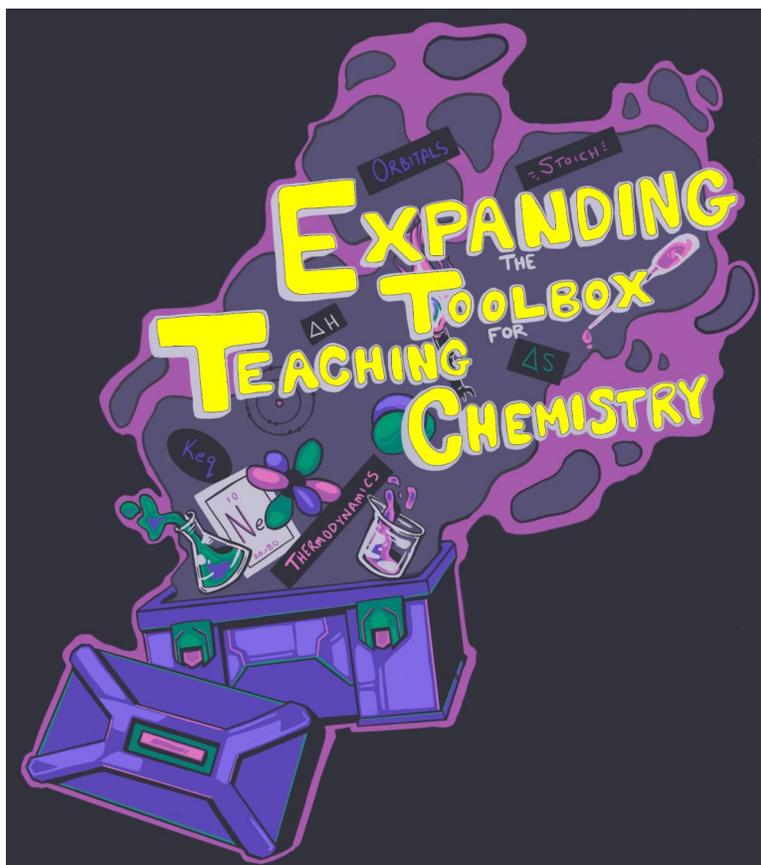


New England Association of Chemistry Teachers

NEACT

Virtual Conference Program

81st Annual Summer Conference | August 10-12, 2020
Online Conference



NEACT President

Kristen VanderVeen

Conference Committee

Kathy Siok
Chris Koutros
Jerusha Vogel

Revised 7/21/20. This program is subject to change.
Check bit.ly/neact2020program for the latest version.



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About NEACT



The New England Association of Chemistry Teachers was founded in 1898 by a group of high school and college teachers meeting at Malden, MA High School, and incorporated in Massachusetts in 1910. Today its membership also includes middle school teachers, administrators, and industrial associates interested in chemical education. The aim of NEACT is to promote the teaching and learning of chemistry.

The annual summer conference is the highlight of the year's activities. In addition, four meetings are held during the school year, one in each geographical division around New England. These meetings include professional development workshops and cover recent developments in chemical education, research, and industry. NEACT also sponsors the John A. Timm award to recognize persons who have made noteworthy contributions toward education in chemistry.

NEACT is a 501(c)(3) Massachusetts non-profit corporation and a PDP and CEU professional development provider.



Registration Information

Register for the conference at our web site: neact.org

The full conference fee includes access to all program sessions and materials including: keynote addresses, workshops, break-out small group sessions, informal “coffee house” and “happy hour” meetings, networking events, vendor programs, raffles, and Google Drive conference file share.

All attendees must be NEACT members, but new and returning members can pay for 2020-2021 membership dues with their conference registration.

Conference Cost (full program included)

NEACT Members

\$50 NEACT member, regular registration

Non-members (includes 1 year membership)

\$80 Non-member, with membership, regular registration

\$25 Full time students (includes 1 year membership)

Contact Kathy Siok at kathys5@cox.net with questions.

Scholarships are available for first-time attendees.

Payment can be made by mail (check or school PO) or by credit card or ACH debit using PayPal. Checks (made out to NEACT Summer Conference) should be mailed to: Kathy Siok, 86 Spring Road, North Kingstown, RI 02852.

Acknowledgements

Thank you to the people and organizations that helped make this conference a reality, especially Dr. Emanuel and Dr. Kulinowski for speaking to us.

Thank you also to our outstanding presenters and to you for attending!



Online Conference Participant Information

This year's annual summer conference will be held virtually using the Zoom video conferencing platform. Our exciting lineup of presentations and workshops will emphasize instructional technology, and explore different models of distance and hybrid approaches to learning, while providing conference attendees with opportunities to network with each other.

Participant Profiles

To help facilitate conference networking and a sense of community, we would appreciate your cooperation in setting up a profile. Conference attendees are strongly encouraged to [create or update their profile on the NEACT website](#). Please submit a photo, contact and school/affiliation addresses, and basic demographic information.

Conference Platform

We will be using **Zoom** as our conference platform because of its stable audio/video capabilities, flexible hosting roles, break out sessions, and whiteboarding capability.

The NEACT website (neact.org) will be used for posting important links, agendas, meeting notes and materials, and participant profiles. Please make sure that you are able to log into your NEACT online account (or create one if you do not have one).

Lecture and workshop sessions will be recorded unless the presenter opts-out. Chat messages, including private messages between attendees, may be part of saved transcripts (though we will attempt to omit private messages from official transcripts). Attendees can avoid being video recorded by muting microphones and web cams. Discussion and coffee house sessions will NOT be recorded. Links to recordings will be made available on the NEACT web site to conference attendees after the conference is over.

Technical support/Conference helpdesk

Email neact1898@gmail.com with any technical questions or concerns. We will be monitoring this account throughout the conference and checking each day before the conference.

Conference Norms of Collaboration

NEACT traditionally has provided a collaborative, friendly, welcoming space for conferences. We ask that attendees embrace conference norms that will be outlined throughout the conference. Some examples are: participate to the best of your ability, use names when possible, treat others with respect, comply with requests from session hosts and presenters.



Coffee House Sessions

One of the best features of our traditional conferences is the ability to talk to peers in the hallway between and during sessions. NEACT members have consistently sought out ways to network and share information informally. We will be trying to replicate this part of the traditional conference experience by having informal “Coffee House” sessions where members can interact in a less formal manner. Break-out rooms will be used when needed to maintain small groups.

