

INTERSOCIETY POLYMER EDUCATION COUNCIL (IPEC)

Semi-Annual Report to Sponsors - August, 2018

IPEC is a 501(c) not-for-profit corporation supported by the American Chemical Society Division of Rubber (RUBB), the Division of Polymer Science (POLY) and the Division of Polymeric Materials Science and Engineering (PMSE), the Society of Plastics Engineers (SPE), and the Plastics Pioneers Association. IPEC's volunteer Board of Directors comprises two voting representatives from each supporting organization.

IPEC's broad goal is to interest K-12 students in science and technology. Students experience polymeric materials every day in shoes, cars, clothes, computers, bandages, packaging, *etc.*, so it is relatively easy to stir their curiosity about what polymers are and how they are used.

IPEC accomplishes its mission primarily by supporting and helping organize the Polymer Ambassadors. The Ambassadors (www.polymerambassadors.org) are a group of talented and dedicated K-12 classroom teachers located coast-to-coast. The Polymer Ambassadors arrange, organize, and present workshops and demonstrations. Examples of Ambassador activities:

- Organizing and conducting workshops at local, regional and national teachers' meetings, where the Ambassadors **teach other teachers** to use polymers in classroom instruction. These workshops continue to be popular with teachers.
- Presenting concepts at National ACS meeting symposium (CHED division in program)
- Performing demonstrations.
- Developing and writing laboratory experiments, some available as Quick Time Movies (future).
- Creating a presence on Facebook (under construction) and other internet media.
- Developing materials for the biennial ACS "Polymer Science of Everyday Things" symposia.

The Polymer Ambassadors have been honored as leaders in K-12 education. Five won Presidential Awards for Science Teaching. For a partial list of Polymer Ambassador accomplishments and awards, see Appendix I.

Polymer Ambassadors have learned that K-12 teachers will teach about polymers (1) when a teacher is excited about them, (2) when a teacher can get the materials inexpensively, and (3) when the activities fit the Next Generation Standards (www.nextgenscience.org).

Ambassadors keep these factors in mind when developing and presenting materials.

Polymer Ambassadors are teachers teaching teachers, and it works. Typical venues for their presentations are National Science Teachers Association (NSTA) national, regional, and STEM conferences, American Chemical Society (ACS) meetings, as well as many local – state conferences. Their workshops generally relate polymer science to topics that interest K-12 students. Among the topics that attracted excellent attendance were:

- A Fun and Relevant Way to Teach Physical Science (Chemistry) Concepts
- Nanotechnology
- What in the world are bioplastics?
- Lotions, potions, and scrubs: Polymer science in cosmetics
- Polymers for the Elementary Teacher
- PolyWhat? Application of STEM Using Polymers
- Materials Matter! Looking at Materials Science to Help Teach Chemistry
- Using Pop Culture and Polymers to Create Inquisitive Minds.

From August 2017 through August, 2018 (the 2017 - 2018 school year): The polymer ambassadors have presented various presentations about polymers to over **3750** teachers during over **50** presentations and workshops at various regional NSTA conferences, State Conferences, ChemEd and local workshops. The total hours spent on presenting these workshops is over **75** hours. Separately, PAs reached out to over **3360** students doing outreach in Illinois, Ohio and Wisconsin doing 1 – 3 hour workshops to those children. Children learned about the engineering design and polymer science as a result of the dedication of the polymer ambassadors. The Polymer Ambassadors have also done several weeklong polymer workshops in Idaho, New York and Illinois.

One PA has started an after school program called junior polymer ambassadors. This program allows them to help students after school on polymer education and present information to local polymer groups and lower grades.

Plans for the 2018 - 2019 school year will include presenting at the ACS National meeting, STEMEd unconference, ASM materials science workshops, iSTEM, BCCE, NSTA STEM conference, and many others. They will also be busy with many local adventures and submitting proposals for the National NSTA conference, the STEM forum, and other summer workshops and conferences. Some of the Polymer Ambassadors, have gone back to the roots of hands on workshops at NSTA conferences. The conference has made it difficult for the PAs to do these types of workshops, but after many discussions, the conference has accepted the hands on workshops.

New Adventures on the Horizon:

The Polymer Ambassadors are looking into ways of teaching teachers in other format. Some of the ideas include to create PD in a box with a webinar to help teachers learn the

polymer science while trying the activities and demonstrations along with the presenter. Also, creating videos and lightboard presentations for teachers to learn at their own pace or be able to see demonstration / activity again and be able to stop and rewatch the concept and idea. Besides the video online presence, the Polymer Ambassadors are going to work on making the website to be the central hub for polymer education.

