



Join us at BCCE!



Workshops

Active Learning in Organic Chemistry: Backward Design (Tuesday 7/30, 2:00 pm)

Cathy Welder



Cathy Lugo



Active, student-centered pedagogies can dramatically improve student outcomes, but before implementing new teaching methods, it is essential to clarify, both to yourself and to the students, what students should be learning. This workshop will apply principles of backward design to the undergraduate organic chemistry curriculum based on *Wiggins and McTighe's Understanding by Design* (2006), *Fink's Creating Significant Learning Experiences: An Integrated Approach to Designing College Courses* (2013),

and *Zakrajsek and Nilson's Teaching at Its Best: A Research-Based Resource for College Instructors* (2023). Participants will develop course and topic-level learning objectives as well as various types of assessments by cognitive level. This clearer understanding of goals and assessment methods provides the foundation for instructional change. While the backward design process aids in the development of any course, the workshop leaders will be focusing on its application to an organic chemistry course. High school teachers who wish to participate should be teachers of organic chemistry. Materials generated from the workshop will be disseminated to the Organic Education Resources community via the website at <http://www.organicers.org/>.

Active Learning in Organic Chemistry: Improving Student Learning and Engagement with Formative Assessment and Collaborative Learning (Wednesday 7/31, 8:30 am)

Justin Houseknecht



Janell Mahoney



Many faculty are excited about using more technology and the “flipped” classroom is making headlines, but these alone don’t improve student engagement and learning. This workshop will introduce proven active learning pedagogies, discuss why they are effective, and provide key characteristics of effective instruction that can use technology and work within the “flipped” paradigm. Participants will develop activities and materials for a particular class session of their choosing.

Workshop facilitators will use examples from their experience teaching active-learning organic chemistry courses with enrollments of 20-200 students. Emphasis will be placed on effective in-class use of collaborative learning and formative assessment techniques such as classroom polling, concept maps, structured problem solving, categorization grid, round table, and background knowledge probe.

Symposium

Active Learning in Organic Chemistry (all day Wednesday 7/31 and Thursday 8/1 morning)

Multiple studies have shown that the use of active learning pedagogies in the classroom results in positive student learning outcomes in science courses. These improved outcomes include higher test scores and final grades, improved understanding and retention of content, lower withdrawal rates, and more positive attitudes toward science. There are many techniques that can be implemented to introduce more active learning into any environment, including those that can be incorporated into traditional lectures, used to flip the classroom, promote collaborative learning, and/or scaffold construction of knowledge. This symposium includes presentations by organic chemistry faculty who have implemented active learning, broadly defined, in their organic courses.

Talks

Results of the 2021-23 Active Learning in Organic Chemistry Workshops and Faculty Learning Communities (Wednesday 7/31, 2:06 pm)

Justin Houseknecht, Alexey Leontyev, Jennifer Muzyka, Cathy Welder

The goal of Organic Education Resources (OrganicERs.org) is to increase the awareness and effective implementation of evidence-based instructional practices (EBIPs) amongst the approximately 2,500 Organic Chemistry instructors in the United States. One virtual and two in-person Active Learning in Organic Chemistry Workshops were held between June 2021 and June 2023. Thirteen experienced instructors used EBIPs to introduce 81 faculty to EBIPs at these workshops; ten of these experienced instructors led follow-up faculty learning communities consistently engaging more than 80% of workshop attendees for 9-10 months after workshop attendance. Workshop participants developed hundreds of

class plans (available at OrganicERs.org), built a community of transformation, and implemented change – as measured by pre- and post-workshop surveys – in their own classrooms. This presentation will discuss some of the challenges, successes, and observations we have made building this community of practice.