Professional Development Hours

NEACT is a registered Professional Development Provider through the Massachusetts Department of Elementary and Secondary Education. CEUs, PDPs, or Professional Development Hours are offered for teachers from Connecticut, Massachusetts and Rhode Island. Certificates of attendance and payment information are available upon request.



Keynote Speakers

Kerry Emanuel, Massachusetts Institute of Technology

Kerry Emanuel is the Cecil and Ida Green Professor of Atmospheric Science in the Department of Earth, Atmospheric and Planetary Sciences at MIT. After completing his doctorate at MIT in 1978, he joined the faculty of the Atmospheric Sciences department of UCLA, where he remained for three years, with a brief hiatus filming tornadoes in Oklahoma and Texas, before returning to MIT in 1981. He is co-founder of the MIT Lorenz Center, a climate think tank which fosters creative approaches to learning how climate works.



Professor Emanuel's research is focused on tropical meteorology and the physics of hurricane development. His work has explored the role of climate change on hurricane activity.

Professor Emanuel is the author or co-author of over 200 peer-reviewed scientific papers, and three books, including *Divine Wind: The History and Science of Hurricanes*, published by Oxford University Press, and *What We Know about Climate Change*, published by the MIT Press. He is the 2020 recipient of the BBVA Foundation Frontiers of Knowledge Award in Climate Change and a member of the National Academy of Science.

Kristen Kulinowski, Science and Technology Policy Institute

Kristen Kulinowski is currently the Director of the Science and Technology Policy Institute at the Institute for Defense Analyses. Prior to taking on this position, Dr. Kulinowski was a member and acting head of the United States Chemical Safety and Hazard Investigation Board, an independent federal agency charged with investigating industrial chemical accidents. Dr. Kulinowski has expertise in chemical and materials sciences, occupational health and safety issues, risk policy, nanotechnology, and research administration. Prior to joining the Board, Dr. Kulinowski was a Research Staff Member in the Institute for Defense Analyses Science & Technology Policy Institute (STPI). Prior to joining STPI, Dr. Kulinowski spent 13 years in Houston at Rice University as a Senior Faculty Fellow in Chemistry. She earned her Ph.D in physical chemistry at the University of Rochester.





Conference Schedule Overview

Time	Sample Daily Schedule	
8:30 am	Coffee House open <i>informal networking and discussion, technical help</i>	
9:00		
9:30	Opening Remarks/Conference Orientation followed immediately by Keynote Address and follow-up questions/discussions in breakout rooms	
10:00		
10:30		
11:00	Morning conference sessions	
11:30		
12:00 pm	Lunch break	
12:30		
1:15	Afternoon conference sessions with breaks in between sessions	Optional Coffee House open
1:45		
2:15		
2:45		
3:15		
3:45		
4:15		
4:45	Closing Remarks	
5:00	Optional Coffee House Happy Hour	
5:30		
6:00	Dinner	
6:30		
7:00	Optional Evening Programs: Watch Party/Discussions (Monday & Tuesday only)	
7:30		
8:00		

Sessions Key

Formal discussion groups, workshops, and presentations.

“Coffee House” informal discussion and networking

Keynote addresses and Meetings

Monday 10am

Dr. Kerry Emanuel (MIT)
Climate Science, Risks, and Opportunities

Tuesday 9:30am

Dr. Kristen Kulinowski (STPI)
Learning from the past and anticipating the future: Lessons for educators from the US Chemical Safety Board

On your own

Evening watch party/discussions



Presentations and Workshops

Monday

All times are Eastern Daylight Time (EDT), which is four hours behind Coordinated Universal Time (UTC-04:00).

Time	Coffee House	Option 1	Option 2	Option 3	Option 4
8:30am	Coffee House open <i>informal networking and discussion, technical help</i>				
9:00					
9:30	9:30 am Opening Remarks/Conference Orientation followed immediately by 10:00 Keynote Address <u><i>Climate Science, Risks and Opportunities</i></u> Dr. Kerry Emanuel, Massachusetts Institute of Technology Additional conversations during Keynote Discussion Session				
10:00					
10:30					
11:00	No coffee house	<u><i>Illustrating Lab Experiments with Chemix</i></u> Hai Mac	<u><i>Clickers instead of POGIL Papers for Voltaic Cells</i></u> Susan Biggs	<u><i>Spectroscopy at Home</i></u> Chris Marks	Keynote Discussion
11:30					
noon	Lunch		Lunch	Lunch	
12:30					
1:15	Coffee House open	<u><i>At-Home Labs: Chemistry is Doing</i></u> Jerusha Vogel	<u><i>Using Pivot Interactives for Online Labs</i></u> Peter Bohacek	<u><i>Synchronous Teaching Using a Lightboard</i></u> Todd Melville	<u><i>AP Teach: A Home for AP Chemistry Teachers</i></u> Gregory Rushton, Samantha Ramaswamy and Anthony Tedaldi
1:45					
2:15				<u><i>AP Chemistry Exam Reading-What's it like and why would you do that to yourself?</i></u> Brendan Wilcosz	<u><i>Making standards based grading work for you</i></u> Tressa Sharma
2:45		Break			



Time		Option 1	Option 2	Option 3	Option 4
3:15	Coffee House open	<u>Escape Room Online Summative Activities</u> Brenda Mitchell and Pam Cafasso	<u>Safety Education in 21st Century Chemistry Teaching Labs</u> Ralph Stuart and Megan Ferm	Break	
3:45				<u>How A Framework for K-12 Science Education is influencing higher chemistry education</u> Sam Pazicni	<u>Using the CALM Homework System in your Chemistry Classroom</u> Kim Arnold
4:15					
4:45	4:45 Closing Remarks				
5:00	Optional Coffee House Happy Hour				
5:30					
6:00	Dinner hour				
6:30					
7:00	7-8:30 Watch Party/Discussion				



Tuesday

All times are Eastern Daylight Time (EDT), which is four hours behind Coordinated Universal Time (UTC-04:00).

