AGENCY FOR SCIENCE, TECHNOLOGY AND RESEARCH

ANNUAL REPORT
APR 2012 – MAR 2013

AGENCY FOR SCIENCE, TECHNOLOGY AND RESEARCH

ANNUAL REPORT FOR THE YEAR ENDED 31 MARCH 2013

In the opinion of the directors, the annual report of the Agency for Science, Technology and Research (A*STAR) is drawn up so as to present fairly the state of affairs of A*STAR as at 31 March 2013.

On behalf of the Board of Directors,

Lim Chuan Poh	Raj Thampuran
Chairman	Managing Director
31 Jul 2013	31 Jul 2013

ORGANISATION DETAILS

Board Secretary	Ms Emily Liew Director Planning & Policy Department Agency for Science, Technology and Research
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Introduction to Agency for Science, Technology and Research (A*STAR)

The Agency for Science, Technology and Research (A*STAR) is an economic agency responsible for spearheading mission-oriented research in Singapore. Tasked with **Creating an Innovation Economy,** A*STAR fosters world-class scientific research and talent to create and capture new economic opportunities, improve the lives of Singaporeans and help establish Singapore as one of the most research intensive, innovative and entrepreneurial economies in the world.

Board Members

Chairman

Mr Lim Chuan Poh
Chairman, A*STAR

Deputy Chairman

Prof Tan Chorh Chuan
Deputy Chairman, A*STAR
President, National University of Singapore

Members

Dr Raj. Thampuran
Managing Director, A*STAR

Prof Bertil Andersson
President, Nanyang Technological University

Prof Isaac Ben-Israel
Chairman, Israel Space Agency
Chairman, Israel National Council for R&D

Mr Bruce Brown
Chief Technology Officer, Procter & Gamble Company

Dr William W. Chin
Executive Vice President, Science and Regulatory Affairs
Pharmaceutical Research and Manufacturers of America (PhRMA)

Prof Jonathan Knowles
Finnish Distinguished Professor,
Institute for Molecular Medicine Finland FIMM
Nordic EMBL Partnership for Molecular Medicine

Mr Ng Cher Pong
Deputy Secretary (Policy), Ministry of Education

Mr Ng Wai Choong
Deputy Secretary (Policy), Ministry of Finance

Prof Sir Keith O'Nions
President & Rector, Imperial College

Prof Sir John O'Reilly
Chairman, Science and Engineering Research Council, A*STAR
Director General for Knowledge and Innovation
Department for Business, Innovation and Skills

Mr Ong Boon Hwee
Managing Director, Beyond Horizon Consulting Pte Ltd

Mr Quek Tong Boon
Chief Defence Scientist, Ministry of Defence

Prof Sir George Radda
Chairman, Biomedical Research Council, A*STAR
Emeritus Professor of Molecular Cardiology, University of Oxford

Dr Sun Shih-Wei
Vice Chairman, United Microelectronics Corporation

Prof Tan Eng Chye
Deputy President (Academic Affairs) and Provost, National University of Singapore

Mr Tan Kok Kiong Andrew
Deputy Secretary (Special Duties), Ministry of Transport

Dr Patrick Vallance
President, Pharmaceuticals R&D, GlaxoSmithKline

Dr Tadataka Yamada
Chief Medical & Scientific Officer (CMSO),
Executive Vice President & Board Member,
Takeda Pharmaceuticals

Mr Yeoh Keat Chuan
Managing Director, Economic Development Board

Three board members stepped down upon the completion of their terms on 31 January 2013. They were:

Prof Sir Alex Markham
Professor of Medicine
University of Leeds

Lord Ronald Oxburgh
Deputy Chairman of the Science and Engineering Council
House of Lords Select Committee on Science and Technology (UK)

Prof Charles Zukoski
Provost and Executive Director (Academic Affairs)
University of Buffalo

