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**Friday, August 11th**

**10:00 am**

**Location: Wilder 111**

## "On-surface Molecular Frameworks - Synthesis Properties and Function"

**Bio:** Dana Medina-Tautz obtained her Ph.D. in Chemistry in 2010 from Bar-Ilan University. In 2011 Dana moved to the Ludiwg-Maximilians-Universität München (LMU, chair Prof. Thomas Bein) as a Minerva fellow to conduct a postdoctoral research, where she is leading in her current capacity a young research group and perusing her habilitation. The research pursued by Dana's group is focused on the design and synthesis of functional porous crystalline frameworks, particularly 2D layered structures. Large part of the research is dedicated to the development of novel on-surface deposition techniques with the goal of bringing periodic porous materials towards thin film applications in electronics, sensing and sieving.

**Abstract:** Crystalline and porous molecular framework materials with specific encoded properties hold promise as a novel, highly tunable functional platform. Through the concepts of reticular chemistry, numerous two- and three-dimensional molecular frameworks with diverse structural, optical and electrical properties are in reach. [1, 2] On-surface deposition of molecular framework coatings is crucial for their utilization as active layers in advanced device-based applications including separation, sensing and optoelectronics. In addition to the variable backbone properties, gaining control over the molecular framework film morphology is of critical importance for achieving the intended functionality.

Herein, the on-surface synthesis of molecular frameworks, namely metal- and covalent-organic frameworks (MOFs and COFs) as films and deposits is presented. For MOFs, vapor-assisted conversion (VAC), a versatile method for the deposition of thin films of both 3D and 2D MOFs, particularly for the metal (Ni2+, Co2+, Cu2+) catecholate, M-CAT-1 series, will be discussed. [4, 5] The films obtained by VAC feature thicknesses in the nanometer scale with a particular morphology, topography and roughness. Subsequently, M-CAT-1 films are implemented as active layers into devices to be tested for a variety of applications ranging from optoelectronics to waste water treatment.[6, 7] For the latter, ultrahigh flux separation of oily pollutants from water is achieved with a filter mesh decorated with MOF nanoscale architectures. For COFs, the in-situ thin film synthesis approach will be described as a reliable and well-established methodology for the synthesis of COF thin films. Here, the synthesis of novel layered thiophene-extended benzotrithiophene-based (BTT) COFs as highly oriented and crystalline thin films and their respective directional electrical conductivity will be illustrated, where BTT-COFs show enhanced in-plane electrical conductivity compared to out-of-plane electrical conductivity.