

# The POGIL Inquirer

In The Spotlight:

Chris Bauer

University of New Hampshire

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Photo by Lisa Nugent, UNH

## From The POGIL Project Director



Dear Friends,

Warm weather is just around the corner and that means that our summer workshops are coming up in just a few short weeks! This year, we are excited to host our regional workshops in New York, Seattle, Chicago and Dallas.

We are also looking forward to our Facilitator Training workshop in St. Paul and our Writers' Retreats in St. Louis and Seattle. We hope you will find the time to attend one of these events and reconnect with members of the POGIL community.

Check out the offerings on our website at [www.pogil.org](http://www.pogil.org).

In late June, we also hope to have a new Mission, Vision and Values statement and Strategic Plan to share with the entire community. The Steering Committee has been hard at work incorporating feedback from last year's POGIL National Meeting into these new documents and will solicit even more feedback in the coming weeks. We will look forward to posting these new documents on our website and always welcome your input as we continue to grow as an organization.

Finally, while summer is a great time to get in some professional development time, we also want to remind everyone to enjoy a brief respite from work. Whether it's savoring the extra hours of daylight, or opening up the car windows on a warm and sunny day, we hope your summer months are filled with great weather and even better memories!

*Richard B. Moog*

## Upcoming Workshops

|            |  |
|------------|--|
| April 21   | POGIL NW Summit, Kirkland, WA                    |
| May 5, 12  | Teaching with Your Mouth Shut, Seattle, WA       |
| May 14     | US Naval Academy 1-Day Workshop, Annapolis, MD   |
| May 21     | UW Colleges 1-Day, Waukesha, WI                  |
| June 4-5   | Westmont College Lab Workshop, Santa Barbara, CA |
| June 11-14 | Round Lake MS 3-Day, Round Lake, IL              |
| June 12    | Kohelet Yeshiva 1-Day, Merion Station, PA        |
| June 14    | Fox Valley Technical College 1-Day, Appleton, WI |

For more info on upcoming POGIL workshops, visit [www.pogil.org](http://www.pogil.org)

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 Rick Moog, Director • Marcy Dubroff, Executive Editor • Katie McCarthy, Intern



## Ask The Mole

**Q:** What is the difference between a group and a team and why is this important?

**A:** Structured group work is a centerpiece of the POGIL approach to teaching and learning. Small teams of students work together to construct and apply course-specific knowledge by completing guided inquiry activities.

Part of the structure of a POGIL team arises from the assignment of specific roles for each team member and the fact that teams are self-managed and the instructor acts as a facilitator rather than as the source of information and approval of answers.

One key distinction is that POGIL practitioners refer to student groupings as “teams” instead of “groups.” This is because teams tend to be more formal and have a higher function than groups. Groups are collections of people who bring together their individual talents and efforts to accomplish a task. Teams, on the other hand, are collections of people who dedicate themselves to common goals, work together to achieve those goals, and remain committed to each other. Thus, teams have a higher level of internal accountability than groups.

*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](mailto:marcy.dubroff@pogil.org)*



## POGIL Launches eSeries

This spring, The POGIL Project offered its first eSeries events, which were focused on process skills development in the classroom. In true POGIL fashion, the online sessions were interactive and discussion based. Enthusiastic participants filled the new professional development sessions, led by Erik Halliday, Juliette Lantz, Teresa Bixby, and Marty Perry.

The Project looks forward to continuing to meet the POGIL community's needs by increasing access to electronic and web-based development activities, and plans to develop more sessions in this vein. If you have suggestions about future eSeries offerings, please email Marcy Dubroff at [marcy.dubroff@pogil.org](mailto:marcy.dubroff@pogil.org).

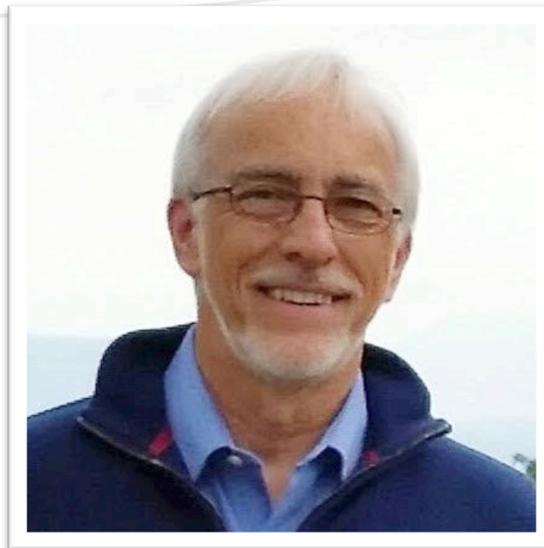


## In the Spotlight: Chris Bauer

*University of New Hampshire, Durham, NH*

*Bauer is a member of the POGIL Steering Committee is leading The Project effort to update its 5-year Strategic Plan. He is a Professor of Chemistry and his research addresses student misconceptions, attitudes about learning and courses, discovery-based chemistry curricula, and faculty beliefs and practice.*

