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PRESIDENT'S SCIENCE AND TECHNOLOGY MEDAL 2010

Professor Chong Tow Chong Provost, Singapore University of Technology and Design

"For his distinguished, strategic and far-sighted contributions to Singapore's science and engineering landscape, particularly in spearheading the development of the data storage industry, driving research integration in Fusionopolis, and shaping R&D in Singapore"

Professor Chong Tow Chong, the Provost of the Singapore University of Technology and Design, is one of the pioneers who have played a vital role in developing the science and engineering landscape in Singapore. A brilliant researcher and a research leader, Prof Chong has, throughout his career, contributed significantly towards building up the science and engineering research capabilities in the A*STAR research institutes, developing the data storage industry, and anchoring some of the leading multi-national data storage companies here in Singapore.

He was also actively involved in cultivating a vibrant public sector science and engineering R&D environment in Singapore that led to important industry collaborations, bridging the gap between the laboratory and industry, and between the public and private sectors. Developing Data Storage Research and Industry Prof Chong Tow Chong's early major contributions to the R&D landscape in Singapore were in the area of data storage research through his work and leadership roles in Data Storage Institute (DSI).

He was Technical Director of DSI from 1995 to 1996, the Deputy Director from 1997 to 1998, and the Executive Director from 1998 to June 2010. During his 15 years at DSI, Prof Chong was instrumental in leading the fledgling institute to achieve worldwide recognition as a research institute of excellence in data storage technologies. Today, DSI is a member of the United States-based Information Storage Industry Consortium (INSIC), where it is actively involved in the development of long-range technology application, and in pre-competitive collaborative research projects with key industry players and academic institutions such as Seagate, Hitachi Global Storage Technologies (GST) and Carnegie Mellon University. DSI has also been recognized locally for its excellent achievements in research by winning the National Technology Awards (the precursor of the President's Technology Award) for three consecutive years in 2004, 2005 and 2006.

Under Prof Chong's leadership, DSI grew by leaps and bounds, contributing substantially towards the growth of the data storage industry in Singapore. In the early days of DSI in the 1990s, one in two disk-drives worldwide was made in Singapore. Over time, when the production of such disk-drives began to move to lower cost countries, Prof Chong led DSI to respond to the needs of the times and

developed new research capabilities which supported the shift of the data storage industries towards higher value-added activities. Today, eight out of 10 higher value-added high-end enterprise drives and nearly five out of 10 hard disk media are manufactured in Singapore. Indeed, much of the success of the of the data storage industry in Singapore, which persuaded key industry players such as Seagate, Fujitsu, EMC, Seiko and Nitto Denko to establish corporate R&D laboratories in Singapore, can be attributed to Prof Chong. By the time Prof Chong passed the reins to his successor, he has already put measures in place for DSI to continue to look ahead to build capabilities to support the key industry players on developing next-generation products such as cost-competitive Non-Volatile Memory devices, network storage technology and high density magnetic storage at 10 Terabits per square-inch.

Spearheading Singapore's Science and Technology Plans Prof Chong's contributions to R&D extended beyond the boundaries of DSI. In 2002 he was concurrently appointed Deputy Executive Director (DED) of the Science and Engineering Research Council (SERC), and subsequently Executive Director (ED) of SERC from Nov 2003 to Jan 2010. In his role as Executive Director of SERC, Prof Chong oversaw the implementation of the recommendations of the Science &Technology Plan (S&T) 2005 plan, and led the technology scanning and planning exercise to develop recommendations for the SERC component of the S&T2010 Plan.

As part of the implementation of the S&T2010 Plan, SERC established programmes which led to the development of strategic research capabilities spanning nanoelectronics, UWB, polymer and molecular electronics; initiated multidisciplinary research programmes in energy and technologies for the Home of the Future; and established key industry consortia programmes for the aerospace and automotive industry sectors. Under Prof Chong's leadership, SERC also established strong capabilities across the broad spectrum of physical sciences and engineering areas and are well-positioned to lead multidisciplinary research for the next phase.

Establishing Fusionopolis as the Science and Engineering Research Hub Prof Chong played a key role in the conceptualisation of Fusionopolis as the physical sciences and technology hub to bring together scientists, research engineers and technology experts from a variety of physical science and engineering disciplines to a single location to tackle complex challenges facing industry, and develop innovative solutions meeting new technological opportunities and challenges. He chaired the Fusionopolis Working Committee, which was responsible for planning for Fusionopolis Phase 1. He was also a member of the Fusionopolis Steering Committee, leading the planning for Fusionopolis Phase 2.

