From The POGIL Project Director

Dear friends,

Given the weather that most of the country has been experiencing, I hope some warm wishes from The POGIL Project help alleviate the cold even a little bit! Here in Lancaster, we’re busy looking to the spring and summer and gearing up for some exciting initiatives, workshops and opportunities that are just on the horizon.

The Project will hold several 1-day workshops across the country in the coming weeks, and is busily planning its slate of 3-day regional workshops in June and July. Each of these workshops will continue to connect educators from all levels with the resources they need to help POGIL reach more students than ever before.

To complement these workshops, The Project also welcomes three new titles to the POGIL family of publications with activity collections for Anatomy and Physiology, Advanced Placement Chemistry, and Advanced Chemistry now available for educators.

Finally, The Project is gearing up for its National Meeting, held annually in St. Louis. This year, we have a record number of practitioners registered for the event, a testament to the incredible devotion of the POGIL community and its willingness to help The Project expand and achieve its goals. I look forward to working with those who plan on attending the meeting as we advance the organization’s strategic plan, now in its third year.

And of course, all this would not be possible without the fantastic support that we continually receive from you, the educators and thinkers that help sustain The Project and its programs. The warm weather cannot come soon enough, and I am eager to share with you the exciting events and advances for The Project as the next few months unfold.

Sincerely,

Rick Moog, Director
The POGIL Inquirer is a publication of The POGIL Project, a 501(c)(3) corporation.
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For more information on upcoming POGIL workshops, visit www.pogil.org
Ask The Mole

Q: What is the science writing heuristic?

A: The Science Writing Heuristic (SWH) is an approach to setting up laboratory classes to make the process more engaging for students and more intuitive to writing laboratory reports. Through this set up, students come to the lab with a beginning question and have the opportunity to discuss it with other students in groups. Then, with a set of guiding questions from those groups, the teacher can create a framework for the experiment that allows students to come to the desired results but allows them an independence and ownership in the investigation. Because of this, students are more engaged and interested in the lab.

By making students more involved in finding solutions on their own, they learn the lesson and process better. This approach makes the lab process easier for students to repeat because they have discovered it on their own.

In Iowa, 3rd though 5th graders who were taught with the SWH approach tended to do better on the Science, Math, and Reading sections of the Iowa Assessments. Students also showed a lasting carry-over effect in later grades. The SWH approach impacts critical thinking growth rates and closes achievement gaps.

If you have any questions regarding inquiry learning, POGIL materials, or any POGIL-related knowledge, email us at mdubroff@pogil.org.

Rick Moog Visits India

Project Director Rick Moog gave talks and ran several workshops about POGIL last December in India. He visited the Vignana Jyothi Institute of Engineering & Technology (VNR), the Institute for Chemical Technology (ICT), and ended at the International Conference on Education in Chemistry held in Mumbai, India.
In the Spotlight: Patrick Brown

The POGIL Effect

ETSU professor takes teaching methods

Spend any time at all with Dr. Patrick Brown and his passion for teaching will become obvious. Still, at the end of his first year as a college professor in 2008, Brown, now an assistant professor of health sciences at East Tennessee State University, admits he was “frustrated” with his new profession.

“I put so much effort into my class. The students loved me. I was very personable. I was charismatic. I got great reviews from my students,” Brown recalls. “But at the end of the semester, half of the class was failing my exam. There was a real disconnect with what I thought I was teaching and what they were actually learning.”

Eager to improve, Brown attended a workshop that summer on a teaching method called process oriented guided inquiry learning, or POGIL. It is a student-centered instructional approach that simultaneously develops content mastery and key process skills like critical thinking, effective communication and teamwork.

“It blew my skull,” Brown says. “They are so thoughtful in developing this. Every piece of these POGIL activities that students do has a purpose. Students are never told anything directly. It’s all about discovery. They are constructing knowledge from scratch.”

That, Brown says, is a far cry from the “old-sage-on-the-stage” model of teaching in which professors simply stand in front of a classroom and lecture for an hour. Now, instead of telling his students what they need to know and expecting them to learn it, Brown uses POGIL activities to give them hands-on opportunities to figure it out themselves.

