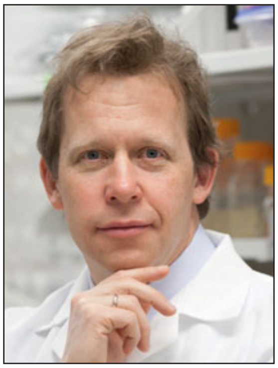
new paradigm for discovering advanced thermoelectrics.

Kanatzidis and his team then created hierarchical structures that integrate the nanoscale with the mesoscale, and which further lower the thermal conductivity by scattering phonons not possible with the nanostructuring alone. To this the research team added electronic band structure engineering between the thermoelectric phase and a second nanostructuring phase, thereby raising the power factor. This led to a significant advance in *ZT* to 2.2 at 800 K.

For his discoveries, Kanatzidis obtained over 22 patents, and he has over 800 publications. After obtaining a BSc degree from Aristotle University in Greece, Kanatzidis received his PhD degree in chemistry from the University of Iowa in 1984. He was a postdoctoral research associate at the University of Michigan and Northwestern University from 1985 to 1987, and moved to Northwestern in the fall of 2006 from Michigan State University where he was a University Distinguished Professor of Chemistry since 1987. He also holds an appointment at Argonne National Laboratory and is Editor in Chief of the *Journal of Solid State Chemistry*. He is a Fellow of the American Association for the Advancement of Science and MRS. His other honors include the Morley Medal from the American Chemical Society and the Alexander von Humboldt Prize.



Sharon C. Glotzer and Nicholas A. Kotov jointly named MRS Medalists for nanoparticle self-assembly

The Materials Research Society (MRS) has announced that the 2014 MRS Medal will be shared by a research team from the University of Michigan–Ann Arbor: Sharon C. Glotzer, Stuart W. Churchill Collegiate Professor of Chemical Engineering, and Nicholas A. Kotov, Joseph B. and Florence V. Cejka Professor of Engineering. Glotzer and Kotov are cited for "foundational work elucidating processes of nanoparticle self-assembly." They will be recognized during the award ceremony at the 2014 MRS Fall Meeting in Boston.

Glotzer and Kotov are each distinguished and influential scientists in their own right, yet their collaborative research has made the highest impact on the field of nanoparticle self-assembly. Glotzer provided predictive computer simulations and theoretical insight to explain the definitive experiments conducted by Kotov. Together, they succeeded in explaining almost a dozen different and unexpected self-assembled nanostructures observed by Kotov and they correctly predicted several more, within a single theoretical framework. Common to all these structures is the delicate balance of repulsive and attractive forces arising from van der Waals, hydrophobic, electrostatic, and entropic interactions. They demonstrated that subtle changes in the ligand binding density on the surface of the nanoparticle, ligand charge, and even nanoparticle polydispersity can produce profound structural changes in the assemblies. Most recently—through their partnership in developing theory, simulation, and experiment— Glotzer and Kotov predict, and explain, the first self-organized terminal structures comprised of proteins and inorganic nanoparticles. They published their results in the May online edition of *Nature Communications*. This multidisciplinary partnership is a model for materials research worldwide.

Glotzer introduced the concept of patchy particles in *Nano Letters* in 2004, and followed this with several papers in which these ideas were elaborated. She argued that the many degrees of freedom arising from the shape and interaction anisotropy inherent to nanoparticles, colloids, and proteins, for example, could be simplified for the purposes of self-assembly to a coarse model of hard shapes with sticky patches. Objects that are comprised of billions of atoms can thus be described simply, within a unifying framework, regardless of material type. In *Nature Materials* in 2007, Glotzer and her colleague Mike Solomon provided the conceptual framework for patchy particles, demonstrating the many orthogonal "dimensions" of anisotropy possible for patchy particles that could affect assembly. In the seven years since publication, this article has received almost 1000 citations, and has changed the way the community thinks about nanoparticle assembly, making possible the very recent shift in nanoparticle synthesis and assembly from that of trial and error to design. The patchy particles concept has infiltrated its way into nearly all work on nanoparticle self-assembly.

