

The POGIL Inquirer

In The Spotlight Ching Yim & Kimberly Stieglitz

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From The POGIL Project Director



Dear Friends,

It seems like just yesterday that the semester began, but we are now already halfway through! This fall has been a busy one at the National Office, as we are already deep into the planning process for next summer's workshops. We are also excited about the progress that our Strategic Plan working groups have made, and we are eagerly looking forward to adding several new titles to the POGIL collection of materials.

During the week of Oct. 21, we held our annual pledge drive, and everyone here was heartened by the overwhelming show of support from our loyal donors. We are still pulling together the final numbers, but we are thankful for the dollars raised, for the number of new and enthusiastic contributors, and for our loyal sustaining partners. We could not do this without you, and we are so grateful for your continued participation.

If you haven't already seen it, visit our website to take a look at our video that features many of your colleagues as they tell us what POGIL is "in one word."

Finally, as we look forward to the winter, don't forget to keep in touch with us. We always look forward to hearing from you, getting feedback, and helping to connect you to one another.

Richard S. Moog

Upcoming Events

Nov. 2	NW Summit Meeting, Kirkland, WA
Nov. 2	NE Summit Meeting, Springfield MA
Nov. 13	eSeries – Assessing Process Skills
Nov. 22	Bakersfield College, CA
Dec. 4	POGIL Book Series – Effective Groups
Dec. 13	NSTA Area Conference on Science Education, Seattle, WA
Jan. 8	eSeries – Mini-POGIL Experience
Jan. 11	NW Summit Meeting, Kirkland, WA
Jan. 18-20	Facilitator Training, Myrtle Beach, SC

For more information on POGIL workshops, visit www.pogil.org



Ask The Mole

Q: Why are POGIL methods particularly well suited to STEM?

A: The POGIL methodology is an effective guided inquiry strategy with a proven track record of enhancing student learning. In addition, the guided inquiry method of teaching matches well with the inquiry necessary for conducting science.

Inquiry methods in the POGIL model follow the learning cycle components of exploration, concept invention, and application, and require students to make use of a set of process skills to learn the relevant material. The learning cycle matches well to the traditional model of the scientific method. In the exploration phase, the activity probes and asks questions about a phenomenon and leads to concept invention, analogous to analyzing data and developing a hypothesis. Students then move on to application, or hypothesis testing, and ask more questions.

Excerpted from *POGIL: An Introduction to Process Oriented Guided Inquiry Learning for Those Who Wish to Empower Learners*, Edited by Shawn Simonson, Stylus Publishing, 2019.

Feel free to suggest your own topics. The more ideas we have, the happier the POGIL community will be! If you have any questions regarding inquiry learning, POGIL materials, or any POGIL-related knowledge, email us at marcy.dubroff@pogil.org

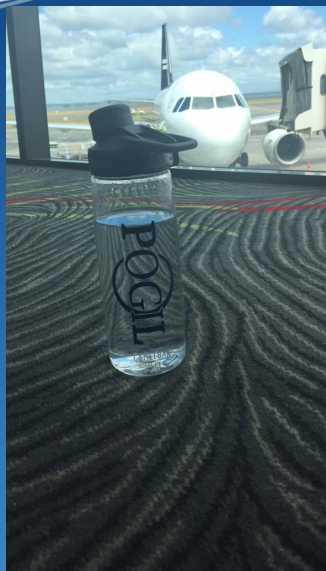


Where in the world is the POGIL water bottle?

Did your POGIL water bottle take a fabulous summer vacation or is it enjoying a lovely autumn trip? We'd love to see where our iconic bottle has traveled this past year!

Send us pictures of your bottle so we can find out where the bottle has gotten its passport stamped. Once again we will feature the photos on our website and on our Facebook page. Feel free to give us some detail! We love living vicariously through the bottle's adventures.

Send your photo or video of your water bottle to Marcy Dubroff at marcy.dubroff@pogil.org.



