

# Washington College Chemistry Teachers Association

## 2017 Conference Program

THURSDAY, OCTOBER 5, 2017	
3:00 – 10:00 pm	<b>Check-in</b>
4:30 – 10:00 pm	<b>Conference Registration</b> (Woodpecker)
6:00 – 7:30 PM	<b>DINNER</b> (KINGFISHER DINING LODGE)
8:00 – 10:00 pm	<b>Informal socializing</b> (Grotto Bar, hot tub, library, etc.) <i>No-Host Bar</i> <b>Game Night</b> in Woodpecker ( <i>beware the Zombie Apocalypse</i> )

FRIDAY, OCTOBER 6, 2017												
7:30 – 8:30 AM	<b>BREAKFAST</b>											
8:45 – 9:00 am	Welcome – Chapel Theatre											
9:00 – 10:15 am	<b>Keynote Address</b> <b>Dr. Joel E. Baker</b> <i>Port of Tacoma Chair in Environmental Science</i> <i>Science Director, Center for Urban Waters</i> <i>Director, UW Puget Sound Institute</i> <i>University of Washington</i> "Smoking guns and balanced checkbooks: Environmental chemistry in everyday life"											
10:15 – 11:00 am	<b>Vendor Break</b> , Salmon Gallery											
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**FRIDAY, OCTOBER 6, 2017**

12:00-1:00PM	<b>LUNCH</b>	
	<b>Woodpecker</b>	<b>Flicker</b>
1:00 – 2:00 pm	Teaching Mole Concepts and Stoichiometry with Your Mouth Shut! (Dharshi Bopegedera, The Evergreen State College)	Undergraduate Research (or something similar) at the Sophomore Level Roundtable Discussion (facilitated by Ted Wood, Pierce College)
2:00 – 2:45 pm	<b>Vendor Break, Salmon Gallery</b>	
3:00 – 3:30 pm	Predicting Student Success in General Chemistry (Deanna Dahlke Ojennus, Whitworth University)	Using Office Mix to Provide Effective and Engaging Course Support for Your Classes (Kathy Carrigan, Portland Community College)
3:30 – 4:00 pm	Exploring General Chemistry Performance Expectations (Peggy Harbol and Nazanin Ruppender, Cascadia College)	Quantum Dots: Connecting Clean Energy Research to Chemistry Curriculum (Valerie A. Mosser, Everett Community College)
4:00 – 5:15 pm	<i>Your own time</i>	
5:30 – 6:30 pm	<b>Reception - Salmon Gallery</b> <i>Sponsored Beverages or no-host bar (TBD)</i>	
6:30 – 7:30 PM	<b>DINNER</b>	
8:00-9:00 pm	<p><b>Evening presentation – Woodpecker</b>  <b>LT S. Andrew Satterlee</b>  <i>Environmental Science Officer</i>  <i>US Army Medical Service Corps</i>  <i>508th Military Police Detentions Battalion</i>  <i>Ft. Lewis, Washington</i></p> <p>"Sustainability start-up: investing in environmentally friendly and mutually beneficial relationships outside the prison walls"</p> <p style="text-align: center;"><i>No-Host Bar</i></p>	

**SATURDAY, OCTOBER 7, 2017**

7:30 – 8:30 AM

**BREAKFAST**

**Woodpecker**

**Flicker**

8:30 – 9:00 am

Hit the floor and give me 20 – moles! Development and utilization of Chemistry Boot Camp (Karen Goodwin, Centralia College)

Addressing Diversity and Inclusivity in the Chemistry Classroom (Aly Lambert, Pierce College)

9:00 – 9:30 am

Academic Support Which Empowers Students: Supplemental Instruction at Whitworth (Kerry Breno, Whitworth University)

Chemistry Outreach Roundtable

9:30 – 10:00

Environmental Field Trips Roundtable

GOB Roundtable

10:00 – 10:30

General Chemistry Roundtable

Organic Chemistry Roundtable

10:30 - 11:00

Break and **Check-out by 11 am**

11:00 – 12:00

Business Meeting – Woodpecker

12:00 – 1:00

**LUNCH**

1:00 pm

Have a safe drive home .... Or, a couple of us will probably go on a shortish local hike before calling it a day; we can be specific at the business meeting

# ABSTRACTS

## FRIDAY MORNING SPECIAL PRESENTATION

**Dr Joel E Baker, University of Washington**

“Smoking guns and balanced checkbooks: Environmental chemistry in everyday life”

Environmental chemistry has evolved as a distinct discipline over the past forty years, fueled in large part by advances in analytical chemistry and by applying quantitative chemical engineering approaches to societally-pressing environmental problems. The roots of analytical innovation are found in the Mars lander missions, where small rugged mass spectrometers determined the elemental composition of both the soils and the overlying atmosphere. Decades of continual improvement in the specificity and sensitivity of mass spectrometric-based methods drove our understanding of how chemicals behave in the environment. More recently, application of ‘non-target’ methods are opening productive research pathways. The power of the analytical toolbox now available to environmental chemists coupled with quantitative process ‘mass and energy balance’ models allows elegant ‘fingerprinting’ of the sources, behavior, fates, and effects of a wide range of natural and anthropogenic chemicals.

