

2019 ACS Award for Affordable Green Chemistry:

The American Chemical Society (ACS) has recognized biocatalysis expert Richard Gross with the 2019 ACS Award for Affordable Green Chemistry, bestowed for outstanding scientific discoveries or chemistries that lay the foundation for cost-competitive environmentally friendly products or manufacturing processes that are less expensive than existing alternatives.

A professor of chemistry and chemical biology and member of the Center for Biotechnology and Interdisciplinary Studies at Rensselaer Polytechnic Institute, Gross seeks to use the molecular building techniques of whole cells and enzymes – “nature’s chemistry” – to create polymers, peptides, and surfactants that are useful, environmentally friendly, and economically competitive.

“Richard is building reuse into the design of polymers and other synthetic materials with a goal of zero waste. In a world that is increasingly awash in synthetic materials, his research offers sorely needed solutions,” said Curt Breneman, dean of the School of Science. “We congratulate him on this recognition and are honored to have him as a colleague.”

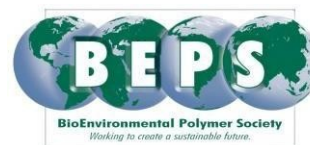
In work recently published in the journal *Biochemistry*, Gross improved the efficiency of a leaf and branch compost cutinase that breaks down polyethylene terephthalate (PET), the plastic used in clear and colored plastic water bottles and many other products. The modified enzyme, which can be further refined, is a promising candidate to fuel limitless recycling of PET and possibly other plastics such as cellulose acetate.

The award was established in 2007 and is supported, beginning in 2009, through an endowment by Rohm and Haas Company, now a wholly owned subsidiary of The Dow Chemical Company. A formal announcement of the names of the 2019 ACS National Award Recipients was made in the September 17 issue of *Chemical & Engineering News*. The award will be presented at the society’s 257th ACS National Meeting on April 2, 2019.



2017 Lifetime Achievement Award from the Bioenvironmental Polymer Society: The

BioEnvironmental Plastic Society (BEPS) honored Gross with the Lifetime Achievement award during a conference held Sept. 20-22, 2017 in Albany, CA, USA. The international award recognizes an outstanding research career, as well as dedication and support for BEPS. The Lifetime Achievement Award is the highest recognition from BEPS to a member who has made “outstanding contributions to scientific advancement and made phenomenal scholarly accomplishments and impact in the field of biopolymers, bio-based materials and/or bioplastic/materials related bioenergy systems,” according to the society’s website. BEPS is an international scientific organization supporting and encouraging research, development and discussions on synthetic, renewable and naturally degradable polymers and composites.



2015 Polymer Fellow Awardee In recognition of excellence in advancing the field of polymer science through scientific accomplishments and service to the profession. This award was established by the Division of Polymer Chemistry in 2009, with inaugural recipients in 2010. The award is administered and sponsored by POLY.

The 2010 Turner Alfrey Visiting Professor award (TAVP),

Award: This award is Michigan Molecular Institutes (MMI) top honor. MMI serves as the intellectual core of a region that includes Dow Chemical and Dow Corning, parts of the world’s



second largest chemical company and major patron of MMI, as well as a host of universities and chemical

organizations. As part of the TAVP program, Gross gave seminars at Dow Chemical, Dow Corning, central Michigan universities and Professional organizations. In addition, he delivered a short course

(June 7 through 11 from 3 to 6 p.m. at the MMI Lecture Hall) entitled "Harnessing Biocatalysis to Overcome Current Challenges in Polymer Chemistry and Material Science". This award puts Gross in the company of such past honorees as Piero Pino of the Swiss Federal Institute of Technology, Nirio Ise of Kyoto University, Gerhard Wegner of the Max-Planck Institut, Robert Prud'homme of Princeton and Nobel Prize winner Pierre de Gennes of the College de France, Paris. All are stars in the polymer field.



The 2003 Presidential Green Chemistry

Award: The Presidential Green Chemistry Challenge Awards program was

established in 1995 as a competitive effort to promote innovative chemical products and manufacturing processes that prevent pollution and are still economically viable. The awards program is administered by EPA's Green Chemistry Program in the Office of Pollution Prevention & Toxics. EPA operates the program with some 20 partners from industry, government, academia, and other organizations, including ACS and the Green Chemistry Institute. Award nominations are solicited in five categories: small business, alternative synthetic pathways, alternative reaction conditions, designing safer chemicals, and academic. The work described in the nomination must have been carried out or demonstrated in the U.S. within the



preceding five-year period. An independent panel, appointed by ACS, judges the nominations and selects the award winners.

Richard A. Gross, a chemistry professor at Polytechnic University, Brooklyn, N.Y., was selected as the Green Chemistry Award winner in the academic category for his group's research on a broad range of lipase-catalyzed polyester syntheses. These condensation or ring-opening reactions generally occur in onepot and don't require a solvent. The high selectivity of the biocatalyst streamlines the reactions by eliminating the need for protection and deprotection of reactive side groups. Overall, Gross's enzymatic approach offers environmental and cost benefits over traditional chemical-catalyzed polymerizations, and it's leading to new hydroxyl-decorated polyesters for commercial and medical applications. Previous winners are Mark Holtzapple, Texas A&M University (1996); Joseph M. DeSimone, University of North Carolina at Chapel Hill (1997); Barry M. Trost, Stanford University, Karen/John Frost, Michigan State University (1998); Terry Collins, Carnegie Mellon University (1999); Chi-Huey Wong, The Scripps Research Institute (2000); Chao-Jun Li, Tulane University (2001); Eric J. Beckman, University of Pittsburg (2002); Charles A. Eckert and Charles L. Liotta, Georgia Institute of Technology (2004); Robin D. Rogers, The University of Alabama (2005); Michael J. Krische, University of Texas at Austin (2007); Professors Robert E. Maleczka and Milton R. Smith, III, Michigan State University (2008); Krzysztof Matyjaszewski, Carnegie Mellon University (2009); James C. Liao, University of California (2010); Bruce H. Lipshutz, University of California (2011)