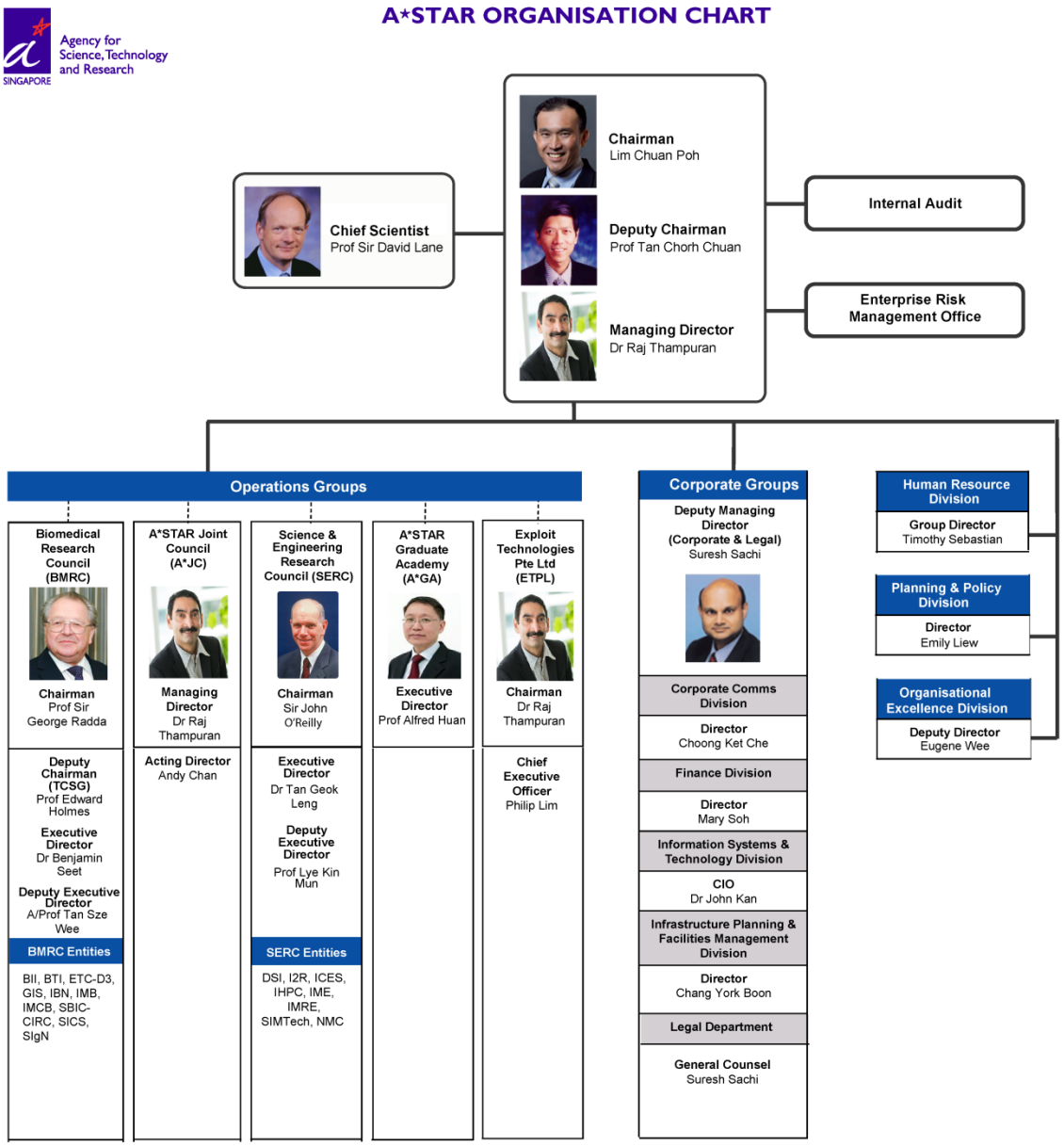
Prof Low Teck Seng, Managing Director, left A*STAR in July 2012 and subsequently joined the National Research Foundation as Chief Executive Officer.

We thank the board members for their service to the Board.

Key Management Personnel

Chairman, A*STAR	Mr Lim Chuan Poh
Deputy Chairman, A*STAR	Prof Tan Chorh Chuan
Managing Director, A*STAR (until July 2012)	Prof Low Teck Seng
Managing Director, A*STAR (from July 2012) and Executive Director, Science and Engineering Research Council (SERC), A*STAR	Dr Raj. Thampuran
Scientific Advisor to A*STAR Chairman	Dr Sydney Brenner
Chairman, Biomedical Research Council (BMRC)	Prof Sir George Radda
Chairman, Science and Engineering Research Council (SERC)	Prof Sir John O'Reilly
Chief Scientist, A*STAR	Prof Sir David Lane
Deputy Managing Director (Corporate & Legal), A*STAR and General-Counsel	Mr Suresh Sachi
Deputy Chairman, Translational and Clinical Sciences Group (BMRC)	Prof Edward Holmes
Executive Director, Biomedical Research Council, A*STAR	Dr Benjamin Seet
Executive Director, A*STAR Graduate Academy, A*STAR	Prof Alfred Huan
Chief Executive, Exploit Technologies Pte Ltd (ETPL), A*STAR	Mr Philip Lim

A*STAR Organisation Chart



Major Shareholder of Subsidiary Companies

Name of subsidiary company:	Exploit Technologies Pte Ltd
% shareholdings in company:	100%

Exploit Technologies Pte Ltd (ETPL)

ETPL is the technology transfer arm of the Agency for Science, Technology and Research (A*STAR), Singapore's lead agency for fostering world-class scientific research and talent. A*STAR oversees 18 biomedical sciences, physical sciences and engineering research institutes and consortia. As a one-stop resource, ETPL supports A*STAR in transforming the economy through driving innovation and commercializing its research outcomes.

ETPL enhances the research output of A*STAR scientists by translating their inventions into marketable products or processes. Through shaping and facilitating licensing deals and spin-offs, ETPL actively engages industry leaders and players to commercialise A*STAR's technologies and apply them to building ecosystems that benefit business, industry and economy.

