The nanotechnology revolution is upon us, and recently HKUST took another step towards helping Hong Kong businesses and industries maximize the potential of this immense advance when the University received HK$56.9 million from the Innovation and Technology Fund (ITF) and HK$6 million from industry to establish the HKUST Institute of Nanomaterials and Nanotechnology (INMT).

"Our primary goal with the INMT will be the development of functional, multiple-application nanomaterial and technologies relevant to the economic growth of Hong Kong. This will be achieved by working with industries and academic and research institutions, both in Hong Kong and worldwide," said Prof Ka Ming Ng, Head of Chemical Engineering and Project Coordinator of the INMT.

Nanotechnology seeks to create and exploit materials and devices at the level of atom, molecule and supramolecular structure. Nanomaterials such as the world’s smallest carbon nanotubes synthesized by HKUST researchers in 2000 display a range of exciting and novel properties, for instance field emission and strength 20 times that of steel. The potential of these materials, according to Prof Ng, will impact every level of 21st century life, from construction to electronics to textiles.

By developing novel applications and taking them to market, Hong Kong businesses and industries will become key players in the nanotechnology and materials sector. Hong Kong’s foundation industries in manufacturing, materials and electronics will be enhanced by producing higher value-added products and services, and new industries could be derived from the Institute’s work.

International collaborations, technology transfer and the grooming of entrepreneurs and researchers at the INMT will also be important as Hong Kong establishes itself as a global hub for nano-innovation and manufacturing.

Focus areas

The new Institute will carry out critical midstream R&D and technology transfer in three primary areas:

Eco-friendly microfuel cells - made from nanostructured materials for mobile
Electronic devices. These will be lighter and more efficient than standard lithium ion batteries, allowing user to benefit from the full potential of portable broadband technology. Such fuel cells would require no recharging and produce no hazardous waste at the end of their lifecycle.

Nanoelectronics display units - excellent color-quality, low power displays applying state-of-the-art advances in nanotechnology, including nano-thickness organic light emitting diodes, will make great strides in a global market valued at US$50 billion annually.

Integrated nanomaterial manufacturing - to facilitate the establishment of a nanotechnology-based manufacturing hub in Hong Kong and the Pearl River Delta. Environmentally friendly production technologies for high-yield, low-cost nanomaterials like carbon nanotubes will be developed for exploitation by local manufacturers.

A fourth area in environmental catalysts - which are already being developed at HKUST - will also be included.

"HKUSTs expertise in nanoscience and nanotechnology is constantly growing," said Prof Ng. "we already have excellent upstream research in the School of Science as exemplified by our Institute of Nano Science and Technology. And in the School of Engineering, we have strong midstream research in product and process design, which helps to take upstream research to a commercial product. Three of our nanotechnology research projects also received a total of HK$33 million from the ITF at the beginning of 2003."

"Hong Kong clearly has the strengths and the foundations to develop its own thriving nanotechnology sector. To maximize the opportunities, we also need to collaborate with regional and international research institution, enterprises and industries to bring Hong Kong to be forefront of this nano-revolution." Prof Ng concluded.