

Q&A

Atam P. Dhawan
NJIT Vice Provost for Research

NJIT's current strategic plan affirms a commitment to multidisciplinary research. What institutional changes are making this commitment a reality?

In keeping with our strategic plan, *2020 Vision*, research at NJIT is focused on four main areas, or clusters. These are life sciences and engineering, sustainable systems, data science and information technology, and transdisciplinary areas where technological challenges posed by complex systems require multidisciplinary solutions.

Institutionally, we have established collaborative, multidisciplinary centers in each cluster to achieve real-world solutions. For example, one focus of the Center for Injury Biomechanics, Materials and Medicine in the life-sciences cluster is better protective helmets for soldiers. The Membrane Science, Engineering and Technology Center in the sustainable-systems cluster is developing specialized membrane technology for energy production, water treatment, pharmaceutical purification and chemical processing.

The next step, establishing transdisciplinary institutes, will encourage integrating results achieved at our research centers to stimulate even more progress. The first of these institutes is dedicated to brain and neuroscience research. In the near future, we anticipate establishing institutes dedicated to materials science and data analytics.

Are these changes a departure from traditional academic research, and if so why is this necessary?

The changes we've implemented are the essential evolution of academic research, and not a radical departure from what we always hoped to achieve in the past. The promise of technological, social and economic progress has long been implicit in university research. That expectation is explicit today. The reality is that we expect research to produce benefits such as better treatments for diseases, better energy technologies, and better solutions for environmental protection.

There's no question that meeting such expectations also requires multidisciplinary research. Take the smart phone, a very multidisciplinary innovation. It is a product of integrated advances in numerous disciplines — communications technology, materials science, information science, energy technology and many other fields.

Does NJIT's evolving research model help the university obtain external funding?

Another 21st-century reality is that the goal of funding organizations — government, corporations, foundations — is to promote research translatable into products and processes that will impact society and economic growth. NJIT's commitment to multidisciplinary research and transdisciplinary development of real-world solutions is well aligned with this reality.

Given the trends you describe, how does basic scientific investigation fit into today's research picture?

In the past, research has often been a "bottom up" process, beginning with fundamental inquiries that could yield practical results in the future. Today, because we typically begin with the need for a particular solution, the path toward investigating relevant underlying science is "top down." Nonetheless, researching a specific solution almost invariably leads to new and unexpected questions at the basic level.

How does the evolution of NJIT's approach to research benefit students?

Awareness of the seamless connection between academic research and the workplace most NJIT graduates will enter fosters the appreciation that research is not a one-way path from basic science to application, but a balancing of practical technological needs with our desire for foundational knowledge. At NJIT, students experience a cooperative, research-oriented environment from the time they first come to campus. Competence in research is an indispensable life skill in every profession, not only in science and technology. It is essential preparation for making significant contributions and succeeding in every field.

Atam P. Dhawan, distinguished professor of electrical and computer engineering, was appointed vice provost for research at NJIT in July 2015. He has published more than 215 articles in refereed journals, books and conference proceedings. He is a fellow of the National Academy of Inventors, American Institute of Medical and Biological Engineering, and Institute of Electrical and Electronics Engineering.

One of the nation's leading public technological universities, New Jersey Institute of Technology (NJIT) is a top-tier research university that prepares students to become leaders in the technology-dependent economy of the 21st century. NJIT's multidisciplinary curriculum and computing-intensive approach to education provide technological proficiency, business acumen and leadership skills. With an enrollment of 11,400 graduate and undergraduate students, NJIT offers small-campus intimacy with the resources of a major public research university. NJIT is a global leader in such fields as solar research, nanotechnology, resilient design, tissue engineering and cybersecurity, in addition to others.