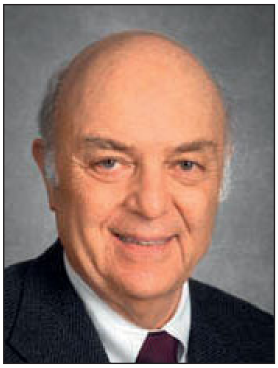

Marvin L. Cohen to receive 2014 Von Hippel Award for modeling of materials and nanoscale structures

The 2014 Von Hippel Award, the Materials Research Society's (MRS) highest honor, will be presented to Marvin L. Cohen, University Professor of Physics at the University of California–Berkeley and Senior Scientist in the Materials Sciences Division of the Lawrence Berkeley Laboratory. Cohen is being recognized for "explaining and predicting properties of materials and for successfully predicting new materials using microscopic quantum theory." Cohen will present his award talk at the 2014 MRS Fall Meeting in Boston on Dec. 3, at 6:30 p.m. in the Grand Ballroom of the Sheraton Boston Hotel.

Cohen is recognized internationally as the leading expert in theoretical calculations of the ground-state properties and elementary excitations of real materials systems. His pioneering work on the pseudopotential method has been the critical theoretical tool that has made "first-principles" studies of complex real materials systems tractable. Prior to his seminal work, theoretical studies of solids involved idealized models, but Cohen moved the field toward accurate calculations of real materials. His research provided a standard model that is used throughout the field and is applicable to bulk crystal properties, surfaces and interfaces, and nanostructures. Cohen revolutionized the concept of solids through theoretical studies that resulted in a new understanding of the electronic and vibrational nature of solid systems. This work led to physical theories and computational approaches capable of describing and predicting basic properties of materials.

The interpretation of the sharp spectra of atoms in gases in terms of electronic transitions was important to the development of quantum mechanics, but due to the complexity of solid-state systems, the broad optical structure of solid-state systems were difficult to interpret. Cohen contributed the theoretical components essential for the current understanding of materials beginning with his early work on empirical pseudo-potentials that provided dozens of electronic band structures and interpreted the measured visible and UV optical spectra of semiconductors in terms of electronic interband transitions. Because of these developments, condensed-matter physics moved quickly from an era when the electronic structure of silicon and germanium were "guesses" by educated experts, to an era where detailed and predictive calculations for many materials are performed routinely. The empirical approaches based on experimental input evolved and developed into *ab initio* methods to calculate electronic, optical, structural, vibrational, mechanical, superconducting, and other properties of solids. This work, which usually requires only the atomic number and mass of the constituent atoms, included predictions of new materials such as boron nitride nanotubes, new forms of silicon, and new superconductors.

Through several generations of his students, Cohen has spawned an entire field of research that constitutes a part of what is now termed the "third branch of science"—computational materials science "experiments." In addition to orchestrating the birth of this field, Cohen has been responsible for several major achievements in the physical understanding of materials; he predicted the superconductivity of semiconductors; he designed new materials using the computer, one of which rivals the hardness of diamond; he predicted a new class of nanotubes based on the Bucky-Balls concept that is being studied experimentally; he has also made numerous predictions of the properties, structure, and phase diagrams of solids at very high pressure.

Cohen received an AB degree from UC–Berkeley, in 1957, and MS (1958) and PhD degrees (1964) from the University of Chicago. After completing his studies, Cohen spent a year at Bell Telephone Laboratories as a member of the Technical Staff. In 1964, he joined the physics faculty at UC–Berkeley, and in 1965, he was appointed at the Lawrence Berkeley National Laboratory. Cohen contributed to more than 800 publications. He is a Fellow of the American Physical Society and the American Association for the Advancement of Science, and a member of the National Academy of Sciences, the American Academy of Arts and Sciences, and the American Philosophical Society. His honors include the National Medal of Science, the APS Oliver E. Buckley Prize for Solid State Physics, the APS Julius Edgar Lilienfeld Prize, the Foresight Institute Richard P. Feynman Prize in Nanotechnology, the Technology Pioneer Award from the World Economic Forum, the Dickson Prize in Science, the Department of Energy (DOE) Award for Outstanding Accomplishment in Solid State Physics, and the DOE Award for Sustained Outstanding Research. He is a member of the Berkeley Fellows, and was awarded Doctorat Honoris Causa at the University of Montreal, the Hong Kong University of Science and Technology, and the Weizmann Institute of Science.