In this discussion, we will explore applications of environmental chemistry that should be accessible to all students while demonstrating key critical thinking skills. Why is there caffeine in Puget Sound? Does its concentration ‘make sense’? How would we know? Who is responsible for fouling our shellfish beds with pathogenic bacteria? Why should raccoons have lawyers? How did Victoria BC get away with dumping raw sewage into their local waters? Is there really an island of garbage in the Pacific Ocean? Where did it come from? And most importantly, why should everyone understand the basics of chemistry?

## FRIDAY EVENING SPECIAL PRESENTATION

**LT S Andrew Satterlee, United States Army**

Starting a new program within any organization is a daunting task full of obstacles. New programs within restricted environments, such as prisons, come with a problem set unique among organizations. However, investing in a program does not have to be a solitary endeavor. Reaching out to organizations within the local community to establish mutually beneficial relationships can not only help lighten the burden on a new program but also help maintain it well beyond its early stages of development.

Many programs within their infancy face a multitude of issues. Challenges which arise may be as diverse as the programs in which they reside- anything from the healthcare of bees and chickens, generating power to sustain greenhouse temperatures, all the way down to soil microbial health. Challenges such as these are unavoidable yet not insurmountable. Establishing relationships with various organizations allows for the exchange of ideas, lessons learned, as well as an exchange of services. The knowledge generated from partnerships will

not only provide solutions for immediate issues but will also lay the foundation for overcoming future obstacles and maintaining a sustainable program for many years to come.

I will discuss the history of sustainability and environmentally focused projects occurring within the Northwest Joint Regional Correctional Facility at Joint Base Lewis-McChord ranging from beekeeping to in-vessel composting and microbial health. Both the challenges and successes will be reviewed as well as how partnerships with other organizations in the community have helped us become a more successful organization.

### **Cynthia Stanich, University of Washington**

“Implementation and Evaluation of a Companion Course to the First Quarter of General Chemistry “

The Chemistry Achievement Workshop was designed as a companion course to the first quarter of the general chemistry sequence at the University of Washington with the goal of improving retention rates of underrepresented groups in science, technology, engineering and math (STEM) majors. The course is part of the STEM-Dawgs program, which was created to foster community and belonging, both shown to improve retention of students. Each week students learn about study skills, practice quizzing, engage in peer instruction, practice metacognition, and solve higher-order chemistry problems. This presentation describes the design of the STEM-Dawgs program and the results of one academic year. We measured affect about students' sense of belonging, views of intelligence, self-efficacy, task value, and attitudes toward the subject of chemistry. Student ability was measured through the Chemical Concept Inventory (CCI), total exam performance, and the DFW rate. Using general linear models we measure the efficacy of this treatment and describe the populations who most benefited from the program.

### **Linda Kuehnert, Shoreline Community College**

Organic Chemistry Experiments Roundtable Discussion

The gathering and sharing of information with a discussion of best practices as it relates to existing Organic Chemistry laboratories, new construction, instrumentation and technical infrastructure. By taking a close look at organic laboratory curriculum and development, this discussion should directly advance overall knowledge and classroom/lab performance, and benefit faculty and staff.

The focus will be on assigned organic chemistry procedures, instruments, software, and student assessment with a discussion of data record-keeping standards (laboratory notebooks vs tablets) and an emphasis on utilizing electronic data acquisition equipment. A discussion of current lab textbooks and the teaching of gravimetric and volumetric lab techniques including instrumentation involving optical spectroscopy (Visible, Emission, Atomic Absorption, Ultraviolet, and Infrared), Chromatography (Sheet, Column, Thin Layer, Ion-Exchange, Gas Liquid, Gas-Mass Spectrometry, High Pressure Liquid) Distillation, Vacuum line and data analysis using a variety of software.

## **Lee West, Pierce College**

### General Chemistry Lab Roundtable

We all have our various difficulties with the laboratory in our General Chemistry courses. Let's help each other out. Bring your good ideas, your good questions, and your most stubborn problems and we'll have an open discussion.

## **Meg Henderson, The University of Washington, Tacoma**

"The Chemistry of Medicinal Plants: An Accessible and Engaging Application for Sophomore Level Organic Chemistry"

Before the rise of the pharmaceutical industry, most medicines were plant derived. Even today, many modern medicines consist of an active compound which was isolated or derived from plant material. Modern scientific technology now allows chemists to delve into the structure and mode of action of these plant derivatives. Because many organic chemistry students have an interest in medicine or pharmacology, including labs or case studies focusing on the isolation, characterization, or even synthesis of active or novel components from plants can be an exciting application of organic chemistry for our students.

