**Faculty of
Mechanical Engineering**

הטכניון
מכון טכנולוגי
לישראל

TECHNION
Israel Institute
of Technology

הפקולטה
להנדסת מכונות

# SEMINAR - סמינר

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ב׳
3.07.2017 (ט׳ בתמוז, תשע״ז), בבניין דן קאהן, אודיטוריום 1, 30 :14.

**ירצה:**

## Asst. Prof. Yuli Starosvetsky
Faculty of Mechanical Engineering
Technion

**על הנושא:**

# Dynamics of Essentially Nonlinear Mechanical Metamaterials
The seminar will be given in Hebrew

**להלן תקציר ההרצאה:**

Of late, the dynamic response of essentially nonlinear meta-materials is attracting substantial interest across multiple scientific fields due to their unique dynamical properties. Recent theoretical and experimental studies of the dynamics of essentially nonlinear discrete metamaterials (e.g. granular crystals) have shown that their response can be efficiently controlled by introducing certain kind of in-homogeneities in their structure. For example, introducing periodic or local mass defects can lead to enhanced mitigation of the primary pulses as well as their spatial redirection. This talk will be divided into two parts. The first will be devoted to the theoretical study of primary wave transmission in complex, in-homogeneous, essentially nonlinear 1D and 2D models. In particular, the analysis of highly nonlinear transient and steady state regimes arising in various ordered homogeneous and inhomogeneous 1D and 2D granular setups. In the second part of this talk we will discuss the fundamental problem of formation and destruction of special resonant transport states excited in the essentially nonlinear systems. Starting with the review of simple configurations involving analysis of resonant energy exchanges in low-dimensional models, we will show that it naturally extends to more complex configurations of many-body problems. In this part of the talk we will address some very important and natural questions:

- Can the mechanism of special uni- and bi-directional energy flow (emerging in the low-dimensional, essentially nonlinear models) be utilized for spatial wave manipulation in the multi-cellular models?

- How transport states manifest themselves in the many-body problems?

- How one can assess the bifurcation structure of these regimes?

- Does the translation from the unit-cell to the multi-cellular models affect the stability of these special transport states?

בברכה,

*פרופ"א שואל אואלסקי*

מרכז הסמינרים