In the Spotlight:

Kimberly Stieglitz & Ching Yim

Roxbury Community College, MA, and Springfield Technical Community College, MA



Kimberly Stieglitz and Ching Yim met because of their shared background as community college professors. Stieglitz is a biochemist who teaches general chemistry at Roxbury Community College, in Boston, and Yim teaches just a few hours away, at Springfield Technical Community College, in Western Massachusetts.



Right away, Stieglitz and Yim knew they faced similar challenges as community college instructors who wanted to implement POGIL. As Stieglitz puts it, their students are often "college-level but not college-ready," and many face additional pressures: full-time jobs, language barriers, and a public high school system that left them underprepared for college-level science.

Yim sees this in his own classroom, too. "Students come from uneven backgrounds and some of them are very poorly prepared," he explained, noting that many of his students have had a difficult time in inner city school districts.

"We teach everyone," Ching added. "We run into students that have different levels of maturity. With POGIL, you put students into groups with roles. Some students may or may not be competent dealing with these kinds of roles."

Yet, despite these roadblocks to implementing POGIL, Stieglitz and Yim both knew a student-centered approach to science was more important than ever for their students. "I have this mission because I think POGIL is a very powerful technique, and I've watched it transform my students into active learners," said Stieglitz. "It's more than just retention. It makes my students take ownership of the learning process."

"Our problem is bringing together all these different groups of people at different levels," Stieglitz added. "In traditional lectures, you can fail up to 30 percent of your students every semester. But when you switch to POGIL, you empower those students who are struggling to move up with the rest of the group. You put to use people who are talented or who might be bored to try and explain to others what's going on. Mentoring is built into the framework."

"My mission within the POGIL project is to promote diversity and inclusion of different life experiences, races, and ethnicities," Stieglitz continued. "I want to get more first-generation students involved in POGIL because it motivates them."

But trying to implement POGIL into community college classrooms on one's own is a daunting task. That's why Stieglitz and Yim partnered up to organize a POGIL summit aimed at community college science faculty in New England. "We know other people are interested, but we never saw them in the workshops because they don't have the money or the time to go over," said Yim.

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The duo decided to keep the summit local, in order to lessen the burden on teachers who may have little time to travel or little budget for professional development. "We're going to set up a network to share our own materials," Yim added.

For Yim, resource sharing also means helping other faculty understand how to write successful activities. He often re-structures POGIL activities for his own classroom, in order to give his students time to slow down and develop the social skills they need to be successful.

"I do not think that a lot of students will have enough independence, and they need to go even slower," Yim said of his POGIL writing strategy. Community college students often need more scaffolding and guidance, he says, and professors interested in teaching POGIL activities in these environments need more support from one another as they experiment with what works.

Stieglitz, in turn, wants the summit to open up a space for mentorship opportunities, and lay the foundation for more systemic support of community college teachers and their professional development. "My hope is to try and pull in minority faculty," Steiglitz said. She wants them to understand that POGIL "is a different culture. This is a pedagogy, this is a method of teaching."

"It's innovative, and it can be misunderstood," Stieglitz added. This can pose a particular danger to minority faculty, who have less room to fail, and who might butt up against more traditional faculty who have a say in hiring and firing. "You want people to understand what you're doing," she said, and notes that she often calls department chairs on behalf of new faculty who want to implement POGIL, just to lend her support.

Stieglitz thinks it's especially important to highlight how a method like POGIL is effective for at-risk students. "The 20 to 30 percent of people who drop off [in community college] can be salvaged," she said. "We don't want to lose anyone. We can be inclusive. POGIL is a tool for me to do that."

—Kristen Evans

Check out the 2019 POGIL Community Report!



Every year, The POGIL Project, as a nonprofit organization, shares that past year's stories, accomplishments, and financial information with our community. Check out our 2019 Community Report, hot off the presses! Visit:

<https://pogil.org/uploads/attachments/ck25hcgs10a40yfx4yvb49cd5-pogilcommreport-fulllayout-r5.pdf>

Kudos!

