



Karen Wooley

Texas A&M University

Tuesday, October 27, 2026; 1:25 PM

Karen L. Wooley holds the W. T. Doherty-Welch Chair in Chemistry and is a University Distinguished Professor in the Department of Chemistry at Texas A&M University. She also has a joint appointment in the Department of Materials Science & Engineering. Wooley studied at Oregon State University (B.S., 1988) and Cornell University (Ph.D., 1993). As an undergraduate, she engaged in natural product total synthesis research in the laboratory of Steven J. Gould (deceased), and she then shifted to macromolecular chemistry with a focus on the synthesis and characterization of dendritic and hyperbranched

polymers during Ph.D. studies under the direction of Jean M. J. Fréchet. The first sixteen years of her independent academic career were spent at Washington University in St. Louis, Missouri and she then relocated to Texas A&M University in July 2009. In addition to her academic positions, she is a co-founder and President of Sugar Plastics, LLC, and Chief Technology Officer of Teysha Technologies, Ltd. Research interests include the synthesis and characterization of degradable polymers derived from natural products, unique macromolecular architectures, complex polymer assemblies, and well-defined nanostructured materials. She has designed synthetic strategies to harness the rich compositional, regiochemical and stereochemical complexity of natural products for the construction of hydrolytically-degradable polymers, which have impact toward sustainability, reduction of reliance on petrochemicals, and production of biologically-beneficial and environmentally-benign natural products upon degradation – these materials are designed to impact global issues and she works aggressively to translate them to overcome global challenges. Recent awards include election as a Fellow of the American Academy of Arts and Sciences (2015), National Academy of Inventors (2019), American Association for the Advancement of Science (2020), American Institute for Medical and Biological Engineering (2020), National Academy of Sciences (2020), and National Academy of Engineering (2026); she was also named as the 2021 Southeastern Conference (SEC) Professor of the Year.

Abstract: “Natural Product Feedstocks to Address Chemical Sustainability while Achieving Enhanced Chemical Complexity and Replacing Chemicals of Concern”

A primary interest in the Wooley laboratory is the production of functional polymers from renewable sources that are capable of reverting to those natural products once their purpose has been served. Long-standing efforts have developed synthetic methodologies that transform sugars, amino acids and other natural products into well-defined polymer structures, while creating mechanisms for breakdown after their useful lifetime is complete, and providing for biological and environmental resorption of the degradation products. This presentation will highlight a transition from academic studies involving cyclic carbonate formation and ring-opening polymerization for a family of carbohydrates to utilization of carbohydrate regio- and stereochemistries to drive translational efforts for polycarbonates prepared from condensation polymerization of bifunctional alcoholic or phenolic monomers. Extending from a focus on carbohydrate-derived polycarbonates, most recent directions have included bisphenol A replacements more broadly.