Time	Coffee House	Option 1	Option 2	Option 3	Option 4
8:30	Coffee House open <i>informal networking and discussion, technical help</i>				
9:00					
9:30	Keynote Address <i>Learning from the past and anticipating the future: Lessons for educators from the US Chemical Safety Board</i> Kristen Kulinowski, Ph.D., Science and Technology Policy Institute Additional conversations during Keynote Discussion Session				
10:00					
10:30	NEACT Recessed Annual Meeting				
11:00	No coffee house	<i>Virtual Learning with Historic Primary Sources</i> Chris Koutros and Aimee Bachari	<i>Chemistry Lab Transition to Mini Scale</i> Marsilio Mark Mangella	<i>Electrolysis Activity</i> Susan Biggs	Keynote Discussion
11:30					
noon	Lunch		Lunch		Lunch
12:30					
1:15	Coffee House open	<i>Using Desmos for Card Sorts and Formative Assessment</i> Kristen Vanderveen	<i>Using Edpuzzle to Drive Student Engagement with Videos</i> Leslie Garrison	<i>Interactive Tools for Distance/Blended Learning</i> Sue Klemmer	<i>Using Project-Based Learning to Engage Students in a Remote Learning Environment</i> Elizabeth Stewart-Miranda
1:45					
2:15					
2:45		Break		Guided discussion: Developing instructional materials for remote learning	Guided discussion: Best practices for hybrid learning classrooms



Time		Option 1	Option 2	Option 3	Option 4
3:15	Coffee House open	<u><i>Inquiry in Remote or Blended Classrooms</i></u> Sue Klemmer	<u><i>Free Web-based Resources and Tools for Teaching Chemistry</i></u> Dan Damelin	Break	
3:45				Guided discussion: Alternative assessment strategies for chemistry	Guided discussion: Best practices for synchronous distance learning
4:15					
4:45	4:45 Closing Remarks				
5:00	Optional Coffee House Happy Hour				
5:30					
6:00	Dinner hour				
6:30					
7:00	<p>7-8:30 Netflix Watch Party: <i>The Devil We Know</i></p> <p>IMDB Summary: A group of citizens in West Virginia challenges a powerful corporation to be more environmentally responsible.</p> <p>Join the optional watch party using your own Netflix subscription or watch via YouTube. This will be a useful <u>starting point</u> for <u>Mary C. Madden's presentation</u> on Wednesday. An email link for the watch party will be sent on Tuesday 8/11</p>				



Wednesday

All times are Eastern Daylight Time (EDT), which is four hours behind Coordinated Universal Time (UTC-04:00).

Time	Coffee House	Option 1	Option 2	Option 3
8:30a	Coffee House open			
9:00	<i>informal networking and discussion, technical help</i>			
9:30	Coffee House open	<u>Explain Everything: My Favorite Tool for Making Tutorials</u> Sue Klemmer	<u>Citizen Science: Engaging Students in Real Research</u> Brenda J Mitchell and Mary Wright	<u>Electrochemical Series / Reduction Potentials Activity</u> Susan Biggs
10:00				
10:30				
11:00		Break		
11:15				
11:45		<u>Green Chemistry PLC: The Lead Teacher Program</u> Ann Lambert, Kate Anderson, and Janie Butler	<u>Break It Up: A Multifaceted Approach to Student Assessment to Combat Integrity Issues</u> Matthew Tracey	<u>"The Two Faces of Chemistry"/"The Devil We Know"</u> Mary C. Madden
12:15p	Lunch			
12:30				
1:15	Coffee House open	<u>Caring for Yourself So You Can Care For Your Students: Creating the Perfect Elements to Self-Care During Covid-19</u> Jessica Fede	<u>Writing College Recommendation Letters--Tips for Science Teachers</u> Drew Skrocki	<u>Presenting AP Chemistry Lessons on YouTube</u> Michael Farabaugh
1:45				
2:15		Guided discussion: Planning for AP Chemistry	Guided discussion: Running in-person lab experiments with COVID-19 safety protocols	Guided discussion: Developing a classroom community in a distance/remote classroom setting
2:45				
3:15	3:15 Closing Remarks			



Presentation Abstracts and Speaker Bios

Monday Presentation Abstracts and Speaker Bios

10:00 am

Keynote Presentation

Climate Science, Risks, and Opportunities

Dr. Kerry Emanuel, Massachusetts Institute of Technology, Department of Earth, Atmospheric and Planetary Sciences

After reviewing the current understanding of the climate system, Dr. Emanuel will discuss efforts to quantify climate risks and economic and other opportunities presented by the migration toward carbon-free energy.

11:00 am

Illustrating Lab Experiments with Chemix

Hai Mac, Chemix

See how you can create great looking lab diagrams, create illustrated experiment instructions and engage students with lab work using Chemix.

Hai Mac is a software engineer in London, UK. He created Chemix in 2007 and has worked on it since. The last time he studied chemistry was in high school.

Clickers instead of POGIL Papers for Voltaic Cells

Susan Biggs, Westborough High School/Mass Insight

In this short seminar I will demonstrate a class activity for instructing about half reactions and voltaic cells. A presentation with embedded clicker questions appropriate for AP level will be provided, though if you teach voltaic cells in first year chem, the materials could be modified as necessary.

Susan Biggs has been teaching chemistry since 1981 and currently teaches AP and Honors chemistry at Westborough High School, in Westborough MA. Susan became an AP Chemistry reader for the first time in 2012, and has enjoyed going ever since. Since 2013, Susan has been teaching both one and two day workshops for the College Board, and various summer institutes. In addition to full time teaching, Susan is the chemistry consultant for Mass Insight. Susan holds a B.A. in Chemistry from the College of the Holy Cross, and a Masters in Chemistry from the University of Saint Josephs.



Spectroscopy at Home

Chris Marks

Experience doing visible light spectroscopy using digital screen sources, kitchen “cuvettes”, and digital camera detectors, first reported in <https://pubs.acs.org/doi/abs/10.1021/ed3007499> and in the referenced poster, will be briefly reviewed and updated. A basic experiment consists of first photographing sample and blank cuvettes side-by-side in front of the source, then measuring red, green, and/or blue intensities from appropriate image regions using common or open source software, and converting these intensities to absorbances. Several simple spectroscopy experiments, appropriate for secondary and general chemistry courses, will be described. Pitfalls, and possible solutions, involved with doing the experiments with remote students will be discussed.

Chris Marks has worked as a chemist and materials scientist at a Fortune 500 company and a major research university. He has taught chemistry at public and private high schools and at a community college. His long-term interest in bringing quality science to students using materials and methods familiar to them has led to the presented work.

