# סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות שתתקיים ביום ד׳ 2.2.2022
(א׳ אדר א׳, תשפ״ב), בשעה 13:30 באמצעות הזום : https://technion.zoom.us/j/97891355080

**מרצה** : אבנר שמואל

**מנחה** : פרופ׳ח שמואל אוסבסקי

**על הנושא:**

## Voids distribution effect on the yield of porous materials

The seminar will be given in Hebrew

**תקציר ההרצאה :**

Failure mechanism in ductile metals, results from the nucleation of microscopic voids, growth and coalescence, which ultimate lead to structural failure. Its effect on material strength is dominant, and has been extensively studied by a large number of researchers in recent decades. The importance has even increased in recent years, due to the massive entry of advanced manufacturing methods through additive manufacturing [AM] and the ability to look into the internal structure of materials, using modern and available imaging tools. Most of the classical models that analyze the phenomenon of porosity and its effect are based on Gurson's pioneering work from the mid-1970s. The vast majoity of these model treat the porosity as a homogenized value, while ignoring effects related to the size and spatial distribution.

The aim of the work is to investigate the sensitivity of the voids size distribution, porosity and different load states. The work will be done by constructing finite element (FE) simulations, which will simulate different loading modes for different distributions of voids in the material. The results from the simulations will serve as a mechanism for producing synthetic information for the Machine Learning [ML] model that will attempt to train a plastic yield model, based on the relationship between the distribution of voids in the material, the nature of the load and the porosity.

In addition, to demonstrate confidence in the use of ML tools for predicting plastic properties, work will be presented that predicts the geometric dimensions of a product created in a deep drawing process based on the anisotropic material properties and vice versa, the material properties prediction based on the final product geometry.

The two predictors that will be presented will demonstrate the possibility of predicting plastic processes at the microscopic and macroscopic level using ML tools.

בברכה,

פרופ״ח אמני סאס
מרכז הסמינרים