

Current Status of Nanotech in Thailand

Thailand, a country with 62 million populations, is well known as the Asia Tourism Capital, Detroit of Asia in automotive industry, the World Graphic Design Center in Software industry, World Tropical Fashion and the Kitchen of the World. The country established its S & T industry infrastructure by setting up the Software Park and Science Park, providing 200% R & D Tax Incentive, Software Loan and Innovation Fund to stimulate industry growth.

The top funding organization for S & T is the Ministry of Science and Technology (MOST). The National Science Technology Development Agency (NSTDA), which is under the MOST, is supporting 3 main national centers including the National Center for Genetic Engineering and Biotechnology (BIOTEC), National Metal and Materials Technology Center (MTEC), and the National Economic and Computer Technology Center (NECTEC).

The National Nanotechnology Center (NANOTEC) has been proposed recently and it aims

- To identify and focus on niche areas in nanotechnology, thus enhancing Thailand's competitiveness.
- To assemble and produce a critical mass of researchers and educators on nanotechnology.
- To act as a national coordinating body between academia, industry and government.

The proposed budget is about USD 25 million for the period of 2004-2008 with 300 personnel. The R & D areas of focus are Advanced Polymer, Nanocarbon, Nanoglass, Nanometal, Nanoparticles, Nanocoating, Nanosynthesis with applications to the industries of Automotive, Foods, Energy, Environment, Medicine and Health.

Currently in Thailand there are 14 laboratories in 6 universities and five laboratories in 2 government agencies with about 100 researchers. The current research areas in Nanoscience have been mainly in Nanoparticles, Quantum Dot Devices, Carbon Nanotube, Nanocoating, and MEMS. The following table summarizes the main players and activities in Thailand:

Institution	Director	Main activities
PTMP, Chulalongkorn Univ.	Prof.Dr.Wiwut Tanthapanichakoon	a. Production of Nanoparticles using arc discharge technique b. Nanoparticle synthesis using electrospray technique
SDRL, Chulalongkorn Univ.	Prof. Dr. Somsak Panyakeow	a. III-V compound semiconductor, quantum well, quantum dots b. Quantum Devices and Nanoelectronics c. Biosensor, high speed lasers, detectors, optical switches, optical memory and single electron transistors d. Crystalline Si Solar Cell e. Laser Technology

		With Molecular Beam Epitaxy (MBE) facility
CNN, Mahidol Univ.	Assist.Prof.Dr. Teerakiat Kerdchareon	<ul style="list-style-type: none"> a. Molecular electronics and photonics b. Nanoscale sensors c. Molecular machinery and robotics d. Carbon Nanotubes (CNT) as nano-wires, nanopores, nano-machine, and nano storage e. Nano transport f. Biomolecular surface science g. Biomolecular simulation h. Nanoinformatics: Matter as software i. Soft condensed matter: liquid and solution
PCD, Kasetsart Univ.	Asso. Prof. Dr. Jumras Limtrakul	<ul style="list-style-type: none"> a. Theoretical Chemistry b. Nanostructure Zeolites c. Molecular Catalysis
ERC, King Mongkut`s Insti. Of Technology Lardkrabang	Asso.Prof. Dr. Wisut Titirongruang	<ul style="list-style-type: none"> a. Research in LSI, VLSI, COSMs b. Diamond film CVD applying to high performance VLSI c. IGBT combitaion with MOSFET
FNRF, Chiang Mai Univ.	Prof. Dr. Thiraphat Vilaithong	<ul style="list-style-type: none"> a. Research on the effect of FIR light operating at near vibration frequency of DNA. b. Imaging and cutting beaded CNT <p>With facilities:</p> <ul style="list-style-type: none"> 1. 20 MeV Linear Electron Accelerator 2. Atomic Force Microscope (AFM) 3. Free electron laser (FEL) operating in far infrared region (FIR) 4. A varian implanter for research in semiconductor technology using ion beams

SRC, Suranaree Technology Univ.	Asso.Prof. Dr. Weeraopong Pairsuwan	<ul style="list-style-type: none"> a. The Siam Photon Project is the reformed SORTEC light source b. The accelerator complex comprises a 40 MeV injector linac, a 1.0 GeV booster synchrotron and a 1.0 GeV storage ring <p>With Facilities</p> <ul style="list-style-type: none"> 1. Vacuum-ultraviolet and soft X-ray (VUV - SX) spectroscopy for materials structure analysis with x-rays 2. Insertion device technology 3. Hard X-rays with photon energies high enough to carry out ordinary X-ray diffraction experiments with 1.0 GeV 4. Superconducting magnet wiggler providing a magnetic field above 7T 5. X-ray fluorescence applications including the micro analysis, and protein crystallography 6. The X-ray research fields: XAFS (X-ray Absorption Fine Structure)
NSTDA-MTEC	President: Pairash Thajchayapong	<ul style="list-style-type: none"> a. Novel Polymers-Inorganic Nanocomposite Materials b. Nanocrystalline SnO₂ for Gas Sensor c. Sol-gel Processing (PZT) Ferroelectric Powders d. Optical Devices, RAMs, DRAMs e. Nanocrystalline SnO₂ for gas sensing application f. Synthesis of ferroelectric thin films by sol-gel methods
NEC TEC		MEMS, VLSI design, solar cell, andnMulti project chip for univ. services,
BIOTEC		Biosensors., bioreceptor

Note:

PTMP-Particle Technology and Materials Processing Laboratory

SDRL- Semiconductor Device Research Laboratory

CNN-Center of Nanoscience and Nanotechnology

PCD- Physical Chemistry Division

ERC- Electronics Research Center

FNRF-Fast Neutron Research Facility

SRC- Synchrotron Research Center

Information of this article was based on the presentation given by Prof. Pairash Thajchayapong, the President of the National Science and Technology Development Agency (NSTDA), `Current Status of Nanotechnology in Thailand` at the Nanotech 2003 + Future held Feb 26-28th 2003.



Prof. Pairash Thajchyapong (2nd from the right) represented Thailand presenting at the Asia Panel Discussion held on Feb. 27th 2003 during Nanotech 2003 + Future.