

POLY Awards

Carl S. Marvel Creative Polymer Chemistry Award- Previous Awardees
1997-2017

2017 Carl S. Marvel Award

The Division was delighted to present the 2017 Carl S. Marvel Creative Polymer Chemistry Award to Professor **Theresa Reineke** from the University of Minnesota. After a PhD from Michigan and a postdoc at Caltech, Theresa Reineke joined the faculty at Cincinnati. She served as an Associate Professor at Virginia Tech, before moving to her current position as Lloyd Reyerson Professor of Chemistry at Minnesota. She is known internationally for her pioneering work in the development of novel carbohydrate-based polymers for the cellular delivery of RNA and DNA, for creation of “theranostic” agents, and for the design of polymeric excipients for drug delivery.

The award was established in 1980 to recognize and encourage accomplishments and/or innovation of unusual merit in the field of basic or applied polymer science by younger scientists.

A symposium to recognize Dr. Reineke was held at the 2017 Spring ACS National Meeting in San Francisco, CA.



Marc Hillmyer (POLY Chair), Theresa Reineke

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2015 Car S. Marvel Award

The Division was delighted to present the 2015 Carl S. Marvel Creative Polymer Chemistry Award to Professor **Todd Emrick** from the Polymer Science and Engineering Department at the University of Massachusetts Amherst. He is a notably accomplished polymer chemist, and pioneer in nanoparticle functionalization, polar and zwitterionic polymers, and polymers for biology. He received his PhD from the University of Chicago in 1997 and spent two years at the University of California at Berkeley as a post-doctoral fellow. He is a researcher with demonstrated vision and accomplishment over a broad range of fields using polymers. His recent work shows the impact and benefits of novel polar polymers he designed (such as polymer zwitterions), extending across polymer therapeutics (as injectable drugs), self-healing structures (as delivery vehicles), and electronic materials (in solar cells). To augment the distinct academic importance of his work, in several cases his work carries a viable practical applicability. This is evident from the number of his issued patents, licensed technology on polymer-drug conjugates for chemotherapy, and thermoplastics that are non-flammable.

The Carl S. Marvel Award is sponsored by Albemarle and POLY was honored to have Jamie Strickler in attendance to present the award. The award was established in 1980 to recognize and encourage accomplishments and/or innovation of unusual merit in the field of basic or applied polymer science by younger scientists.

A symposium to recognize Dr. Emrick was held at the 2015 Spring ACS National Meeting in Denver, CO.



J. Strickler (Albemarle), Todd Emrick, Rigoberto Advincula (POLY Chair)

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2013 Carl S. Marvel Award

The Polymer Division of the American Chemical Society was delighted to present the 2013 Carl S. Marvel Creative Polymer Chemistry Award to Professor **Zhenan Bao** from Stanford University.

Professor Bao leads a dynamic research program focused on the synthesis, characterization, and processing of polymeric and other soft materials for myriad flexible electronic applications. She has successfully translated fundamental findings in her laboratory into useful technologies for carbon nanotube electronic type sorting, pressure and chemical sensing, and stretchable electronic devices. Professor Bao is without a doubt among the world leaders in the field of organic semiconductor polymers and materials, and the POLY Division is proud to have her join the ranks of Carl S. Marvel Creative Polymer Chemistry Awardees. Professor Bao received her Ph.D. degree in chemistry from The University of Chicago in 1995 and joined the Materials Research Department of Bell Labs, Lucent Technologies. She became a Distinguished Member of Technical Staff in 2001. She joined the faculty of the Stanford University, Chemical Engineering Department in 2004. Professor Bao has more than 300 refereed publications and more than 40 US patents. She was elected a SPIE Fellow in 2008 ACS PMSE fellow in 2011, ACS Fellow in 2011 and AAAS Fellow in 2012. A few of her many awards include the ACS Cope Scholar Award in 2011, the Royal Society of Chemistry Beilby Medal and Prize in 2009, and the IUPAC Creativity in Applied Polymer Science Prize in 2008.

The Carl S. Marvel Award is sponsored by Albemarle and POLY was honored to have Kevin Coppola in attendance to present the award. The award was established in 1980 to recognize and encourage accomplishments and/or innovation of unusual merit in the field of basic or applied polymer science by younger scientists.

A symposium to recognize Dr. Bao was held at the 2013 Spring ACS National Meeting in New Orleans, LA.