For more information, please visit http://etpl.sg

List of A*STAR Research Institutes and Consortia

A*STAR has 18 research institutes and consortia, spanning a broad range of research areas from the biomedical sciences, to the physical sciences and engineering.

Biomedical Research Institutes and Consortia
Bioinformatics Institute (BII)
Bioprocessing Technology Institute (BTI)
Experimental Therapeutics Centre – Drug Development and Discovery (ETC-D3)
Genome Institute of Singapore (GIS)
Institute of Bioengineering and Nanotechnology (IBN)
Institute of Medical Biology (IMB)
Institute of Molecular and Cell Biology (IMCB)
Singapore Bioimaging Consortium – Clinical Imaging Research Centre (SBIC-CIRC)
Singapore Institute for Clinical Sciences (SICS)
Singapore Immunology Network (SIgN)

Science and Engineering Research Institutes and Consortia
Data Storage Institute (DSI)
Institute of Chemical and Engineering Sciences (ICES)
Institute of High Performance Computing (IHPC)
Institute for Infocomm Research (I^2R)
Institute of Materials Research and Engineering (IMRE)
Institute of Microelectronics (IME)
National Metrology Centre (NMC)
Singapore Institute of Manufacturing Technology (SIMTech)

Staff Strength in A*STAR

The total strength of the A*STAR community, including scientists and researchers, technical and non-technical staff, and industry development and commercialisation staff was 5,105 as at 31 March 2013.

Overview of FY2012 Achievements

1. Singapore's R&D landscape has grown considerably since A*STAR was formed in 2001. In 2011, Singapore's gross expenditure on R&D reached an all-time high of S$7.4 billion and R&D products contributed over S$13.5 billion to the economy. The R&D workforce has grown from 22,000 in 2001 to more than 38,000 in 2011. The growing stature of our research efforts is also reflected in Singapore's performance in innovation reports. A*STAR was ranked 9th in the world in patent applications among government and research institutes based on the 2013 WIPO report. In terms of number of patents, licenses, and start-ups per billion R&D spending, A*STAR benchmarks well against top systems in the US such as UCal, Harvard and MIT (see below)[1].

	R&D budget (S$b)	Patents per S$b	Licences per S$b	Start-ups per S$b
A*STAR	1	324	157	14
UCal System	6.75	142	43	8
Harvard	1.04	204	82	8
MIT	1.86	350	63	13

2. Beyond the rankings, A*STAR has been pursuing its mission with success. A*STAR RIs have continued to forge significant public-private partnerships across a range of industries including partnerships with GE Healthcare, L'Oreal and Lloyd's Register, as well as expanding R&D collaborations with companies such as Applied Materials and P&G. From 1 Apr 2011 to 31 March 2013, A*STAR has undertaken more than 2,700 industry projects which catalysed more than S$500 million in industry R&D spending in Singapore.

3. We have achieved greater commercialisation outcomes and have already matched the achievements of the last five-year tranche in licensing (278 licences with an RICV value of $130 million from 1 Apr 2011 to 31 Mar 2013). Start-ups harnessing A*STAR technologies are also gaining international recognition. For example, Sofshell (IMRE) won the Silver Award of 'Wall Street Journal's Asian Innovation Awards 2012' and HistoIndex (IBN) won the Biospectrum Asia magazine's '2012 Asia Pacific's Emerging Company of the Year'.

4. On talent, A*STAR has a vibrant, dynamic and cosmopolitan community of more than 5,000 staff from 60 different countries. Of the more than 4,100 researchers, engineers and technical support staff, 51% are PhDs and 57% are Singaporeans. This year, within the scientific community, Professor Sir George Radda (Chairman, BMRC), Professor Sir David Lane (Chief Scientist, p53lab), Professor Alex Matter (ETC-D3), Professor Dim-Lee Kwong (IME), Professor Paola Castagnoli (SIgN), among others, have all won prestigious scientific awards. We are starting to see our young scientists excelling and winning recognition on the global stage, thereby auguring well for the future of research in Singapore. Dr Bruno Reversade (IMB), Dr Jonathan Loh (IMB) and Dr Joel Yang (IMRE) were among early-career researchers who were recognised internationally for their scientific

[1] AUTM Report, 2011.

contributions. A*STAR was also conferred the 'Frost & Sullivan's 2012 Inaugural National Innovation Development Award' to recognise the Agency's efforts in creating an innovation economy.

5. A*STAR had a productive year in 2012. We are well on track in achieving its Key Performance Indicators (KPIs) into the second year of the Research, Innovation and Enterprise (RIE) 2015 tranche and in a number of KPIs, we have already surpassed the 5-year target.