Chalcones for SARS-CoV2 in Organic Chemistry Lab CURE (Wednesday 7/31, 4:12 pm)

Jennifer Muzyka



Second semester organic chemistry laboratory has been revised and was presented as a course-based undergraduate research project (CURE). Our project focused on chalcones as potential inhibitors for the chymotrypsin-like main protease of SARS-CoV2. Students synthesized chalcones and carried out docking calculations of their synthesized compounds with the enzyme. We administered a pre-survey with two subscales from the Persistence in the Sciences (PITS): self-efficacy and science identity subscales. We also administered a postsurvey (Laboratory Course Assessment Survey and Persistence in the Sciences) to determine whether the CURE was implemented effectively and what impact it had on our students. We observed some increased self-efficacy because of this transformed laboratory. The LCAS demonstrated that our implementation of the CURE was effective, giving similar results to CUREs previously reported in the literature. The research project was carried out in the second semester organic chemistry labs in fall 2022 and fall 2023.

Measuring the Effectiveness of a Flipped Classroom on Higher-order Learning Objectives (Wednesday 7/31, 8:57 am)

Matt Casselman



Flipped classrooms continue to see widespread use in chemistry instruction. Prior evidence suggests that positive outcomes on student learning associated with the flipped classroom include improved exam performance and diminished course failure rates. A previous randomized controlled trial (RCT) was conducted that showed the flipped classroom had equivalent learning gains compared to a traditional lecture setting. Additionally, in that study, nearly all learning gains were associated with the online pre-activity video portion of the flipped classroom. This prior work focused on a lower-order learning objective (LO), but it was unclear how this might translate to a higher-order LO. To measure learning gains on a higher-order LO, a randomized controlled trial on aromatic substitution mechanisms was conducted with student volunteers learning via either traditional lectures or a flipped classroom. Student learning gains were measured before, during, and after the learning intervention. Performance was compared between treatment groups and with a negative control group. Under these experimental conditions, both flipped classroom and traditional lecture treatments showed similar learning gains, however, a greater proportion of learning gains were associated with collaborative in-class activities and practice compared to content presentation through online video or lecture. These results suggest that instructors may target higher-order LOs with flipped activities for maximum benefit and that the benefits of the flipped classroom instructional approach may be the result of impacting student attitudes toward learning.

Mastery Quizzes for Essential Topics in Organic Chemistry (Thursday 8/1, 8:30 am)

Matt Leathen



First semester organic chemistry was taught using mastery quiz completion rates as a modifier on regular summative examination scores. Students were given multiple attempts to master (approx. 40) learning objectives by scoring 100% on online mastery quizzes. Three initial attempts were allowed before needing to consult with the instructor to unlock additional tries. In a survey, students rated the quizzes as helpful for their learning (average 8.3 rating out of 10). Scores on the first semester cumulative final, 20% of the course grade, were 4% higher than previous versions of the course. Challenges, adjustments, and future plans will be discussed.

Birds of a Feather (BoaF)

Active Learning in Organic Chemistry (Tuesday 7/30, 12-12:45 pm, Cats Den)

Come join us for an informal gathering of those who teach or plan to teach organic chemistry. This is a great way to meet or catch up with members of the Organic Education Resources online community (www.organicers.org) or with those who have attended an ALOC workshop. All welcome.

Get Involved as an OrganicERs Fellow!

OrganicERs Fellows are experienced Organic Chemistry instructors that have committed to a specific task to support their colleagues for 1-2 years. Fellows will be paired with members of the Leadership Board or one another. Their service will be acknowledged on OrganicERs.org, our Facebook group, and (by request) a letter to their Chair or Dean. Possible OrganicERs Fellows roles include:

- Facilitating a faculty learning community (FLC)
- Facilitating a workshop at a national meeting
- Facilitating a symposium at a national meeting
- Representing OrganicERs at a national meeting
- Helping with the newsletter or member spotlight
- Helping with the website
- Helping with Facebook
- OrganicERs chemical education research

Members interested in serving as a Fellow should **complete the (short) Google form** (<https://forms.gle/5Z4ikyRbgFsvKHKF8>) by **June 30th** that will ask you to identify which role(s) interest you. Thank you!

