

# Professors discuss value of uncommon connections

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From an engineer working with a gymnastics coach to a chemist's collaboration with surgeons, MIT researchers continue to conduct the interdisciplinary research that the Institute was founded on.

Speaking at a research symposium in honor of President Susan Hockfield's inauguration this week, four MIT professors described work at the interface of science and technology.

"From the start, the MIT curriculum was multidisciplinary," said Rosalind H. Williams, director of the Program in Science, Technology and Society. "This was not respectable at that time [1861], certainly not to our neighbor up the river." Science was seen as aristocratic, technology as lower-class, said the Robert M. Metcalfe Professor of Writing.

She noted that the convergence of science and technology, "is novel in history." The beginning of this trend was in the 1850s, so MIT's founding "is a very important milestone."

Williams challenged MIT, however, to pioneer an even broader kind of "multidisciplinarity": "We need to bring science, technology and society together."

For example, "nanotechnology is not just a matter of molecules, but also of public understanding because fear of it will hurt the field."

Professor of Chemistry Mounqi Bawendi, who works in nanotechnology,

agreed. Bawendi's research focuses on quantum dots, or semiconductor particles only a few billionths of a meter in diameter. He noted that "the societal psychology around quantum dots is extremely difficult to navigate."

He went on to give several examples of how science has pushed quantum dot technology forward, and vice versa. These include early work on using quantum dots to form a better laser. The problem was, "It didn't work. They wouldn't lase," Bawendi said. "We needed to understand the science first. [Then] you can fix the problem." And they did.

Bawendi also described collaborating with a surgeon who had heard about his work and was interested in the dots' optical properties. The end result: a new approach to biomedical imaging.

Penny Chisholm, the Lee and Geraldine Martin Professor of Environmental Studies, has devoted her research to understanding some of the smallest organisms on Earth: marine microbes.

"They are screaming out to be studied and observed," she said, "but they have basically been ignored in the realm of the sciences."

Why are they so important? Among other things, "If you look at the global amount of photosynthesis annually, the microbes I work with are responsible for about as much [photosynthesis] as all the plants and trees on land," Chisholm said. They are "shaping our atmosphere and the Earth."

Chisholm and colleagues are using the organisms as a model system for understanding global processes from the genome to the ocean. To do so they are working with experts in fields ranging from ecology and genomics to physiology and applied mathematics.

Professor Alexander Slocum, the last speaker, began his talk with what Williams dubbed "geek rap": a poem about all four participants' topics and the overall theme of the event.

Slocum, of the Department of Mechanical Engineering, then described several unusual collaborations in his own research. For example, he is currently working with Noah Riskin, head coach of MIT Men's Gymnastics, on an MIT course aimed at engineering innovative exercise equipment. The course is part of MIT's Physical Intelligence Program, developed as an alternative to regular physical education.

To Slocum, "the true power of interdisciplinary research is finding out how other people think. That helps me think differently, and if I can think differently, then every day I continue to grow."

Source: MIT

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