6. KPI achievements for FY2012 are summarised below.

Category	RIE 2015 KPIs	FY2012 Achievement Cumulative (% achieved)	RIE2015 Target
Public R&D	Industry funding received ($mil)	$107 mil (42%)	$255 mil
	No. of industry projects	2726 (165%)	1,651
	No. of Translational and Clinical Research (TCR) projects	105 (45%)	234
	IAF Industry R&D spending ($mil)	$449 mil (90%)	$500 mil
	IAF Industry projects	101 (135%)	75
Innovation & Enterprise	No. of RSEs from RIs seconded to industry (GET-Up only)	117 (43%)	275
	No. of licenses (overall)	278 (106%)	263
	No. of licenses or spin-offs arising from completed Gap Funded projects	107 (107%)	100
	No. of licenses or businesses facilitated by IPI	15 (19%)	80
Talent	No. of PhD postgraduates trained or being trained by the RIE2015 talent budget	311 (40%)	780
	No. of PhD postgraduates who work in Singapore upon graduation	*Lag KPIs. Data will only be provided towards the end of the RIE2015 tranche.*	399
	No. of PhD postgraduates who work in Singapore within a 5-year window upon graduation		399

Information as at 31 March 2013, rounded to the nearest whole number

Industry Engagements

Partnerships with Companies

In FY2012, A*STAR made strides in forging strategic partnerships with many companies that have brought in significant investments into Singapore and created high-value jobs. Notable industry deals include:

a. Fujitsu. DSI signed an RCA with Fujitsu Limited to jointly research hybrid drive storage systems involving the use of hybrid hard disk drives (HDD) in an enterprise-grade disk storage system. The objective of the project is to demonstrate the advantages of hybrid HDD for enterprise use in data centres to deliver better performance, energy efficiency and data reliability with faster data reconstruction than conventional enterprise HDD. DSI staff will take a lead role in the development of the hybrid drive software and hardware components.

b. Lloyd's Register. In Sep 2012, Lloyd's Register (LR) announced the establishment of a Group Technology Centre (GTC) in Singapore, and signed a Master Research Collaboration Agreement with A*STAR to deliver innovations and solutions to the Energy and Maritime sectors. In 2013, Lloyd and IHPC officially opened a joint laboratory. The laboratory will leverage on HPC's capabilities in computational fluid dynamics and engineering mechanics, and deliver innovative technological solutions to address the challenges faced by the marine, energy and offshore sectors. LR's investment will exceed $93M.

c. Procter & Gamble. Since the signing of the MRCA with A*STAR in Sep 2010, there has been increased project collaborations between A*STAR and P&G. A total of 6 projects were signed in FY2012, bringing the total project collaborations to 17. This is in tandem with P&G's announcement, in May 2012, to move its headquarters for skin care, cosmetics and personal care to Singapore to be closer to the fast-growing Asia beauty market.

d. Chugai. Chugai made the decision to establish a second R&D facility in Singapore. The Chugai Pharmabody Research (CPR) is located in Biopolis and is a 60-man R&D unit working on antibody engineering. A*STAR's Chief Scientist Prof Sir David Lane had been appointed as Chairman of CPR, where his research and scientific standing were instrumental in attracting Chugai to Singapore.

e. L'Oreal. L'Oreal, the worldwide leader in cosmetics, opened an Advanced Research Centre in IMB in Dec 2012. Having a leading cosmetic company such as L'Oreal set up a research centre in Biopolis is a testament to IMB's expertise in skin biology research. IMB would help L'Oreal better understand Asian skin types and the effects of the tropics on skin. This is IMB's second partnership with L'Oreal. The first partnership was in 2010 to reconstruct Asian skin from cultured cells.

f. Baidu. The Baidu-I^{2}R Research Centre (BIRC), a Joint Laboratory between Baidu and I^{2}R, was officially opened in Singapore in Jul 2012. In this collaboration, Baidu will leverage on I^{2}R's unique capabilities in Southeast Asian Language Resources, Natural Language Processing, Information Retrieval and Extraction, and Speaker Verification technology. In Nov 2012, BIRC announced the adoption of I^{2}R's Speaker Verification technology by Lenovo's A586 smartphone – the first in industry to allow for voice authentification.

g. Advanced Remanufacturing & Technology Centre (ARTC). ARTC signed a Memorandum of Understanding (MOU) with its potential members in May 2012 to jointly develop technologies in remanufacturing. MNCs that have signed the MOU include Rolls-Royce, Boeing, Siemens, ABB, Fuchs Lubricants and Carl Zeiss. The ceremony was held in conjunction with the Groundbreaking Ceremony of CleanTech Park 2, where ARTC also signed a tenancy agreement with JTC. By the third quarter of 2014, ARTC will occupy a purpose built facility within CleanTech Park 2 and is the first Remanufacturing Centre in Asia. Remanufacturing is a class of additive manufacturing technologies pivotal in the advancement of high value manufacturing.

h. Business Analytics Translational Centre (BATC). A*STAR and the Infocomm Development Authority of Singapore (IDA) jointly opened BATC in Sep 2012. The centre aims to help companies and government agencies use cutting-edge analytics capabilities to mine and manage big data, so as to guide business strategy and planning, and optimise day-to-day business processes. BATC's first partners include Wiley and Revolution Analytics. BATC's lead public sector user and technology partner is the Ministry of Law. BATC will also provide training opportunities for researchers, engineers, IT professionals and business analysts from academia and industry to expand the talent pool in business analytics.