Zhenan Bao, Greg Tew (POLY Chair), Kevin Coppola (Albemarle)

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2011 Carl S. Marvel Award

POLY is delighted to congratulate Prof. **Marc Hillmyer** for winning the Carl S. Marvel Creative Polymer Chemistry Award.

In twelve years on the Minnesota faculty he has become recognized as an international leader in our field. Prof. Hillmyer has made substantial contributions not only in polymer synthesis but also in theory and experiment; in particular, the use of block copolymers as templates for nanoporous materials, the development of bio-renewable polymers, and the synthesis and self-assembly of novel block copolymers with fluorinated blocks in aqueous solution. His impact on the polymer chemistry community is outstanding for such a young scientist.

He has over 200 publications and the quality and importance of his work is exceptional. Over a dozen of his coworkers have gone on to academic positions, at outstanding research institutions such as UConn, Wisconsin, Louisiana State, Imperial College, Colorado State, and the University of Houston.

The University of Minnesota has recently bestowed on him a McKnight Distinguished University Professorship, and four years ago the Chemistry Department selected him from among the entire tenured faculty to occupy the Elmore Northey Chair.



Robert Moore (POLY chair), Marc Hillmyer

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2009 Carl S. Marvel Award

The Polymer Division honored the recipient of the 2009 Carl S. Marvel Creative Polymer Chemistry award, Professor **Geoffrey W. Coates** (Cornell University), at the Spring ACS Meeting in Salt Lake City.

Professor Coates has made, and continues to make major creative contributions and innovations in modern polymer chemistry. Coates is an internationally known polymer chemist whose research focuses on the development of new catalyst systems for the synthesis of novel polymers. Besides his groundbreaking research in major areas of metal-catalyzed synthesis, Coates has turned his attention to several important families of commercially relevant polymers and has developed efficient, environmentally-friendly and affordable synthetic routes to aliphatic polycarbonates, polylactic acid, and poly-beta-hydroxyalkanoates. These three families of compounds, which reflect a novel approach to polymer chemistry in today's post-petroleum era, are already in widespread commercial use.

Coates' novel synthetic methodology has led to important discoveries and new cost-efficient processes for use in both basic and applied polymer science



Eric Martin (Rohm and Haas), Geoff Coates, Dennis Smith (POLY Chair)

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2007 Carl S. Marvel Award

The Polymer Division of the American Chemical Society is proud to announce the recipient of the 2007 Carl S. Marvel Creative Polymer Chemistry award, Dr. **Anne Mayes**.

Mayes' research seeks to harness general molecular assembly principles perfected by nature to create new nanostructured polymeric materials for technological use. Her research program blends theoretical and experimental elements, concentrating on key materials challenges in the areas of energy and water resources, nanotechnology and medicine. She is both a highly creative theorist and an ingenious experimentalist. Her research has addressed a diverse array of topics, including the development of electrolytes for lithium rechargeable batteries, cell-signaling biomaterials, fouling-resistant membranes for water purification, block copolymer films for nanolithography, weak polyelectrolyte multilayer assemblies and a new class of pressure-processed plastics. In each of these areas she has made important breakthroughs.

Anne M. Mayes is author or coauthor of over 100 publications which have 2900 citations and co-inventor on 12 U.S. patents issued or pending. She has served as a member of the DOE Basic Energy Sciences Advisory Committee from 1999-2003 (a direct appointment by the Secretary of Energy), the Materials Research Society Board of Directors 1999-2002, Treasurer of the Neutron Scattering Society of America 1999-2002, 2003 Program Chair for the Division of Polymer Physics (DPOLY) of the American Physical Society, and is currently the Chair Elect of DPOLY. For outstanding service contributions she received the MRS Woody Award (2002) and the NSSA Exceptional Service Award (2004). Her research contributions have been recognized through the NSF Young Investigator Award (1993), the MRS Outstanding Young Investigator (1998), the APS Dillon Medal for Polymer Physics (1999), and election as a Fellow of the APS (2004). She was appointed MacVicar Faculty Fellow in 2001 for her outstanding contributions to undergraduate teaching at MIT.

The Carl S. Marvel Award is sponsored by the Rohm and Haas Company and the Polymer Division of the American Chemical Society for the purpose of recognizing and encouraging accomplishments and/or innovation of unusual merit in the field of basic or applied polymer science by younger scientists. Dr. Mayes will present the award address at a symposium organized in her honor at the upcoming national meeting in Chicago.