Kristen Drury was honored by the William Floyd Alumni Association as an “Outstanding Educator” on October 17, 2019; a distinguished award for teachers, administrators, and mentors who have guided and mentored William Floyd students in their K-12 education and were nominated by former students for their phenomenal work as educators.

Karen Groh has been a professor at Good Samaritan College of Nursing and Health Science for seven years and was honored with the college’s “Outstanding Educator” Award in May of this year.

KUDOS to **Karen Groh** and **Kristen Drury** on their awards!

Have you received an award, or know of a colleague who should be mentioned here? Email Marcy Dubroff at marcy.dubroff@pogil.org with the information!

New to POGIL



POGIL

An Introduction to Process Oriented Guided Inquiry Learning for Those Who Wish to Empower Learners (Stylus Publishing).

Edited by Shawn Simonson

The first part of this book introduces the theoretical and philosophical foundations of POGIL pedagogy and summarizes the literature demonstrating its efficacy. The second part of the book focuses on implementing POGIL, covering the formation and effective management of student teams, offering guidance on the selection and writing of POGIL activities, as well as on facilitation, teaching large classes, and assessment. The book concludes with examples of implementation in STEM and non-STEM disciplines as well as guidance on how to get started. Appendices provide additional resources and information about The POGIL Project.

To order this book, visit

<https://styluspub.presswarehouse.com/browse/book/9781620365441/POGIL> and use the code **POGIL** to get a discount at checkout.

Keep an eye out for announcements about our new POGIL Book Webinar Series. Explore chapters in this book through an online Q&A with selected authors. Registration is free, but required to receive the webinar link. All webinars will run 6-7 PM eastern time.

Dec. 4 Effective Teams with Megan Hoffman and Susan Richardson

Feb. 12 Facilitation with Jenny Loertscher and Mare Sullivan

April 8 Assessment with Shawn Simonson

POGIL Published Works

Developing Student Process Skills in a General Chemistry Laboratory

Gil Reynders, Erica Suh, Renee S. Cole, and Rebecca L. Sansom

Laboratory coursework is widely considered to be an integral part of chemistry undergraduate degree programs, although its impact on students' chemistry knowledge is largely unsubstantiated.

Laboratory experiences provide opportunities to learn skills beyond chemistry content knowledge, such as how to use scientific instrumentation appropriately, how to gather and analyze data, and how to work in a team. The acquisition of process skills, including critical thinking, problem solving, and communication, is an integral part of becoming a scientist and participating in the scientific community. As apprentice scientists, chemistry students interact with each other in a context-rich environment where the need for process skills can arise organically. This study seeks to understand the role of laboratory courses in developing process skills. Students in a first-year chemistry laboratory course used rubrics to assess their own process skills. During the course, the students also received feedback via rubrics from a teaching assistant trained in rubric use. Additionally, students reported their understanding of process skills and their perceived improvements over the course of the semester. Our results suggest that students understand group dynamics process skills such as teamwork and communication better than they understand cognitive process skills such as critical thinking and information processing. While the evidence further suggests that students improved their process skills, and students reported that they improved their process skills, they showed inconsistent abilities to self-assess and provide justification for their assessment using rubrics

Gil Reynders, Erica Suh, Renée S. Cole, and Rebecca L. Sansom
Journal of Chemical Education 2019 96 (10), 2109-2119
DOI: 10.1021/acs.jchemed.9b00441

Assessment of Process Skills in Analytical Chemistry Student Responses to Open-Ended Exam Questions

Jennifer A. Schmidt-McCormack, Caryl Fish, Anne Falke, Juliette Lantz, and Renée S. Cole

Assessment, including course exams, clearly indicates to students what learning goals they are expected to master in a certain course. However, most of these assessments tend to focus on generating a correct answer rather than on the type of reasoning or skills used to arrive at the answer. If educators value skills in addition to the correctness of an answer, it is important that they assess them. As part of the ANA-POGIL (analytical process oriented guided inquiry learning) project, the ANA-POGIL team developed a set of process-rich or guided-inquiry-type assessment questions to be used on exams.