Industry Consortia

a. Consortium for Electronics Sector. In 2013, IME launched three consortiums to develop capabilities for the Electronics sector. First, the Through-Silicon-Interposer (TSI) Consortium for end-to-end flow for 2.5D TSI technology, whose members include UMC, UTAC, Tezzaron Semiconductor, Synopsys, Huawei Technologies, Altera and eSilicon. Second, it inaugurated the 12th Electronics Packaging Research Consortium with a focus on areas such as copper pillar interconnects, power electronic packaging solutions for high temperature applications and 3D embedded wafer-level packaging. Members include Ajinomoto, ECRIE, EVG, Globalfoundries, Henkel, Infineon, and Tokyo Ohka Kogyo. Third, the Rugged Electronics Consortium focuses on advanced packaging and sensor technology for power devices with high thermal endurance. Members are Lloyd's Register, Rolls-Royce and DSO.

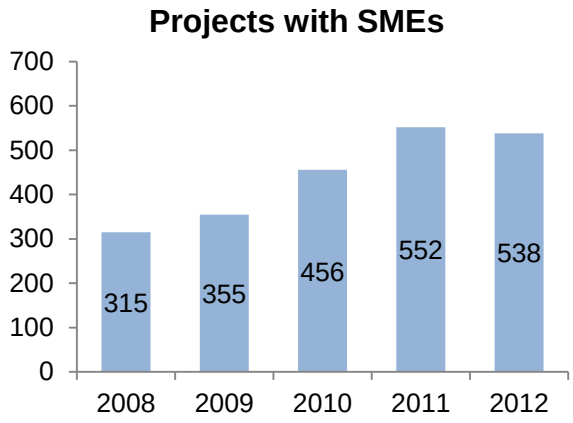
b. Micro-Electo-Mechanical-Systems (MEMS) Consortium Phase 2. In Jun 2012, IME launched MEMS Phase 2 to upgrade the local MEMS industry supply chain, by targeting next generation mobile applications through technology platforms, new devices and systems. Phase 2 will focus on developing MEMS-CMOS integration methodologies and a process design kit for specific MEMS devices, such as magnetometers and energy harvesters. Although the market today for MEMS is largely in ink jet printers, there are signs that the market for other devices (such as gyroscopes, microphones, filters and sensors) are burgeoning. Last year Apple spent about US$500 million on mobile MEMS devices. The Consortium currently has 14 members including SOITEC, Marvell, Robert Bosch, AAC Acoustics, Conventor, EV Group, SPP Process Technology Systems and Global Foundries.

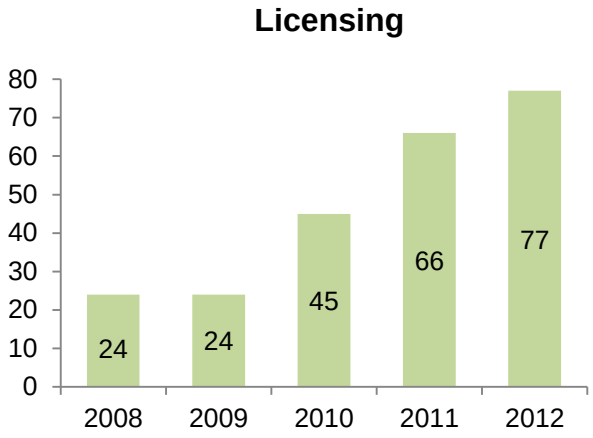
c. Aerospace Programme. The A*STAR Aerospace Programme aims to drive innovation critical to the development of Singapore's aerospace industry. Pre-competitive research carried out through the consortium built Singapore's mindshare with leading aerospace original equipment manufacturers (OEM) and enhanced Singapore's standing as a global aviation hub. This strengthens Singapore's value proposition for aerospace engineering, manufacturing, and MRO (Maintenance, Repair and Overhaul) activities. Currently in its 5th cycle, the research consortium has a total of 18 members, including the addition of 2 new Tier 1 members in FY2012, namely Hexcel and Panasonic Avionics. The consortium has undertaken a total of 37 multidisciplinary projects to date covering materials, coatings, inspection, data analytics, communications, electronics, manufacturing and repair technologies.

d. Industry Consortium in Industrial Coating and Packaging (ICAP). The ICAP industry consortium, formed by IMRE, was launched with a first project aimed at developing new transparent plastic packaging films that are better at protecting foods and medicines from oxidation by keeping moisture out and blocking UV rays. These plastic films are more environmentally friendly, require less energy to produce and allow consumers to see the actual perishable products as compared to today's opaque aluminium-plastic packaging materials. IMRE will work with the companies to develop capabilities and improve production processes to shorten the time to market. The core members of the consortium include Nestle R&D Centre, Daibochi Plastic And Packaging Industry Berhad, Texplore, Nipo International, Piaget Chemicals & Manufacturing, and Nipsea Technologies Pte Ltd.