1:15 pm

At home labs - Chemistry is doing

Jerusha Vogel, Greenwich HS, Greenwich CT

During quarantine we were asked to teach a lab class without being in a lab. The materials that students have at home are limited. In this workshop I will share some simple kitchen labs that I assigned to teach college prep chemistry. I will show how I used them as a phenomenon to introduce topics and to delve deeper into material we were already learning. I will discuss how to make these labs accessible for all students. Participants are encouraged to share labs with the group. In the second half of the workshop, participants will be in smaller chat rooms to discuss what was presented and share with each other. NOTE: This workshop is for live labs - not simulations or other e-labs.

Jerusha Vogel teaches all levels of chemistry at Greenwich High School in CT. She has been an active member of NEACT for 20 years; as a past NEACT president she organized and ran two summer conferences. Jerusha was inducted into the Northeastern Section of the ACS Aula Laudis Society for distinguished contributions to chemistry education in 2005.

Using Pivot Interactives for Online Labs

Peter Bohacek, Henry Sibley High School and Pivot Interactives

Can you do authentic science investigation online? Pivot Interactives using interactive video so students learn from real events, not simulations. Students can change the scenario, and measure the outcome. This allows students to learn and practice all the AP/NGSS science practices. Pivot Interactives makes it easy for teachers and students with integrated teacher-modifiable instructions, data tables and graphs built-in, and automatic feedback.

Peter Bohacek has been a classroom teacher for nearly 20 years at Henry Sibley High School in Mendota Heights MN. Now he is part of the team that creates Pivot Interactives.



Synchronous Teaching using a Lightboard

Todd Melville, Lakefield College School, Lakefield, ON, Canada

This presentation will describe how to build and incorporate a "lightboard" into teaching chemistry in a remote environment. Tips and suggestions for designing lessons for teaching synchronously, as well as recording video, using a lightboard will be discussed. Insights into how to design synchronous and asynchronous lessons that keep students engaged will be highlighted.

Todd Melville is a chemistry teacher and the Program Area Leader for Science at Lakefield College School, a leading independent co-ed boarding and day school in Lakefield, Ontario, Canada. He earned a B.Sc. in Chemical Physics from the University of Waterloo and a Ph.D. in Chemistry at Dalhousie University before starting a career teaching Chemistry and Physics at the high school level 15 years ago. Todd currently teaches AP Chemistry, pre-AP Chemistry and Honours Chemistry.

AP Teach: A Home for AP Chemistry Teachers

Gregory Rushton, Tennessee State University,
Samantha Ramaswamy, Penn Trafford High School, PA
Anthony Tedaldi Middle, Belleville HS, MI

Teaching is hard; teaching chemistry is really hard; but teaching chemistry online during a pandemic or its aftermath? Join three veteran teachers as they discuss a recently developed online community for collaborating on the toughest parts of teaching AP chemistry. We'll talk about how AP Teach is designed to be responsive, dynamic, productive, and supportive of teachers in diverse learning environments. Lessons learned and ideas for scaling to support teachers of other subjects will be considered.

Greg Rushton is a professor of chemistry and the Director of the TN STEM Ed Center at MTSU. He holds an undergraduate degree in chemistry from the University of Southern Cal (USC) and graduate degrees in science education and physical organic chemistry from the University of South Carolina (the 'other' USC). He has taught college prep, honors, AP at the high school level and advanced courses at the university level since 1995.

Samantha Ramaswamy is the AP Chemistry teacher at Penn-Trafford High School in a suburb of Pittsburgh, PA where she is also the sponsor of the Science National Honor Society. She has taught every level of chemistry from academic up through AP. She earned her Bachelor's degree in Chemistry from Purdue University and then her Masters degree in Science Education from Montana State University. Outside of the classroom, she is the president-elect of the Pennsylvania Science Teachers Association where she is working to create a more collaborative network of science teachers.

Anthony Tedaldi earned his Master's in Chemistry at St. John's University, in Queens, New York. In June of 2014 Anthony was awarded the Woodrow Wilson Teaching Fellowship and entered the Secondary Master of Arts with Certification program for Education at the University of Michigan. Upon completion of the program, he accepted a full time chemistry teacher position at Belleville High School, in Belleville, Michigan. At Belleville High School, Anthony has taught Conceptual & Honors Chemistry, Organic Chemistry I and II and AP Chemistry. In his first year he was awarded the Knowles Teacher Initiative Fellowship. Outside of the classroom, Anthony is the advisor for the Gay- Straight Alliance, class advisor for the Class of 2023, a member of the schools PBIS team and a member of the Van Buren Public Schools Education Foundation.

2020 NEACT Summer Conference Program



2:15 pm

AP Chemistry Exam Reading-What's it like and why would you do that to yourself?

Brendan Wilkosz, Berlin High School, Berlin CT

Interested in helping your students demonstrate their understanding more clearly on the AP Chemistry Exam? What is it like to be an AP Chemistry Reader? Why would anyone want to do that? Get a better sense of the protocols involved in the scoring of the AP Chemistry Exam from a Reader who scored exams in 2016 and 2019 in Salt Lake City, Utah and also from home during June of 2020. Overview of the Exam Reading process, example questions, and exam performance tips will be discussed.

Brendan Wilkosz earned a Masters in Education in 2004 from UConn and a Masters in Chemistry from University of Saint Joseph in 2012. He has been teaching chemistry for the last 15 years at Berlin High School. He established the AP Chemistry program at the school in 2008 and made the course a dual enrollment option with UConn Early College Experience Chemistry in 2011. He's read AP Exams in 2016 and 2019 in Salt Lake City, Utah and did the AP scoring from home this year in June.

Making standards based grading work for you

Tressa Sharma, Woodstock High School, IL

This presentation will discuss the design and implementation of a hybrid system combining standards based grading and traditional grading systems that can be used in all levels of chemistry classes.

Tressa Sharma has been teaching in Illinois for 7 years and has been the science department chair at Woodstock High School for the last 5 years. During this time she has taught general chemistry, honors chemistry, and AP chemistry. This fall she will be adding dual credit chemistry to her teaching duties..

3:15 pm

Escape Room Online Summative Activity

Brenda Mitchell and Pam Cafasso, Bow High School, Bow NH

We designed a challenge for students to work in groups on challenging chem problems in an online format. In this workshop you will make your own chemistry escape room using Google meet and Google slides.

