Boris Yakobson
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Host: Thomas Webster
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"From Material Substance to Shape to Property"

Tuesday, March 18
90 Snell Library
11:45 a.m. – 1:00 p.m.

Refreshments will be served

ABSTRACT Connecting the underlying chemical processes with the growth and emergent form remains unsurmountable problem in life sciences [0]. In materials research, the current outlook is more optimistic. Establishing such connection, from the basic interatomic forces to growing nanostructure shape and its properties becomes a real possibility. We will discuss several important examples or current interest. Theory of carbon nanotubes chirality [1], growth and morphology of graphene [2] and other important 2D-materials [], including the shape of equilibrium or growing islands, polycrystallinty and grain boundaries, and the unexpected functionality they bring about: electronics, magnetism, energy storage, catalysis.

[0] *On Growth and Form*, by D'Arcy W. Thompson (Cambridge U, 1917).
[1] F. Ding et al. PNAS 106, 2506 (2009); R. Rao et al. Nature Mater. 11, 213 (2012); Q. Yuan et al. PPRL 108, 245505 (2012).
[2] Y. Liu et al. PRL 105, 235502 (2010); V. Artyukhov et al. PNAS 109, 15136 (2012); Y. Hao et al. Science, 342, 720 (2013).
[3] X. Zou et al. Nano Lett. 13, 253 (2013); Z. Zhang et al., ACS Nano, 7, 10475 (2013); S. Najmaei et al., Nature Mater. 12, 754 (2013).

BIOGRAPHY Boris I. Yakobson is an expert in theory and computational modeling of materials nanostructures, of their synthesis, mechanics, defects and relaxation, transport and electronics. Presently, Karl F. Hasselmann Chair Professor in Engineering, professor of Mechanical Engineering and Materials Science, and professor of Chemistry, Rice University, Houston, Texas. PhD 1982 in Physics and Applied Mathematics, from Russian Academy of Sciences. 1982-1989, Head of Theoretical Chemistry group at the Institute of Solid Materials of the Russian Academy. 1990-1999, on the faculty of the Department of Physics, North Carolina State University. His research, sponsored over the years by the National Science Foundation, Department of Energy, NASA, Department of Defense, Army Research Office, Air Force Research Laboratory and AFOSR, Office of Naval Research, as well as private industry and foundations, resulted in over 250 publications and seven patents. Received Department of Energy Hydrogen Program Award, Nano 50 Innovator Award from Nanotech Briefs (Boston), Royal Society (London) Professorship Award, Department of Energy R & D Award, NASA Faculty Award. Yakobson has mentored a number of PhD students and postdoctoral associates, serves on the editorial boards of several journals and on steering committees.

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