*Recognitions include the UNH Jean Brierley teaching award, the Howard Wagner Award for Outstanding Contribution to Science Education in NH (NHSTA), the chair of the 2007 Gordon Conference on Chemical Education Research and Practice, and the Ted Ashford Fellowship from the ACS Examinations Institute.*



“We know what ideas students have difficulty with - but why are they so problematic, and what can be done in instruction to improve it?” Chris Bauer, a professor of chemistry at the University of New Hampshire, asks.

Long before POGIL was founded, Bauer specialized in chemistry education and explored how student attitudes toward learning affected their performance. Much of his research is devoted to common trouble areas in content acquisition, which he funnels into both assessment models and professional development programs for graduate students.

“POGIL caught my attention because of the way it approached teaching and learning in the classroom,” Bauer says. “I thought POGIL had a strong theoretical basis.”

In 2008, the National Science Foundation awarded Bauer and his colleagues a grant to hold graduate-level inquiry-based workshops in some of the top chemistry departments across the country, including Harvard, Stanford, North Carolina, and Penn State. “It was really an attempt to introduce them to teaching and learning in a way they had never thought about before,” Bauer says.

“We wanted them to be aware that there was, in fact, learning theory out there that had an impact on how you might make decisions about curriculum and day-to-day instruction.” According to Bauer, this was a necessary intervention in graduate-level instruction.

“There’s still a lot of folks coming out of graduate programs who’ve had bare-bones contact with teaching and learning research,” says Bauer. He’s even taught a teaching and learning course in the UNH chemistry department since the early ‘90s to try and address the issue.

“I’ve run into a couple of people since then who were in those NSF workshops,” Bauer recalls. “One student finished the workshop and changed her research direction. Now she’s pursuing teaching and learning as a postdoc.” Now, Bauer is enjoying serving on POGIL’s steering committee and leading it in its latest round of strategic planning.

“POGIL really has been a vehicle for me to think about my own classroom instruction, what I can do for students at my institution, and how I can affect my local colleagues,” says Bauer.

While he’s facilitating the next round of strategic planning, he’ll be thinking about where POGIL has been in the past - and how to help the organization shape its future.



## Congratulations to the SPUR<sup>+</sup> Grant Recipients!

We're pleased to announce that The POGIL Project's SPUR<sup>+</sup> seed grant program funded two important and timely proposals in 2017:

· *Middle School Earth and Life Science POGILs*, led by Lori Stanton, Master Teacher with experience as a high school and middle school science teacher; and, Amy Steele, Middle School Science Teacher at Cornerstone Christian Academy. This team, with Mare Sullivan as a consultant, has developed 22 activities that have been beta tested in middle school classrooms at least one, with additional beta testing continuing through May of 2018. The activities have been designed to meet specific Next Generation Science Standards (NGSS), and are currently undergoing the POGIL activity feedback and endorsement process.

· *Environmental Science Activity Cultivation (ESAC)*, led by Caryl Fish, Professor of Interdisciplinary Science and Environmental Chemistry at Saint Vincent College; and, Daniel King, Associate Professor of Environmental Chemistry at Drexel University. The team will be meeting several times throughout 2018, including during the POGIL Northeast Regional Meeting, to catalogue existing college level environmental science activities, determine the stage of development for each, while also identifying any gaps in content coverage. Once the identification phase is complete, a team of environmental science faculty will move the collection forward by writing, reviewing, and classroom testing the activities.

Selected from many worthy proposals by The POGIL Project's Steering Committee, these projects stood out for their strong support of collaboration, close alignment with the goals of The POGIL Project and strategic plan, and their ability to have a lasting and positive impact on the ability of The POGIL Project and POGIL community to reach teachers in new disciplines. We look forward to hearing more from these SPUR<sup>+</sup> teams as their projects progress!

## Registration Now for Summer Workshops!

If you are a high school teacher or college/university instructor and want to enhance your professional development, our POGIL 3-day workshops are for you! You will learn about POGIL's philosophy and methodology and benefit from additional focus on activity writing, classroom facilitation, and/or lab implementation. Informative poster and plenary sessions will provide you with opportunities to meet and network with other POGIL users.

