

UC San Diego

JACOBS SCHOOL OF ENGINEERING
Aiiso Yufeng Li Family Department of
Chemical and Nano Engineering

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DEPARTMENT SEMINAR

Wednesday, June 4th, 2025

11:00 AM - 12:00 PM

SME 248



Dr. Gennady Gor, PhD

*"Tiny Pores, Huge Moduli: Probing Nanoporous Materials with
Ultrasound and Molecular Modeling"*

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Abstract: Nanoporous materials are widely used for adsorption of gases. Adsorption of guest species affects the materials themselves, in particular causing their deformation. Adsorption-induced deformation of nanoporous materials ignited interest in their mechanical properties, e.g. elastic moduli [1]. Elastic moduli of a solid can be calculated from the speed of ultrasound propagation through a sample. If ultrasonic measurements are performed on a porous material during the adsorption process, they provide additional information. The speed gives the moduli of the solid-fluid (adsorbent-adsorbate) composite, and allows to probe the elasticity of the adsorbed phase [2]. The signal attenuation provides information on filling of the pore space. In this talk, I will highlight my group's recent results on ultrasonic experiments on nanoporous glasses and carbons during water vapor adsorption [3]. Additionally, I will present molecular simulation predictions of moduli of adsorbed phase and adsorbent-adsorbate composite [4].

[1] Gor, G.Y., Huber, P. and Bernstein, N., 2017. Appl. Phys. Rev., 4(1), 011303.

[2] Dobrzanski, C.D., Gurevich, B., Gor, G.Y., 2021. Appl. Phys. Rev., 8(2), 021317.

[3] Ogbebor, J., Valenza, J.J., Ravikovitch, P.I., Karunaratne, A., Muraro, G., Lebedev, M., Gurevich, B., Khalizov, A.F. and Gor, G.Y., 2023. Phys. Rev. E, 108(2), p.024802.

[4] Flores Roman, S.A., Emelianova, A., Gor, G.Y., 2025. J. Phys. Chem. C, 129 (3), 1841-1849.

Bio: Dr. Gennady Gor is an associate professor at NJIT. He received a PhD in theoretical physics from St. Petersburg University, Russia, in 2009. He continued his research in the United States, first at Rutgers University, and then at Princeton University and Naval Research Laboratory. In 2016, he joined the faculty of NJIT. The central focus of Dr. Gor's research is in interactions of fluids with porous materials. He is an expert in molecular modeling of fluid adsorption, known for his contributions to modern methods of adsorption porosimetry and the development of the theory of adsorption-induced deformation. His current research interests include confined liquids and electrolytes, atmospheric aerosols, lithium-ion batteries, and ultrasound propagation in porous media. Dr. Gor authored more than 80 peer-reviewed publications, he is the recipient of the NSF CAREER Award (2020), and an associate editor of the journal Adsorption.

Seminar Host: Tod Pascal