

## Speaker Bio:

Gary Brudvig is the Benjamin Silliman Professor of Chemistry, Professor of Molecular Biophysics and Biochemistry, and Director of the Yale Energy Sciences Institute. He received his B.S. (1976) from the University of Minnesota, his Ph.D. (1981) from Caltech working with Sunney Chan and was a Miller Postdoctoral Fellow with Ken Sauer at the University of California, Berkeley from 1980 to 1982. Professor Brudvig has been on the faculty at Yale since 1982 and served as Chair of the Chemistry Department from 2003-2009. His research involves study of the chemistry of water oxidation in photosynthesis and work to develop artificial bioinspired systems for solar fuel production.

### NYCS 2014 Annual Symposium Poster Competition Graduate Student Winner

**Paul F. Smith**

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### Cobalt Oxides as Catalysts for Water Oxidation: Modeling with Organometallic Clusters up to "Cubane" Nuclearity

The metal-oxo  $M_4O_4$  "cubane" topology is of special significance to the field of water oxidation as it represents the merging of bioinspired structural principles derived from natural photosynthesis with successful artificial catalysts known to date. Many researchers have found promising materials when adapting the  $Co_4O_4$  cubane, which is the structural unit responsible for activity in a variety of heterogeneous catalysts- cubic  $LiCoO_2$ , spinel-type  $Co_3O_4$ , and amorphous "Co-Pi", for examples. This talk will cover a molecular study of "half cubane"  $Co_2O_2$ , "incomplete cubane"  $Co_3O_{3.4}$  and cubane  $Co_4O_4$  clusters in the same ligand sets. We show that the cubane topology facilitates the accessibility of cobalt to the high oxidation states required to oxidize water. This talk will also discuss that demonstrating these discrete cubanes as molecular, homogeneous catalysts remains a significant challenge.

Biography: Paul F. Smith obtained his B.S. in Chemistry from Gettysburg College, and is currently a 5<sup>th</sup> year Inorganic Chemistry Ph.D. candidate in the lab of G. Charles Dismukes at Rutgers University. In his Ph.D. training, he is the coauthor to 6 peer reviewed publications as well as one textbook chapter in the 2012 Prose Award winner "Bioinspiration and Biomimicry in Chemistry." He is a fellow of the NSF-IGERT Renewable and Sustainable Fuels program at Rutgers, a winner of the Rutgers Reid research award, and an alumnus of the NSF East Asia Pacific Summer Institute. His research has focused on the development of first row transition metals (Co, Mn, Fe) into water oxidation catalysts, and systems which can model the activity of natural photosynthesis.

Dinner is a buffet, and includes <u>a choice of beef, chicken or fish</u>	Members	<b>\$40</b>
Social Hour (Cash Bar)	Non-members	<b>\$50</b>
Dinner	Students	<b>\$25 (Student Members = \$10)</b>
Presentation	Retired/Post-Doc/Unemp.	<b>\$40 (Members = \$30)</b>
	Annual Membership Dues	<b>\$35 (Student/Retired = \$15)</b>

**Deadline for dinner reservations is 4:00 p.m. Friday, February 13, 2014**

Email Fuat E. Celik ([fuat.celik.nycs@rutgers.edu](mailto:fuat.celik.nycs@rutgers.edu)) for reservations. With the exception of extreme circumstances, anyone not canceling reservations by the above deadline will be billed for dinner regardless of attendance.

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