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

**Wolfson Department of Chemical Engineering Seminar**

**Monday, March 21st, 2022 at 13:30**

**Room 6 # via Zoom:** <https://technion.zoom.us/j/97577956516>

**Electrospun PZT nanofiber-based composites for vibration control**

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**MSc Seminar**

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Vibrations are an undesirable, yet common byproduct in many engineering applications. The existence of vibrations in a mechanical system can impair its durability and result in limited accuracy and performance. Piezoelectric materials can transform mechanical energy into electrical energy and vice versa. This property makes them particularly useful in vibration control systems. Polycrystalline ceramic materials, such as lead zirconate titanate (PZT - $Pb(Zr\_{x}Ti\_{1-x}O\_{3})$), can be processed to exhibit significant piezoelectric properties. However, industrial applications of PZT are hindered by its low flexibility and brittle nature. PZT–polymer composites have the potential to overcome these limitations by combining the electromechanical properties of PZT and the mechanical flexibility and processing possibilities of polymers.

The relationship between the microscopic structure of a material and its macroscopic properties is well-known in material science. More specifically, the microscopic structure of the PZT will have a profound impact on the characteristics of the PZT-polymer composite. PZT is generally prepared via solid state chemistry. This preparation route results in a typical microparticulate structure. Electrospinning is a simple technique capable of generating various nanofibrous structures. Many researchers explored the link between PZT morphology and composite architecture on the resulting piezoelectric properties, but a systematic comparison between composites with different PZT morphologies is scarce. The focus of this research is a comparison between the piezoelectric properties of powder-based, and fiber-based composites. The fruits of this research could be used to produce highly optimized composites for vibration control systems.