Abstract
Heterogeneous catalysis provides a tremendous opportunity to reduce energy use because chemical production, which relies on heavily on heterogeneous catalysis, accounts for nearly 25% of energy use worldwide. The objective of our work is to develop a fundamental understanding of reactivity for selective oxidation and hydrogenation processes on dilute alloy surfaces, so as to develop principles that govern catalytic processes. The ability to predict catalytic reactivity and selectivity for Au-based catalysts, containing small amounts of Ag and Pd, is demonstrated. More recent studies of Pd/Ag alloy models provides insight into generalization of the approach.

Bio
Cynthia Friend is the Director the DOE-funded Energy Frontier Research Center, Integrated Mesoscale Architectures for Sustainable Catalysis (IMASC) and the Director of the Rowland Institute for Science at Harvard. She is currently the T.W. Richards Professorship of Chemistry and Professor of Materials Science in the Paulson School of Engineering and Applied Sciences, having joined the Harvard faculty in 1982. She earned her Ph.D. from the University of California, Berkeley in 1981, graduated from the University of California, Davis in 1977 with a degree in Chemistry and was a postdoctoral fellow at Stanford University. Friend's current research is focused on developing solutions to important problems in energy usage and environmental chemistry.

Friend has served in many leadership roles, including Director of the IMASC Energy Frontier Research Center at Harvard, Associate Dean of the Faculty of Arts and Sciences at Harvard, as the first and only female Chair of the Harvard Chemistry Department, and as an Associate Director of SLAC National Laboratory at Stanford. Friend has also served on numerous advisory boards, including as Associate Chair of the 2016 DOE Basic Research Needs Workshop on Innovation in Instrumentation Science. In addition, she was Sr. Editor of Accounts of Chemical Research, and is currently on the Editorial Advisory Boards of ACS Catalysis and ACS Central Science. Due to her involvement in scientific innovation, she was elected to the Board of Directors of Bruker Instruments in 2016.

Professor Friend is the recipient of three national American Chemical Society Awards: the 2017 Award in Surface Chemistry, the 2009 George Olah Award in Hydrocarbon Chemistry and the 1991 Garvan Medal. She is also a fellow of the American Academy of Arts and Sciences, the American Association of the Advancement of Science, and the American Chemical Society, as well as a recipient of a Humboldt Senior Research Fellowship in 2007.