

EMPAC

TALK

Vincent Meunier

Physics in reduced
dimensions: nano-science
for mega-impact

TUE / NOV 18TH

12:00 PM

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Physics in Reduced Dimensions: Nanoscience for Mega-Impact

“There is plenty of room at the bottom,” Richard Feynman told a group of physicists in 1959, in a famous call for new investigations into subatomic science. The many new wonders of nanoscience demonstrate the prescience of Feynman’s claim. Over the last few decades, the effort to turn molecular and atomic building blocks into functional materials has energized scientists and engineers, and eventually led to the field of nanotechnology.

With the emergence of nanotechnology, scientific scrutiny must now shift again, tracing these nano-level discoveries back up to a larger scale, where materials with predictive functionality can be assembled atom by atom. Manipulations at the sub-nanometer scale are extremely promising, making it possible to express the intricacies of quantum physics at the device level. These manipulations are also extremely challenging, requiring technical mastery at many different levels.

In this talk, Rensselaer professor Vincent Meunier will present examples from the quest to optimize properties at the nanoscale for macroscopic applications in areas such as energy harvesting, storage, water purification, and nanomaterials design. The use of large-scale supercomputing will be highlighted, showing how current capabilities are quickly closing the gap between realistic length and time scales with those amenable to state-of-the-art modeling.

Biography

Vincent Meunier

Vincent Meunier is an associate professor in the Department of Physics, Applied Physics and Astronomy and in the Materials Science and Engineering departments at Rensselaer Polytechnic Institute, where he is the Gail and Jeffrey L. Kodosky ’70 Constellation Chair. Meunier earned his PhD from the University of Namur in Belgium in 1999 and was a senior research and development staff member at Oak Ridge National Laboratory until 2010, when he joined Rensselaer. He has published more than 150 papers in peer-reviewed journals and is a fellow of the American Physical Society. Meunier leads the Innovative Computational Material Physics (ICMP) group, where his research uses computation to examine the atom-level details of materials. He is particularly interested in low-dimensional materials and domains where he can collaboratively work with engineers and experimentalists to optimize these materials, starting at the atomic level and targeting higher-level functionality.

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EMPAC 2014-2015 presentations, residencies, and commissions are supported by grants from the National Endowment for the Arts and The MAP Fund, a program of Creative Capital, primarily supported by the Doris Duke Charitable Foundation; additional funding from the Andrew W. Mellon Foundation, the Community Connections Fund of the MetLife Foundation, Boeing Company Charitable Trust, and the New York State Council for the Arts. Special thanks to the Jaffe Fund for Experimental Media and Performing Arts for support of artist commissions.