

## MIT launches global nanotech push Group to focus on medical and health research

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By Robert Weisman, Globe Staff | October 12, 2005

CAMBRIDGE -- Leaders of 10 research universities from around the world will gather at the Massachusetts Institute of Technology today to launch an international collaboration to use nanotechnology tools for global health and medical research.

The collaboration, called GEM4, or Global Enterprise for Micro-Mechanics and Molecular Medicine, represents an ambitious effort to apply global sourcing principles to research at the intersection of engineering and life sciences.

The conference was organized by Subra Suresh, head of MIT's department of materials science and engineering.

MIT's president, Susan Hockfield, said in an interview that the initiative could herald a new model for international research, with far-flung researchers sharing their expertise in person, online, and through teleconferencing.

"GEM4 is a new way of collaborating," Hockfield said. "I am very interested in cultivating the kinds of activities that bring engineers and life scientists into conversation with one together."

Other nanotechnology research projects have focused heavily on diagnostics and testing the effectiveness of drugs. GEM4, though, will use tools like atomic force microscopes, laser tweezers, and nanoscale plate stretchers -- staples at Suresh's three-year-old Nano-[Mechanical Technology](#) Lab at MIT -- to study changes in human cells for research projects on infectious diseases like malaria and sickle cell anemia, cancers of the liver and pancreas, and cardiovascular diseases.

"These are tools that were not available five years ago," said Suresh, who initially used them to examine how stresses affect materials. "They could help to answer one of the key questions as a disease progresses in the human body:

"What is the connection between the development of the disease and the ability of a cell to change shape, move through the body, and stick to a blood vessel wall?"

GEM4 grew out of Suresh's collaborations over the past two years with the National University of Singapore, which has a strong research program in microbiology, and Institut Pasteur of France, a leader in genetics research.

Others that have signed on are the Harvard School of Public Health, the Max-Planck Institute in Germany, the University of Illinois, Georgia Institute of Technology, California Institute of Technology, Johns Hopkins University, and Chulabhorn Research Institute in Thailand.

All told, these schools have contributed several million dollars toward the project.

Within the next few years, Suresh said, GEM4 hopes to attract tens of millions of dollars in research grants from US agencies such as the National Science Foundation and the National Institutes of Health, as well as foreign technology research funding sources.

At a kickoff colloquium scheduled for tomorrow, teams focused on nanomechanics, biomedicine, and environmental health will begin identifying specific research projects.

GEM4 also plans to host an international conference on cancer in 2007, probably in Singapore.

"By leveraging global resources, we can take on problems that no one individual scientist or institution or region of the world can address effectively by themselves," said Suresh, who worked with MIT biological engineering professors John Essigmann and Ram Sasisekharan to define the scope of the global collaboration.

Among those set to attend a launch ceremony for GEM4 at MIT today are C. Fong Shih, president of the National University of Singapore; Richard Herman, chancellor of the University of Illinois; Judah Folkman, director of surgical research at Children's Hospital in Boston; MIT professor Robert Langer, a leader in biomedical engineering; and Thailand's Princess Chulabhorn Mahidol, a biochemist who is president of Chulabhorn Research Institute.

Hockfield, who in May unveiled an MIT initiative to address the world's growing energy problems, said programs like

GEM4 will represent another major thrust of MIT research in the coming years. She likened today's convergence of engineering and the life sciences to the convergence of engineering and physics that transformed the research environment at MIT and other technology-oriented schools 50 years ago.

"A third of our engineering faculty are already doing some kind of work in the life sciences," Hockfield said, noting that the two fields were distinct in the past.

"And the life sciences are evolving very rapidly in directions where . . . the engineering disciplines are being applied in their research."

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