



MECHANICAL ENGINEERING MSc SEMINAR (30 min.)

Thursday, July 3rd, 2025, at 14:00-14:30, D. Dan and Betty Kahn Building, Room 217

Monitoring stochastic mechanical behaviors by data-driven analysis of acoustic emissions

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Adviser: Prof. Doron Shilo

Acoustic Emission (AE) refers to bursts of acoustic waves released by a material during plastic deformation. AE monitoring has become a powerful tool for understanding mechanical processes in materials at small spatial and temporal scales. In this seminar, I present a data-driven approach to analyzing AE signals, demonstrated through two key problems: classifying deformation mechanisms and predicting fatigue failure. Using unsupervised learning techniques, such as dimensionality reduction and clustering, and prior knowledge obtained by other experimental methods, we distinguish between slip and twinning in magnesium based on their AE waveforms. In addition, we show that changes in AE spectral features over time can serve as an early warning sign for fatigue damage, helping to identify when catastrophic failure approaches. These findings enhance our understanding of material behavior under cyclic loading and highlight the potential of AE for real-time structural health monitoring.

Note: the seminar will be given in Hebrew

<https://technion.zoom.us/j/96857128740>

Seminars Coordinator: Assoc. Prof. Shmuel Gal.