These questions were designed to mirror the structure of the POGIL activities, where students were provided data in the form of a table, graph, or set of information with the intention of eliciting evidence of process skills such as information processing, problem solving, and critical thinking in the students' written responses. This study presents an analysis of student responses gathered from multiple institutions over several semesters to determine characteristics of questions that are likely to elicit evidence of process skills. Results of this project can provide some insight and recommendations to instructors about how to construct questions to elicit evidence of desired skills. Jennifer A. Schmidt-McCormack, Caryl Fish, Anne Falke, Juliette Lantz, and Renée S. Cole Journal of Chemical Education 2019 96 (8), 1578-1590
DOI: 10.1021/acs.jchemed.8b00877

Cooperative Learning in Large Sections of Organic Chemistry: Transitioning to POGIL

Dorian A. Canelas, Jennifer L. Hill, and Robert G. Carden

A brief review of recent literature describing cooperative learning in organic chemistry, and the use of POGIL in particular, is presented. A case study of the steps one instructor took to implement the POGIL pedagogy will be outlined along with instructor reflections on the overall experience. Examples of outcomes from experiments comparing cooperative learning sections to lecture sections will be reviewed and expanded. Differences in learning between the participants in the experimental (cooperative learning) and control (lecture format) groups have been found in three key areas: (1) psychological affect variables, (2) development of transferable skills, and (3) self-reported gains in key organic chemistry content areas. Comparison of the two groups in terms of their elucidation of molecular structures from spectroscopy data will be discussed. When compared to the lecture group, students in the cooperative learning group self-reported higher gains in skills, and this was confirmed using a direct measure: performance on free response spectroscopy problems on the final exam. Indeed, the cooperative learning group scored higher than the lecture group on these spectroscopy free response exam problems, and this difference between the scores of the two groups was statistically significant.

DOI: 10.1021/bk-2019-1336.ch012

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Published works, continued from page 6

Building a Community of Transformation and a Social Network Analysis of the POGIL Project

Susan E. Shadle, Yujuan Liu, Jennifer E. Lewis, and Vicky Minderhout

Communities of transformation work to achieve deep, transformational change in higher education teaching practice. This case study of The POGIL Project follows the development of a community of transformation principally focused on the propagation of effective teaching in STEM. We describe the origin of the community, elucidate the emergent decisions that shaped its growth, and offer a social network analysis of the connections between change agents that have been deeply engaged in the growth and development of the POGIL community. The case provides concrete examples of how the features of a community of transformation, most particularly the community network, can be intentionally fostered. We discuss the implications for STEM education reform in light of the case analysis.

Shadle, S.E., Liu, Y., Lewis, J.E. et al. *Innov High Educ* (2018) 43: 475. <https://doi.org/10.1007/s10755-018-9444-0>



POGIL Implementation Guides are here!

This digital guide explains POGIL® implementation and provides tips for running a successful POGIL lesson. With POGIL, students work on carefully crafted guided inquiry activities that are scaffolded to help students master content and develop life and learning skills. Use this guide and POGIL role cards (AP9841) for clear expectations and a smooth activity.

<https://www.flinnsci.com/pogil-implementation-guide/ap10647/>

POGIL eSeries Returns this Fall

The POGIL eSeries will return this fall with a great lineup of web professional development offerings. **Visit the POGIL website for exact dates and registration information.** The topics this year include:

Non-Compliance
Process Skills
Mini-POGIL
NGSS

POGIL Summer Coordination Team

Debra Driscoll

University of Texas at El Paso – MaST Academy

Joyce Easter

Virginia Wesleyan University

Brandon Fetterly

University of Wisconsin Colleges

Tim Herzog

Weber State University

Dan Libby

Moravian College (retired)

Tracey Murray

Capital University

Stephanie O'Brien

Commack School District, NY

Michelle Poletski

Newburg School District

Shannon Wachowski

University of Wyoming

NSF Grant - Bridging to STEM Excellence

The POGIL Project recently received funding from the National Science Foundation for its project, "Bridging to STEM Excellence." By using a consortium approach to coordinate and collectively improve proven professional development organization, the BTSE project will accelerate the adoption of department and program-level interventions with demonstrated evidence for improving student learning outcomes and retention.

