ficient level to carry out the work. "To do this kind of research correctly, you need a full effort on all the pieces," said Pochan. "There are three labs involved in our project, so you need three times the funding."

Some DMREF-funded researchers, particularly those looking at very fundamental science, emphasize the unique opportunity these large collaborative grants provide. "There would be nothing else to fund this project if not for DMREF," said El Kadiri. Keten agreed, and said MGI should be a top funding priority, but he also highlighted that single-PI grants "can provide crucial advances in areas where overlap between experiment and theory is virtually non-existent."

DMREF has yet to become a top funding priority. NSF's FY 2014 budget request slated a modest USD$42 million for DMREF across the Foundation, with the Directorates for Engineering; Mathematical and Physical Sciences; and Computer and Information Science and Engineering expected to participate. Furthermore, in the current fiscal climate, the program's enacted budget may be considerably less, and thus a materials evolution may be more likely than a revolution.

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National Academies recommend single-agency oversight of nanomaterials safety

http://national-academies.org

While some progress has been made in advancing the US research agenda on environmental, health, and safety aspects of engineered nanomaterials, little work has been done in implementing an integrated research strategy throughout the federal government, according to a report from the US National Research Council. The report, *Research Progress on Environmental, Health, and Safety Aspects of Engineered Nanomaterials*, suggests that progress could be accelerated if a single agency with sufficient management and budgetary authority was designated to direct environmental, health, and safety research efforts and ensure implementation of a coordinated plan among the federal agencies that make up the National Nanotechnology Initiative (NNI).

The global market for nanotechnology is expected to exceed USD$3 trillion by 2015, including products ranging from cosmetics to medical therapies to electronics. The unique characteristics and behaviors of nanomaterials and uncertainties regarding how they interact with biologic systems have spurred research on their potential risks to human health and the environment. However, despite an increase in funding and peer-reviewed publication of research over the past decade, environmental, health, and safety

research efforts are not keeping pace with the increasing and evolving applications of nanotechnology, and the potential effects of these materials on humans and ecosystems are still not fully understood.

A 2012 Research Council report, *A Research Strategy for Environmental, Health, and Safety Aspects of Engineered Nanomaterials*, identified four high-priority research areas and developed a set of indicators in each category to serve as criteria for measuring progress. The new report, prepared by the same committee, uses these indicators to evaluate the progress of recent research efforts in the United States and the European Union. Given that the interval between the two reports was too short for substantial new research programs to be put into place and produce results, the committee instead examined trajectories of research and progress in developing the mechanisms needed to ensure effective implementation. Each indicator was classified as "green" for new activities or expected sustained progress, "yellow" for moderate or mixed progress, or "red" for minimal activity and few anticipated changes.

The report classifies just one indicator as green—development of methods for detecting, characterizing, tracking, and monitoring nanomaterial transformations in simple, well-characterized media, which falls under the objective for an adaptive research and knowledge infrastructure. All other indicators for both research and implementation progress ranged from yellow to red.

In order to improve the level of progress and move the indicators toward green, the report offers specific actions and objectives for each research category. But the committee reiterates a conclusion from the first report: Accountability for implementation of a research strategy is hampered by the absence of an entity with sufficient management and budgetary authority to direct research efforts government-wide. In addition, the committee maintains that NNI would benefit from a clearer separation of authority and accountability for its environmental, health, and safety research enterprise in relation to its mandate to promote nanotechnology development and commercialization. Progress toward both of these indicators was classified as red.

The report concludes that more engaged and broadly reaching governance is needed for nanotechnology health and safety research. An important function for the organization that oversees the research will be to secure and maintain a sustained funding commitment over at least the next decade. The lead agency should also ensure that all stakeholders have access to a "knowledge commons"—a collaborative environment for the development of methods, models, and materials and for the capture and dissemination of data. An integrated and well-coordinated program on national and global scales would help ensure that research findings provide the evidence needed to inform decisions so that potential health and environmental risks can be effectively managed and prevented. □