### \*Three Tracks to Choose From in 2018\*

These workshops are designed for both those who are new to POGIL and those who have previously attended a POGIL workshop. On the first day of the workshop, new POGIL participants will attend a "Fundamentals of POGIL" session while previous participants will attend two sessions of universal application. The start of the second day will expose all participants to facilitation in a POGIL classroom and POGIL activity structure. For the remainder of the workshop, participants will follow a series of sessions focused on their chosen area of interest - Activity Writing, Classroom Facilitation, or Implementing POGIL in the Lab.

For more information on the tracks, please visit <https://pogil.org/2018-summer-regional-workshops>

## Registration Information

The workshop fee is \$425, which includes registration, materials, three lunches, and two dinners. On-campus housing for two nights is available for an additional \$175 and includes two accompanying breakfasts. Visit [www.pogil.org](http://www.pogil.org) to register today!

### Northeast Regional Workshop

Manhattan College  
4513 Manhattan College Parkway  
Riverdale, NY  
July 10-12, 2018

### Northwest Regional Workshop

University of Puget Sound  
Tacoma, WA  
July 10-12, 2018

**\*\*\*Thanks to an anonymous donor, we have a limited number of scholarships available for rural High School STEM teachers from the states of Washington and Idaho. Visit [www.pogil.org](http://www.pogil.org) for more information.**

### North Central Regional Workshop

University of Illinois at Chicago  
Chicago, IL  
July 16-18, 2018

### South Central Regional Workshop

University of Texas at Dallas  
Richardson, TX  
July 17-19, 2018

Contact Marcy Dubroff to find out which track is right for you ([marcy.dubroff@pogil.org](mailto:marcy.dubroff@pogil.org)) or Julie Boldizar ([Julie.boldizar@pogil.org](mailto:Julie.boldizar@pogil.org)) or Ellen Harpel ([eharpel@pogil.org](mailto:eharpel@pogil.org)) for additional information about the workshops.

**Register today!**

## Refreshing The POGIL Project's Strategic Plan and Mission, Vision and Values Statements



As our Strategic Plan reaches the 5-year mark, the POGIL community is in the process of reviewing and refreshing its Strategic Plan and Mission, Vision, Values statements to position us for the next five years. The community feedback process, led by Chris Bauer of the University of New Hampshire, kicked off at the 2017 POGIL National Meeting in true POGIL fashion with a series of team activities designed to ask questions such as: What has changed in education since we started? What has changed in our society? How can we have a greater impact? How do our Mission, Vision, and Values statements need to evolve to better reflect our work and our goals?

Throughout the past year, the POGIL Steering, Board of Directors, and POGIL National Office professional staff have worked to assess and incorporate the community’s feedback into draft form for final review and comment at the 2018 POGIL National Meeting. We are also reaching out to various members of the community for additional insights before presenting the proposed revisions to the POGIL Board of Directors for final approval. Many thanks to everyone who has contributed to this process, especially Chris Bauer for his leadership. We'll keep you posted!

## Regional Networks

Last summer, a task force was formed to build upon or establish regional networks across the country as part of the Strategic Plan working group’s primary goal. This goal was to strengthen targeted areas of the POGIL community in an attempt to better connect practitioners so that they can feel supported both in and out of the classroom. The group, chaired by Tim Herzog of Weber State University, began pilot programs in New York City, Chicago, Los Angeles and Seattle. Regional leaders have been identified and outreach strategies are being formed. This group expects to implement some outreach activities in the coming months, including setting up mentoring networks, establishing Facebook groups, and organizing information get-togethers (both virtual and in-person).



## POGIL Published Works

### Student perceptions of immediate feedback testing in student centered chemistry classes

*Jamie L. Schneider, Suzanne M. Ruder, and Christopher F. Bauer*

Feedback is an important aspect of the learning process. The immediate feedback assessment technique (IF-AT®) form allows students to receive feedback on their answers during a testing event. Studies with introductory psychology students supported both perceived and real student learning gains when this form was used with testing. Knowing that negative student perceptions of innovative classroom techniques can create roadblocks, this research focused on gathering student responses to using IF-AT® forms for testing in general chemistry 1 and organic chemistry 2 classes at several institutions. Students' perceptions on using the IF-AT® forms and how it influenced their thinking were gathered from a 16-item survey. The results of the student surveys are detailed and implementation strategies for using IF-AT® forms for chemistry testing are also outlined in this article.

