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Northwestern, NASA team up through nanotechnology

In an effort to forge a stronger and expanded relationship with academia, NASA recently established seven University Research, Engineering and Technology Institutes, each in an area of long-term strategic interest to the agency and the nation.

Northwestern engineers and scientists are playing major roles in two of these interdisciplinary institutes, which are both dedicated to nanotechnology re-search. NASA will provide approximately $3 million annually over 10 years to each institute.

One Northwestern team is part of the Institute for Biologically Inspired Materials (BIMat), which also includes Princeton University, the University of North Carolina at Chapel Hill, the University of California at Santa Barbara, and ICASE, a research institute operated at the NASA Langley Research Center in Virginia. The BIMat Center will work to develop new materials for civil aviation and space travel that mimic the structural and self-repairing properties of biological substances such as bone or sea shells. These materials could adapt to changing conditions and are expected to help make airplanes and spacecraft lighter, stronger and more reliable.

“Beyond their use in aerospace, the new materials could be used in cars, trains, containment structures — even in tape and other adhesives,” said Rod Ruoff, professor of mechanical engineering and leader of the Northwestern team. The team will contribute expertise in fabricating and measuring the mechanical properties of composite materials.

Other participating faculty are Ted Belytschko, Cate Brinson and Isaac Daniel of the department of mechanical engineering; George Schatz of the department of chemistry; and Phil Messersmith of the department of biomedical engineering.

The second Northwestern team is part of the Institute for Nanoelectronics and Computing, led by Purdue University. The institute’s goals include inventing new molecular computing devices and developing techniques to assemble the devices into ultra-dense systems integrated with a silicon platform. Such technology could make possible electronic systems able to adapt to new conditions on deep-space missions.

Tobin Marks and Mark Ratner of the department of chemistry are serving on the leadership council of the institute. The Northwestern team also includes Robert Chang and Mark Hersam of the department of materials science and engineering; Teri Odom of the department of chemistry; and Seng-Tiong Ho and Valerie Taylor of the department of electrical and computer engineering.

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