

POLY Awards
Paul J. Flory Polymer Education Award-Previous Awardees
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2010 Paul J. Flory Award

Harry Allcock, Professor of Chemistry at Pennsylvania State University, is the recipient of the 2010 Paul J. Flory Polymer Education Award.

The Flory Award commemorates the achievements of the late Paul Flory, a Nobel Prize recipient who was a chemist at Stanford University. It was created to recognize, encourage, and stimulate outstanding achievements by an individual in promoting undergraduate or graduate polymer education. An award symposium was held during the Spring ACS National Meeting in San Francisco.

“There is a crucial need to acquaint students in the chemistry-related disciplines with the ways in which long-range academic research can lead to useful developments,” said Allcock. “Fewer than a quarter of the students in chemistry will find careers in teaching, whereas the majority will be employed in industry or government laboratories. Thus, as faculty, we have a responsibility to broaden students’ interests beyond the highly focused academic topics of their thesis research. This is what I try to do in my classroom teaching, in the research laboratory, and in my books.”



Harry Allcock (left) and Barry Farmer, POLY Chair, right)

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2008 Paul J. Flory Award

The recipient of the 2008 Division of Polymer Chemistry Paul J. Flory Polymer Education Award is **Frank N. Kelley**, Dean Emeritus, College of Polymer Science and Polymer Engineering and Professor Emeritus of Polymer Science, The University of Akron, Akron, Ohio. Born in Akron, Ohio, he attended The University of Akron where he earned a B.S. in chemistry, an M.S. and a Ph.D. (1961) in polymer chemistry.

While attending the University, he was employed by the Goodyear Tire & Rubber Company and later the Institute of Polymer Science at UA. After graduating, he was employed by the Union Carbide Corporation until entering active duty as a first lieutenant in the United States Air Force. He was assigned to the Air Force Rocket Propulsion Laboratory Edwards AFB, California, and, at the completion of his military tour, in July, 1964; was employed as a civilian.



He conducted research and managed technical programs associated with solid-propellant mechanical properties. He rose through the ranks and in 1971 was named Chief Scientist, the lead civilian position. In 1973, Dr. Kelley transferred to the Air Force Materials Laboratory at Wright-Patterson AFB, Ohio to occupy a similar position. In 1976, he was promoted to Director of the 450 person Laboratory, with responsibilities for the USAF Materials and Manufacturing Technology R&D programs.

In 1978 he returned to his alma mater to serve as a professor and Director of the Institute of Polymer Science. He was appointed dean when the College was formed in July 1988, a position he held for 18 years. As Professor of Polymer Science, he personally supervised the research of 18 PhD and 6 Masters degree graduates. He has published approximately 50 articles and book chapters, and has edited a book on Polymers in Space Research. He has 2 active patents and has given invited lectures in over 30 countries worldwide.

As dean, Dr. Kelley was the chief administrator of the largest academic polymer program in the U.S. Since 2000, it has been ranked as # 2 in the nation by US News and World Report. The college serves approximately 250 graduate students and postdoctoral fellows. In addition to two graduate level academic departments and two research institutes, it houses an applied research services lab supporting the polymer industry, a training center for plastics and rubber technologists, and an on-line polymer distance education program.

He has served on the boards of the Great Lakes Science Center, the Edison Polymer Innovation Corporation and Ohio Polymer Enterprise Development Corporation. He served for 13 years as a director of Premix Inc., an Ohio based polymer composites company, and currently serves on the board of Romeo RIM, Inc., a Michigan based plastics company. He is a corporate advisor to The Reserve Group, a private equity firm based in Fairlawn, Ohio. He serves on the Boards of Directors of Polyflow Inc., Akron Polymer Systems, Inc., and Akron Polymer Coatings Inc.

Dr. Kelley received the Rubber Age Award, the American Institute of Aeronautics and Astronautics Outstanding Technical Contribution Award, the Air Force Commendation Medal, the Civilian Meritorious Service Medal, twice, (in 1967 and 1978), and the Exceptional Civilian

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Service Award from the Secretary of the Air Force. He received the Distinguished Award of Council from the Akron Council of Engineering and Scientific Societies, and the Distinguished Sales and Marketing Award from Sales and Marketing Executives International. He has been awarded the Society of Plastics Engineers Fred Schwab Education Award (National), the G.S. Whitby Award in Rubber Education from the American Chemical Society's Rubber Division (National, 2008), and was a recipient of the Northern Ohio Live Magazine's Special Award of Achievement. He was named Outstanding Alumnus of the Department of Polymer Science at UA, and received the John R Buchtel Award in Natural Sciences from the Buchtel College of Arts and Sciences. He was named a National Alumnus of the Year by Tau Kappa Epsilon Fraternity in 1996. Retiring January 1, 2007, he was awarded a Doctor of Humane Letters degree; honoris causa, by UA. Also, the University bestowed upon him the Order of the Phoenix in recognition of his career contributions to the University, his profession and community.

