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

**Wolfson Department of Chemical Engineering Seminar**

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

**Room 4**

**Enzymes as viscoelastic catalytic machines**

**Prof. Tsvi Tlusty**

Department of Physics, Ulsan National Institute for Science and Technology (UNIST)

The Institute for Basic Science (IBS)

Protein function is the combined product of chemical and mechanical interactions encoded in the gene. Thus, the function of enzymes relies on finetuning the chemical groups at the active site, but also on large-scale mechanical motions, allowing enzymes to bind to substrates selectively, reach the transition state, and release products. We will discuss recent work aiming to probe directly the linkage between these collective internal motions and the functionality of enzymes, using nano-rheological measurements, AI-prediction of point mutation effects, and physical theory.  This work proposes a physical view of enzymes as viscoelastic catalytic machines with sequence-encoded mechanical specifications, which are modulated via long-ranged force transduction.

[1] Weinreb et al. “High-strain regions in an enzyme impact viscoelastic mechanics and activity”. In review - *Nature Physics*.

[2] McBride et al. “AlphaFold2 can predict single-mutation effects”. *Physical Review Letters* 2023

[3] McBride et al. “AI-predicted protein deformation encodes energy landscape perturbation”. *Physical Review Letters* 2024.

Refreshments will be served at 13:15