. Supalo* then obtained a Ph.D. in Chemistry at Penn State University, whilst adding majors in liberal arts, computer science, and engineering. (continued on page 2.....)

C3 2016 IN SASKATOON

The 2016 C3 Conference was held in sunny Saskatoon, SK. The conference kicked off with a fabulous tour of the Potash Mine (see page 3 for full article). Another tour of the Canadian Light Source was also fun and informational with many pictures taken below the “Brightest Light in Canadian Science” (at right). The conference presentations showcased the brightest lights in chemistry education. (continued on page 2...)



NEWSLETTER

2016 CONFERENCE (CONTINUED...)

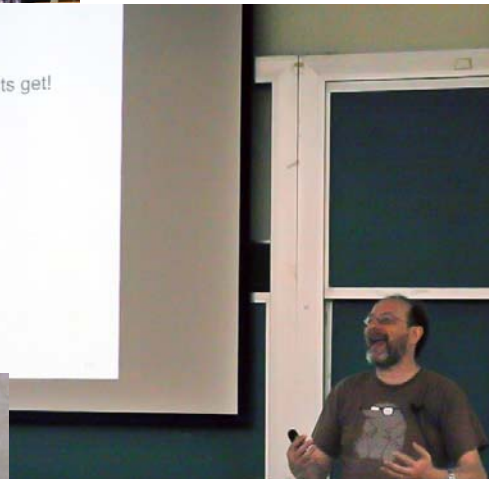


The conference was held on the campus of Saskatchewan Polytechnic.

With talks ranging from apt analogies to chemistry comic characters, there was something for everyone. At the banquet at the Bessborough, awards were presented to Sask Poly students Lauren Iverson and Amanda Barbosa (picture below at left). The teaching excellence award was presented to Kathy Darvesh (below at right).

Observations:

- WYSINWYSG
 - What YOU see is **NOT** what your students get!
- Visuals are Vital
- Analogies must be Apt
- History Helps



C3 CONFERENCE COMES TO TORONTO (CONTINUED...)

He is the founder and president of Independent Science, a company that develops multi-sensory tools for blind and low vision STEM students. Dr. Supalo's methods can also be adopted by non-visually impaired chemistry students to improve learning process engagement.

In addition to the academic program, there will be social activities such as the opening reception, tours, the conference banquet and the much anticipated fun run, which will take in the beautiful U of T scenery.

Registration for the conference will open a few months before the conference (collegechemistry.ca/conferences/17conf/conf2017.html), with abstract submission beginning shortly afterwards.

There is additionally a rich variety of chemistry education programming at the 100th CSC Conference & Exhibition. Symposia titles and descriptions are available at: csc2017.ca/chemical-education. We are looking forward to seeing you in Toronto in May!

Andrew Dicks
Kristine Quinlan
David Stone

44th College Chemistry Canada Conference
Organizing Committee

C3 goes Deep Again - Jimmy Lowe, BCIT

Following the 2015 Conference Theme of “Deep Learning in Chemistry” the 2016 conference in Saskatoon began with a visit to the Potash Corp Allan mine. Here is an excerpt from their literature. “Nearly 400 million years ago a vast sea covered most of Saskatchewan. The salt water eventually evaporated leaving a bed of mineral salts known as the Prairie Evaporate Formation. The province of Saskatchewan alone accounts for almost half of the world potash reserves.”



Not Breaking Bad! (left)

The C3 crew is outfitted and ready to head to the service shaft elevator. Next stop – over 1 km deep below the Prairies. Not suitable for the claustrophobic or nyctophobic.

Joyrides down below (right) We are heading to the bore site in electric vehicles, our tour guides drove us (for safety). The average temperature in the mine is 27°C. Air is continuously pumped into the mine shafts as the employees work 10-12 hour shifts – everything is down here including wifi (C3 discussed opening a pop-up Starbucks for fundraising).



Potash Small amounts of iron oxide give the potash a pink-reddish colour. The potash at this mine is composed of 55% NaCl, 40% KCl & 5% clay/insolubles. Everyone received samples of the potash and purified KCl. For those of us flying we got through airport security without the full search (hmmm, Bruno did let me go first)!



