

# Optical properties and electrical contacts in low-dimensional materials

## Professor Vasili Perebeinos

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**Date: Wednesday, December 11, 2024 14:30-16:00**  
**Venue: Faculty of Engineering Bldg. 2, Room 31B**

### Abstract:

Fascinating optical and electrical properties of low-dimensional materials, such as carbon nanotubes (CNTs) and other atomically thick van der Waals materials, offer great potential for electronics and optoelectronics applications. In this talk, I will review carbon nanotubes' linear and non-linear optical properties and the role of exciton-phonon interactions on excited state dynamics in CNTs. The electrical properties of low-dimensional devices are dominated by contact resistance, which is a crucial factor limiting device performance for carbon nanotube field effect transistors. Contact resistance reflects a complex interplay of many factors. I will review a unique general-purpose CNT device simulator that includes quantum-mechanical tunneling, both acoustic and optical-phonon scattering, and the crucial transfer of carriers between the CNT and metal contact.



**Prof. Vasili Perebeinos**  
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### Biography:

Vasili Perebeinos is a Professor of the Electrical Engineering Department at the University of Buffalo. During his research career, he became a Fellow of the American Physical Society. He received the highly competitive "IBM Research Technical Accomplishment" award three times and the best paper award by the IBM Materials Research Council. Perebeino's research interests are theory and simulations of advanced materials and nanostructures for electronics and optoelectronics, specifically novel 2D materials and 1D carbon nanotubes. He is the author or co-author of over 100 journal articles cited over 18,000 times (h-index 55 – Google Scholar).

主催:

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