The Paul J. Flory Polymer Education Award was established in 1981 and is administered and sponsored by the Polymer Chemistry Division to recognize, encourage, and stimulate outstanding achievements by an individual or team in promoting undergraduate and/or graduate polymer education. Dr. Kelley will present the award address at a symposium arranged in his honor at the fall meeting of the Polymer Chemistry Division in Philadelphia, Pennsylvania.

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2006 Paul J. Flory Award

J. MacKnight, Wilmer D. Barrett Distinguished Professor Emeritus of the Polymer Science and Engineering Department, University of Massachusetts Amherst, is the recipient of the 2006 Division of Polymer Chemistry Paul J. Flory Polymer Education Award. Professor MacKnight is recognized for his contributions to polymer chemistry education and research during his 40 year tenure at UMass Amherst.

As one of the founders of the Polymer Science and Engineering Department at UMass Amherst, Dr. MacKnight's educational accomplishments include a 16-year tenure as department head and 11 years as co-principal investigator of the nation's oldest operating Industry-University Cooperative Research Program. He has served as mentor to 48 Ph.D. recipients. His doctoral students are employed in industrial, government, and academic laboratories, and hold professorships at institutions in the U.S. and abroad.

Dr. MacKnight's contributions to polymer chemistry research have been recognized by his receipt of the Ford Prize for High Polymer Physics, the ACS Award in Polymer Chemistry, the Herman F. Mark Award, election to membership of the National Academy of Engineering, and many additional honors.

The Paul J. Flory Polymer Education Award was established in 1981 and is administered by the Polymer Chemistry Division and sponsored by the Rohm and Haas Company to recognize, encourage, and stimulate outstanding achievements by an individual or team in promoting undergraduate and/or graduate polymer education. Dr. MacKnight will present the Award Address at a symposium arranged in his honor at the spring meeting of the Polymer Chemistry Division in Atlanta, Georgia.

Rohm and Haas Company representatives Katie Hunt (ACS President-Elect) and Erica Martin (POLY Member-at-Large) were on hand to present Prof. William MacKnight (UMass Amherst) with the Paul J. Flory Polymer Education Award.



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2004 Paul J. Flory Award

Two years after courses in polymer chemistry began to be offered at Virginia Tech, Paul J. Flory received the 1974 Nobel Prize in chemistry for his achievement in the physical chemistry of macromolecules. This year, the award given in his name to recognize outstanding achievements in polymer education is being presented to the pioneers of Virginia Tech's polymer education program.

Virginia Tech chemistry professors **Tom Ward** and **James McGrath** and chemical engineering professor emeritus **Garth Wilkes**, all of Blacksburg, have been awarded the Paul J. Flory Polymer Education Award by the American Chemical Society Division of Polymer Chemistry.

Ordinarily presented to an individual, the 2004 award recognizes the Virginia Tech team for long-term efforts in undergraduate, graduate, and continuing education in polymer science and engineering, says Lloyd Robeson, a principal research associate for Air Products and Chemicals Inc. in Allentown, Pa., who nominated the trio. Since the 1970s, Ward, McGrath, and Wilkes have pulled together a team of faculty members from chemistry and engineering to teach hundreds of undergraduate and graduate students and provided short courses on polymer chemistry to thousands of industry and government scientists.

In 1972, Ward introduced a senior course on polymer and surface chemistry and a graduate course on the physical chemistry of polymers, which used Flory's textbook. "By 1974, Professor Ward was named an Outstanding Educator for America," says McGrath, who nominated Ward for the Flory prize at the same time Robeson nominated all three faculty members.

A national surge in interest in polymers encouraged the Virginia Tech chemistry department to expand faculty in this area. McGrath joined the chemistry department and, in 1978, persuaded Wilkes to leave Princeton University and join the Virginia Tech chemical engineering department with the promise of an interdisciplinary program. They founded and still co-direct the Polymer Materials and Interfaces Laboratory (PMIL).

"We began with 10 faculty members from forest products, engineering science and mechanics, chemical engineering, chemistry, mechanical engineering, and material science," recalls Wilkes. "We now have 23 faculty members with one of our most recent additions being from physics.