The BTSE project will fill a gap through the integration of strategies that support individual faculty in improving their practices as well as encourage the broader use of by institutions, departments, and programs. Five consortium member institutions will collaboratively build a community of practices and develop a consultancy corps, knowledgeable in the improvement practices of all five organizations. The consortium members will then undertake a cycle of consultation, action and follow-up support, with five pre-selected institutional partners. The members of the consortium, in addition to The POGIL Project, are BioQuest, the National Association of Geosciences Teachers, the National Center for Science and Civic Engagement, and the Summer Institutes on Scientific Teaching. Institutional partners include Bakersfield College, California State University at Chico, Georgia State University, The Ohio State University, and the University of Richmond.

POGIL Pledge Week 2019

Many, many thanks to the POGIL community for your generous support and participation during POGIL Pledge Week! We were thrilled to receive 103 gifts toward our goal! Also this year, we continued the first-time donor match and want to send a special thank you to our match donor, AND extend a warm welcome to our 15 first-time donors! And, congratulations to Dan Libby, the winner of our donor drawing for an M&M-filled water bottle!

Last year, you helped make it possible for us to provide 58 workshops to more than 1200 educators, subsidize six workshops at schools and colleges, and fund several new collections of POGIL activities. And, thanks to you, we were able to offer financial assistance to 74 educators to attend POGIL workshops and meetings this past summer.

Your POGIL Pledge Week gift will help us continue to provide educators with the training, tools, and community support they need to bring POGIL to more classrooms in the coming year.

The POGIL community is the heart of The POGIL Project. All year long, you give of your time, treasure, and hearts to help make it possible for students to experience a POGIL education—an education that prepares them to think critically, solve problems, work with others, and experience the joy of discovery. To all of you who give so much, you are truly our heroes and we thank you from the bottom of our hearts. Together, we are transforming education!



DONOR IMPACT

2018-2019

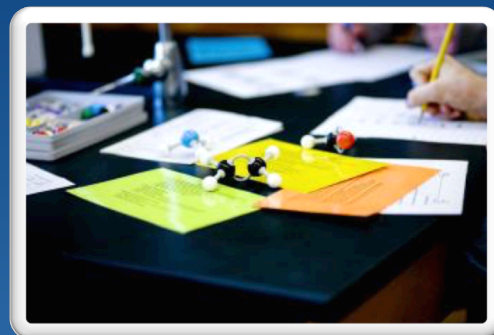
Thanks to your support, The POGIL Project was able to provide:

- 74 Teacher Scholarships**
(to POGIL workshops and meetings)
- 6 Workshop Subsidies**
(to schools)
- 1 SPUR+ grant**
(for new POGIL activities)

Looking to Book a Workshop?

- If you would like to bring a POGIL workshop to your area, please get in touch with us! We are interested in teaching more instructors about POGIL at both the high school and post-secondary levels and want to help them make their classrooms and laboratories more student-centered.

Please visit our website and submit a request a workshop form or email Marcy Dubroff at marcy.dubroff@pogil.org.



Send us your news!

We'd love to feature your news, your grant, or your video on the POGIL website and in the POGIL newsletter. Send news to Marcy Dubroff at marcy.dubroff@pogil.org

Get all the latest POGIL news by following us on Twitter or Facebook! Sign up to get our @POGIL tweets at [twitter.com](https://twitter.com/POGIL).

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The POGIL Inquirer

The POGIL Project

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