Pam Mitchell is a former engineer turned Chem (and Bio and Robotics) teacher. A graduate of John Hopkins, she has been at Bow HS in NH for 6 years. She won the NH Science Teacher Association Novice teacher Award. She also coaches Vex robotics.

Brenda Mitchell has been in education for over 30 years, teaching Chemistry, Biology, AP Chemistry and Forensics. She graduated long ago in a far away galaxy from UC Berkeley. Brenda's claim to fame is that one former student is the mayor of San Francisco and another is the NH State Epidemiologist. She also coaches a LARP group.



Safety Education in 21st Century Chemistry Teaching Labs

Ralph Stuart and Megan Ferm, Keene State College, Keene NH

While chemistry education has evolved rapidly over the last several decades, safety education in high school and undergraduate chemistry laboratories has not kept pace. Recognizing this challenge, the American Chemical Society has been developing support materials for educators in both of these environments that take a new approach to teaching lab safety. This workshop will explore the RAMP paradigm used in these materials and demonstrate how it can be used as a teaching tool for both faculty and students.

Ralph Stuart is the Environmental Safety Manager and *Megan Ferm* is the Senior Laboratory Technician in the Chemistry Department at Keene State College.

3:45 pm

How A Framework for K-12 Science Education is influencing higher chemistry education

Sam Pazicni, University of Wisconsin–Madison

A Framework for K-12 Science Education was published in 2011 and paved the way for the Next Generation Science Standards to be developed and released for adoption in 2013. The Framework was grounded in research on learning and learning science—therefore, although the Framework was intended to inform K-12 science education, there is no reason why it can't be used to inform all levels of science education. This talk will discuss how the Framework is influencing curriculum design and assessment in higher chemistry education. The discussion will highlight examples from the chemistry education community, including the American Chemical Society's General Chemistry Performance Expectations project as well as the author's own teaching and research.

Sam Pazicni received B.A. degrees in Chemistry and Music from Washington and Jefferson College, M.S. and Ph.D. degrees in Inorganic Chemistry from the University of Wisconsin, and performed post-doctoral research in Biophysics and Chemistry Education at the University of Michigan. In 2009, Sam began his independent career at the University of New Hampshire, receiving tenure in 2015. After ten years at New Hampshire, Sam returned to his alma mater to serve on the faculty of the University of Wisconsin-Madison. He presents research and workshops on teaching and learning both nationally and internationally and regularly publishes in *The Journal of Chemical Education* and *Chemistry Education Research and Practice*. Sam is also a member of the American Chemical Society, and currently serves on the Society's Committee on Education as the vice-chair of the Graduate Education Advisory Board. Outside of the lab, Sam enjoys music and theatre, cooking extravagant things, and exploring the world.



Using the CALM Homework System in Your Chemistry Classroom

Kimberly S. Arnold, Indiana University Bloomington

CALM (Computer Assisted Learning System) is a web-based learning tool, developed by the chemistry department at Indiana University Bloomington, that is based upon a Socratic pedagogy. CALM promotes student learning by allowing multiple attempts to answer a question without penalty, incorporating adaptive features, and emphasizing practice as a way to develop mastery, while giving instructors tools to assess learning of individual students and the entire class. In this workshop, we will explore the features of the CALM system, which provides immediate feedback and automatic grading. We will discuss strategies for using CALM in both high school and college settings, as well as in distance learning.

Kimberly Arnold received her B.S. in Biochemistry at Calvin College in Grand Rapids, MI. She earned her MAT in Chemistry from Indiana University Bloomington in 2003. Kim teaches courses in general chemistry. In addition to her teaching, Kim is working with IU's Advanced College Project (ACP) program to establish a hybrid dual credit course for high school students. Kim is also the department coordinator for the Chemistry Undergraduate Teaching Intern Program at IU.

Tuesday Presentation Abstracts and Speaker Bios

9:30 am

Keynote Presentation

Learning from the past and anticipating the future: Lessons for educators from the US Chemical Safety Board

Kristen Kulinowski, Ph.D., Science and Technology Policy Institute

Some of the most serious chemical disasters investigated by the CSB resulted from a failure to learn from past incidents or to anticipate how changes to a process could introduce new hazards. Although an oil refinery may seem very different from a school laboratory, both settings may contain hazards that must be managed appropriately. Whether you're performing a demonstration, teaching an experiment, or conducting original research, safety should be foremost in your thinking and planning. Former CSB Board Member and PhD chemist Kristen Kulinowski will share lessons from industrial process safety accidents and link them to safety in an educational setting.



11:00 am

Virtual Learning with Historic Primary Sources

Aimee Bachari, Steamship Historical Society

Chris Koutros, Oliver Ames High School

We will be discussing how to use historic primary sources in chemistry through remote learning and in-person. The Steamship Historical Society STEAMing into the Future web site has numerous educational lessons and activities with primary sources from the SSHSA archives. These have been used by K-12 teachers and are adaptable for at-home asynchronous learning. Participants will leave with ready-to-go real world learning activities centred on density, dimensional analysis, thermodynamics, and solutions.

Aimee Bachari is the Education Director at the Steamship Historical Society. She uses primary sources from the Ship History Center archives, based in Warwick, Rhode Island, to create STEAM and social studies curriculum for the society's remote learning program, STEAMing Into the Future (www.shiphistory.org).

Chris Koutros has taught Chemistry for 16 years and is the NEACT Southern Division Chair. He earned his Bachelor's degree from the College of the Holy Cross, an M.S. in Chemistry from UMass Boston, and an M.Ed. in Instructional Technology from Bridgewater State University. He has extensive experience with POGIL, integrating technology in a BYOD environment, and giving students strong lab experiences. Chris is usually in his element: his wedding ring is tungsten, he enjoys skiing on carbon-titanium skis, sailing with a carbon fiber mast, and taking walks with his black lab, Beaker.

Chemistry Lab Transition to Mini Scale

Marsilio Mark Langella, PWISTA

This presentation is designed as a guide for Chemistry Instructors to use as they modify existing laboratory experiments to become more inquiry based through the incorporation of new techniques and questioning methodology. The presentation addresses the importance of a minor yet significant change of approach necessary to transition to the development of guided inquiry labs. These exercises are intended to serve as models for teachers implementing changes to their laboratory courses, they have been intentionally designed substituting some of the traditional materials and methods used in general chemistry classes with less environmentally hazardous options. The labs are designed to both minimize the amount of material consumed and the time involved in the laboratory. Maintaining exposure to fundamental theory and introductory level techniques, these adapted experiments consume no greater than 15 milliliters of reagent per trial and the maximum time required for any given trial is no more than fifteen minutes, allowing several trials in a single class period.