"One of the early interests of several faculty members was adhesion, which is why "interfaces" is in the title of our PMIL program. But we investigate polymers in general $\text{\textcircled{D}}$ synthesis, characterization, and processing. It was one of the first major interdisciplinary efforts at Virginia Tech, and it took off," says Wilkes. "We developed an industrial affiliates program and hold a research review every 18 months. The reviews are more focused on the polymer research than education, but it brought us to fifth in the country in the U.S. News ranking of graduate education in polymers."

While a Ph.D. program in materials science and engineering was created, most students outside of engineering remained in their majors but took courses in other disciplines and had interdisciplinary Ph.D. committees.

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Wolfgang Glasser, professor emeritus of wood science and an original PMIL faculty member, says, "The concept of polymers was introduced into wood chemistry by the efforts of Drs. (Jim) Wightman, McGrath, Wilkes and Ward. It helped us to become pioneers in understanding the makeup of natural materials from a polymer perspective and to create new materials.

"We all work in our respective niches and become experts, but it is the diffusion of knowledge to peripheral fields that triggers developments," Glasser says.

Of his 47 students and post docs, "The ones who have taken Ward's, Wilkes', McGrath's, and Wightman's courses have carried the banner of polymer chemistry into their industries and professional societies," Glasser says. "Their careers are defined by combining wood with polymer chemistry."

Eugene Joseph, division scientist at 3M, is a chemical engineering graduate who benefited from the polymers program. He received his doctoral degree from Virginia Tech in 1983 with Wilkes as his thesis adviser. "My focus was structure-property interrelationships in polymers. PMIL offered both a strong theoretical and a hands-on approach. Students received training in synthesis, structural properties, and processing of polymers - a complete education in polymer science," says Joseph. "As a graduate of such a program, I found I could work effectively with the synthetic chemist on the development of new materials in the laboratory, and, because I understand both properties and processes, I can interact effectively with the people responsible for scale up of processes from the laboratory to the manufacture of new materials and products. Understanding this transition from bench to factory is somewhat unique," says Joseph, who knows because he now recruits students who will be researchers at 3M.

In 2001, a multi-college Macromolecular Science and Engineering (MACR) M.S. and Ph.D. degree program at Virginia Tech received state approval, and the polymers group, led by chemistry professor Judy Riffle, was awarded a \$2.7-million National Science Foundation (NSF) Integrated Graduate Education and Research Training (IGERT) grant in macromolecular science and infrastructure engineering, which helps support many MACR students. There are now 30 MACR students. Over 50 others continue to major in a single discipline, but focus their courses and research in polymers.

"The MACR program has become a huge success in a time of very little funding," says McGrath. "Dr. Riffle (who directs the MACR program) has been able to generate industry support for first year students on the order of \$100,000."

In addition to programs for undergraduate and graduate students, Ward and McGrath co-founded the American Chemical Society polymer chemistry short courses in 1976. In order to offer lab instruction, most of the courses are now offered at Virginia Tech during the summer.

"We thought it would be useful for our students to learn from and to interact with industry," says McGrath. "The courses provide a detailed introduction to polymer science split between experiments and lectures. Our graduate students do some of the lectures and oversee many of the experiments. It gives them an appreciation for what they actually know and can contribute to industry and government labs."

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The polymer group is giving five different short courses this year. Some years it's as many as seven. Those who attend a short course receive a semester-long course's instruction in a week. "It's an intense week. The people in the short courses have been known to keep us until 11 p.m. answering questions," says McGrath. "The feedback also helps us keep our material for undergraduate and graduate classes up to date."

The courses also are offered as TV courses for the continuing education program and at industry sites worldwide, although without the experiment part of the program. "We estimate we've taught 10,000 people," says McGrath. "If someone says hello to one of us at a meeting, there's a high probability they were here for a course five or 10 or 20 years ago."

In 1989, Ward initiated a summer undergraduate research program, offering students from many universities opportunities to be faculty members' research partners for three months.

"I wanted it to be different from programs where students were mostly on their own," Ward says. "I wanted a science camp with common housing, social events, and a lot of camaraderie so they would bond and do a better job. They would do their own research, then each one would write a paper and give a talk. That meant faculty had to carefully think through projects for the students in advance.

"We had good reviews from the start, and after three years, the students were coming from the same schools, thanks to word-of-mouth. We've always had a diverse representation of undergraduates; participation from North Carolina State University, University of North Carolina, MIT, Cal Tech, New Mexico, Texas, and Clark Atlanta University would be typical. We started with seven the first year and have now graduated 355 young scientists and engineers. We've been careful from the beginning to have a balance in terms of gender and ethnic groups represented."

