2009 PSTA WINNER CITATIONS

PRESIDENT'S SCIENCE AND TECHNOLOGY MEDAL 2009

Professor Miranda Yap
Executive Director, Bioprocessing Technology Institute
Executive Director, A*STAR Graduate Academy
Agency for Science, Technology and Research

"For her sustained, distinguished and strategic contributions to Singapore's Biomedical Sciences landscape particularly in the areas of developing the biologics industry sector, building the research culture and nurturing young talent"

Professor Miranda Yap is one of the pioneers who has played a pivotal role in developing the biomedical sciences landscape in Singapore. Her contributions have helped develop the biologics industry sector, anchoring some of the leading multi-national biologics manufacturing companies here in Singapore. She has cultivated a vibrant bioprocess R&D environment that has led to important industry collaborations and partnerships, bringing the translation of research closer to potential healthcare applications.

Instrumental contributions by the Bioprocessing Technology Institute (BTI) under the leadership of Professor Yap have enabled Singapore to gain a foothold in the rapidly growing global biologics sector. Through BTI, Singapore has attracted six commercial scale biologics plants. Building a critical mass in biologics will enhance Singapore's status as a global hub for biopharmaceutical manufacturing, and raise the bar for competing locations because of the highly-skilled manpower and complexities associated. The establishment of the six biologics manufacturing plants here will employ almost 1,300 staff, bringing in about S$2.5 billion in investments.

Professor Yap has led the BTI since its origins as the Bioprocessing Technology Unit (BTU) in 1990, and nurtured its growth from a small unit into a successful research institute. Bridging between discovery and commercialisation, BTU developed research capabilities, supported manpower training and provided core services for the biotechnology industry. This included the establishment of a cGMP facility, the Biopharmaceutical Manufacturing Technology Centre (BMTC), in 1999 for the production of clinical grade materials as contract service to local and overseas biotechnology companies. BMTC was subsequently spun out in 2004 as A-Bio Pharma, a commercial entity and the first biologics contract manufacturing company in Singapore. A-Bio Pharma quickly built up a successful client base of companies, providing process development, optimisation, manufacturing scale-up, GMP production, quality control and regulatory compliance to pharmaceutical and biotech companies.

The bioprocess R&D efforts at BTI, spearheaded by Professor Yap, has resulted in several successful collaborations and partnerships with academia and industry. The Consortium for Chinese Hamster Ovary (CHO) Cell Genomics, which was jointly organised by BTI and the University of Minnesota in 2006, helped place BTI and Singapore on the world map. The Consortium, started with up to US$2 million provided by companies through the Society for Biological Engineering (USA), has attracted the participation of nine leading pharmaceutical and biotechnology companies including Bayer Healthcare AG, Boehringer Ingelheim, Bristol-Myers Squibb, SAFC Biosciences and Schering Plough. BTI has also developed research collaborations and projects with industry partners where the companies commit resources and funds to jointly develop projects to build up research competencies in industrially important areas. A case in point is the more recent development of GSK Biologicals SA Belgium's S$2 million commitment to BTI in three vaccine and adjuvant system related research.

BTI actively builds up a ready pool of talent trained in biologics manufacturing, which is a critical component in attracting companies to Singapore for their various investments. Through teaching relevant courses and in supervising research projects, BTI supported early programmes such as the Specialist Manpower Programme and the Postgraduate Manpower Programme to address projected needs by offering specialisation in biopharmaceutical engineering to chemical engineering undergraduates and Masters students at NUS. In 2005, Professor Yap also initiated an intensive hands-on training programme, the Bioprocess Internship Programme, to prepare science and engineering graduates for careers in bioprocessing.

As the Executive Director of A*GA since 1 November 2006, A*GA has made tremendous in-roads into the top schools, junior colleges and universities in Singapore through its flagship scholarship programmes. Professor Yap is also instrumental in launching new initiatives under the Youth Science programme to cultivate students' interest in science and to enthuse young Singaporeans to pursue careers in Science and Technology. Some examples include providing opportunities for A*STAR scientists to engage teachers and students to develop in them an awareness of R&D, as well as establish and administer scholarships for bright Singaporeans in upper secondary schools. Through these initiatives, A*GA has built up a healthy pipeline of young Singaporeans keen on pursuing research as a career.

Under her watch, A*GA also introduced other scholarships and awards to encourage international students to do their PhDs in Singapore and A*STAR so as to build up an internationally diverse PhD talent pool as well as strengthen the network of PhD talent connected with Singapore and A*STAR. These include the Singapore International Graduate Award (SINGA), the A*STAR Research Attachment Programme (ARAP), and the Singapore International Pre-graduate Award (SIPGA). In addition, Professor Yap has also worked tirelessly at strengthening linkages between A*STAR and internationally renowned research institutions and universities such as the University of Cambridge and University of Oxford so as to increase the opportunities available for A*STAR scholars and fellows to be trained there. It is due to no small effort on the part of Professor Yap that some of the best opportunities for top-notch scientific training and networking have been made available to A*STAR scholars and fellows to give them the grounding and space to be developed into world-class scientific leaders.

Professor Yap's other achievements include starting the Centre for Natural Product Research (CNPR), a joint venture between GlaxoWellcome and the Institute for Molecular & Cell Biology (IMCB) in 1993, and heading it for seven years until 2000. In 2002, CNPR was privatised and became MerLion Pharmaceuticals, a start-up which has established itself as a leading natural product-based R&D company. It has received several awards and accolades including the Frost & Sullivan Market Penetration Leadership Award in March 2006. It was also named as one of the top biotech

companies of 2007 in the annual FierceBiotech "Fierce 15" list and the 'Best Company in an Emerging Market' at the industry's annual Scrip Awards in 2007.

Professor Yap also led the development of the Singapore Stem Cell Bank (SSCB) under the auspices of the Singapore Stem Cell Consortium (SSCC). The SSCB, which began operations in August 2006, is a centralised repository and distributor of high quality research-grade human stem cell lines that are maintained and characterised according to validated and standardised processes for basic and translational research. The bank, which also provides technical support and educational opportunities through hands-on training of research students and post-doctoral researchers in specialist techniques of human embryonic stem cell culture and characterizsation, represents an important initiative in Singapore to advance stem cell research and the development of stem cell-based technologies.

Professor Yap's outstanding achievements in education, research and management in the field of mammalian cell culture were recognised by the prestigious U.S. National Academy of Engineering, which elected her as a Foreign Associate in February 2006. She became the first foreign female associate and the only engineer in Singapore to be elected into the academy. For her contributions, Professor Yap was honoured with the National Day’s Public Administration Medal (Silver) in 2003.

For her sustained, distinguished and strategic contributions to Singapore’s Biomedical Sciences landscape, particularly in the areas of developing the biologics industry sector, building the research culture and nurturing young talent, Professor Miranda Yap is awarded the President’s Science and Technology Medal 2009.