



Department of Chemistry

香港城市大學  
City University of Hong Kong

***Special Departmental Seminar***

*By*

**Prof. Smaranda C. Marinescu**

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University of Southern California, USA

***Biologically Inspired Catalytic Systems  
for Chemical Fuels***



**Date: 9 November 2026 (Monday)**

**Time: 10:30 am – 11:30 am**

**Venue: B5-210 (Blue Zone, 5th Floor)  
Yeung Kin Man Academic Building  
City University of Hong Kong**



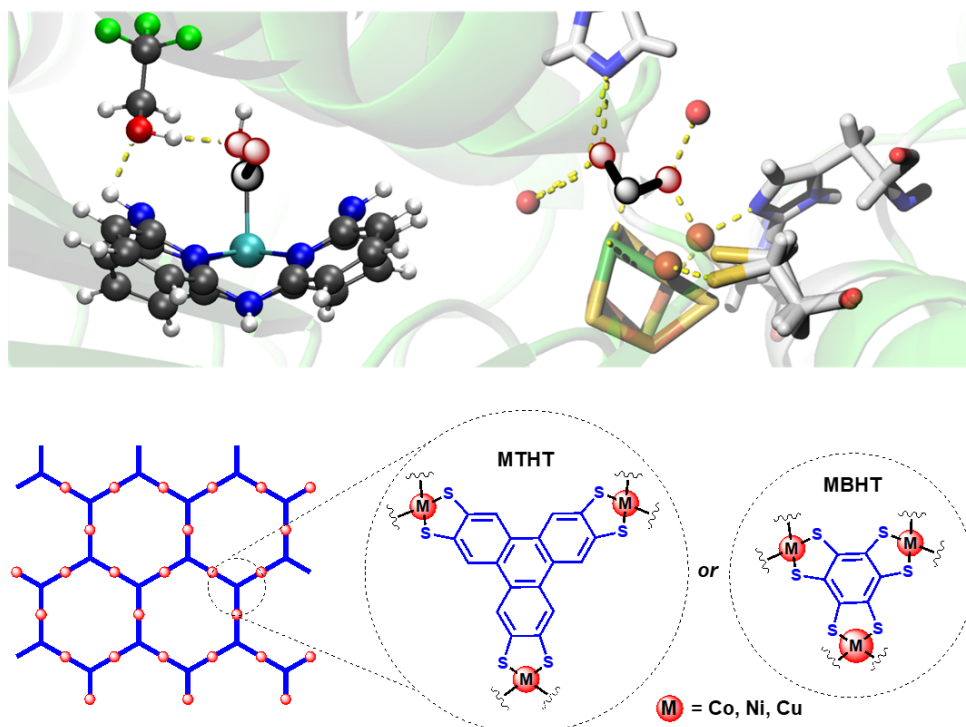
***For abstract, please refer to the attached sheet.***

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***~ Limited seating ~  
~ First come, first served ~***

## Abstract

Research in the Marinescu group focuses on the development of novel catalytic systems for chemical fuels synthesis from abundant and renewable sources. Inspired by biological systems, we design molecular catalysts that involve hydrogen bonding networks capable of small molecule activation through multiple proton and electron transfers. We have shown that cobalt complexes with pendant secondary amine (NH) moieties act as highly efficient electrocatalysts for the reduction of CO<sub>2</sub> to CO, and the proposed mechanism involves the formation of a hydrogen-bonding network intermediate that enables direct proton transfer from acid to the activated CO<sub>2</sub> substrate. In addition to CO<sub>2</sub> reduction, we also developed catalytic systems for the conversion of water into H<sub>2</sub>, such as the dithiolene-based coordination complexes and polymers that display remarkable electrocatalytic activity for the hydrogen evolution reaction (HER). We have also shown that cobalt phosphinothiolate complexes catalyze the electrochemical reduction of CO<sub>2</sub> to formate with excellent selectivity. Additionally, we have also explored the immobilization of well-known CO<sub>2</sub>-reduction catalysts, such as metal porphyrins or rhenium bipyridine tricarbonyl moieties, via incorporation into covalent-organic frameworks or via covalent attachment through robust diazonium reductive coupling. We expect the design principles discovered in these studies to have a profound impact towards the development of advanced materials and sustainable technologies.



Research in the Marinescu group focuses on the development of biologically inspired catalytic systems for efficient *solar-to-fuel* technologies.

## Biography



Prof. Smaranda C. Marinescu grew up in Romania and moved to the US for college. She graduated from the California Institute of Technology (Caltech) in 2006. During her undergraduate studies, she did research in organometallic chemistry with Prof. John E. Bercaw on the synthesis and reactivity of group 3 dialkyl complexes supported by tetradentate, monoanionic ligands. After graduation, Smaranda continued one more year at Caltech, doing research in the group of Prof. Brian M. Stoltz, where she developed a homogeneous Pd-catalyzed enantioselective decarboxylative protonation. In 2007, she started her Ph.D. at the Massachusetts Institute of Technology (MIT) under the tutelage of Prof. Richard R. Schrock, exploring molybdenum and tungsten alkylidene species for enantio-, *Z*-, and *E*-selective olefins metathesis reactions. After graduation in 2011, she undertook a postdoctoral position in the laboratories of Prof. Harry B. Gray at Caltech, as an NSF CCI postdoctoral fellow. Her research focused on mechanistic studies of the cobalt catalyzed hydrogen evolution, which shed new light on the previously speculative mechanisms of proton reduction. In August 2013, she started her independent career as an assistant professor in chemistry at the University of Southern California. She was promoted to Associate Professor of Chemistry in March 2020.