He says, "The most rewarding thing for me is the tremendous growth in the scientific philosophy of these undergraduates that I see in just 12 weeks. By the end of that period, they recognize the importance of communication, questioning of results, and reproducibility of data.

"I have stayed in touch with a lot of the graduates. One student I directed, from Clark Atlanta University, just wrote me that she is finishing her Ph.D. at MIT this year. This certainly inspires you as teacher," Ward says. More than 90 percent of these participants go to graduate school. "They are the best and the brightest."

McGrath praised Ward's ability to keep the program funded. "Initially, the principal funding was from the NSF Center for High Performance Adhesives and Composites at Virginia Tech," Ward says. "After that program concluded, we received grants from the NSF Research Experience for Undergraduates and the IGERT programs and from the Center for Adhesive and Sealant Science at Virginia Tech."

Early projects addressed composites and adhesives, he says. "Now we find interest in fuel cells and interfacial phenomena, as well as other interdisciplinary fundamental topics." In addition to the polymer program, Ward is affiliated with the Virginia Tech Center for Adhesive and Sealant

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Sciences, and the Center for Composite Materials and Structures and is a Commonwealth Endowed Professor. McGrath is a member of the National Academy of Engineering, a University Distinguished Professor, and the Ethyl Corp. Chair in Chemistry. Wilkes is a University Distinguished Professor emeritus of chemical engineering.

"The team was 25 years in front of everyone in terms of education at the interface of polymer science and engineering," says Virginia Tech chemistry professor Tim Long, who graduated from the polymers program and worked in industry before joining the university's faculty. "As one of their students, I benefited. They set the standard for how we need to educate our students in the future. They were successful in class and in the lab because they recognized that integrating science and engineering is where discoveries happen."

The Flory award is presented biennially in even-numbered years. It was awarded at the 227th annual meeting of the American Chemical Society in Anaheim, Calif., March 28 to April 2, 2004. The DuPont Company sponsored the award. Roberson, Ward, McGrath, and Wilkes organized the awards symposium, 8:30 a.m. to 4:30 p.m., Monday, March 29, in the Anaheim Coast Hotel room Park D. The symposium focused on polymer research and education.

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Dr. Ulrich Suter received his Dr. Sc. Techn. from ETH-Zurich, Department of Chemistry in 1973. After a post-doc position at Stanford University and visiting scientist positions at IBM Almaden and msi inc. he joined the faculty of MIT in the Department of Chemical Engineering as Associate Professor. In 1987 he became full Professor before leaving to join the ranks of the Department of Materials, Institute of Polymers at ETH-Zurich in 1988 where he remains at present.

Dr. Suter's research interests include macromolecular chemistry and physical chemistry of polymers, particularly structure-property relationships; polymeric materials, particularly in the predictability of properties; atomistic, molecular, and materials modeling; and application of computers in education and research. During his time at MIT, Dr. Suter along with another colleague, took the lead in establishing an interdepartmental program on polymer science and technology (PPST). He also was among the pioneers for "Project Athena" which integrated computing into undergraduate curriculum at MIT.

The coauthored/edited books "Rotational Isomeric State Models in Macromolecular Systems," "Atomistic Modeling of Physical Properties," and "Conformational Theory of Large Molecules" are regarded as having a tremendous educational impact on polymer computations and demonstrate Suter's dedication to write didactic material.

Regarded as "the leading practitioner of atomistic-level polymer simulations in the world today," Dr. Ulrich Suter continues to promote the education of polymer science even further as demonstrated by the MATch project. The main thrust behind the MATch initiative is to create a nationwide, high-quality web-based learning experience for students of Materials Science and Engineering (MS&E) in Switzerland.

The Division of Polymer Chemistry of the American Chemical Society congratulates Dr. Ulrich Suter on his well deserved receipt of the 2002 Paul J. Flory Award. A Half-day Session (1 to 5 p.m.) on Monday, April 8, 2002 at the 2002 ACS Spring Meeting, Orlando, FL. USA
Opening and closing remarks by P. Smith, ETH Zurich, Switzerland

Speakers:

B.E. Eichinger, Accelrys, San Diego, CA, USA

D.N. Theodorou, Univ. of Patras, Greece

K. Kremer and R. Everaers, Max Plank Institute,
Mainz, Germany

G.R. Rutledge, MIT, Cambridge, MA, USA

M. Utz, Univ. of Connecticut, Storrs, CT, USA

U.W. Suter, ETH Zurich, Switzerland

The symposium will be followed by an Apéro -
sponsored by ETH Zurich, Rektorat

