Nanotechnology in Indonesia

-Summary of The Mochtar Riady Center for Nanotechnology & Engineering

Indonesia, a country consists of over 225 million population (100 million more than that in Japan), has also recognized Nanotechnology as an important area for research, development and engineering as well as industry. The Indonesia Ministry of Research and Technology focuses on two priority areas: Food and Energy in its R & D planning. Other areas such as Agriculture; Health; Environment; Marine, Land and Space; Information and Microelectronics; Manufacturing; New Materials; Biotechnology; and Transportation and Logistics; Social and Culture; Development of Sector Regional Systems are needed to be further developed. The Minister Dr. Kusmayanto Kadiman, former chairman of Institut Teknologi Bandung (ITB: a top university in Indonesia) with engineering background, recognizes the importance biotechnology and nanotechnology in Indonesian R & D and engineering and wishes to explore how biotech and nanotech may impact on the current priority areas such as Food and Energy. So far there have been several workshops and other activities organized/funded by the Ministry to investigate and prepare for some coordinated policy and research programs.
The government lab, the Research and Development Centre for Materials Science and Technology (RDCMST) is currently in the process of initiating and establishing a cooperative program in nanotechnology research.

In the private sector, Dr Mochtar Riady (a very rich man) initiated and funded the Mochtar Riady Center for Nanotechnology and Bioengineering (MRCNB) in May 2004. The center building is currently being built and is expected to finish by May 2005. The total funding of the center is about USD20 Million both from Dr Mochtar Riady and from LIPPO group (a large group of business in Indonesia including Lippo Bank, Matahari Retail, Hospital Siloam Gleneagles, Lippo Securities, Lippo Telkom, Kabel Vision, Sea world, Universitas Pelita Harapan, Sekolah Pelita Harapan and others). With the backing of the Lippo group who is very strong in marketing and business support, the research outcome of the center can be more efficiently utilized.

The MRCNB is to be a center of scientific creativity with entrepreneur consciousness and corporate management concept, and it intends to be one of the most important research center in Indonesia, which is internationally acknowledged and respected due to scientific discoveries or breakthroughs in both basic and applied sciences
It is gathering talents from Indonesia and overseas to

a) Apply Nanotechnology and Bioengineering to solve health problems (such as cancer and tropical diseases), ensuring food availability, preserving natural resources, seeking alternative energy, and complementing metal processing, cement, ceramics, herb, cosmectic industries.
b) To foster nanotechnology and bioengineering industries in Indonesia.
c) To train the next generation young talented scientists in nanotechnology and bioengineering.
d) To create research collaboration among local and international institutes
e) To encourage universities in Indonesia to be more research oriented

Asia Pacific Nanotech Weekly, Vol.3, article #1 (2005).

f) To lift the Indonesia education quality on Nano science and technology through discoveries, invention, publication and education services.

The center dedicates to the study and research on manipulation of atoms and molecules focusing on strategy areas 1) Molecular and Cellular Biology 2) Medicine and Health 3) Materials and Manufacturing.

In particular, the Materials and Manufacturing consists of Nanostructured Materials Program and Scanning Tunneling Microscopy (STM) Built-up Program.
The Nanostructured Materials Program mainly focuses on hard coating nanocomposites and nanoparticles including Carbon Nanotubes, graphite nanocrystal, photo catalyst materials and Silica (filler PNC). The research activities involve collaborations with well know research institutions in Switzerland and Germany as well as Indonesia industries.

The center has a very impressive Scientific Advisory Board which includes Dr Mochtar Riady as a Chairman who is already hold chairman position in Board of Trustee in a few Chinese Universities and Universitas Indonesia. Other Scientific Advisors include Prof. Claude Cohen Tannoudji (Ecole Normale Superieure, France), Prof.Hugo Scheer (Ludwig-Maximilliam University, Germany), Prof. Yasushi Koyama (Kwansei Gakuin University, Japan), Prof. S. Veprek (Technical University of Munich, Germany), Prof. Maw Kuen Wu (Minister of National Science Council, Taiwan) and others.

This report is based on discussions with Prof. Yohanes Surya (co-founder and CEO of the Mochtar Riady Centre for Nanotechnology and Bioengineering) and Dr. Syahril (DIC M.Eng., Research and Development Centre for Materials Science and Technology) and the presentation about the Mochtar Riady Center for Nanotechnology & Bioengineering.

Appendix:

Biography of Prof. Yohanes Surya, PhD

Co-founder and CEO of the Mochtar Riady Centre for Nanotechnology and Bioengineering
Physics Professor at Universitas Kristen Satyawacana Salatiga
INDONESIA.

Education

Ph.D degree in physics from Physics Dept. College of William and Mary in Virginia, USA, 1994

Award/Fellowship

Summer School Fellowship HUGS at CEBAF USA 1992-1994, Summer School Fellowship Netherland 1992, Summer School Fellowship TRIUMF Canada 1993
CEBAF/SURA award '92-93
Zable Fellowship '93-94

Members

Indonesian Physical Association
Bandung Fe Institute (Board Member)
The First Step to Nobel Prize in Physics (Vice President)
Asian Physics Olympiad (President)
International Physics Olympiad (Board Member)
The World Physics Competition Federation (executive member)
National Science Teacher Association (NSTA) - USA
IEEE

Experience

1988-1989	Teaching Assistant Physics Dept. College of William and Mary
1989-1993	Research Assistant Physics Dept. College of William and Mary
1994	Researcher Continous Electron Beam Accelerator Facilities.
1995-1997	Researcher at Physics Department Universitas Indonesia
1998-2003	Director International Center for Physics and Mathematics Univ. Pelita Harapan
2003 - 2004	Dean of Faculty Science and Math Univ. Pelita Harapan
2004 – now	Chief Executive Officer The Mochtar Riady Center for Nanotechnology and Bioengineering INDONESIA/ Physics Professor at Universitas Kristen Satyawacana Salatiga INDONESIA.