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Carl S. Marvel Creative Polymer Chemistry Award- Previous Awardees
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2005 Carl S. Marvel Award

The recipient of the 2005 Carl S. Marvel Creative Polymer Chemistry Award is Dr. **Timothy M. Swager**. He is Professor of Chemistry and Associate Director of the Institute for Soldier Nanotechnologies at the Massachusetts Institute of Technology.

Dr. Swager is recognized for his research and leadership in several fields of polymer chemistry. He has conducted pioneering work in ring opening metathesis polymerization, and has made key contributions to the understanding of both conducting and semiconducting polymers.

His work on TNT detection is highly noteworthy because of its importance not only as a contribution to science and technology but also as an outstanding humanitarian contribution. His sensor science is playing an important role in mine detection and in the detection of improvised explosive devices (IEDs). This technology is based on his development of conjugated polymer sensory transduction schemes that translate molecular recognition events into readily measured signals. The cooperative nature of these materials produces enormous enhancements in observable signals relative to their monomeric analogs.

Tim has developed novel methods for the formation of ladder polymers including all-aromatic graphite ribbon structures and supramolecular polyrotaxanes. He has addressed fundamental problems in electronic polymers by using novel chemical structures and a diverse array of analytical methods.

Dr. Swager received his Ph.D. from the California Institute of Technology in 1988 and has over 150 articles, 15 patents, and serves on numerous editorial boards and scientific advisory boards. He has won a number of awards including the ACS Cope Scholar Award (2000), the Union Carbide Innovation Recognition Award (1998) and the Karapetoff Award (MIT, 2000).

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Carl S. Marvel Creative Polymer Chemistry Award- Previous Awardees
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2003 Carl S. Marvel Award

The recipient of the 2003 Carl S. Marvel Award in Creative Polymer Chemistry is Dr. James L. Hedrick from the IBM Almaden Research Center in San Jose, CA. Dr. Hedrick received his PhD from Virginia Polytechnic Institute and State University in 1985 under the mentorship of Dr. James E. McGrath and he has since established himself as a major contributor and leader in the area of macromolecular science.

Dr. Hedrick led the research team that developed the very first thermoplastic toughened thermosets. This work paved the way for subsequent development and use of composite materials in demanding applications. The many other areas that Dr. Hedrick has been a major contributor since joining the IBM Almaden Research Center include (1) novel syntheses of thermally stable polymer for electronic applications, (2) the concept and realization of nanopore foams and their application to low dielectric constant thin film insulators, (3) the design of polymer architectures based on both conventional and novel stars and dendrimers utilizing unique simultaneous ring opening and vinyl co-polymerizations, and (4) the discovery of environmentally attractive organic nonmetallic catalysts which form the basis of a new paradigm for living polymerizations. His prolific career thus far has produced over 200 refereed journal articles and books as well as more than 30 U.S. patents. In addition to his contributions as an IBM researcher, Dr. Hedrick has also contributed to his field of science through collaborations with both academia and industrial partners and he has been a critical member in the joint Stanford/ IBM/ National Science Foundation MRSEC on Polymeric Interfaces and Macromolecular Assemblies for the past decade.

The Carl S. Marvel Creative Polymer Chemistry Award, which is currently sponsored by the Dow Chemical Company Foundation, was established in 1980 and administered by the Polymer Division of the American Chemical Society. The purpose of the award is to recognize and encourage accomplishments and/or innovation of unusual merit in the field of basic or applied polymer science by younger scientists. The award consists of a plaque and an honorarium of \$2000. The award is usually presented biennially in odd-numbered years at the spring meeting of the Polymer Chemistry Division. The recipient is expected to present an address at a symposium organized in his/her honor. Travel expenses to the meeting are paid in addition to the honorarium. The 2003 award will be presented at the upcoming 225th ACS National Meeting in New Orleans, Louisiana. The award symposium will be held on March 24th at 1:00 pm in the New Orleans Hilton Riverside.

POLY Awards

Carl S. Marvel Creative Polymer Chemistry Award- Previous Awardees
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2001 Carl S. Marvel Award

Dr. **Craig J. Hawker**, Research Staff Member at the IBM Almaden Research Center in San Jose, CA, will receive the 2001 Carl S. Marvel Creative Polymer Chemistry Award of the ACS Division of Polymer Chemistry, sponsored by the Dow Chemical Company Foundation. The Carl S. Marvel award recognizes accomplishments and innovations of unusual merit in the field of basic or applied polymer science by younger scientists.