Cohen has served on numerous committees internationally, including chair of the Executive Council of the Division of Condensed Matter Physics of the American Physical Society; the US representative on the IUPAP Semiconductor Commission; member of the US Delegation to Bilateral Dialog for Research and Development in the United States and Japan; and member of the Governing Board of the American

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Institute of Physics. Cohen is a member of the International Advisory Boards for the Weizmann Institute of Science, the Institute for Advanced Study at the Hong Kong University of Science and Technology, and the Korean Institute for Advanced Study.

The MRS Von Hippel Award includes a $10,000 cash prize, honorary lifetime membership in MRS, and a unique trophy—a mounted ruby laser crystal, symbolizing the many faceted nature of materials research. The award recognizes those qualities most prized by materials scientists and engineers—brilliance and originality of intellect, combined with vision that transcends the boundaries of conventional disciplines, as exemplified by the life of Arthur von Hippel (http://vonhippel.mrs.org).

Rodney S. Ruoff selected for 2014 David Turnbull Lectureship

The Materials Research Society's (MRS) David Turnbull Lectureship recognizes the career of a scientist who has made outstanding contributions to understanding materials phenomena and properties through research, writing, and lecturing, as exemplified by the late David Turnbull of Harvard University. This year Rodney S. Ruoff, Director of the Center for Multidimensional Carbon Materials (CMCM), Institute for Basic Science (IBS), and Distinguished Professor at the Ulsan National Institute of Science & Technology (UNIST) in South Korea has been selected to give the 2014 Turnbull Lecture. Ruoff is cited for "pioneering discoveries related to carbon materials and their innovative preparation, characterization, and mechanics." He will be presented with the award at the 2014 MRS Fall Meeting in Boston.

Devoting his career to research into carbon-based nanostructures, Ruoff has made numerous fundamental breakthroughs in the chemistry and physics of these materials that shaped the research and practical applications of these materials as they are known today. His contribution created the chemical foundation of virtually all the processing schemes involving these materials, from dispersions to devices and composites. His early work included extensive studies of fullerenes. Ruoff then made a series of significant contributions to carbon nanotube science, and more recently he has gained an international reputation for his work on graphenes.

Ruoff and his colleagues were the first to discover encapsulation of metal particles inside supergiant fullerenes. His group demonstrated that carbon nanotubes deform from a perfect cylindrical shape with profound consequences that lend themselves to new approaches for studying chemistry. Ruoff's group was the first to measure the tensile and fracture mechanics of individual carbon nanotubes, and also the first to use solubility parameters to rationalize the solubility of fullerenes, nanotubes, and graphene sheets. And recently, his extensive studies of the growth of graphene by chemical vapor deposition and graphene oxide in composites and for use in electrical energy storage initiated a large number of similar research studies worldwide.

The technological impact of his works can be seen from the multiple companies that emerged from his general studies of carbon nanostructures, especially in the area of synthesis of carbon nanostructures. Ruoff is the co-founder of several companies. Several other start-up companies were founded by his students, which is indicative of the inspiration and guidance Ruoff provided to graduate education. Ruoff received his BS degree in chemistry from The University of Texas at Austin (1981) and his PhD degree in chemical physics from the University of Illinois at Urbana-Champaign (1988, H.S. Gutowsky; Advisor). After completing his studies, he was awarded a Fulbright Postdoctoral Fellowship at the Max Planck Institut für Strömungsforschung, Göttingen, Germany, followed by a postdoctoral fellowship at IBM-Watson Research Laboratory. In 1991, Ruoff joined the Molecular Physics Laboratory at SRI International as a research staff scientist. He was appointed associate professor of physics at Washington University, Missouri, in 1997, and in 2000, he joined the Department of Mechanical Engineering at Northwestern University, Illinois, as full professor where he also directed the Biologically Inspired Materials Institute and was the John Evans Professor of Engineering. From 2007 to 2013, Ruoff served as Cockrell Family Regents Chair at The University of Texas at Austin. He is a Fellow of MRS, the American Physical Society, and the American Association for the Advancement of Science. Ruoff received the Lee Hsun Lecture Award, Institute of Metal Research, Chinese Academy of Sciences, Shenyang, China, in 2009, and was Distinguished Chair Visiting Professor (2005–2007) at the Sungkyunkwan University Advanced Institute of NanoTechnology.

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