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|  |  |  הטכניון - מכון טכנולוגי לישראל TECHNION - ISRAEL INSTITUTE OF TECHNOLOGY  |
| הפקולטה להנדסה כימיתע"ש וולפסון |  |  |
| The Wolfson Department of Chemical Engineering |  |  |

**Wolfson Department of Chemical Engineering Seminar**

**Wednesday, May 12th, 2021 at 13:30**

**Lecture hall No. 6, Chemical Engineering (under Green Pass regulations)**

**Mineralization in the tumor microenvironment**

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The tumor microenvironment affects tumor progression and can drive cancer invasion in certain conditions and altered extra cellular matrix (ECM) plays an important role in tumor progression. Calcifications are a component of the tumor microenvironment that appear in more than 90% of breast precancer cases and in almost 80% of patients with thyroid papillary carcinoma, but are often scientifically overlooked. There is evidence to suggest that the crystal properties of calcifications can affect cancer progression and may have a diagnostic or prognostic value. The composition and structural properties of both the ECM and calcifications strongly depend on the chemical conditions in the tumor microenvironment, e.g., its acidity.

We utilize engineered 3D tumor models to associate the chemical conditions in the tumor microenvironment with the progression of breast precancer to invasive cancer. Specifically, we focus on local changes in acidity and on the interactions of precancer cells with mineral deposits with varying crystal properties. In addition, we use vibrational spectroscopy to study the crystal properties of calcifications present in breast and thyroid clinical samples to correlate these properties with cancer diagnosis and prognosis.

Our methodology includes scanning electron microscopy under cryogenic conditions (cryo-SEM) to preserve the composition and structure of hydrated tissues, microCT for 3D imaging of calcifications within soft tissues, FTIR and Raman mapping for spatial characterization of mineral-containing tissues and in situ fluorescence confocal live imaging to map ECM acidity.