Working with SMEs

A*STAR uses multiple platforms to engage SMEs. Over the past five years, A*STAR has engaged about 700 SMEs in 2,212 projects. Licenses to SMEs more than tripled.





a. Manufacturing Productivity Technology Centre (MPTC). The MPTC at SIMTech promotes the use of technology to enhance manufacturing productivity. MPTC helps companies improve manufacturing productivity through the use of A*STAR's technologies, tools and capabilities in automation, processes and systems. For example, CKE Manufacturing, an SME specialising in the manufacture of parts for the Oil & Gas industry, benefitted from SIMTech's Operations MaNagement Innovation (OMNI) programme, which provided a series of operations methodology training that identified areas of improvement. SIMTech also helped the company adopt a production planning and scheduling system. This boosted the company's labour productivity by 33%.

b. Growing Enterprises for Technology Upgrade (GET-Up). In 2013, GET-Up celebrated it's 10th anniversary. 700 participants attended, about 70% of whom were beyond GET-Up's current installed base.

As at Apr 2013, 418 companies have benefited from GET-UP, 417 researchers were seconded to 244 companies (T-Up), 190 technology road maps were developed for 164 companies (OTR), and 141 researchers provided technical advisory services to 94 companies (TA).

In a recent GET-Up survey, respondents reported that they experienced a 7% increase in sales revenue growth and a 15% increase in employment growth in the last three years. 79% of respondents had launched new products in the last three years, with 52% launching two or more new products in this time as a result of the GET-UP.

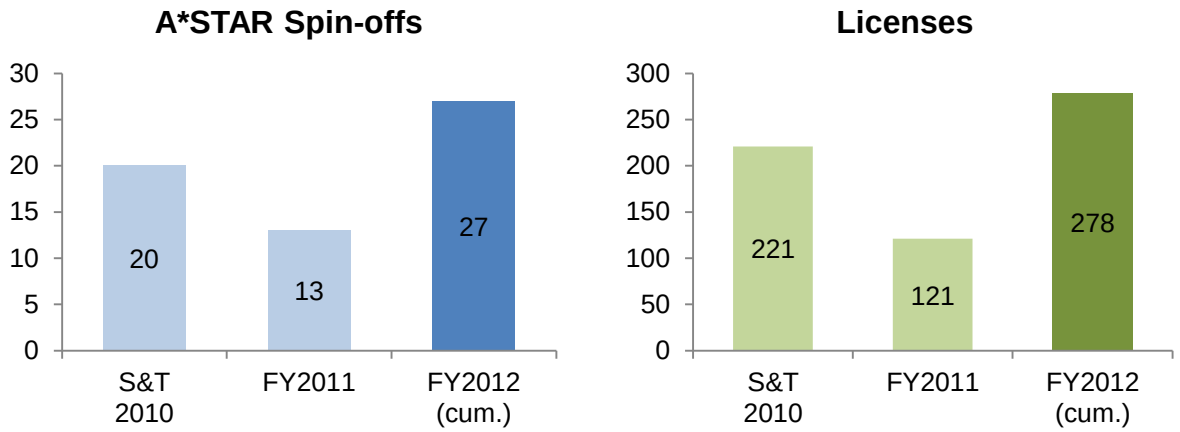
c. Technology Adoption Programme (TAP). TAP aims to increase the productivity of companies with technologies and innovations. $51 million was allocated from the productivity fund to deliver on the goals of TAP. It will help to

drive better coordination among private and public sector productivity-related entities and make technological solutions more accessible to companies. TAP is piloted in six sectors – construction, food manufacturing, precision engineering, marine and aerospace, and retail.

A*STAR will introduce a team of experienced individuals (‘intermediaries’) who will support companies with their technological needs through a pro-active approach to advise and match them with the relevant solution providers from the private or public sectors. Funding will be provided to solution providers (‘technology implementers’) from the public sector to support companies to improve productivity through more than 1,000 technology adoptions over three years. Where there are no suitable technological solutions available, ‘technology developers’ such as tertiary institutions will identify and translate at least 20 technologies for application in companies over the next three years.

Commercialisation Activity

A*STAR has seen greater commercialisation activity in FY2012 when compared to previous tranche.



a. Start-ups. A*STAR is part of an integrated ecosystem that provides funding and advice at various stages: Research Grants, Gap Funding, POC Funding, POV Funding, Angel & VC Investment. Examples of A*STAR start-ups as follows:

Company Name	Technology	RI	Remarks
nanoveu EyeFly 3D	0.1 mm thick screen protector filter which has been nano-engineered to contain hundreds of thousands of lenses on its surface	IMRE	First ever glasses-free 3D accessory that can display content in both landscape and portrait mode.
Sofshell	Flexible High Impact Energy Dissipation Composite Material that is a responsive soft-shell armour that hardens upon impact	IMRE	"Coolest Innovation Award" at TechVenture 2011, "Demoguru" at DemoAsia 2012 and finalist of Asian Innovation Awards 2012
ZWEEC Analytics	Licensed drowning early warning system (DEWS) software to develop and sell drowning and distress detection systems for pool monitoring	I^2R	Honor Award. International Water Association's Asia Pacific Regional Project Innovation Awards
KNOREX EXPEDITING INTELLIGENCE	Semantic Technologies enable data aggregation, integration and mining to expedite knowledge discovery and application.	I^2R	Merit Award, Most Innovative Infocomm Product/Service at National Infocomm Awards 2012 (Singapore)