Since receiving his Ph.D. under the direction of Professor Sir A.R. Battersby (Cambridge 1988), and Post-doctoral Advisor, Professor J.M.J. Frechet (Cornell 1990), Dr. Hawker has contributed important and innovative strategies toward the synthesis and elaboration of macromolecules with well defined architectures. He has established himself as a leader in modern polymer synthesis and is credited as inventor and pioneer of the convergent synthetic strategy toward dendritic macromolecules. Hawker's original work in this area has now been duplicated in hundreds of publications that rely on the original "Hawker methodology" to afford synthetic macromolecules in which molecular shape, size, functionality, and degree of branching in hyperbranched systems are controlled with accuracy and are unmatched in non-natural macromolecules. In addition, Hawker has contributed significantly to the area of controlled/living radical polymerization by demonstrating the importance of using well defined initiators and combinatorial approaches.

Dr. Hawker's work has resulted in over 200 publications, 15 US patents, and numerous professional honors including the IUPAC Young Scientists Award (2000), ACS Arthur K. Doolittle Award (1997), and several IBM Patent Invention Awards. His current professional service activities include: Editor of the Journal of Polymer Science, Editorial Board of Polymer Bulletin, Editorial Board of Chemistry of Materials; Editorial Board of the International Journal of Polymeric Materials, Scientific Advisory Board for SYMYX Technologies and Microbar Technologies, and Advisory Board for The Knowledge Foundation.

The Carl S. Marvel - Creative Polymer Chemistry Award will be presented to Dr. Hawker during the American Chemical Society National Meeting in San Diego, CA on April 1-5. The award symposium will be Sunday, April 1 in the San Diego Marriott (San Diego C), followed by an Awards Reception on Monday at 5:30 PM in Hall B.

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1999 Carl S. Marvel Award

Joseph M. DeSimone, Mary Ann Smith Professor of Chemistry at the University of North Carolina, Chapel Hill and Professor of Chemical Engineering at North Carolina State University, will receive the 1999 Carl S. Marvel Creative Polymer Chemistry Award of the ACS Division of Polymer Chemistry, sponsored by the Dow Chemical Company Foundation.

The Carl S. Marvel award recognizes accomplishments and innovations of unusual merit in the field of basic or applied polymer science by younger scientists. Since receiving his Ph.D. under the direction of Prof. Jim McGrath (Virginia Tech.) in 1990, DeSimone has established himself as the pioneer of solvent-free polymerization and processing in CO₂, an innovation with profound global impact for polymer science and environmentally responsible chemical manufacturing.

As Assistant Professor at UNC-CH, DeSimone reported (Science 1992, 257, 945) the polymerization of fluorinated olefins to high molecular weight fluoropolymers in environmentally benign supercritical CO₂, thereby demonstrating the avoidance of traditional chlorofluorocarbons in this technology. Two years later, he reported (Science 1994, 265, 356) the design and use of specialized surfactants for the heterogeneous emulsion / dispersion polymerization of acrylic and styrenic monomers in a supercritical CO₂ continuous phase. This industrially and environmentally friendly breakthrough offered hope to a multitude of commodity plastics manufacturers who at present must process billions of pounds of contaminated waste water each year. DeSimone then expanded (Science 1996, 274, 2049 and Nature 1997, 389I, 368) his discovery of "CO₂-philic" and "CO₂-phobic" surfactants to include the synthesis of block and graft copolymers with tailored supramolecular structure. Today Prof. DeSimone continues to lead the implementation of his work as Co-Director of the Kenan Center for the Utilization of Carbon Dioxide in Manufacturing and as Co-Founder and Chairman of MICELL Technologies, a leading distributor of liquid CO₂ equipment designed to replace over 30 billion pounds of solvents used in professional garment care and other industries.

Prof. DeSimone has also made significant contributions to other areas of polymer chemistry including; the synthesis of novel step growth polymers, new materials and techniques for microlithography, living polymerization, and synthetic methods for polymer end-group control. His work has resulted in over 80 publications, 25 patents, and professional honors including; a NSF Young Investigator Award, a Presidential Green Chemistry Challenge Award, and an Alfred P. Sloan Fellowship. He currently serves on the editorial board of Journal of Applied Polymer Science and High Performance Polymers. The Carl S. Marvel, Creative Polymer Chemistry Award will be presented to Prof. DeSimone during the American Chemical Society National Meeting in Anaheim, CA on March 21-25.

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1997 Carl S. Marvel Award

Bruce Novak