Others experience

1986-1987	Writting best seller book “Fisika” for high school 4 volume
1994-1996	Writting Physics Olympiad Book for Indonesian.
1996-2003	Writting 16 module for preparing Indonesian team in the physics olympiad
2002-2003	Developing amusement park physics at Dunia Fantasi Ancol.
2002	Visiting Professor at Tokyo Denki University
1992 -	Tutoring Indonesian Physics Olympiad Team
2000 -	Board of advisor center for science and technology TMII
1995 -	Jury many science competitions in Indonesia
1995 -	Training physics teachers in many different area in Indonesia (how to teach physics easily and fun)
2002 -	Writting physics comic (Archie Meidy, Adventure TOFI).
2002 -	Developing CD rom for teaching physics
2002 -	Popularize physics through Television :Tralala trilili, Fisika Dunia Fantasi and Pesona Fisika TVRI.
2000	Chairman of Asian Physics Olympiad I in Karawaci.
2002	Chairman The World Physics Competition Federation in Bali
2002	Chairman International Econophysics Conference in Bali
2003 -	Head of econophysics center at Universitas Pelita Harapan
2000 -	Writting hundreds of popular physics articles in newspaper such as: Media Indonesia, Tempo, Kompas, Bisnis Indonesia, Majalah Gatra, Majalah Swa dan Majalah Intisari.
2002 -	Writting science and Math books for elementary school.

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Biography of SYAHRIL, DIC M. Eng

Group Leader of Metal Research
Research and Development Centre for Materials Science and Technology (RDCMST)
Senior Researcher of the Mochtar Riady Centre for Nanotechnology and Bioengineering (MRCNB)

Education, Experience, and Fellowship

Oct. 1986	Graduated from Bandung Institute of Technology (ITB), Bandung, Indonesia, majoring in Physics and has since been employed by the Research and Development Centre for Materials Science and Technology, Batan, Puspiptek, Serpong, Indonesia.
1989 - 1991	Visiting Scientist at the Interfaculty Reactor Institute (IRI), Delft University of Technology (TU - Delft), Delft, The Netherlands, conducting research on thin films for magnetic recording media in collaboration with Philips Research Establishment. (Overseas Fellowship Program awarded by the Indonesian Ministry for Research and Technology (MoRT) in collaboration with the World Bank).
1992 - 1994	Post-graduate program (M.Eng degree) at the Mechanical/Materials Engineering Department, ITB, Bandung, Indonesia (Science, Technology and Industrial Development Fellowship (STAID) awarded by MoRT – World Bank).
	Visiting Scientist at Japan Atomic Energy Research Institute (JAERI), Tokai-mura, Japan, conducting research on Small Angle Neutron Scattering and semiconductor materials (Indonesia - Japan Bilateral Cooperation Fellowship)
1996	Head of the Metallurgy and Industrial Materials Division, Research and Development Centre for Materials Science and Technology, Batan, Puspiptek, Serpong, Indonesia
1996 - 2000	PhD program at Imperial College of Science, Technology and Medicine, University of London, London, UK conducting research on the development of alloys for soft magnetic applications. The research was carried out in collaboration with Carpenter Technology (UK) Ltd (STAID Fellowship).
Apr.-Jun. 2002	Visiting Scientist at the Centre for Electron Microscopy (GFE), Aachen University of Technology (RWTH), Aachen, Germany; electron microscopy / electron crystallography research on automotive catalytic converter materials (Indonesia-Germany Bilateral Cooperation Fellowship)
Oct. 2002	Chairman of the 5th National Conference on Materials Science and Technology. Held on 22 - 23 October 2002, this conference gathered scientists, engineers and practitioners from various private and governmental institutions in Indonesia and abroad. Around 80 scientific papers were presented in this event.

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Present:

1. Involved in a joint research project between BMBF - Germany and Batan - Indonesia on the development of automotive catalytic converter materials and electron microscopy.
2. Conducting research on surface engineering (coatings), high temperature corrosion and the development of corrosion-resistant alloys.
3. Characterization of nano-powder materials
4. Serves as a materials engineering consultant to several companies, such as Garuda Indonesia to investigate the failure of aircraft components, to Indonesia Power - PLTU Suralaya, a coal-fired power plant, to investigate the failure of its steam generator components, to the Indonesian Electricity Companies PLN for materials testing and evaluation of various components of its power plants, and to some other companies for materials testing and evaluation and product development activity (e.g. automotive components, nano powders, and nano composite materials).
5. Head of Group for Metals Research at the Research and Development Centre for Materials Science and Technology, Puspiptek, Serpong.
6. Lecturer at Indonusa Esa Unggul University, a prospective, fast growing private university (Jakarta, Indonesia).
7. Senior Researcher of the Mochtar Riady Centre for Nanotechnology and Bioengineering