



MECHANICAL ENGINEERING SEMINAR

Monday, January 02 2023 at 14:30, D. Dan and Betty Kahn Building , Auditorium 1

Heterogeneous materials: Microstructure-property connections and cross-property relations

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Hosted by: Prof. Daniel Rittel

We consider materials with cracks, inclusions, pores and consider relations between the effective properties (elasticity, thermal and electric conductivity) and microstructures. We then discuss the connections between the elastic and the conductive properties (cross-property connections). The usefulness of these connections is due to the following factors:

- Expressing the effective properties in terms of microstructures requires rather detailed knowledge of microstructural information – that may not be available;
- Using these connections, we can replace measuring the elastic constants (that can be a difficult problem, particularly in anisotropic cases) by easier task – measuring the electric conductivity
- The cross-property connections can be used for design of microstructures for the best combination of the elastic and conductive properties (for example, in various coatings)

Mark Kachanov obtained his PhD degree in Solid Mechanics at Brown University in 1981. He is currently a Professor of mechanical engineering at Tufts University and an Editor-in-Chief of International Journal of Engineering Science (IF 7.02). He is a recipient of von Humboldt Research Award for senior scientists (Germany) and of Distinguished Fulbright Chair. He has held visiting appointments at a number of universities around the world, including Technion. He published a monograph "Micromechanics of Materials, with Application" (jointly with I. Sevostianov; Springer, 2018) and over 160 journal papers. His *H*-index is 47.

His works are in the general area of microstructure-property relations, damage, multiple cracking, with applications to ceramics, geo-materials and steels.

Note: the seminar will be given in English