

סמינר - SEMINAR

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ב' 13.03.2017 (טו' באדר, תשע"ז), בבניין דן קאהן, אודיטוריום 1, 14:30.

ירצה:

Asst. Prof. Dan Mordehai
Faculty of Mechanical Engineering
Technion

על הנושא:

Computational Nanomechanics – Studying Plasticity from the Atomic Scale

The seminar will be given in English

להלן תקציר ההרצאה:

Plastic deformation of solids is been traditionally considered on the continuum level, although it is has been well known since the pioneering work of Polyani, Taylor and Orowan that motion of microstructural defects on the atomic level is responsible to the macroscopic deformation. However, continuum models may breakdown when the size of specimens is reduced to the nanoscale, mainly because of an increase in the surface-to-volume ratio and of lowering the amount of microstructural defects in the material. To bridge this gap, multiscale computational approaches are required. This is the long term goal of the Nanomechanics Simulations Laboratory at the Technion, where we employ and develop analytical and computational techniques in order to study mechanical properties of small-scale specimens. In the first part of this talk, I will summarize our work on nucleation-controlled plasticity. This mode of plastic deformation is typical to the nanoscale, for specimens which are pristine of dislocations, lines defects within the lattice structure which are the carriers of plasticity. In this case, dislocations have to be nucleated at the onset of plasticity. I will discuss how we employ atomistic simulations (molecular dynamics), mesoscopic-scale simulations (discrete dislocation dynamics) and continuum models (finite elements analysis) in order to study the size- and shape-dependent strength of specimens at the nanoscale. In the second part of the talk, some work in progress on microstructural-design of strength and on the effect of temperature on plasticity at the nanoscale will be presented.

בברכה,

פרופ' דן מורדהי
מרכז הסמינרים