## **Dharshi Bopegedera, The Evergreen State College**

"Teaching Mole Concepts and Stoichiometry with Your Mouth Shut!"

The evidence from the chemistry education literature is clear – the lack of understating of mole concepts and stoichiometry have led to a failure rate of at least 30% (often higher) in college level first-year chemistry courses, preventing students from pursuing their academic goals. One chemist went so far as to suggest that since these concepts are "destroying many people's enjoyment of a splendid subject,"<sup>4</sup> it should be X-rated [*J. Chem. Educ.* **1985**, 62 (1), 59]!

Chemistry faculty are eager for a better outcome, especially because mastering mole concepts and stoichiometry is key to students' success in chemistry. Since successful completion of first-year chemistry is required for most science and engineering majors, we have the potential to positively influence a large number of students if we can help them master mole concepts and stoichiometry.

I have developed a workbook to teach mole concepts and stoichiometry following the principle of *teaching with your mouth shut*. Students work in small teams or individually using carefully crafted worksheets that show connections between mole concepts and students' life experiences. These worksheets cover mole concepts and stoichiometry topics in the same order as in chemistry textbooks. The instructor's role is to answer questions and encourage students to find solutions. I have used the workbook for almost a decade with success. It is suitable for high schools and all undergraduate institutions. Senior students could use it as a self-study tool. It is excellent for training teachers and teaching assistants.

My presentation will include a discussion of the workbook, data demonstrating students' success in ACS exams, and a mini workshop to give participants a first-hand experience on the effectiveness of the worksheets. Workbooks will be available to participants.

Title: Mole Concepts and Stoichiometry: A Chemistry Workbook

Author: Dharshi Bopegedera

ISBN: 978-1-60797-744-5

Publisher: Linus Learning

### **Ted Wood, Pierce College**

Undergraduate Research (or something similar) at the Sophomore Level Roundtable Discussion

Perhaps the question I've been asked most frequently at our past conferences is what I do in terms of "research" in my organic chemistry course. My impression is that most of us like the concept of independent research as early as the sophomore organic course, but many of us feel that it either needs to be high quality, in terms of the science, or we shouldn't bother. Personally, I think we should bother and low quality can be OK. I'll start off this roundtable by explaining what I do, give everybody a chance to tell me I'm doing it wrong, and then we can discuss other ideas.

### **Deanna Dahlke Ojennus, Whitworth University**

"Predicting Student Success in General Chemistry"

For many years the Chemistry Department at Whitworth University has administered a placement test for all students entering General Chemistry I. The goal of the placement test was to identify students who would likely struggle and may need an introductory course prior to taking General Chemistry as well as to identify students we could encourage to take the honors version of the course. Recently, we revisited our placement test due to increasing numbers of WDF's among freshmen STEM students in their science courses. In this presentation, I will compare the old and revised placement tests, examine student performance on the tests as it correlates to class performance, and describe how an online version of the test can be used to direct incoming freshmen to a summer "bridge" course.

### **Kathy Carrigan, Portland Community College**

Using Office Mix to Provide Effective and Engaging Course Support for Your Classes

This year in Portland we have experienced an unusually high number of snow days, and many teachers, and students, are highly stressed trying to figure out how to complete the content in a shortened quarter. I have had the opportunity to offer totally online courses and I currently use "office mix" and a "bamboo pen" to present course content in an engaging manner. Even if

you do not want to teach online, learning how to use this tool to provide course support for your students might increase retention, as students like to “re-watch” some “lectures” presented in a face to face class after hours, to remind them of what was done in class. I use the term “lecture” in quotes because it does not have to be a didactic power point presentation. Let me show you what works for my students and how to use this tool effectively.

### **Peggy Harbol and Nazanin Ruppender, Cascadia College**

“Exploring General Chemistry Performance Expectations”

In the chemistry classroom, students often struggle with the transition between learning concepts and effectively applying these concepts to solve problems, and educators often lack the tools to successfully help students make this transition. To address this issue, the American Chemical Society (ACS) recently spearheaded an effort entitled “General Chemistry Performance Expectations” (GCPE) that is built on the Next-Generation Science framework employed in the K-12 setting. In short, GCPE attempts to build performance expectations (PEs) that incorporate a 3-D framework consisting of concepts that comprise the core of chemistry, practices employed by scientists to solve problems, and cross-cutting concepts that re-appear throughout the scientific realm.