DOI: 10.1039/C7RP00183E

### Effectiveness of POGIL with ssi context on vocational high school students' chemistry learning motivation

*I. B. Yuliastini, S. Rahayu, F. Fajaroh, N. Mansour*

This study aimed to examine the difference of Vocational High School students' learning motivation after they were taught the topic of the electrolyte solution and redox reaction using POGIL model with SSI context, POGIL, and conventional learning. The research design used was quasi-experiment with the model of pre-test and post-test control group design. The research subjects were three classes with the similar initial ability. The data were obtained using SMTSL motivation questionnaire ( $r = 0.824$ ) and analyzed using ANCOVA. The research results showed a significant difference in learning motivation between students taught using POGIL with SSI context, POGIL, and conventional learning. The students who were taught using POGIL with SSI context had the highest learning motivation compared to those taught using POGIL and conventional learning.

DOI: 10.15294/jpii.v7i1.9928

### Exploring Power Distribution and Its Influence on the Process of Argumentation in a POGIL Biochemistry Classroom

*Annabel N. Prince, Wesley B. Pitts, and David W. Parkin*

In this exploratory case study, we consider how students in an undergraduate biochemistry class engaged in the process of argumentation within an inquiry-oriented learning environment to investigate a chemical mechanism in a particular part of the tricarboxylic acid cycle. Audio/video recordings of student groups during the mechanism discussion were analyzed in a coordinated fashion using three coding frameworks.

The first framework examined students' pattern of argumentation using Toulmin's Argumentation Patter model, the second coded the interactions for discursive moves using the Inquiry-Oriented Discursive Moves Framework, and the final analysis phase used turn-at-talk counts as a framework to explore how power and authority shift between and among participants in the classroom. This research found that argumentation is supported by structures that provide opportunities for discussion, claims, and rebuttals but that the instructor, acting in nuanced ways through expressions of discursive moves, can also promote or inhibit the argumentative process. We provide suggestions for pedagogical moves in inquiry-oriented classrooms.

### Metacognition in Chemistry Education: Connecting Research and Practice

*Tyler M. Miller*

People thinking about their own thinking, a phenomenon known as metacognition, has a long history. Records of metacognitive thinking date back to ancient Greece, but people thinking about their own thoughts and beliefs certainly existed before then. However, actual metacognitive research in psychology only began in the mid-nineteenth century. In this chapter, I provide a very brief account of metacognition in history and present an overview of some topics in measurement, theory, and current research from my perspective as an experimental psychologist. Topics included have psychological, neuropsychological, and educational relevance. I pay particular attention to the varieties, causes, and consequences of metacognitive bias. I also include a sample of interventions from the literature used by teachers and researchers to improve metacognitive monitoring accuracy in the classroom and in the lab. Finally, the reasons why metacognitive sophistication should be promoted are found throughout the chapter.

DOI: 10.1021/bk-2017-1269.ot001

### POGIL as a Culturally Relevant Pedagogy (CRP) in Qatar: a Perspective from Grade 10 Chemistry Classes

*David F. Treagust, Sheila Qureshi, Venkat Rao Vishnumolakala, Daniel C. Southam*

Educational reforms in Qatar have seen the implementation of inquiry-based learning and other student-centred pedagogies. However, there have been few efforts to investigate how these adopted western pedagogies are aligned with the high context culture of Qatar. The study presented in this article highlights the implementation of a student-centred intervention called Process-Oriented Guided Inquiry Learning (POGIL) in selected independent Arabic government schools in Qatar. provided school-based mentoring and professional

*Continued on page 8*

**Published Works**  
*continued from page 7*

The study followed a theoretical framework composed of culturally relevant pedagogical practice and social constructivism in teaching and learning. A mixed method research design involving pedagogical practice and social constructivism in teaching and learning. A mixed method research design involving experimental and comparison groups was utilised. Carefully structured learning materials when implemented systematically in a POGIL intervention helped Grade 10 science students improve their perceptions of chemistry learning measured from pre- and post-tests as measured by the What Is Happening In this Class (WIHIC) questionnaire and school-administered achievement test. The study further provided school-based mentoring and professional development opportunities for teachers in the region. Significantly, POGIL was found to be adaptable in the Arabic context.

DOI: 10.1007/s11165-018-9712-0

**POGIL Regional Coordinators**

**North Central Region**—(IA, IL, IN, MI, MN, SD, ND, NE, OH, WI)

Craig Teague, Cornell College (2018)

**Northeast Region**— (CT, DC, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VT,WV)

Joe Brown, U.S. Coast Guard

**Northwest Region**—NW (AK, ID, MT,OR, WA)

Mare Sullivan, Seattle Pacific University

Charity Lovitt, University of Washington Bothell

**Southwest Region**—(AZ, CA, CO, HI, NM, NV, UT, WY)

Tim Herzog, Weber State University

**South Central Region**—(AR, KS, LA, MO, OK, TX)

Megan Daschbach, Washington University in St. Louis

**Southeast Region**—(AL, FL, GA, KY, NC, MS, SC, TN, VA)

Megan Hoffman, Berea College (2018)



**Kudos**

Congratulations to Tracey Murray of Capital University who has received that institution's Praestantia Award for Outstanding Teaching. This is the highest honor that can be given to a Capital University faculty member.