Faculty Learning Communities (FLCs)

OrganicERs is looking for Organic Chemistry instructors to facilitate faculty learning communities during the 2024-25 academic year. Pairs of facilitators will work with a maximum of 6 participants to better understand and implement some facet of organic chemistry instruction. Past FLC topics have included:

- Open education resources
- Clickers
- Scholarship of Teaching and Learning
- Learning objectives
- Alternative grading
- Formative Assessment
- Flipping with video
- Diversity, equity, and inclusion
- Green chemistry

FLC Fellows will facilitate approximately 5 meetings each semester. Expectations include:

- Develop 2-4 learning objectives for the FLC at the first meeting - post to Google drive
- Optimize meeting time(s)
- Record session descriptions and attendance - post to Google drive
- Review progress on learning objectives during the final meeting - post to Google drive
- Complete post-FLC survey

Members interested in facilitating a FLC should **complete this Google form**

(<https://forms.gle/fADAd8544bx5mGVQ9>) **by June 30th** that will ask you to identify the lead facilitator, co-facilitator, time zone for each, proposed topic (see form for past topics), proposed semester(s) to meet, and a time that both facilitators are available for FLC meetings.

Meet the Inaugural Fellows

Janell Mahoney



Janell Mahoney is a Teaching Assistant Professor and the Organic Chemistry Director at the University of Nevada, Reno. She primarily teaches organic chemistry, including large-enrollment lecture classes and coordinating a large teaching lab program. She has taught all of her organic chemistry lectures using research supported active learning methods since 2019. Since attending the 2023 ALOC workshop she has been focused on the implementation of new collaborative learning techniques and formative learning assessment techniques in her large enrollment organic chemistry I and II courses.

Cathy Lugo



Catherine Serrano Lugo started teaching organic chemistry at Texas A&M in the Fall of 2018. Since then, she has adapted student-centered and innovative teaching techniques to improve student outcomes. Most notably, she started a Learning Assistant Program to equip and empower former students in facilitating an active and collaborative learning environment in her classes. Building upon this success, she spearheaded the establishment of the Chemistry Learning Laboratory, which offers free peer-tutoring services to students of organic chemistry. Her efforts laid the groundwork for expanding similar initiatives across other courses in her department. Recognized for her exceptional dedication and positive impact, she received the 2022 Associate of Former Students College of Arts and Sciences Distinguished Achievement in Teaching Award. She has been recently appointed as a Fellow for the Organic Education Resources (OrganicERs).

Matt Leathen



Matt Leathen has taught at Truckee Meadows Community College (TMCC) in Reno, Nevada, as a Professor since 2014. He serves as lead faculty for Organic Chemistry I lecture and lab, Organic Chemistry II lecture and lab, and Introductory Organic Chemistry. Prior to joining the faculty at TMCC, Matt taught lecture and lab courses at Grand Valley State University for 3 years. He earned a Ph.D. in Organic Chemistry at University of Michigan – Ann Arbor. Matt attended the OrganicERs Active Learning in Organic Chemistry (ALOC) summer workshop in 2022 and has been excited to continue improving his teaching through the use of evidence based instructional practices. Matt looks forward to many more years teaching while sharing his excitement for science and nerdy chemistry shirts.

Danielle (Dee) Jacobs



Danielle (Dee) Jacobs (she/her) was born & raised in [central New Jersey](#), where she initially developed her love for chemistry—or more importantly nerdy chemistry jokes—from her high school teacher, Dr. Kimmel. She graduated with a BS in chemistry from Haverford College (2002) and PhD in organic chemistry from UNC Chapel Hill (2008), after which she moved to Ft. Collins, CO as a AAAS Mass Media Fellow, reporting science for KUNC, the

