Department of Chemistry Seminar Series
Spring 2023

Friday, January 20, 2023, 3:30 PM – **HPA1-O119 (Health Sciences)**
Host: Fernando Uribe-Romo

Supramolecular Design Approaches for 2D Polymers and 3D Printing

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My research group has two focus areas: 1) the synthesis of novel polymeric materials for 3D printing 2) the supramolecular design of functional microporous polymers, namely covalent organic frameworks.

The rapid growth of 3D printing as a technology has enabled its use as a transformative force in commercial and biomedical applications. The current toolbox of polymeric materials used for 3D printing typically consists of commodity polymers that have acceptable properties for applications in prototyping, but are limited in their usefulness in practical applications desired for industrial, medical, or military purposes. We use the concepts of dynamic covalent chemistry and self-assembly to alleviate these issues.

In addition to printable polymers we also synthesize and study materials with permanent porosity. One of the more promising classes of materials being developed for use in energy harvesting and storage are covalent organic frameworks, or COFs. COFs are a class of porous two-dimensional polymers whose structure is controlled by interplay between non-covalent aromatic interactions (π-stacking, hydrogen bonding) and dynamic covalent bond formation. In order to design new COFs with precisely controlled properties, a thorough understanding of the underlying principles controlling the mechanism of their formation is paramount. We use the tools of organic synthesis to develop structure-function relationships that are relevant to the design of microporous materials, including COFs.