**Soon in Print**

Congratulations to Shawn Simonson of Boise State University, editor of the forthcoming POGIL: An Introduction to Process Oriented Guided Inquiry Learning for Those Who Wish to Empower Learners, published by Stylus Publishing. You can preorder your copy at <https://sty.presswarehouse.com/Books/BookDetail.aspx?productID=484320>.

## NCAPP 2019

We are excited to announce The POGIL Project's second National Conference for Advanced POGIL Practitioners (NCAPP): *Building Bridges, Breaking Barriers*, to be held June 24-26, 2019 at Washington University in St. Louis, MO.

At the inaugural NCAPP in 2017, more than 90 experienced practitioners from all levels and all content areas gathered from across the country (and across the world!) to share their ideas and their experiences of implementing POGIL in a wide range of classroom settings and disciplines. This highly interactive conference, designed by and for advanced POGIL practitioners, saw instructors finding solutions to vexing problems and discovering new ideas and techniques to try in their classes. We all left inspired by the ingenuity and passion of our colleagues.

NCAPP 2019 will build on this foundation to create an environment where advanced practitioners can connect with peers to gain insight into effective teaching and facilitation, share and find new activities and approaches for the classroom and the laboratory, and establish collaborations over shared interests. We are also excited to announce our plenary speaker lineup, which includes **Michael Bruno**, Ph.D., instructor of chemistry at North Carolina School for Science and Mathematics; **Sylvia Hurtado**, Ph.D., former Director of Higher Education Research Institute at UCLA; **Saundra Yancy McGuire**, Ph.D., Director Emerita of the Center for Academic Success and retired Assistant Vice Chancellor and Professor of Chemistry at Louisiana State University; and **Susan Shadle**, Ph.D., founding Director of the Center for Teaching and Learning and Distinguished Professor of Chemistry and Biochemistry at Boise State University.

Visit the POGIL website this summer for more information and application information.

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## New Steering Committee Members Selected



The POGIL Project will add three new Steering Committee members to its ranks at this summer's POGIL National Meeting. The Steering Committee provides direction and definition to the goals of The Project. The group of nine meets monthly via conference call and twice yearly in person. Positions on the Steering Committee are determined via an annual application process, and three slots become available each year. Those joining the committee for three-year terms are (from left) **Caryl Fish**, St. Vincent College; **Ashley Mahoney**, Bethel College; and **Kristin Plessel**, University of Wisconsin-Rock County. They join Chris Bauer, University of New Hampshire; Urik Halliday, Von Steuben Metropolitan Science Center; Marty Perry, St. Louis College of Pharmacy; Suzanne Ruder, Virginia Commonwealth University; Shawn Simonson, Boise State University; and Laura Trout, Lancaster Country Day School. Retiring from the committee after this summer are Alex Grushow, Rider University; Sally Hunnicutt, Virginia Commonwealth University; and Mare Sullivan, Seattle Pacific University.



## Announcing the 2018 POGIL Water Bottle Summer Photo Contest

Do you love traveling with your POGIL water bottle? Are you exploring new paths this summer just like you do in your classroom throughout the school year? If this sounds like you, we invite you to submit a photo of your POGIL water bottle while on its summer journey.

We're interested in photos of your water bottle while exploring:

- Stunning natural settings
- Interesting historical sites
- Exotic locales of any kind
- Any other places that make your heart sing!

For water bottle photo examples, visit [pogil.org/about-the-pogil-project/the-pogil-water-bottle](http://pogil.org/about-the-pogil-project/the-pogil-water-bottle)

One Grand Prize winner will be selected. The Grand Prize winner will receive a stylish "Keep Calm and POGIL On" T-shirt and will appear on the cover of the 2019 POGIL calendar. Eleven photos will be selected for Honorable Mention and will appear in the 2019 calendar. Photographers selected for Honorable Mentions will receive a copy of the calendar featuring the winning photos. Winners will be announced by September 30, 2018.

The contest will run from June 1, 2018 – August 31, 2018. Look for the application information and official contest rules later in May.

Need to get a water bottle so you can enter the photo contest? Visit the POGIL online store at <http://store.apexadv.com/pogil/>  
And while you're at it, pick up a Keep Calm and POGIL On T-shirt as well!



## 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](mailto: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](mailto: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).

# POGIL

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