local NPR affiliate on the gorgeous Colorado Front Range. Still, freshly minted Dr. Jacobs heard the song of the siren, and returned to NJ where she joined the faculty at Rider University (Lawrenceville, NJ). As an associate professor of chemistry, Dee teaches undergraduate courses in organic chemistry—as well as any other chemistry tangentially related to organic—and leads an active research lab in organic synthesis and methodology, having mentored over 50 undergraduate and high school students since 2008. At Rider, Dee was awarded with the Mazzotti Women's Leadership Award (2015), Christian R. and Mary F. Lindback Distinguished Teaching Award (2019), and the Provost's Initiative Award (2022), but most proudly displays her trophies for "Best Dressed Professor" and "Hardest Professor" awarded by Rider's Student Affiliates of the ACS. From 2016 through 2022 she served as the PI on a \$1.49M NSF-Noyce grant that prepared 22 undergraduate STEM majors as science & math teachers in high need school districts. She also serves as the treasurer for the Trenton Section of the American Chemical Society (TrACS) and coordinates the US National Chemistry Olympiad for the region. While Dee chose—at least for now—a career in academia over science reporting, her goals over her 16 years in the classroom have been the same as the pressroom: to instill scientific understanding, skills, and critical thinking in an engaging, accurate, and transferable manner. Toward this goal, since attending the OrganicERs ALOC workshop in 2022, she has primarily focused on developing Learning Assessment Techniques to engage students in effective reading techniques, and is getting her toes wet with alternative and un-grading. She is honored to be considered a valued member of this community of like-minded teacher-scholars.

Peer Review Comes to OrganicERs Website

To encourage the development and sharing of high-quality instructional materials on our website, the OrganicERs Leadership Board has developed a peer-review feature that contributors may select when they submit learning objects for inclusion on the site. We realize that peer review plays a significant role in professional advancement of faculty members. The ability to include peer-reviewed learning objects in a dossier for tenure or promotion may strengthen a faculty member's case, and we hope to facilitate this process.

When a member submits a learning object as a contribution to the OrganicERs website, they now have the opportunity to request peer review on their submission. The review process will proceed similar to how it works with journals. Editors will work with reviewers to seek feedback on submissions, with a rubric listing expected components of a successful submission. Author and reviewer instructions are available in a new section on the website titled Peer Review Process.

Website users will be able to recognize materials that have passed the peer review process by the peer review badge on these items. Authors may elect to have these materials available to website visitors that are not members of the community. Authors may request a letter from an OrganicERs leadership board member providing details about their peer reviewed submissions for inclusion in a tenure or promotion file. OrganicERs members who are interested in serving as reviewers should contact Matt Casselman at matthew.casselmann@ucr.edu.
[Link to information about peer review process on OrganicERs site](#)



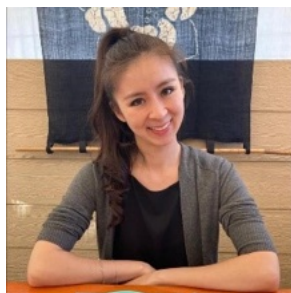
Peer Reviewed

Bi-monthly Virtual Meet-up

In April, we had our first virtual meet-up to discuss alternatives to lab reports. The next virtual meet-up will be in late June. Please reach out to Gidget Tay (gtay1@pasadena.edu) with any questions or topic suggestions!

New Article: Personalized System of Instruction

Gidget Tay
(Pasadena City College)



Gidget has developed a personalized system of instruction (PSI) to help students navigate foundational topics in first semester organic chemistry at their own pace. Students must pass assessments prior to proceeding to the next topic and have built in time for one-on-one support. [Click here](#) to read the article.

New Cosmetic Science Program at Spelman College

Leyte Winfield (director)



Starting in Fall 2024, Spelman College will now offer a chemistry major with a concentration in cosmetic chemistry as well as a cosmetic science minor! The cosmetic science program represents the first of its kind at Historically Black Colleges and Universities (HBCU). [Click here](#) to read more about program.

Upcoming Events

[Green Chemistry and Engineering Conference, June 2-5, Atlanta, GA](#)

[Empowering Women in Organic Chemistry \(EWOC\) Conference, June 20-21, Merck Rahway, NJ \(and virtual option\)](#)

[Biennial Conference on Chemical Education, July 28-August 1, University of Kentucky, Lexington, Kentucky](#)

[ACS Fall 2024 Meeting, August 18-22, Denver, CO \(and hybrid\)](#)

[National Organization for the Professional Advancement of Black Chemists and Chemical Engineers \(NOBCChE\) Conference, September 30-October 3, Orlando, FL](#)