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Singapore launches S\$50 million integrated circuit (IC) design research centre *Centre aims to be a world-class IC design house focusing on ultra low power green microchips and circuits*

In the near future, consumers can look forward to ultra-low powered or self powered electronic devices such as laptops, PDAs and mobile phones. This is made possible with power management and cutting-edge energy harvesting technologies which are critical elements for power optimisation and higher energy efficiency in electronic devices and systems.

Analog IC design is the key enabling capability for power management and energy harvesting. To pre-position in analog and mixed signal capabilities, Singapore's new Integrated Circuit (IC) Design Centre of Excellence was launched today at the International Symposium on Integrated Circuits 2009 (ISIC 2009), Suntec Singapore International Convention & Exhibition Centre, by Mr Damian Chan, Director (Electronics), Economic Development Board (EDB).

The S\$50 million jointly funded centre by Nanyang Technological University (NTU) and EDB named **VIRTUS** (Latin for Excellence), aims to be a world-class IC design house, developing key technologies required to design integrated circuits and systems for applications in medical technology, clean technology and consumer electronics.

"Electronics is a key enabling technology for today's high-tech world. The EDB has identified four new growth areas - green electronics, bioelectronics, plastic electronics and security – and VIRTUS' research areas are well aligned with the new growth areas of green electronics and bioelectronics," said Mr Chan.

R&D is an integral part of the electronics industry, with Singapore having the full value chain of R&D activities from component-level IC design and semiconductor process R&D; to system-level product design, firmware development and industrial design. Specifically for IC design, there are some 1,100 design engineers in Singapore, with which 44 per cent specialise in analog, mixed signal and RF IC design. With the global shortage of IC design engineers, especially in the area of analog and mixed signal IC design, Singapore's differentiating strategy is to train and build up strong capabilities in this domain.

"NTU is pleased to partner EDB in setting up the Integrated Circuit Design Centre of Excellence, VIRTUS, signalling the need for Singapore to groom more locally based IC design houses to fuel and further foster the growth of the semiconductor ecosystem in Singapore. VIRTUS establishment is of strategic national interest and promises potentially high economic yield," said Professor Kam Chan Hin, Chair, School of Electrical & Electronic Engineering (EEE) NTU. "The establishment of VIRTUS is also in line with NTU's strategic

thrusts, which encompasses building a reputation for world-class research and developing an innovation and entrepreneurship ecosystem.”

VIRTUS will also collaborate with world renowned universities, top research institutions and well-known companies in its pursuit of excellence in research and development in IC design and technology.

Among its key partners is Agilent Technologies, the world's premier measurement company and a technology leader in communications, electronics, life sciences and chemical analysis. Agilent is contributing its industry-leading suite of simulation software worth some \$28 million to VIRTUS. NTU and Agilent signed a Memorandum of Understanding today to seal their partnership.

“As the technology leader in electronic design automation tools, Agilent is pleased to collaborate with the Integrated Circuit Design Centre of Excellence, VIRTUS, through the contribution of our industry-leading suite of simulation software,” said Rob Young, General Manager at Agilent Technologies Singapore. “Using our design simulation software, the centre’s IC designers will reduce the time needed to design next-generation integrated circuits that will consume less power and have more features packed into a smaller footprint. This means the Centre can speed up the commercialisation of the integrated circuits to be used in end products from mobile phones to space shuttles.”

Apart from its primary focus in design, innovation and enterprise, VIRTUS is also committed to train more than 100 postgraduate students and researchers in the next five years.

Located at NTU, VIRTUS is expected to be operational in first quarter 2010 and will boast a team of at least 20 top notch scientists and researchers within the next five years. Professor Yeo Kiat Seng, Head, Division of Circuits & Systems, EEE, NTU is currently VIRTUS’ Interim Director.

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About Nanyang Technological University

Nanyang Technological University (NTU) is a research-intensive university ranked among the world’s top 100 universities, according to the 2009 Times Higher Education-Quacquarelli

Symonds (QS) World University Rankings. The Yunnan Garden campus, NTU's main campus, is located in the south-western part of Singapore and will be the Youth Olympic Village of the inaugural Youth Olympic Games in 2010. The NTU@one-north campus, home to educational and alumni clubhouse facilities, is located near Singapore's biomedical research hub, Biopolis; and the new engineering and physical sciences hub, Fusionopolis.

NTU has four colleges, namely:

- The Nanyang Business School (the College of Business), the first and only Singapore business school to be ranked in the top 25 of the Financial Times Global MBA 2009 rankings. It is also one of only three in Asia to be awarded both the EQUIS (European Quality Improvement System) and AACSB (Association to Advance Collegiate Schools of Business) accreditations – international hallmarks of quality.
- The College of Engineering, with six schools focused on technology and innovation and a research output among the top four in the world.
- The College of Humanities, Arts, & Social Sciences, home to the Wee Kim Wee School of Communication and Information, a top journalism and media school in Asia; a fast-growing humanities and social sciences school with distinctive niches of excellence; and Singapore's first professional art school offering degree courses in art, design and interactive digital media.
- The College of Science, with award-winning faculty and world class laboratories, runs Singapore's only direct honours bachelor's degree programmes in the biological, physical and mathematical sciences.

The S Rajaratnam School of International Studies, an autonomous graduate institution of NTU, runs the Institute of Defence and Strategic Studies, long recognised as a world authority on strategic studies and security research. The National Institute of Education, Singapore's only teacher-training institute, is internationally-acclaimed and provides educational consultancy to countries from Indonesia to Abu Dhabi. The Earth Observatory of Singapore, established in 2008 with \$150 million in state funding, is dedicated to hazards-related earth science.

As the main science and technology university in Singapore, NTU makes significant contributions to the nation's renewed drive for research and innovation spearheaded by the Singapore National Research Foundation. This effort will see S\$2.4 billion being invested over five years in biomedical sciences, environmental and water technologies, and interactive and digital media – areas NTU is strong in. Impressed by the vibrant entrepreneurship environment at NTU, the Ewing Marion Kauffman Foundation, widely known as 'The Foundation of Entrepreneurship', has chosen NTU to be the first Kauffman campus outside the United States of America.

NTU has a strong and broad international reach covering academic and research partnerships with top institutions in the US, Europe and Asia, such as MIT, Stanford University, Cornell University, Caltech, University of Washington, Georgia Institute of Technology, and Carnegie Mellon University; Cambridge University, Imperial College and Swiss Federal Institute of Technology; and Peking University, Shanghai Jiaotong University, Waseda University, and Indian Institute of Technology.

For more information, visit www.ntu.edu.sg

About the Singapore Economic Development Board

EDB is the lead government agency for planning and executing strategies to enhance Singapore's position as a global business centre and grow the Singapore economy. We dream, design and deliver solutions that create value for investors and companies in Singapore. In so doing, we generate economic opportunities and jobs for the people of Singapore; and help shape Singapore's economic future.

'Host to Home' articulates how EDB is sharpening its economic development strategies to position Singapore for the future. It is about extending Singapore's value proposition to businesses not just in helping them improve their bottom line, but also in helping them grow their top line. EDB plans to build on existing strengths and add new layers of capabilities to enable Singapore to become a *'Home for Business'*, a *'Home for Innovation'* and a *'Home for Talent'*.

For more information on how EDB can help your business, please visit www.sedb.com