Awards:

IPEC along with the Polymer Ambassadors have been working hard at some new programs to help promote polymer education. The formation of a K - 8 award called TAPE (Teaching Award for Polymer Education) was formed and the OPEA (Outstanding Polymer Educator Award) for high school teachers, formally known as the PolyEd Award. Both of these awards provide educators the opportunity to go to a conference, an honorarium for their classroom and a plaque. Several submissions were turned in for both the High School award as well as the K - 8 award. The recipients of the awards will be presented at the fall ACS meeting for approval and the release of the winners names will so follow. If you know any deserving educator for either one of these awards please send them to the following link <http://polymerambassadors.org/award-applications/> for the application. The deadline was May 15th for both awards. The two candidates for winning the awards will be introduced and voted on at the board meeting at the ACS meeting in Boston and will be announced shortly after that.

IPEC is also providing mini grants for classroom supplies. Ten \$250 grants will be decided at the board meeting in Boston. These grants are awarded to teachers needing supplies to teach polymer science in their classroom throughout the year. The grants can also be used for professional development, reference materials, etc that a teacher might need to strength the presence of polymers in the classroom.

At least four Polymer Ambassadors participated in development of “Hands on Plastics” Kits, and several were involved in developing a second edition “HOP-2.” These kits are intended to facilitate classroom instruction (and teacher training) at three K-12 levels. The kits are available online from the American Chemistry Council's Plastics Division, see www.store.americanchemistry.com/Hands-on-Plastics

To disseminate their materials more broadly, the Ambassadors publish their materials in leading journals and on the world wide web. A partial list of about 25 publications is at www.polymerambassadors.org. They also supply CDs with PowerPoint presentations to teachers.

Polymer Ambassadors volunteer their time. About 85% of IPEC’s budget supports Polymer Ambassador expenses, mostly travel.

We are actively seeking new Polymer Ambassadors. New Ambassadors commit to a

training year and three active years. Many continue to serve after that, but attrition occurs eventually. Long-overdue increases in travel allowances for Ambassadors and the Ambassador Chair were implemented. One new Ambassador has already been recruited, and we are selectively seeking more.

The IPEC board is seeking grants from several potential sources, including industrial supporters. This activity is coordinated with the POLY/PMSE Industrial Advisory Committee.

We would be welcome new board members. It would be desirable if supporting organizations appoint three or four representatives to enlarge the workforce and assure representation at each board meeting.

Board meetings are open, and all interested people are invited. The next meeting will be at 10:30 AM Tuesday, March 20th during the ACS national meeting.

IPEC member organizations can be proud of what IPEC accomplishes and can look forward to more high-impact activities.

Sherri Conn Rukes, Polymer Ambassador Chair [scrukes@comcast.net]

APPENDIX I.

PARTIAL LIST OF POLYMER AMBASSADOR AWARDS AND ACCOMPLISHMENTS

- ACS Great Lakes Region Outstanding High School Teacher Award
- President of AACT 2018 - 2019 school year
- President - elect of AACT 2017 - 2018
- High School Ambassador for AACT 2016 - 2017
- ISTA High School Director of Physical Science 2017 - present
- Five Presidential Awards for Excellence in Science Teaching
- One inductee to the High School Athletic Hall of Fame in Ohio
- Three PolyEd awards for outstanding polymer science teaching
- Two Ohaus Awards
- Three Chemical Manufacturers Association Catalyst Awards
- Two State Teacher of the Year Awards
- One Disney Award for teaching (it included a parade at Disney World)
- A single PA and her students won eight regional and seven national awards in ExploraVision using polymers in designs for future technologies
- Two National Board Certifications
- Four Kishor M. Kolkarni Distinguished High School Science Teaching Awards
- Four Board Members of the National Middle Level Science Teachers Assn.
- One is High School Science Teacher of the Year in Mississippi
- One is a finalist for the Presidential Award for Excellence in Math and Science Teaching in Illinois.
- Three Tandy Technology Awards
- Two Regional ACS High School Teaching Awards
- Five National Material Science Instructors
- Ambassadors published about 25 articles in leading journals.
- Four Ambassadors played a major role in developing the original “Hands on Plastics Kits” and several were involved in a recent revision. “HOP-2” Kits are available from the American Chemistry Council.
- One is in charge of the ASM High School Outreach Committee.
- One is on the ASM Education Foundation Board.
- One presented to the Washington State Legislature.
- One on the Washington State Governor’s education outreach committee.
- One on the Puget Sound Aviation Consortium committee.
- Several participated in program design and were presenters at the Akron Global Polymer Academy.
- Several helped design a major polymer exhibit at Epcot Center.
- One worked with the state Alabama on a STEM project for middle schools based on their polymer presentation on bioplastics.
- One communicated with curriculum directors from Oregon and Alaska about how

to use polymer activities with ESL kids.

- One is working to put a polymer gallery into a museum in the Philippines.
- One is on a writing team for Ford Motor Company on “The Chemistry of Cars.”
- One Golden Apple Winner for Chicago
- Chicagoland Chemistry Award