“We all have preconceived notions, prior knowledge that affect how we learn. On the first day of class, I ask my students, ‘How many of you are a 38-year-old straight man, cradle Catholic from southern Appalachia?’ I don’t get anyone raising their hands,” he says. “And that’s the point. How can I expect a 19-year-old black woman from Memphis to have the same view of the world as I do? I can’t.”

POGIL originally began with activities to teach college-level chemistry. Activities now exist in a variety of subjects at both the college and high school levels.

In a POGIL classroom, students work in small groups on specially designed materials. Those materials supply students with data or information for interpretation followed by guiding questions to lead them toward the formulation of their own valid conclusions. The professor serves as a facilitator, observing and periodically addressing individual and classroom-wide needs.

Continued on p. 4
Continued from p. 3

The method is based on three main determinations about learning – first, that teaching by telling does not work; second, that students who are part of an interactive community are more likely to be successful; and third, that knowledge is personal and students develop greater ownership over material when they are given an opportunity to construct their own understanding of it.

“It requires a lot more work on everybody’s part. The students can’t just sit there and you, as the teacher, have to be doing that one-on-one mentoring in the classroom,” Brown says. “But it works. Students learn better.” The proof, he adds, is in the overall improvement of his students and their grades.

“My fail rate on my final exam was almost 20 percent when I was just lecturing,” Brown says. “With POGIL, it dropped steadily to about 5 percent – and that 5 percent is the ones that just gave up.”

Brown doesn’t just use POGIL activities in the classroom – he creates them and even teaches other educators how to use them. “I drank the Kool-Aid,” he jokes. “After that summer conference, I went home and wrote the world’s first anatomy and physiology POGIL activities.”

He has since written approximately 40 such activities and the complete set, just recently endorsed by The POGIL Project, will soon be available on the Wiley website. Brown also serves as the POGIL coordinator for the Southeast.

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New POGIL Publications

POGIL announces several new publications: PASCO’s Advanced Chemistry through Inquiry, POGIL Activities for AP Chemistry, edited by Laura Trout, and a chapter written by Rick Moog in Integrating Cognitive Science With Innovative Teaching in STEM Disciplines. The Project was also featured in Reaching Students: What Research Says About Effective Instruction in Undergraduate Science and Engineering.

The PASCO manual uses investigations to move students from the low-level task of memorization or confirmation of science facts to higher-level tasks of exploration, data analysis, concept construction, and application. The entire approach is grounded in POGIL methodology. Available at www.pasco.com

The AP Chemistry collection, published by Flinn Scientific, is the latest in a series of activities designed to integrate scientific practices, reasoning and inquiry into the AP Chemistry curriculum. It features 30 interactive, guided-inquiry learning activities in six major topic areas. Available at www.flinnsci.com

Moog’s chapter “Process Oriented Guided Inquiry Learning” is part of a larger collection on teaching and learning, and explains how a POGIL learning environment is set up and works to improve learning. Available at http://openscholarship.wustl.edu/circle_book/3/

Reaching Students is a publication of the National Research Council and presents the best thinking to date on teaching and learning science and engineering. Available at http://www.nap.edu/catalog/18687/reaching-students-what-research-says-about-effective-instruction-in-undergraduate
POGIL Fundraising Has Successful Pledge Week

As you may have noticed over the holiday season, The POGIL Project developed several new fundraising initiatives aimed at both increasing the donor base of the organization, and also further engaging the POGIL community across the country. In addition to an annual appeal, The Project also launched its inaugural “POGIL Pledge Week” — a 5-day giving event focused on the goal of adding 150 new supporters to The Project. The Project also took part in Lancaster County's “Extraordinary Give,” a daylong event of digital giving hosted by the Lancaster County Community Foundation.