Impacting Singaporeans' Lives

Over the years, A*STAR has impacted Singaporeans' lives through R&D capabilities developed in various areas. The following are highlights of A*STAR's impact:

a. H1N1 Vaccine. The first vaccine clinical trial from A*STAR. ETC-D3 and SIgN have collaborated with Switzerland's Cytos Biotechnology AG, DSO National Laboratories and Duke-NUS Graduate Medical School to develop a H1N1 influenza vaccine based on virus-like particle (VLP) technology. The vaccine candidate has entered Phase 1 clinical trial, where the safety and immunogenicity of this candidate and its potential to protect against H1N1 influenza infection will be evaluated. If the VLP strategy proves to be effective, it can accelerate the production of vaccines against new emerging strains of flu, and aid Singapore's preparedness to produce vaccines quickly, safely and economically in the event of a flu epidemic. This could potentially open doors for faster production of vaccines to a range of viral diseases as well.

b. EyeFly 3D screen protector. It is a nano-engineered screen protector that turns ordinary mobile devices into 3D displays, without the need for 3D glasses. The team is exploring using the same technology for security access tokens as an inexpensive alternative to tokens used by Singapore banks today. This is a collaboration between IMRE and Temasek Polytechnic and marketed by start-up Nanovue. Since its launch in March 2013, EyeFly has sold 10,000 pieces and negotiations are underway with various countries with orders ranging from 300,000 to several million pieces per region in the next year. Currently, only iPhone 5 and iPod touch are available for pre-orders. The company plans to introduce EyeFly for iPad and popular Android devices in the coming months.

c. GE Flight Quest. I^2R won the 2013 GE Flight Quest competition, beating over 175 international teams, based on their ability to predict user activities from sensor data. The researchers created an algorithm that predicts gate and runway arrival times, producing flight arrival estimates that were 40 percent more accurate than standard industry benchmark estimates. According to GE, their solution has the potential to save travellers up to 5 minutes of travelling time per passenger by helping airlines reduce gate congestion and managing crews more efficiently. It would also save crew costs and fuel.

d. GUSTO (Growing Up in Singapore Towards Healthy Outcomes). GUSTO is one of the world's most comprehensive birth cohort studies involving over 1200 families, where women were recruited during pregnancy and followed until their infants are at least three years of age. The programme involves SICS, NUS, NUH and KKH, and focuses on epigenetics, which studies how environmental factors can lead to chemical changes in her baby's DNA, that can in turn affect the child's development and health. This gives us deep insights into early childhood development and the subsequent links to diseases like obesity and diabetes. It also

allows A*STAR researchers to work with companies like Nestle, Abbott and Danone, on nutrition products for young children.

e. VoiceTra4U-M (Speech Translation Application). VoiceTra4U-M was developed by I²R as part of the Universal Speech Translation Advanced Research Consortium (U-STAR). It allows five people to chat simultaneously in 23 different languages, these 23 languages cover 95% of the world. The application was launched in June 2012 during the London Olympic Games.

Awards Won by A*STAR

A*STAR's scientists won several international and local awards in FY2012.

International awards

- Professor Sir David Lane, A*STAR Chief Scientist, was the recipient of **2012 Cancer Research UK Lifetime Achievement Award**. Professor Lane was recognised for his contribution to the pioneering research that led to the discovery of the p53 protein, also known as the 'guardian of the genome'. The discovery revolutionised scientists' understanding of the nature of cells and cancer.

- Professor Sir George Radda, Chairman of BMRC, was awarded the **BioSpectrum Asia lifetime achievement award** in 2013 for his pioneering efforts in shaping the Singapore's Biomedical Sciences landscape. Sir George has been involved with Singapore's Biomedical Sciences initiative since 2003 when he first served as a member of Singapore's Biomedical Sciences International Advisory Council. He was also a key driver in building up bioimaging capabilities which led to the establishment of the SBIC in 2005 and CIRC in 2007. The CIRC is one of the few facilities in the world dedicated to doing clinical R&D. Sir George had also spearheaded significant tie-ups for Singapore with key industry players such as Bayer and GE Healthcare.

- Professor Alex Matter, Chief Executive Officer of ETC, was awarded the 8th Annual Szent-Györgyi Prize for Progress in Cancer Research by the National Foundation for Cancer Research (NFCR) for his contributions to the development of the first drug specifically targeting a molecular lesion in cancer. The preclinical research led by Professor Matter demonstrated that it is possible to counteract cancer by specifically inhibiting the activity of key oncogenic molecules, turning deadly cancers into treatable diseases.