In September 2016, a team of three Cascadia College chemistry faculty was invited to attend the first ACS-sponsored workshop to think about and to practice writing Performance Expectations for college-level General Chemistry using the 3-D framework. During the AY2016-17, Cascadia continued this effort in our CHEM& 161 and 162 classrooms, focusing on the thermodynamics portion of these courses. In both courses (CHEM& 161-F16 and CHEM& 162-W17), we identified opportunities for improved instructional support. Modified instruction for each course was implemented in the trailing sequences. Preliminary results indicate improvement among students, especially with regard to critical and mathematical thinking.

In this session, participants will gain an understanding of the performance expectation 3-D framework, write sample performance expectations, and obtain tools to introduce this practice into a chemistry course.

### **Valerie A. Mosser, Everett Community College**

“Quantum Dots: Connecting Clean Energy Research to Chemistry Curriculum”

One of the challenges of undergraduate chemistry curricula is linking the classroom content to laboratory activities that are integrated, supportive and relevant. This is especially true in sections of the course that deal with concepts surrounding quantum mechanics and bonding. Other than a molecular modeling lab – what is an instructor to do? In the Summer of 2017 I was chosen to participate in a 4-week faculty research experience fellowship sponsored by Clean Energy Institute at the University of Washington. My goal during the fellowship was twofold: First I wanted to educate myself about the basics of solar energy and the evolution of research and development in the field. Second I wanted to identify a lab that I could adapt that would introduce these concepts in the context of introductory quantum mechanical concepts that would be appropriate for my first-year Chemistry students



I identified a lab that allows students to synthesize and characterize ZnO nanoparticles - or quantum dots. Quantum dots are a recent innovation in the field of solar energy research as well as many other applications including computers and cellular imaging.

I thought this lab would be perfect to introduce my students to not only the basics of solar energy but also some cutting-edge research in the field.

In my presentation, I will talk about my research experience at the CEI and the lab that I chose to adapt and why. I will talk about what worked (and what did not!) and where I am in the process now.

I will also talk a little bit about the Clean Energy Institute itself. The CEI has an extensive and active outreach mission that focuses on clean energy education, innovation and transformation by educating and training the next generation of clean energy innovators.

### **Karen Goodwin, Centralia College**

“Hit the floor and give me 20 – moles! Development and utilization of Chemistry Boot Camp”

Many students that successfully place into the General Chemistry sequence (if a placement even exists!) are still “rusty” when it comes to basic prerequisite knowledge. In this presentation, I will share the development of a boot-camp style course for General Chemistry. I will also share the adaptations that have been made to the way this program is utilized at Centralia College. All materials will be available for sharing, so feel free to bring along a flash drive!

### **Aly Lambert, Pierce College**

“Addressing Diversity and Inclusivity in the Chemistry Classroom”

As educators, most of us want to be inclusive and address the needs of an increasingly diverse student body, but because discussions surrounding diversity and inclusivity in the classroom tend to focus on the humanities, science faculty are often left floundering. College-wide trainings can turn us off because they usually lack concrete methods and ideas. On top of this, with high teaching loads and classes already overflowing with information, we balk at the idea of adding yet another element to our teaching. As chemistry faculty, what specific, concrete ways can we adapt our teaching to create a more inclusive classroom environment without sacrificing content or rigor? In May I attended NCORE, the National Conference on Race and Ethnicity in Higher Education, with this question in mind. In this session I will begin by presenting some of the ideas I learned at this conference, followed by a roundtable discussion.

### **Kerry Breno, Whitworth University**

“Academic Support Which Empowers Students: Supplemental Instruction at Whitworth”

Supplemental instruction (SI), developed at the University of Missouri-Kansas City, is an academic assistance program for students at all performance levels. At Whitworth, trained peer facilitators lead 90-minute cooperative learning experiences to help students learn course

content and study skills. Students who participate build community, earn higher grades, and are less likely to fail (D, W, F). In addition, significant growth of the leaders is observed. As the Whitworth faculty member leading the program, I will share benefits and challenges of SI and strategies we have developed within our program.

### **Ralph Morasch, Pierce College**

#### Chemistry Outreach Roundtable

This roundtable is designed to share/discuss anything that anybody is doing, or would like to do, regarding chemistry outreach, in the community, in the K-12 system, with industry, with other colleges, etc. Come with your own experiences or listen to the experiences of others.

### **Ted Wood, Pierce College**

#### Environmental Field Trips Roundtable

Let's share field trip ideas. Since the theme this year is, sort of, environmental chemistry, we'll focus on environmental trips, but any other field trip discussions/suggestions/concerns are welcome.

### **GOB Roundtable / General Chemistry Roundtable / Organic Chemistry Roundtable**

These are our usual course specific roundtable discussions, where any and all topics are welcome. We'll make sure there is somebody from Pierce or UW/T at each of these because, hey, somebody has to speak first.