Fostering collaborations with industry to advance industry development Prof Chong also led in the development of a framework, through which the science and engineering research institutes of A*STAR were positioned to advance industry development. This led the way for SERC research institutes to partner and collaborate with MNCs in developing new technologies and anchoring research and manufacturing facilities in Singapore. The HP Labs and Fujitsu are two cases in point. HP Labs' successful Shared Services Platform (SSP) collaboration with A*STAR on grid computing and service automation contributed to HP Labs' decision to set up a full-scale research lab in Fusionopolis, its first in Southeast Asia, to look into future concepts in data centre and cloud computing. HP was committed to investing S$50 million (US$35.6 million) into the new local facility over five years.

In the same vein, the Fujitsu-High Performance Computer Lab was also set up for Fujitsu and A*STAR to jointly develop advanced applications technologies for the next generation of scientific computing known as petascale computing. Another of Prof Chong's innovative industry concepts was the Lab-in-RI programme. The Lab-in-RI scheme allows MNCs, without a prior physical R&D presence in Singapore, to quickly jumpstart their R&D activities by locating its R&D lab in an A*STAR research

institute. Mitsui, through such an initiative at ICES, subsequently decided to locate its first R&D lab outside of Japan in Singapore.

A more recent example would be DyStar Singapore Pte Ltd (DyStar), the local branch of DyStar Textilfarben GmbH & Co. Deutschland KG, a leading German provider of products and services for the textile and leather industry. In addition, key industry consortia programmes were initiated and launched. A*STAR initiated the Aerospace Programme in 2007 to help companies grow R&D activities and build up technical capabilities for the future.

In all, 18 companies including industry giants such as Boeing, EADS, Pratt & Whitley and Rolls Royce; the local Globally Competitive Companies such as SIA Engineering Company; and local Small and Medium Enterprises (SMEs) such as IDI Laser and Tru-Marine are collaborating with A*STAR's research institutes in the pre-competitive R&D. The end-goal is to develop and move the aerospace industry up the value chain, including anchoring manufacturing & design activities in Singapore. In recognition of A*STAR's role in establishing the Aerospace Programme, A*STAR was awarded the Frost & Sullivan Asia Pacific Aerospace & Defense Award for Aerospace R&D Institution of the Year in 2009.

The success of the Aerospace Programme paved the way for the formation of similar research consortium such as the 3-Dimensional (3D) Through-Silicon Via (TSV) consortium in September 2009 to boost next generation wafer stacking manufacturing capability for Singapore semiconductor industry to meet technology and product needs, and the MEMS Consortium in April 2010 to bring together eight MNCs and local enterprises from the MEMS supply chain in public-private sector research collaboration to grow the MEMS industry in Singapore.

Under Prof Chong's charge, SERC also implemented the Growing Enterprises through Technology Upgrade (GET-Up) programme in 2003 to boost the global competitiveness of local technology-intensive enterprises and equip them for the knowledge-based economy. Under the GET-Up programme, A*STAR would assist SMEs to move up the value chain through the secondment of A*STAR researchers to SMEs for up to two years, with funding support from EDB and SPRING. In addition, A*STAR would provide assistance to the SMEs through operations and technology roadmapping, and technology advisory assistance. Since its inception, more than 200 SMEs have benefited from the GET-up initiative. Apart from his achievements as a research leader, Prof Chong is a remarkable researcher in his own rights.

Throughout his career, he authored and co-authored more than 350 publications in international refereed journals, presented more than 25 invited talks and registered 23 patents. He has also groomed and mentored promising R&D talent that passed through his laboratory. Prof Chong has recently been appointed as the Provost of the Singapore University of Technology and Design on 1 June 2010 where he will continue to contribute towards the R&D landscape in Singapore by grooming a new generation of technically grounded innovators, entrepreneurs and leaders.

For his distinguished, strategic and far-sighted contributions to Singapore's science and engineering landscape, particularly in spearheading the development of the data storage industry, driving research integration in Fusionopolis, and shaping R&D in Singapore, Professor Chong Tow Chong is awarded the 2010 President's Science and Technology Medal.