Throughout all of these initiatives, The Project featured videos, photos and other testimonials from POGIL practitioners and students who were willing to share their experiences with POGIL, and the reasons they support The Project. In addition to the content that The Project created, we also received an outpouring of anecdotes and responses from individuals around the country championing the work that The POGIL Project continues to do every year. Thanks to your incredible support throughout these initiatives, 2014 was The POGIL Project’s most successful fundraising season since becoming a 501(c)(3) organization, and provided vital funds that are needed to continue to conduct workshops and develop new materials for the coming year.

Beyond this however, the 2014 fundraising season offered The POGIL Project a unique opportunity to become better engaged with its community, both in its home base of Lancaster via the Extraordinary Give, and with its practitioners across the country during POGIL Pledge Week. With the backing that we received, we are more encouraged than ever to continue working for more student-centered learning in classrooms of all levels, and to give teachers the resources they need to accomplish their goals.

—Aaron Spangler, Development Associate
POGIL Project Announces Summer 3-Day Workshop Lineup

The POGIL Project is pleased to announce the lineup of 3-Day Regional Workshops for 2015. These 3-day Regional Workshops provide instructors from both high schools and colleges/universities with a significant opportunity to obtain professional development and to gain new insights into teaching and learning.

At these workshops, participants will follow a sequence of tracks based on their experience with POGIL methodology and their professional development goals.

**Introductory Track:** This workshop requires no prior POGIL experience. It introduces the POGIL methodology to participants and they learn to facilitate POGIL activities.

**Intermediate Track:** This workshop requires previous attendance of at least a 3-hour POGIL workshop and is focused on improving facilitation skills. Participants will also be introduced to the POGIL activity structure.

**Advanced Track:** This workshop requires previous attendance of at least a 3-hour POGIL workshop and is focused on improving facilitation skills. There is also an opportunity to write and receive feedback on POGIL activities and/or develop a Scholarship of Teaching and Learning Project. **This track is only available at one of the following workshops: North Central Regional Workshop, Northwest Regional Workshop, or Southeast Regional Workshop.**

All workshop attendees will participate in informative poster and plenary sessions. For a description of the session offerings, please go to the POGIL website at the following address: https://pogil.org/resources/workshop-resources-for-participants/regional-meetings.

The workshops focus on the STEM disciplines; however, attendees from all disciplines are encouraged to attend.

**To Register:**

Go to the website and click on the event you wish to attend. Click on the gray button on the left of the screen being registration. The full workshop fee is $399 and a housing fee of $100 (optional) is required at registration. Space is limited and registrations will be processed on a first-come first-served basis.

- **July 8-10**  NE Regional Workshop – Muhlenberg College
- **July 8-10**  SC Regional Workshop – University of Texas at Dallas
- **July 14-16**  SW Regional Workshop – Westminster College
- **July 21-23**  NC Regional Workshop – Grand Valley State University
- **July 21-23**  SE Regional Workshop – University of North Carolina Asheville
- **July 27-29**  NW Regional Workshop – Lewis and Clark College
POGIL Kudos

Clif Kussmaul of Muhlenburg College received a Google CS Engagement award to develop and integrate materials to increase student engagement and retention in introductory CD courses. He will use it to support a new CS1 course on Computing and Cognition.

Laura Lavine of Washington State University completed her collaborative research on the genetic mechanisms of conditional-expression and trait exaggeration in animals. The study began in 2009 and concluded in September 2014. Lavine and her colleagues discovered a correlation between the exaggerated male-specific traits and the nutrition they consume.

Helen Hu’s AACU TIDES project is in its 1st year, and is developing and revising POGIL activities, with a particular emphasis on diversity and multiculturalism, to be used in CS Principles courses paired with courses in other disciplines. Hu is at Westminster College.

Thomas J. Greenbowe of Iowa State University received the 2014 James Flack Norris Award for Outstanding Achievement in the Teaching of Chemistry. Greenbowe strives to improve the curriculum and the experience of introductory chemistry courses by working with high school teachers, community college instructors and university chemistry and education faculty. He was honored using an award presentation in Boston in November.

