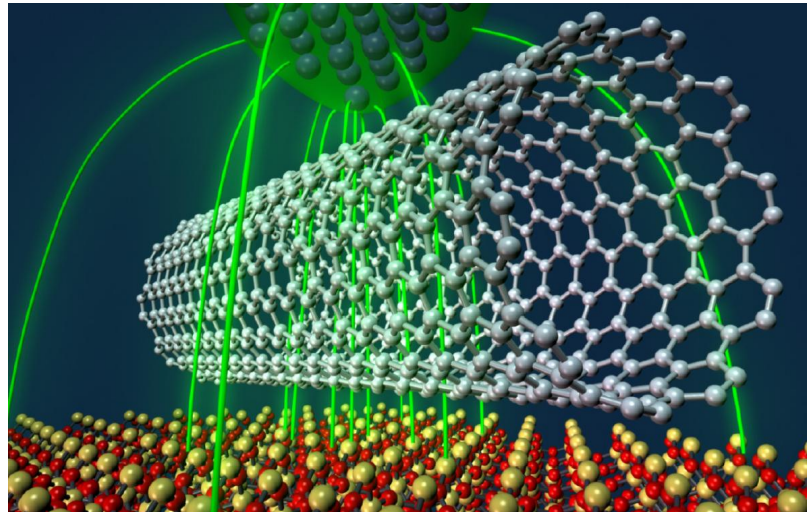


"Nanoscale Physics: A transformative force in the new millennium"

Tuesday/Thursday 1:10-2:25 pm

Freshman Seminar "Nanoscale Physics: A transformative force in the new millennium" is an examination of the fascinating concepts of Nanoscience and Nanotechnology and a discussion of the revolutionary role of Nanoscience and Nanotechnology in modern science and industry and for society in general.



When shrinking down to the scale of one billionth of a meter, the properties of matter change. We have started to learn how we can exploit these properties to benefit existing technology, ranging from the chemistry of paints and water-resistant shield sprays to the computer science of fast and radiation-hard electronics to be launched into deep space to the edge of the Solar System. We could also ask fundamental questions about the quantum nature of the materials. It is the size scale where classical Newtonian mechanics must be corrected, revised or even replaced by the approach of Schrodinger and Heisenberg.

Knowledge collected by a generation of scientists studying nanoscale objects has already resulted and will further result in a metamorphic fusion of the traditionally separate fields of Physics, Chemistry, Chemical and Electrical Engineering, Material Science, Social Science and Humanities to make a new toolbox for a researcher in the XXI century. In the future, it is a part of the near future, and such a seminar course is offered to prepare our graduates for their future.

The main goal of this seminar is to introduce Freshman students to the atmosphere of the state-of-the-art research in Nanoscience and Nanotechnology and place them in the intellectual environment of contemporary science.

The material covers most relevant and important aspects of modern nanoscale physics and related sciences, including: Introduction to Nanotechnology concepts; Review of modern nano-characterization techniques; Nanoscience modeling tools; Special aspects of Nano-bio-technology; Review of methods of nanofabrication; Nano-devices and applications; and Social facets of Nanotechnology. The seminar level is similar to the level of the "Introductory Physics" course.

Three hours per week. Prerequisites: Math 21, 31, 51, previously or concurrently; knowledge of basic Physics concepts at the introductory level. Grade will be based on class attendance and participation, quiz and homework accomplishments, and a term paper/term presentation.

Course Instructor: *Slava V. Rotkin is Frank J. Feigl Junior Faculty Scholar and Assistant Professor of Physics. He has worked in the field of carbon-based nanostructures for 15 years. He is an Editor of the recent textbook "Applied Physics of Nanotubes" by Springer, a member of the Editorial Board of "Research Letters in Physics", and an author of 90 scientific papers. He has taught special courses on Nanoscience at various levels at UIUC and Lehigh. He enjoys student advising both in the class and in his lab.*