Army invests $120 million in basic research partnership to exploit new materials

U.S. Army

ADELPHI, Md. (Aug. 21, 2012) -- As the nation looks for ways to double the speed and reduce the cost of new advanced materials, recent advances have brought it closer to realizing this ability than ever before.

The Army's already robust materials science research has expanded to include a new $120 million investment in basic research over 10 years that includes more than 12 university partners that want to change the way scientists look at designing advanced materials.

Developments in high performance computing and power, experimental techniques, materials characterization and processing have all led to the Enterprise for Multiscale Research of Materials.

The U.S. Army Research Laboratory,or ARL, Enterprise for Multiscale Research of Materials kick-off meeting held from July 31 to Aug. 2, at Aberdeen Proving Ground, Md., brought together partners and colleagues for this monumental basic research collaboration with ARL's researchers, academia and industry to pave the way forward.

"The vision for the Enterprise for Multiscale Research of Materials is to achieve a materials-by-design capability that will give us revolutionary devices and materials for the Army. We have that capability only in part now to give the soldier the incredible equipment they have today, but we have to think about the demands of the future," said John Pellegrino, acting director of ARL.

Cyrus Wadia, assistant director for Clean Energy & Materials R&D with the White House Office of Science and Technology Policy, was the lead speaker at the event, discussing the national push toward high-tech material manufacturing.

"You have a tremendous asset to drive us forward and be a lead in the [White House] materials genomes initiative," Wadia said. "You are not only equipping our Soldiers, but you are strengthening our nation and our economy in the process."

Materials are a major part of the American manufacturing enterprise -- a central feature of the nation's economy that generates innovation, opportunities and jobs. The pace of developing new materials today is far too slow, sometimes as much as 20 years, he said.

The Army shares the problem of slow implementation of new materials, said Scott Fish, the Army's chief scientist. He talked about a portfolio of Army research projects, many of which deal with advanced materials design.

The two collaborative agreements that are part of the enterprise are at the heart of where the Army is going, Fish said.

"Over 60 percent of the Army's research budget is related directly to new materials," Fish said. "It's not an understatement to say materials are at the foundation of almost everything we do."

A Johns Hopkins University-led group will develop new materials designed to protect Soldiers in extreme dynamic environments. This effort launched on April 16, with an award of up to $90 million. The program is planned for a five-year initial study that could be renewed for an additional five years.

ARL also awarded a University of Utah-led alliance a cooperative agreement with an award up to $20.9 million to develop multiscale modeling techniques needed to design new materials for lighter-weight, more energy efficient electronic devices and batteries for the Soldier.

The in-house component for Multiscale Research of Materials, which has been ongoing since 2010, is a collaboration of leading ARL scientists and engineers in materials research, electron devices research, and computational approaches in models that can span the materials space.

"We have a deep-rooted capability," Pellegrino said. "The alliance builds on that expertise to take it to the next level. It is a natural progression for us to look at the deeper science and link all of the pieces together."

As ARL looks at ways to study materials that will enable Soldiers by limiting the weight of the materials used in their protective armor, devices and batteries are several of many goals that the enterprise addresses.

The kick-off introduced partners from Johns Hopkins University, California Institute of Technology, University of Delaware and Rutgers University working on materials in extreme environments. It also brought together partners from the University of Utah, Boston University, Rensselaer Polytechnic Institute, Pennsylvania State University, Harvard University, Brown University, the University of California, Davis, and the Polytechnic University of Turin, Italy that will work on modeling of electronic materials and the in-house enterprise staff of researchers and senior leaders.

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