

## סמינר - SEMINAR

הנדך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ג' 26.11.2019  
(כ"ח בחשוון תש"פ), בניין דן קאהן, אודיטוריום 1, 13:30.

מרצה:

### **Associate Prof. Bart Raeymaekers**

*Department of Mechanical Engineering  
University of Utah, Salt Lake City  
UT 84112, USA*

על הנושא:

## **Manufacturing engineered materials with ultrasound directed self-assembly**

The seminar will be given in English

להלן תקציר ההרצאה:

Engineered materials consisting of nano- or microparticles embedded in a matrix material may exhibit unique physical properties that are attributed to the specific type, geometry, and spatial pattern of the particles. However, existing techniques for fabricating such engineered materials are limited to laboratory scale, specific materials, and/or 2D implementations. We employ ultrasound directed self-assembly (DSA), which relies on the acoustic radiation force associated with an ultrasound wave field, to organize particles of any material type dispersed in a fluid medium, into a user-specified pattern over a macroscale area or volume. We theoretically derive and experimentally implement a method for multi-dimensional ultrasound DSA, which enables manipulating the position of a single particle and organizing user-specified patterns of nano- and microparticles dispersed in a fluid medium contained within a reservoir lined with ultrasound transducers, respectively. Finally, we integrate ultrasound DSA with stereolithography to fabricate engineered materials layer-by-layer via stereolithography, where in each layer we organize a user-specified pattern of particles using ultrasound DSA. This process enables manufacturing macroscale 3D materials with a user-specified microstructure consisting of particles of any material. This process has implications for applications including manufacturing of metamaterials, and multifunctional composite materials.

Bio: Bart Raeymaekers is Associate Professor in the Dept. of Mechanical Engineering at the University of Utah. He received his M.Sc. from the University of Brussels in Belgium (2004), and his Ph.D. from the University of California San Diego (2007), both in Mechanical Engineering. He also received an MBA from the Massachusetts Institute of Technology (2009), and was a postdoc fellow at the Los Alamos National Laboratory (2010) prior to joining the University of Utah. His group researches new processes to manufacture engineered materials, primarily using ultrasound, and also works in the area of nanoscale tribology.

מארח: פרופ' יצחק עציון

בברכה,

פ"פ 1907"א מתי סאס

מרכז הסמינרים