

INTERSOCIETY POLYMER EDUCATION COUNCIL (IPEC)

Semi-Annual Report to Sponsors, July, 2016

IPEC is a 501(c) not-for-profit corporation supported by the Society of Plastics Engineers (SPE), the Akron Section of SPE, the Plastics Pioneers Association and the American Chemical Society Divisions of Rubber and of Polymeric Materials Science and Engineering. IPEC's volunteer Board of Directors comprises two voting representatives from each supporting organization. IPEC's website is www.ipeconline.org.

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.
- Creating a presence on Facebook 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 State Science Educational Standards and the new 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
- Food Chemistry
- Junk Drawer Chemistry
- Secret life of a water bottle and other toys – how plastics are recycled.

From August 2015 through July 2016: The Polymer Ambassadors have been really busy this past year. Sherri Rukes even just got back from presenting at the NSTA STEM conference in Denver. There she gave three talks and they were all received with over 120 teachers coming to listen to her speak. At the other NSTA conferences, the Polymer Ambassadors presented to over 1500 teachers during the 30 presentations and workshops. They also presented to over 120 teachers at the ACS symposiums in Boston and San Diego and over 150 teachers at the Sunday High School Day Program. The PAs also spoke at several functions. For example, one of the PAs spoke at the Plastic Pioneers meeting this past fall and the Wisconsin SPE educators' night in April. Separately, several PAs have presented over the past summer have been instructors for a week long material science workshop where one whole day (8 hours) of instructor is on polymers. These workshops have reached 350 more teachers with polymer science.

Reaching out to students is another way the PAs reached out to promote polymers science. More than 1029 students have been touched by polymer science by doing outreach in Illinois and Wisconsin doing 1 – 3 hour workshops to those children. One PA also was the Keynote speaker at the International Rubber Division Conference in Cleveland Ohio where over 100 students were there learning more about Rubber science.

Overall, the Polymer Ambassadors have spent this past year over 360 workshop hours presenting to teachers or children.

Plans for the rest of the upcoming school year is already being discussed. The PAs have put in proposals to the multiple NSTA's Regionals that are held in the fall and the National convention in Los Angeles. Plans also continue to put on a Polymer Symposium at the National ACS meetings. The Polymer Ambassadors will have a large roll at the fall ACS meeting in Philadelphia in a couple of weeks. There the PAs will be putting on a talk about the polymers in food during the High School Day programming on Sunday in the convention center, as well as, participating in the PSOET (Polymer Science of Everyday Things) on Monday morning in the Sheraton and the Chemistry of Everyday Things symposium on Monday afternoon at the convention center.

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 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. The website is in the middle of being revamped and hoping the new

website will be up and running within the next month or so. 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.

More kudos for PAs: Two Polymer Ambassadors have been awarded honors this past school year. James Brownlow is the Science Teacher of the Year for High School Teaching in Mississippi, and Sherri Rukes is a Finalist for the Presidential Award for Excellence in Math and Science Teaching (PAEMST) for the high school teaching in the state of Illinois. The PAEMST finalist winner goes to the national level and Sherri does not find out if she is the State Presidential winner until next year. However, Sherri was announced this past April on receiving the Golden Apple award for teaching in Illinois. She is one of 10 new fellows of this award and will be taking a sabbatical from teaching in the spring to further her education at Northwestern University. The ceremony was televised on the local PBS station in Chicago and you can more information about our polymer ambassador on line at <http://www.goldenapple.org/2016-award-recipient-sherri-rukes> or watch the full broadcast at <http://interactive.wttw.com/golden-apple-awards-excellence-teaching-2016>. Sherri also won the election for AACT (American Association of Chemistry Teachers) as the High School Ambassador. She is on the governing board for the organization for the upcoming school year. Sherri will be representing the views of high school chemistry teachers around the world.

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 pursuing three more possible ambassadors.

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 9:30 AM Tuesday, August 23rd 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

- Five Presidential Awards for Excellence in Science Teaching
- One inductee to the High School Athletic Hall of Fame in Ohio
- Two 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
- Three 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.”