Kotov is acknowledged as the first to have recognized the concept of nanoparticle assembly into ordered structures, in his 2002 publication in *Science*. This work is credited with creating the currently expanding field of nanomaterials in which nanoparticle shape and interactions are controlled for purposeful assembly. Kotov has demonstrated a fine degree of control over structures assembled spontaneously from nanoparticles by tuning the strength of repulsive and attractive nanoparticle interactions. He was also the first to recognize fundamental similarity in function and structure between inorganic and biological nanoscale particles, such as globular proteins.

Glotzer received her BS degree in physics from the University of California–Los Angeles, in 1987 and her PhD degree in physics from Boston University in 1993. After completing her studies, she joined the Polymers Division in the Materials Science and Engineering Laboratory at the National Institute of Standards and Technology (NIST), first as an NRC Postdoctoral Fellow, and then as a permanent member of the Technical Staff. In 1994, she co-founded the Center for Theoretical and Computational Materials Science at NIST, serving as Deputy Director (1995–1997) and Director (1997–2000), before joining the Departments of Chemical Engineering and Materials Science and Engineering at the University of Michigan. She holds appointments also in Physics, Applied Physics, and Macromolecular Science and Engineering, and is affiliated with numerous institutes and centers. Glotzer is a member of both the National Academy of Sciences and the American Academy of Arts and Sciences. She is a Fellow of the American Association for the Advancement of Science and the American Physical Society, is a Simons Investigator, and is a member of the National Security Science and Engineering Faculty Fellows program. Other awards include the American Physical Society Maria Goeppert-Mayer Award in 2000, and the Charles M.A. Stine Award from the Materials Engineering & Sciences Division of the American Institute of Chemical Engineers in 2008. Glotzer serves the materials community broadly through leadership, strategic planning, and service on many national and international boards, committees, and studies, including those contributing to the creation of the Materials Genome Initiative.

Kotov received his MS (1987) and PhD (1990) degrees in chemistry from Moscow State University. On completion of his studies, he remained at Moscow State University as a research associate, before joining the Chemistry Department of Syracuse University, New York, as a postdoctoral associate. He continued his research as a visiting professor at Hamburg University, Germany, and then in the Chemistry Department at Oklahoma State University. In 2003, Kotov joined the Department of Chemical Engineering at the University of Michigan. He is a Fellow of the Royal Society of Chemistry and MRS. His awards include the Gran Prix, Materials Research Society Entrepreneurship Challenge in 2006; the ACS Langmuir Lecture Award, the College of Engineering Research Excellence Award, and Caddell Award from the University of Michigan in 2007; and the Charles M.A. Stine Award for Materials Research in 2012. Kotov serves as Associate Editor for *ACS Nano* and as a member of several Advisory Boards for nanotechnology and materials journals.

Hyuk Chang of Samsung to give plenary address at 2014 MRS Fall Meeting

Hyuk Chang, Senior Vice President and Samsung Fellow at Samsung Advanced Institute of Technology (SAIT), a corporate research center of Samsung Electronics Co., South Korea, will give the plenary talk, "Innovation in Electronic Materials: Creating Novel Devices with New Functionalities," at the 2014 Materials Research Society Fall Meeting in Boston. In the race to release new technology, product performance relies on the aid of new materials. However, "electronic materials innovations are falling behind the device revolution," said Chang. "Materials and devices therefore have to be synchronized in the development process from the beginning stage of research so that the performance requirements can be understood in order to accelerate the enhancement of both materials and devices."

Focusing on recent achievements at Samsung Electronics, Chang will demonstrate this "innovation loop" in organic semiconductors, inorganic nanomaterials, and optical film materials for display devices as well as energy storage, conversion, and ion-transport materials for rechargeable batteries. He will also emphasize the advanced experimental methodologies based on materials informatics and analytical science. The presentation will be given on Monday, Dec. 1, at 6:30 pm, in the Grand Ballroom, second floor of the Sheraton Boston Hotel.

Chang is now Director of the Materials Research Center of SAIT. In 2011, he was appointed Samsung Fellow—the most honorable in Samsung's researchers and engineers—in recognition of his technology leadership in Samsung and industries as well. Prior to that, he held a research associate position at the University of Illinois at Urbana-Champaign. He received his PhD degree in metallurgical engineering from the University of Utah and has over 120 technical publications and 30 US patents.