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| הפקולטה להנדסה כימית  ע"ש וולפסון |  |  |
| The Wolfson Department of Chemical Engineering |  |  |

**Wolfson Department of Chemical Engineering Seminar**

**Monday, March 18th, 2024, at 13:30**

**Room 1**

**Surface-guided Crystallization of Theophylline for Refractive Optical Elements**

**Angelica Elkan**

**Department Seminar**

Department of Chemical and Biomolecular Engineering, University of Houston

Department of physics of complex systems, The Weizmann Institute of Science

**Abstract:** Numerous bio-organisms employ template-assisted crystallization of molecular solids to yield crystal morphologies with unique optical properties that are difficult to reproduce synthetically. We developed a facile procedure to deposit bio-inspired birefringent crystals of theophylline on a template of single-crystal quartz. Crystalline sheets with well-defined orientation were obtained, giving rise to high optical anisotropy in the plane parallel to the quartz surface, with a refractive index difference of Δ*n* ≈ 0.25 and a refractive index along the slow axis of *n* ≈ 1.7. A classical crystallization mechanism was observed by time-resolved AFM. Finally,  patterning of the crystalline stripes with a tailored periodic grating leads to a thin organic polarization-dependent diffractive meta-surface, opening the door to the fabrication of various optical devices from a platform of small molecule based organic dielectric crystals.