Mark Langella is currently an AP Chemistry instructor at Mahopac High School in New York. He is presently an adjunct education professor at Manhattanville College and Adjunct Chemistry Professor at Westchester Community College. He received a BA in Chemistry from Manhattan College, and a MA in Science Education from Lehman College. Mark Langella has over 30 years of experience teaching AP Chemistry and is a College Board AP Chemistry consultant since 1994, as well as a College Board workshop coordinator. Mid-Hudson Section of the American Chemical Society has chosen Mark as a recipient of the Excellence in High School Chemistry Teaching Award. He is also the founder and director of the Putnam/Westchester Industry and Teacher Alliance and has been a coordinating board member of both the SUNY Purchase Alliance of Chemistry Educators (1990-2000), as well as, the Teaching Center at SUNY Purchase (1999-2002). He is also a developer for Mini-Concepts Custom Designed Chemistry Lab Kits. <https://mini-concepts.com/>



Electrolysis Activity

Susan Biggs, Westborough HS, Westborough MA

In this short seminar I will demonstrate lab activities for the electrolysis of water as well as the electrolysis of KI. Lab papers appropriate for AP level will be provided, though if you teach electrolysis in first year chem, the materials could be modified as necessary.

Susan Biggs has been teaching chemistry since 1981, currently teaching at Westborough High School, in Westborough MA, where she teaches AP and Honors chemistry. Susan became a reader for the first time in 2012, and has enjoyed going ever since. Since 2013, Susan has been teaching both one and two day workshops for the College Board, and various summer institutes. In addition to full time teaching, Susan is the chemistry consultant for Mass Insight. Susan holds a B.A. in Chemistry from the College of the Holy Cross, and a Masters in Chemistry from the University of Saint Josephs.

1:15 pm

Using Desmos for Card Sorts & Formative Assessments

Kristen Vanderveen, The Bromfield School, Harvard MA

Desmos is a suite of digital learning tools designed for math education--but the activity builder has virtual card sort options as well as drawing tools, short answer inputs, discussion prompts and formative assessment. In this workshop, we will explore some card sort activities for chemistry. We will also start using Desmos to create our own activities to share.

Kristen Vanderveen has taught every level of chemistry, including honors and AP Chemistry, at The Bromfield School in Harvard, MA since 2004. She earned her Bachelor's degree in Chemistry and German from SUNY Binghamton (now Binghamton University) and then her MS and Ph.D. degrees in biophysical chemistry from the University of Rochester, where she also did postdoctoral research. After a brief stint at a start-up pharmaceutical company, she decided to pursue a career in education. She is currently the president of NEACT.

Using Edpuzzle to Drive Student Engagement with Videos

Leslie Garrison, Westford Academy, Westford MA

Whether you are experienced with Edpuzzle or just a beginner, learn how to use the features in Edpuzzle to transform videos into a wide variety of tools to drive learning. Workshop will include how to utilize Edpuzzles with your own instruction videos (so that students actually watch them!), how to repurpose a lab video with your own voice over, and how to use the feedback feature as you check for understanding on a new topic. Because identifying videos to use can be the most time-consuming step, we will also discuss different approaches to finding videos beyond Tyler DeWitt and Bozeman Science. Come away with a set of Edpuzzles to edit or use as is in your classroom.

Leslie Garrison has been teaching chemistry for 15 years at the high school and middle school levels and earned National Board Certification in Chemistry.



Interactive Tools for Distance/Blended Learning

Sue Klemmer, Camden Hills Regional High School, Camden ME

How do you keep your students engaged during a Zoom lesson? How do you preserve a sense of community when teaching in a blended or remote classroom? I will share several tools I have found. PEARDECK is an add-on to Google Slides or Powerpoint that allows participants to chime in with multiple types of responses, from answering multiple choice questions to dis/agreeing with a statement to placing themselves on a map. KAHOOT is a great way to break up a lecture with a check in on who gets what (and did you know it generates a report on how each student did?). It is also a great way to start a new topic or review at the end of a lesson. BREAKOUT rooms get students talking, but how do they report out? PADLET is a fun visual alternative to a Google.doc for multiple groups or individual students to record their ideas when you don't have time to hear from everyone. This session will not provide all the details on each program, but will let you experience them and will provide resources to learn more.

Sue Klemmer earned her BA in Chemistry at Wesleyan University in 1975, then spent a year as a volunteer teacher on the southern tip of Lake Michigan. She went off to Carnegie Mellon for a PhD in theoretical chemistry but had fallen in love with teaching and left after a year. Lacking teaching credentials, she taught in a parochial school in Pittsburgh for seven years. She then came to the University of Maine to get her science teaching credentials and broaden her background in biology, geology, marine sciences, and history of science. She was hired to teach at Camden-Rockport High School in 1990 (now Camden Hills Regional HS). She has taught mostly chemistry (Honors, college-prep and tech prep as well as classes for alternative and adult ed students) but these days she also teaches a lot of college prep and project-based Physics. Her special interests are the use of history of chemistry to teach content and scientific methods, the use of concept mapping to both help students learn and to help teachers understand what students are thinking, and submicroscopic modeling in chemistry. She is an active NEA union member and currently serves on our state's Instruction and Professional Development (IPD) Committee and as an RA Delegate. Sue is the Northern Division Chair of NEACT and has finally instituted virtual "ChemChats" to support our isolated teachers in ME, NH, and VT.

Using Project Based Learning to Engage Students in a Remote Learning Environment

Elizabeth Stewart-Miranda, Greater Lowell Technical High School, Lowell MA

The period of remote learning has often been remarked as a time where it has been difficult to engage students. One method to re-ignite a student's interests is to provide them with agency and have them become involved with a remote project-based learning experience of their choice while also utilizing interesting interactive web tools. In my presentation, I will share approaches to this strategy and the different tools I utilized to help my students on their way.

Liz Stewart-Miranda has a B.A. in Anthropology from Tufts University and an M.S./A.B.D. in Archaeology from the University of New Mexico. She spent 5 years working as student Archaeologist before switching to work as an adjunct professor of Sociocultural Anthropology at several local community colleges. In 2009, she became a full-time high school instructor, spending 10 years at Greater Lawrence Technical School as a Chemistry, Biology, and whatever else was needed teacher before changing to Greater Lowell Technical School in January, 2019 where she now works teaching Biology and Chemistry.