2015 POGIL Regional Coordinators

North Central Region
(IA, IL, IN, MI, MN, ND, NE, OH, SD, WI)
Audrey Armoudelin, Cranbrook Educational Community
(aarmoudlian@cranbrook.edu)

Northeast Region
(CT, DC, DE, MA, MD, NH, NJ, NY, ME, PA, RI, VT, WV)
Kris Lantzky-Eaton, St. John Fisher College
(klantzky@sjfc.edu)

Northwest Region
(AK, ID, MT, OR, WA)
Mare Sullivan, Bellevue Christian School (retired)
(joe.mare.sullivan@gmail.com)

South Central Region
(AR, KS, LA, MO, OK, TX)
Marty Perry, Ouachita Baptist University
(perrym@obu.edu)

Southeast Region
(AL, FL, GA, KY, MS, NC, SC, TN, VA)
Patrick Brown, East Tennessee State University
(brownp@etsu.edu)

Southwest Region
(AZ, CA, CO, HI, NM, NV, UT, WY)
Matt Horn, Utah Valley University
(hornma@uvu.edu)

Please contact any of the Regional Coordinators if you have any questions about events or workshops in your region.

New POGIL Video Now Online

The POGIL Project is pleased to present its new video “What is POGIL” at https://pogil.org/about. Can the Sundance Film Festival be far off?
POGIL Published Works

Creating a Learner Centric Environment Through POGIL: Our experience in engineering and management education in India
S. Kode & J. Cherukuri
Technology for Education (T4E), 2014 IEEE Sixth International Conference on Technology for Education

ABSTRACT: Engineering education in India is primarily through lectures and little emphasis is on student involvement. To enhance the skills of the student/learners they need to be involved in the learning process. This paper describes the use of Process Oriented Guided Inquiry Learning (POGIL) in an engineering and management college in Andhra Pradesh, India. Though POGIL has been developed and validated extensively over the last 15 years in the US, it is quite new in the Indian scenario and in Engineering and Management education. The authors share the process steps followed in introducing POGIL in the classroom and highlight the changes that they observed in the students and the teachers after introducing POGIL. The authors observed increased classroom interaction and improved grades in students. These positive findings encourage the authors to further use POGIL in engineering and management and spread POGIL to other colleges.

Implementing POGIL in the lecture and the Science Writing Heuristic in the laboratory – student perceptions and performance in undergraduate organic chemistry
J.D. Schroeder & T.J. Greenbowe
Chemistry Education Research and Practice (2008), 9, p.149-156

ABSTRACT: This study investigated the possible connection between effective laboratory activities and student performance on lecture exams. In a traditional undergraduate organic chemistry course for non-science majors, students could predict the products of organic reactions, but struggled to provide reaction mechanisms for those same reactions, despite obtaining perfect scores on their laboratory reports where reaction mechanisms were required. In addition, student attitudes toward chemistry in general were sharply negative after taking organic chemistry. To address these two issues, we implemented POGIL activities in the course and the Science Writing Heuristic in the laboratory to replace the standard lecture format and verification laboratory experiments. This paper will focus on student performance on nucleophilic substitution reaction mechanisms on a class exam. Performance on these questions improved compared with students in past traditional classes. In addition, students were given a pre-class and post-class survey regarding their perceptions of the course. At the conclusion of the term, many students thought the class was easier than what they initially expected. This illustrates the view that non-science majors have the ability to learn organic chemistry from a mechanistic point of view, and integrate concepts learned in the laboratory with concepts presented in the lecture.

Pedagogies of engagement in science: A comparison of PBL, POGIL, and PLTL
T. Eberlein, J. Kampmeier, V. Minderhout, R.S. Moog, T. Platt, P. Varma-Nelson, & H.B. White
Biochemistry and Molecular Biology Education (2008), 36(4), p.262-273

ABSTRACT: Problem-based learning, process-oriented guided inquiry learning, and peer-led team learning are student-centered, active-learning pedagogies commonly used in science education. The characteristic features of each are compared and contrasted to enable new practitioners to decide which approach or combination of approaches will suit their particular situation.
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 an event request at https://pogil.org/contact/enter-request or email Marcy Dubroff at mdubroff@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 mdubroff@pogil.org
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