Production Shaft (left) Potash is hoisted to the surface in skips.

The Mill (right) Solution mining involves mixing heated brine to extract the potash. Processing reagents are then added to the potash/brine mixture. The reagents enable potash to be attached to fine air bubbles that are introduced. The potash particles rise to the surface for collection.



C3 GOES DEEP AGAIN (CONTINUED...)



Storage of the purified KCl (left)

After a tour of the mine and mill, our C3 delegation was treated to a fantastic lunch. On a dare (?), Bruno confirms the potash is too salty to add to our tasty meal. (picture at right)

If you are really disappointed you missed the mine tour in person, you can tour the mine online at www.potashcorp.com/minetour.



LATEST IN LITERATURE BY SUDHIR B. ABHYANKAR, GRENFELL CAMPUS, MEMORIAL

In a column titled “In Defense of the Lecture Revisited”, *Journal of College Science Teaching*, **2016**, 46(2), 8, Shawn Stover discusses the advantages and disadvantages of the lecture, still commonly used method of instruction in colleges and universities. The original point of view was published in the same journal in 2007.

Detailed analysis of the ways in which students reason about structure and reactivity of acids and bases can be found in an article titled “Investigating Students’ Reasoning about Acid-Base reactions” by Cooper et. al. in the October 2016 issue of the *Journal of Chemical Education*, **2016**, 93(10), 1703.

Fernando Gomollon-Bel reveals the secrets of various pigments, hormones, and enzymes responsible for spectacular color changes in tree leaves during autumn in an article titled “The Chemistry of Autumn” which appeared in *Chemistry World*, October 28, 2016, published by the Royal Society of Chemistry.

Australian Journal of Education in Chemistry, **2016**, 75, describes “Regioselective Formation of Enolates: A way to understanding kinetic versus Thermodynamic control” by H. Salimi and co-authors. Kinetic versus thermodynamic products formation and their stability has always been one of those concepts student often find difficult.

William Langley describes an effective approach that he has used for over twenty years to foster research by first and second year students in an article titled “Undergraduate Research at a Two Year College: A Team Approach” published in the *Journal of College Science Teaching*, **2015**, 45(2).

In an article titled “Rethinking Undergraduate Physical

Chemistry Curricula”, *Journal of Chemical Education*, **2016**, 93(9), 1536-1542, Stephen Miller outlines the rationale behind revamping physical chemistry curriculum stating that the students are better equipped to deal with physical chemistry-related problems than their peers from previous years.

Van Duzor describes use of a lab notebook and report writing to learn a method emphasizing student self-explanations of procedures and outcomes, specifically the Decision/Explanation/Observation/Inference (DEOI) method in the article “Using Self-Explanations in the Laboratory to Connect Theory and Practice: The Decision/Explanation/Observation/Inference Writing Method” *Journal of Chemical Education*, **2016**, 93(10), 1725-1730.

Australian Journal of Education in Chemistry, **2014**, 74, describes “A Tactile Limiting Reagent Exercise: Toys in the classroom” by Tenaya Newkirk. The activities enhance students’ understanding of the idea of limiting reagents and makes learning much more enjoyable and beneficial to students.

In an article titled “A Game-Based Approach To Learning the Idea of Chemical Elements and Their Periodic Classification” *Journal of Chemical Education*, **2016**, 93(7), 1173-1190, Franco-Mariscal and co-authors offer detailed analysis of use of educational games to teach chemical elements and their periodic classification to high school students in Spain. The authors claim their study has identified a new type of educational resource, namely Task Involving Play (TIP), that can be defined as intermediate between play and game scenarios.

Presidential Message: Presidential Politics - Bruno Cinel



Well, what a year 2016 was! I must admit, when I sat down to write my “President’s Message”, current events south of the border were still quite present in my mind. To somehow make sense or gain some sort of closure from, arguably, one of the most *interesting* Presidential elections in recent history, my mind settled on an often-stated, reassuring expression: “May you live in interesting times...” And as many of our students do, I then took to Wikipedia to find the internet’s explanation of that expression.