3:15 pm

Inquiry in Remote or Blended Classrooms

Sue Klemmer, Camden Hills Regional High School, Camden ME

When I was first dumped into remote teaching I fell back onto teacher-centered learning: stress brings out old habits. But in a future where distance learning is a permanent possibility we need to maintain the active inquiry-based learning many of us have worked so hard to create. This session is an open discussion of how to do this in a classroom of socially distanced and/or virtual students. I will start the discussion by throwing out three samples: a POGIL-like activity wrapped around a Phet sim, the use of a simple do-at-home activity to spark experimental design, and the use of canned data to generate questions and/or CERs. We'll critique these examples: what are the pros and cons? what are the criteria and constraints of remote inquiry? Then I'll open the discussion for other solutions.

Sue Klemmer earned her BA in Chemistry at Wesleyan University in 1975, then spent a year as a volunteer teacher on the southern tip of Lake Michigan. She went off to Carnegie Mellon for a PhD in theoretical chemistry but had fallen in love with teaching and left after a year. Lacking teaching credentials, she taught in a parochial school in Pittsburgh for seven years. She then came to the University of Maine to get her science teaching credentials and broaden her background in biology, geology, marine sciences, and history of science. She was hired to teach at Camden-Rockport High School in 1990 (now Camden Hills Regional HS). She has taught mostly chemistry (Honors, college-prep and tech prep as well as classes for alternative and adult ed students) but these days she also teaches a lot of college prep and project-based Physics. Her special interests are the use of history of chemistry to teach content and scientific methods, the use of concept mapping to both help students learn and to help teachers understand what students are thinking, and submicroscopic modeling in chemistry. She is an active NEA union member and currently serves on our state's Instruction and Professional Development (IPD) Committee and as an RA Delegate. Sue is the Northern Division Chair of NEACT and has finally instituted virtual "ChemChats" to support our isolated teachers in ME, NH, and VT.

Free Web-based Resources and Tools for Teaching Chemistry

Daniel Damelin, Concord Consortium

This presentation will involve a survey of numerous resources developed by the Concord Consortium to support online chemistry learning, including molecular dynamics simulations, a full course called Interactions about how forces and energy at that atomic level explain much of the world we observe around us, a system modeling tool called SageModeler, and a data analysis tool called CODAP, which facilitates data exploration.

Daniel Damelin has worked in the field of education for 27 years, as a teacher, curriculum and technology developer, professional development leader, and educational researcher. A long standing NEACT member, he is currently an employee of the non-profit Concord Consortium, where he has worked on numerous NSF and foundation funded projects that resulted in open educational resources to support the learning of science through simulation, interactive curriculum and pedagogy, data analysis, and formative assessment.

Tuesday Guided Discussion Sessions

Developing instructional materials for remote learning

Best practices for hybrid learning classrooms

Alternative assessment strategies for chemistry

Best practices for synchronous distance learning



Wednesday Presentation Abstracts and Speaker Bios

9:30 am

Explain Everything: My Favorite Tool for Making Tutorials

Sue Klemmer, Camden Hills Regional High School, Camden ME

Explain Everything is a versatile app that allows you to do more sophisticated lessons than a screencast but has a lower learning curve than something like iMovie. In this workshop you will watch a short tutorial made with Explain Everything to see some of its features. "Butterflies" who have seen enough will be provided with resources for how to learn to do this on their own and can flit to another session. "Bees" will then walk through making their own Explain Everything tutorial. You will need an iPad and have previously downloaded the "Explain Everything" app. If you have an Apple Pencil bring it: it is not necessary but it is useful for this program. I will have some materials (a video, some pictures) for a tutorial, but if you have a particular topic you may want to come with your own resources. This is learning-by-doing! Breakout rooms will be provided for those who want to work in small groups while others may choose to stay online or go off to work and Zoom back in for questions or to share their work. I will also introduce you to the NEACT shared Google sheet of teacher-made tutorials.

Sue Klemmer earned her BA in Chemistry at Wesleyan University in 1975, then spent a year as a volunteer teacher on the southern tip of Lake Michigan. She went off to Carnegie Mellon for a PhD in theoretical chemistry but had fallen in love with teaching and left after a year. Lacking teaching credentials, she taught in a parochial school in Pittsburgh for seven years. She then came to the University of Maine to get her science teaching credentials and broaden her background in biology, geology, marine sciences, and history of science. She was hired to teach at Camden-Rockport High School in 1990 (now Camden Hills Regional HS). She has taught mostly chemistry (Honors, college-prep and tech prep as well as classes for alternative and adult ed students) but these days she also teaches a lot of college prep and project-based Physics. Her special interests are the use of history of chemistry to teach content and scientific methods, the use of concept mapping to both help students learn and to help teachers understand what students are thinking, and submicroscopic modeling in chemistry. She is an active NEA union member and currently serves on our state's Instruction and Professional Development (IPD) Committee and as an RA Delegate. Sue is the Northern Division Chair of NEACT and has finally instituted virtual "ChemChats" to support our isolated teachers in ME, NH, and VT.

Citizen Science: Engaging Students in Real Research

Brenda J Mitchell, Bow High School

Mary Wright, Kearsarge High School

Anecdota is a way for your students to collect data at home or school to be used in real research projects. Students can also download data sets and do the same analysis that is going on in labs. Exciting practical connections; free and online!

Mary Wright trained as a biologist at Bates College and has been teaching Chemistry and Biology at Kearsarge Regional High School for 12 years. *Brenda Mitchell* graduated from UC Berkeley in Microbiology and has been a teacher for over 30 years, 20 of them at Bow High School. Both are part of the All About Arsenic SEPA grant program through MDI Biological Laboratory and Dartmouth College.



Electrochemical Series / Reduction Potentials Activity

Susan Biggs, Westborough HS, Westborough MA

In this short seminar I will demonstrate a lab activity for the easy filter paper set up for determining an electrochemical series for six different metals. Lab papers appropriate for AP level will be provided, though if you teach electrolysis in first year chem, the materials could be modified as necessary.

