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סמינר

Introduction to Cryo-electron Microscopy and Tomography

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Abstract

Cryo-electron microscopy (cryo-EM) and tomography have emerged as powerful techniques for elucidating the intricate structures of biological macromolecules and complexes. Cryo-EM is a technique for imaging specimens in a frozen, hydrated state at near-atomic resolution, providing invaluable insights into molecular architecture and interactions. By rapidly freezing samples to cryogenic temperatures, potential artifacts from sample preparation present in traditional electron microscopy techniques are minimized, preserving biological structures in their native conformations. It is well recognized that single particle cryo-EM ushered in a new era for structural biology as the Nobel Prize in Chemistry was awarded to Jacques Dubochet, Joachim Frank and Richard Henderson in 2017 “for developing cryo-electron microscopy for the high-resolution structure determination of biomolecules in solution”. Cryo-electron tomography (cryo-ET) extends the capabilities of cryo-EM by enabling three-dimensional (3D) visualization of complex cellular architectures at nanometer resolution and beyond. Not only can cryo-ET be used to generate 3D reconstructions of macromolecular complexes, but it has the potential to elucidate how cells are organized at the molecular level and how that organization is altered during different biological processes. This potential is beginning to be realized; in 2020 cryo-ET was used for the first time to determine the structure of a macromolecular complex *in situ*, or in the context of a frozen hydrated cell. In this presentation, I will provide an overview of cryo-ET principles, review the transformative technological advances that facilitated modern cryo-EM/cryo-ET, delve into common experimental practices and associated challenges, and highlight exciting applications and ongoing areas of research.

ההרצאה תתקיים ביום רביעי, ה-27.03.24 בשעה 12:30

באודיטוריום המכון למצב מוצק, קומת כניסה

**The lecture will take place on Wednesday, 27.03.24 at 12:30
at the Solid State Institute auditorium, entrance floor**

Host: Associate Professor Ido Kaminer