- Professor Paola Castagnoli, Scientific Director of A*STAR's SIgN, is the first Italian scientist in Singapore who was conferred the honour of the **"Order of the Star of Italy"** (Ufficiale dell'Ordine della Stella d'Italia). Professor Castagnoli led her research group in discoveries that provided novel insights into the mechanisms of immune diseases and also actively engaged and created platforms to forge research collaborations between scientists from Singapore and Italy in both the public and private sectors.

- Professor Wieslaw L. Nowinski, principal scientist and director of A*STAR's Biomedical Imaging Lab, was awarded the **"Outstanding Pole" Award**, a prestigious award given under the patronage of the President of the Republic of Poland which recognises him for his work in radiology and neurosurgery. He was also awarded the **Cum Laude Award** as well as the **Certificate of Merit Award** for his exhibit at the **98th Scientific Assembly and Annual Meeting of the Radiological Society of North America**. His scientific exhibit

focused on the topic of brain atlases which have been applied into clinical practice.

- Dr Bruno Reversade, a Principal Investigator at IMB, was the first scientist based outside Europe to be awarded the prestigious **European Molecular Biology Organization (EMBO) Young Investigatorship** for providing original and outstanding research output. His research examines rare genetic conditions which provide insights into common diseases and traits that affect the general population.

- Mr Ngiam Jiquan, A*STAR's National Science Scholarship (NSS) PhD Scholar at Stanford University, was featured in **Forbes Magazine's "30 under 30" list for Education** for his work as Chief Engineer of the learning platform Coursera, a massive open online course (MOOC) platform that offers classes from 33 top-tier universities to more than 1.7 million students at no cost.

- Dr Patricia Ng, Research Fellow at the SIgN, was among 15 exceptional winners globally to receive the **International Fellowship accolade** at the **14th Annual L'Oréal-UNESCO Awards for Women in Science**. Dr Ng's research focuses on the challenge of re-engineering antibodies to become more effective in fighting diseases and her investigation objective is to develop an improved antibody which can be adapted to other antibodies that bind to viruses.

Local awards

- Professor Dim-Lee Kwong, Executive Director of IME, was awarded the **2012 President's Science and Technology Medal** for his contributions to science and engineering in Singapore, particularly the semiconductor industry, through R&D and the forging of strategic research partnerships between industry and public sector agencies.

- Professor Wang Yue of IMCB received the **2012 President's Science Award (PSA)** for his ground-breaking discoveries in biology and virulence of the fungus Candida albicans, a leading cause of serious hospital-acquired infections.

- Dr Joel Yang Kwang Wei of IMRE received the **Young Scientist Award**, which was given to researchers aged 35 and below who are actively engaged in R&D in Singapore, and who have shown great potential to be world-class researchers in their fields of expertise.

- Dr Yeo Sze Ling, a research scientist at I^2R, was awarded the prestigious **Singapore Youth Award 2012**. Despite losing her sight at the age of four, Dr Yeo achieved academic excellence with three degrees, including a PhD in Mathematics. She is currently an adjunct assistant professor in the School of

Physical and Mathematical Science at Nanyang Technological University (NTU) and also mentors other visually-disabled youths at the Society for the Physically Disabled.

- Dr Law Bee Khuan, Jaslyn from IMRE was awarded the **2012 L'Oréal for Women in Science National Fellowships** for her materials science work in nanoimprinting. Dr Law's research focuses on turning ordinary material surfaces into functional surfaces or ones with uniquely engineered properties.

Outlook for the Next Fiscal Year

As Singapore continues efforts to transform its economy and boost productivity, the engagement of industry will continue to be of utmost priority for A*STAR. We will seek to position Singapore as an attractive investment location for global companies due to our collaborative and integrated R&D ecosystem, and anchor corporate R&D with a view towards capturing higher-value-added manufacturing activities in Singapore.

In the year ahead, A*STAR will focus on rolling out the R&D productivity initiative. The Technology Adoption Programme (TAP) will enable SMEs to gain easier access to technology, upgrade their capabilities and increase productivity. By connecting companies to appropriate vendors in the public and private sectors, using a team of intermediaries with industry experience, TAP will help SMEs gain access to technology, upgrade their capabilities and successfully achieve technology adoptions.

A*STAR will also continue to pursue R&D in cutting-edge technologies that are of relevance to industry, and seek to leverage its integrated capabilities to develop solutions for companies. Examples of such programmes are Robotics, Personal Care, Food and Nutrition, Genomics-to-Therapeutics in a clinical environment (Polaris) and City Logistics.

A*STAR has been working with MND, URA and other agencies on the scope of the National Innovation Challenge (NIC) on Land and Liveability. The NIC seeks to create an economically-vibrant, highly-liveable and resilient city of the future with land capacity for sustainable growth. A*STAR and IDA will co-lead the enabling thrust on development of enabling information and communications technologies and platforms for land optimisation and liveability. The NIC is a collaborative effort across agencies, academia and industry to develop applied research; test bed solutions within districts; and deploy ready solutions on a wider scale.