Susan Biggs has been teaching chemistry since 1981, currently teaching at Westborough High School, in Westborough MA, where she teaches AP and Honors chemistry. Susan became a reader for the first time in 2012, and has enjoyed going ever since. Since 2013, Susan has been teaching both one and two day workshops for the College Board, and various summer institutes. In addition to full time teaching, Susan is the chemistry consultant for Mass Insight. Susan holds a B.A. in Chemistry from the College of the Holy Cross, and a Masters in Chemistry from the University of Saint Josephs.

11:15 am

Green Chemistry PLC: The Lead Teacher Program

Ann Lambert, King Phillip High School/Beyond Benign
Kate Anderson and Janie Butler, Beyond Benign

Beyond Benign's approach to bringing sustainability into chemistry education is through fostering a professional learning community (PLC) of educators who collaborate together and cultivate green chemistry resources. The Lead Teacher Program, our K-12 PLC, is designed to develop and support teachers to take a leadership role in advancing sustainable science education as teacher trainers and presenters. As a part of this three-year program, participating teachers become ambassadors and experts in sustainable science and green chemistry. Ann Lambert, a teacher and department head who completed the lead teacher program, is a certified lead teacher and continues weave green chemistry education into her school. Her chemistry department at King Philip Regional High School in Wrentham, MA has woven green chemistry education through a traditional, standards-based curriculum. Students write a "green chemistry connection" as a component of each lab report, and they also design and conduct their own, student-driven experiments that incorporate green chemistry connections. The Lead Teacher program works to empower, educate and equip educators to weave green chemistry into their teaching.

Ann Lambert is the Chemistry Department Head and chemistry teacher at King Phillip Regional High School. She is also a Certified Lead Teacher with Beyond Benign. *Kate Anderson* is the K-12 Director of Education at Beyond Benign. *Janie Butler* is the K-12 Program Manager at Beyond Benign.



Break It Up: A Multifaceted Approach to Student Assessment to Combat Integrity Issues

Matthew Tracey, University of Pittsburgh Johnstown

Academic integrity is a common issue with the current remote instructions. With widespread access to rapid assistance and online tutoring, instructors are in a precarious position of ensuring academic integrity without overstepping. Though many services exist to help combat this, they may not be ideal for all instructors. This presentation will provide a unique approach to preventing cheating by developing exams that are both synchronous and asynchronous. The three part exams are broken up based on question type, with short answer questions being administered via a remote proctored meeting, and the others being delivered asynchronously, but designed to minimize academic integrity issues and maximize student critical thinking. The method to be discussed was tested with a remote summer Organic chemistry course. The benefits and pitfalls of this method will be discussed.

Dr. Matthew Tracey is an Assistant Professor of Chemistry at the University of Pittsburgh Johnstown. He received his B.Sc. degree from Fordham University, graduating in 2011. He received his Ph.D in chemistry from the University of Pittsburgh in 2017, following which he joined the faculty at the University of Pittsburgh Johnstown as a Visiting Assistant Professor. He later accepted a position as an Assistant Professor of Chemistry. He is currently engaged in research of biologically active compounds for the treatment of filoviruses as well as new pedagogical methods.

"The Two Faces of Chemistry" / "The Devil We Know"

Mary C. Madden, retired (former H.S. and community college Chemistry instructor)

Chemicals are absolutely necessary for our survival, health, and our quality of life. However, some once-considered-safe-chemicals have been found to cause harm. A dramatic example involves DuPont, PFOA, Teflon, and a decades-long conflict that culminated in a class-action lawsuit against Dupont on behalf of West Virginian citizens as well as personal injury cases that continue to this day.

Participants read the article by Nathaniel Rich "[The Lawyer Who Became DuPont's Worst Nightmare](#)," for in-depth descriptions of the chemical, industrial, human, and legal aspects of the DuPont suit.

With this background we will share ways of integrating the information into chemistry instruction including researching recent chemical developments. Participants will receive a short-answer assignment I created and suggest alternate assignments or assessments. A rudimentary knowledge of organic molecules is helpful but not necessary. Participants in this presentation are encouraged to join the [Tuesday evening Netflix watch party of "The Devil We Know,"](#) a 1hr 28m, a dramatic, heart-rending documentary detailing DuPont's cover-up.

Mary Madden was active in education for over 47 years, as high school chemistry teacher, two-time school principal, and as a community college chemistry instructor. She maintains her chemistry connection through NEACT. Mary is a past president of NEACT and is currently the curator of the NEACT archives. Her current teaching is via Facetime with her youngest grandchildren.



1:15 pm

Caring for Yourself So you Can Care for Your students: Creating the Perfect Elements To Self-Care During COVID-19

Jessica Fede, Johnson & Wales University

Since the start of COVID -19, teachers have been faced with even more stress and pressure with virtual teaching and working from home. With the second wave of the virus looming, and the possibility of virtual teaching again, many teachers are already starting the new year worn out and stressed. Self-care is more important than ever before. The purpose of this presentation is to discuss the key components to self -care and offer some practical strategies to make self-care part of your daily practice.

Jessica Fede is an Associate Professor at Johnson & Wale University. She teaches courses in counseling and psychology. She also has a part-time private practice working with individuals of all ages. Her research interest includings strategies to motivate students, teaching study strategies and self -care.

Letters of Recommendation for College--Advice for Chemistry Teachers

Drew Skrocki, The Bromfield School, Harvard MA

In this presentation, An experienced school counselor shares his tips and advice for science teachers when writing letters of recommendation for college.

Drew Skrocki has been a school counselor at The Bromfield School in Harvard, MA for the last 10 years. Drew specifically works with students in grades 10-12 in the college search and application processes. Drew has also worked with teachers on crafting letters of recommendation for these students.

Presenting AP Chemistry Lessons on YouTube

Michael Farabaugh, Albemarle High School, Charlottesville VA

This presentation will describe and summarize the work involved in planning and presenting AP Chemistry lessons and review sessions for the College Board on their YouTube channel.

Michael Farabaugh has taught chemistry in Albemarle County Public Schools in Virginia for 22 years. He has been a Reader, Table Leader, and outside item writer for the AP Chemistry exam. He works with the National Math and Science Initiative as a Coach for AP Chemistry. He is one of the admins for a group of AP Chemistry Teachers on Facebook (with over 4800 members). He enjoys sharing ideas and collaborating with other chemistry teachers.

Wednesday Guided Discussion Sessions

Planning for AP Chemistry

Running in-person lab experiments with COVID-19 safety protocols

Developing a classroom community in a distance/remote classroom setting