"May you live in interesting times" is an English expression purported to be a translation of a traditional Chinese curse. While seemingly a blessing, the expression is always used ironically, with the clear implication that 'uninteresting times', of peace and tranquillity, are more life-enhancing than interesting ones, which from historical perspective usually include disorder and conflict.

Despite being so common in English as to be known as "the Chinese curse", the saying is apocryphal, and no actual Chinese source has ever been produced.

[https://en.wikipedia.org/wiki/](https://en.wikipedia.org/wiki/May_you_live_in_interesting_times)

[May you live in interesting times](https://en.wikipedia.org/wiki/May_you_live_in_interesting_times)

After reading this, I somewhat bemusingly noted *again* how chemistry truly is all around us. Not, sadly, in the word “ironic” or in the entropic “disorder” mentioned, but in noting that the US President largely prevailed over his opponent by convincing voters in the “Rust Belt” (the term that came to reflect the economic decline and decay experienced by manufacturing, coal, and steel workers in this region of America towards the later part of the last century). Had I been teaching our first year general chemistry course at the time, I would have enjoyed the challenge of linking the election with iron, rust, oxidation reactions, oxidation of coal, fossil fuels, greenhouse gases, climate change... (Heck, there’s even a link to China in that story if anyone follows Twitter!) In fact, it was truly “ironic” that at a time when scientists were proposing formal recognition of the geological Anthropocene epoch, climate change was never a prominent election issue and never formally addressed in any Presidential debate.

I guess, in a way, we’re quite fortunate as Chemistry educators. It is never hard to find the Chemistry links to everyday life and everyday events that are occurring around us. It is fascinating to think of the artificial orange colouring disappearing from Kraft Macaroni and Cheese... around the same time it began to disappear from a presidential candidate’s hair. Not surprisingly, these asides or detours off of the “formal content listed

in the course outline” are often those most remembered by our students; and really should be a prominent part of engaging, real-world chemistry curriculum. Of course, it goes without saying that at that time of year, our detour into the chemistry of the Rust Belt and Coal Country could naturally end with the spectre of a jolly old man... dressed in red... delivering coal to those caught cheating on final exams!

What was a prominent theme in the election, some would argue, was the idea of inclusion and diversity. On the surface, a bit of a warm and fuzzy notion that is comforting as we watched our mercury dip shiveringly low across the nation... (it’s getting so hard to find a mercury thermometer anymore, I wonder if our students appreciate the chemistry behind that last statement, but I digress...)

With inclusion and diversity featuring prominently as backdrops on the world stage, it is most fitting, then, to highlight our upcoming 2017 C3 Annual conference theme: “Beyond Diversity: Inclusiveness in Chemistry Education” (see special feature on our conference in this newsletter!). As always, our incredible conference organizers are hard at work planning a fantastic event, happening just prior to the larger 100th annual CSC conference, also held in Toronto this spring. Plan your conference travels now, and don’t miss out on all things Chemistry this coming summer!

Which brings me back to our wonderful C3 membership and ultimately, Presidential politics again. All the C3 attendees felt very fortunate to attend the wonderful 43rd annual conference hosted this past June by Saskatchewan Polytechnic. A heartfelt and warm thank you to the organizers for the tireless efforts and job well done! At the conference AGM, we elected for the first time, in a long time, a full Board of Directors including Regional Directors from every one of our six designated regions nationwide (BC/Yukon, Prairies, Ontario, Quebec, Atlantic). It makes a President’s job so much easier having a wonderful “cabinet” of skilled and dedicated individuals helping out... so thank you all! By tradition, the C3 President is also term-limited (2 years instead of 2 terms ☺). But a, dare I say “huge”, difference is C3 is very fortunate to have the unanimous acclamation of an exceptional President-Elect lined up to continue the important work.

For now, all that remains is for me to wish you a great new year on behalf of the entire C3 Board. Our best wishes for health and happiness... and may you continue to be inspired... and be inspiring... Cheers, Bruno