

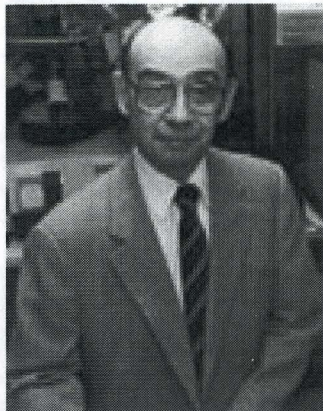
Previous Lecturers

- 2014 Professor Peter Stang
- 2013 Professor Robert H. Grubbs
- 2012 Professor Roald Hoffman
- 2011 Professor Tobin Marks
- 2010 Professor Harry Gray
- 2009 Professor Robert Crabtree
- 2008 Professor Daryl Busch
- 2007 Professor Thomas Fehlner



THE OHIO STATE UNIVERSITY

Sheldon G. Shore Kimberly Professor



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DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY



Dr. Christopher Cummins
Massachusetts Institute of
Technology

Sheldon Shore Lecture 2015

April 17, 2015



THE OHIO STATE UNIVERSITY

Professor Sheldon Shore Distinguished Professor of Mathematical and Physical Sciences

Sheldon Shore was born in Chicago in 1930. After completing his Bachelor's degree at the University of Illinois in 1951, he moved to the University of Michigan where he completed his Master's (1953) and Doctoral degrees (1957). Shortly thereafter, he moved to join the Chemistry faculty at The Ohio State University, where he provided 57 years of distinguished service.

Professor Shore's research spanned vast areas of the periodic table, but perhaps he is best known for his pioneering work in the area of boron hydrides, metal cluster carbonyls and lanthanide transition metal systems. He and his coworkers developed the first rational synthesis of B_4B_{10} boron hydrides and one of his early compounds, ammonia borane, which had been predicted to be too unstable to isolate, was isolated by him and shown to be stable at elevated temperatures. It is currently a hot topic for hydrogen storage and release. He produced the first well-defined examples of boron nitride nanotubes, analogs of multi-walled carbon nanotubes. His mechanistic studies of the synthesis of metal cluster carbonylates and the water-gas shift reaction attracted wide attention. This work has been featured in current treatises on cluster chemistry and is also described in inorganic chemistry text books. His work on mixed metal clusters of lanthanide-transition metal elements and their conversion to nanoparticles has led to new heterogeneous catalysts for the selective hydrogenation of phenol to cyclohexanone, hydrodechlorination of chlorobenzenes, and the reforming of propane.

Dr. Shore authored over 300 scientific publications and 14 patents. He received numerous awards and recognitions for his research. Most notable among them is the Chemical Society's Columbus Section Award, the Morley Medal of the Cleveland Section, the ACS Award for Inorganic Chemistry and election as a corresponding member of the Bavarian Academy of Sciences. The Ohio State University also recognized him with the Distinguished Lecturer Award, the Distinguished Scholar Award, the Charles H. Kimberly Chair of Chemistry, and the Distinguished Professor of Mathematical and Physical Sciences Award. Dr. Shore received the ACS Award for Inorganic Chemistry in 2008. During Dr. Shore's tenure at OSU, 91 students completed MS or Ph.D. degrees with him, and many more postdoctoral fellows and visiting scholars were associated with his laboratory, not including the thousands of undergraduates who passed through his classes. Over a long and active career, Sheldon Shore left a profound and indelible imprint on the lives of the many faculty, staff, and students of the broader Ohio State University family that were fortunate to know him. The annual Sheldon G Shore Lecture provides an opportunity to remember and celebrate his achievements.

Professor Christopher Cummins MIT

Christopher "Kit" Colin Cummins benefited from formative undergraduate research experiences carried out sequentially in the laboratories of Professors Susan E. Kegley, James P. Collman, and Peter T. Wolczanski, respectively of Middlebury College, Stanford University and Cornell University. He graduated from the latter institution with an A.B. degree in 1989. Following this he undertook inorganic chemistry graduate studies under the direction of Professor Richard R. Schrock at the Massachusetts Institute of Technology, from which he obtained his Ph.D. degree in 1993 with a thesis entitled "Synthetic Investigations Featuring Amidometallic Complexes". Also in 1993 Dr. Cummins joined the chemistry faculty at MIT as an Assistant Professor, and in 1996 he was promoted to his current rank of Professor.

Dr. Cummins' work has been recognized with Harvard University's E. Bright Wilson Prize, the Phi Lambda Upsilon National Fresenius Award, a Packard Fellowship for Science and Engineering, an Alfred P. Sloan Foundation Fellowship, the ACS Award in Pure Chemistry, the NSF Alan T. Waterman Award, the TR100 Award, an Alexander von Humboldt Research Award, the Dannie-Heineman Preis of the Akademie der Wissenschaften zu Göttingen, the ACS F. Albert Cotton Award in Synthetic Inorganic Chemistry, and the Raymond and Beverly Sackler Prize in the Physical Sciences. He was also selected as the inaugural winner of the *Inorganic Chemistry* Lectureship Award, and as a recipient of the RSC Ludwig Mond Award. Dr. Cummins has been elected to membership in the American Academy of Arts and Sciences, and is a corresponding member of the Akademie der Wissenschaften zu Göttingen.

Lecture Abstract: In the book by the same name, W. E. Dasent identifies "nonexistent compounds" as compounds of low stability, or which despite not offending the simpler rules of valence are characterized by a low degree of stability. Here we find an intersection of the chemistry of interstellar molecules and that of reactive intermediates. By asking what would be the chemistry of such species under ambient conditions we have been motivated to synthesize molecular precursors that can deliver them upon mild thermal activation either into solution or into the gas phase. To be related are a few vignettes based upon simple molecules including P_2 and HCP that illustrate ramifications for synthetic advances and inorganic aromaticity.

Friday, April 17, 2015

Lecture

4:00 p.m.

130 CBEC

151 W. Woodruff

Dr. Christopher Cummins

"Nonexistent Compounds"

Reception

5:15pm

CBEC 100/Lobby

151 W. Woodruff Ave.

