"One of the most important and exciting things in chemistry is the synthesis of new molecules that have never been seen before. Most of my scientific career has been devoted to doing just that. However, there are many hypothetical molecules that appear to have reasonable structures but which have never been synthesized. This is particularly true in inorganic chemistry where the diversity of elements throughout the entire Periodic Table provides seemingly endless possibilities for unusual chemical bonding and coordination geometries. Modern theoretical chemistry methods based on quantum mechanics and computing technology can tell us which such molecules are reasonable future synthetic objectives and which are likely to remain as figments of imagination."

R. Bruce King

R. Bruce King Lecture

2010	Lawrence F. Dahl	Hilldale Professor University of Wisconsin
2011	Robert H. Crabtree	C. P. Whitehead Professor Yale University
2012	Robert H. Grubbs	Victor & Elizabeth Atkins Professor California Institute of Technology
2013	Richard R. Schrock	Frederick G. Keyes Professor Massachusetts Institute of Technology
2014	Tobin J. Marks	Charles E. & Emma H. Morrison Professor Northwestern University
2015	Stephen J. Lippard	Arthur Amos Noyes Professor Massachusetts Institute of Technology
2016	Harry B. Gray	Arnold O. Beckman Professor of Chemistry California Institute of Technology
2017	Robert G. Bergman	Gerald E. K. Branch Distinguished Professor of Chemistry University of California Berkeley
2018	Jerry L. Atwood	Curators' Distinguished Professor of Chemistry University of Missouri
2019	Philip P. Power	Distinguished Professor of Chemistry University of California Davis

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The University of Georgia

The Eleventh
R. Bruce King Lecture

From Molecular Gyroscopes to Homeomorphic Isomerization: Molecules that Turn Themselves Inside-Out

Professor John A. Gladysz

Distinguished Professor of Chemistry

Texas A & M University

College Station, Texas

11:00 AM
March 14, 2023
Room 1218 STEM

Center for Computational Quantum Chemistry
Department of Chemistry
University of Georgia

ROBERT BRUCE KING

R. Bruce King was born on February 27, 1938 in Rochester, New Hampshire. He received his B. A. degree from Oberlin College in 1957 and his Ph. D. degree from Harvard University in 1961 under the direction of Professor F. Gordon A. Stone. After finishing his degree at Harvard, Dr. King moved to Dupont in Wilmington, Delaware, for a year followed by four years at the Mellon Institute. He joined the University of Georgia in 1966 and was appointed Regents' Professor in 1973. Professor King formally "retired" from the University of Georgia in 2006 but remains very active (9 papers in 2022) as Regents' Professor Emeritus. Since 2000 Professor King has also held an adjunct professorship at Babeş-Bolyai University in Cluj-Napoca, Romania. He received an honorary doctorate from that university in 2008.

Professor King's research career in inorganic and organometallic chemistry spans more than a half-century and has led to more than 1100 scientific papers as well as 20 books, most in synthetic inorganic, organometallic, and organophosphorus chemistry. Later he became interested in the underlying mathematics of structure and bonding and was one of the first to apply methods of graph theory and topology to theoretical inorganic chemistry. In recent years Professor King's research has focused on computational inorganic and organometallic chemistry. Much of his research has moved to China where he was an Associate Director of the Center for Computational Quantum Chemistry at South China Normal University (Guangzhou) and an Academic Co-Director of the Research Center for Advanced Computation at Xihua University (Chengdu). Professor King's research contributions have been recognized by American Chemical Society National Awards in Pure Chemistry (1971) and Inorganic Chemistry (1991), as well as awards from the Georgia, Florida, and Memphis local sections. In 1972 Dr. King was named Georgia Scientist of the Year. In 2009 Professor King was elected to the inaugural class of Fellows of the American Chemical Society.

Professor King served as Editor-in-Chief for the first two editions of the multi-volume *Encyclopedia of Inorganic Chemistry* published by John Wiley in 1994 and in 2005. This is the most significant modern reference work in inorganic chemistry. He was the American Regional Editor of the *Journal of Organometallic Chemistry* for 17 years (1981 to 1998). His authored books include *Applications of Graph Theory and Topology in Inorganic Cluster and Coordination Chemistry* (CRC Press, 1993), *Inorganic Chemistry of Main Group Elements* (VCH Publishers, 1995), and *Beyond the Quartic Equation* (Birkhäuser, 1996)

JOHN A. GLADYSZ

John A. Gladysz is a native of the Kalamazoo, Michigan area, and obtained his B.S. degree from the University of Michigan (1971) and his Ph.D degree from Stanford University (1974) with E. E. van Tamelen. He subsequently held appointments at UCLA (Assistant Professor, 1974-1982), the University of Utah (Associate Professor and Professor, 1982-1998), and the University of Erlangen-Nuremberg in Germany (Professor Ordinarius, 1998-2007), where he succeeded P. v. R. Schleyer. He then assumed the Dow Chair in Chemical Invention at Texas A&M University, where he is Distinguished Professor of Chemistry.

Gladysz received an Arthur C. Cope Scholar Award in 1988, the University of Utah Distinguished Research Award in 1992, the ACS Award in Organometallic Chemistry in 1994, the International Fluorous Technologies Award in 2007, the Texas A&M Distinguished Achievement Award in Research in 2013, and the Royal Society of Chemistry Award in Organometallic Chemistry in 2013. He was elected as a Fellow of the American Chemical Society in the inaugural year, 2009, and became a Fellow of the Royal Society of Chemistry in 2013. From June 1984 through July 2010, he served as the Associate Editor of *Chemical Reviews*. He then succeeded Dietmar Seyferth as the Editor in Chief of *Organometallics*, a position he held until January 2015.

Gladysz has authored over 500 scientific papers and 75 patents and editorials, most centering on organometallic chemistry and branching into catalysis, organic synthesis, stereochemistry, mechanism, molecular devices, and materials and green chemistry. He was responsible for many early advances in C1 model chemistry (stable formyl, methylidene, a-hydroxyalkyl, formaldehyde complexes), and established the first examples of *cis*/*trans* isomerism about M=CHR linkages. He pioneered the development of several types of enantiopure chiral-at-metal complexes, devoting 200 papers to adducts of chiral rhenium Lewis acids that promote numerous ligand-based asymmetric reactions that lead to a variety of enantiopure organic molecules. In the last decade, he has shown that chiral cobalt(III) complexes synthesized by Werner >110 years ago and lacked any practical applications are in fact outstanding catalysts for a variety of enantioselective transformations via an unanticipated outer coordination sphere mechanism.

Gladysz was also a leader in the development of novel recoverable fluorous catalysts and reagents, including protocols that eliminated the need to use highly fluorinated solvents. He has been a trailblazer in the synthesis and study of wire-like long polyynes capped by metal fragments (L*y*M-(C≡C)*n*-ML*y*; *n* = 10-20), which provide models for the elusive polymeric sp carbon allotrope carbyne, which is poorly characterized relative to diamond (sp3) and graphite (sp2). His current work on molecular gyroscopes and *in*/*out* isomers is summarized in the abstract to his R. Bruce King Lecture.

Gladysz and his wife (Janet Blümel, also a chemist) live on the Crow's Nest Ranch, which consists of 140 acres (57 hectares) seven miles east of Texas A&M.