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The ability to manipulate matter at the molecular level has been key to advances in nanoscale science. How fitting, then, that the first Kavli Prize in Nanoscience (2008) was awarded for the discovery of carbon nanotubes and colloidal semiconducting nanocrystals, that the Nobel Prize in Physics (2007) was given for the discovery of giant magnetoresistance observed in nanoscale thick layers of alternating ferromagnetic and nonmagnetic materials, and that the Nobel Prize in Chemistry (1996) was awarded for the discovery of C_{60}. Of course, the invention of tools to control and "see" matter at the atomic level, such as the scanning tunneling microscope, which was recognized by the Nobel Prize in Physics (1986), has also been critical to this field.

Louis Brus, a corecipient of the 2008 Kavli Prize and contributor to the first *Accounts of Chemical Research* special issue on nanoscience (*Nanoscale Materials*, Vol. 32, 1999) as well as this one, also concurs with the importance of materials to nanoscale science. "In retrospect, nanoscience is a new area of basic research, on the (previously neglected) boundary of chemistry and physics. It is still mainly in the discovery phase. The titanium dioxide nanoscale memristor is an intrinsically new type of device. Graphene and single walled carbon nanotubes offer amazing properties. But, major synthetic advances are needed to make useful technologies."

ooking back over the past 10 years, it is clear that *interest* in nanoscience has grown. Not surprisingly, many journals exclusively dedicated to nano have since emerged. *Nano Letters* was launched in 2001, *Small* in 2005, *Nature Nanotechnology* in 2006, and *ACS Nano* in 2007. Also, government-supported research in nanoscience has expanded worldwide and across numerous areas of science; for example, the United States' National Nanotechnology Initiative, which was launched in 2001, now includes over 25 agencies.

One of the goals for this special issue is to examine the potential *impact* of nanoscience (i.e., nanotechnology) on three important areas that are of particular urgency today: energy, the environment, and medicine. Addressing these problems requires not only a grasp of the fundamentals of preparing and assembling nanoscale building blocks but also a practical approach for scaling and integrating them into existing device platforms. And we cannot neglect the necessity of the characterization and modeling tools for resolving structural interfaces at the atomic level. Were we trying to reach too far? We do not think so. As guest editors, part of our vision was to outline the frontiers of nanoscience and then have the contributors define them. Collectively, we believe they did.

Based on the research described in this special issue, it is clear that not only is basic research still very much at the forefront of nanoscience but also nano has become significantly more *inclusive* in a positive way and not just simply a new label for old science. Much of the evolution in nanoscale materials is represented in this lengthy special issue. Nano building blocks, including noble metal nanoparticles, metal–organic units, and organic macromolecules, are employed extensively. There is an increasing emphasis on how to create nanoparticles with multimodal, site-specific functionality. Moreover, design rules for assembling nanostructures into predetermined one-, two-, and three-dimensional architectures are beginning to appear.

What is especially interesting in this special issue is how the approaches—and interests—of chemists have evolved as they relate to nanoscale science. First, a significant number of contributors are using more top-down approaches to create nanomaterials, such as nanofabrication or template methods with memorable acronyms such as SNAP, PRINT, and PEEL. Second, more authors are moving toward nanomaterial-based biomedical applications such as photothermal therapy, magnetic resonance imaging, and assaying proteins. Third, chemists are becoming more proficient at device fabrication using nanomaterials and are adopting strategies from engineering in order to create improved electronic and optical components.

As you can see, nanoscale science is extremely broad and growing in scope and impact. This special issue includes only a small slice of the work in this field—but certainly an extremely interesting and exciting sample! We hope that you enjoy reading these timely reviews as much as we have.