The President’s Science and Technology Awards (PSTA) are the highest honours bestowed on exceptional research scientists and engineers in Singapore for their excellent achievements in science and technology. These national awards are given annually to recognise and celebrate outstanding and invaluable contributions by individuals or teams to the research and development landscape in Singapore.
6.30 pm  Registration & Cocktail Reception

7.15 pm  All guests to be seated

7.30 pm  Arrival of Guest-of Honour
President Tony Tan Keng Yam

Welcome Remarks
by Mr S. Iswaran
Second Minister for Trade and Industry

Presentation of
Young Scientist Awards
by Minister

Presentation of
President’s Science & Technology Awards
by President

8.15 pm  Dinner
Dessert Buffet

10.00 pm  End
I congratulate the winners of this year's President's Science and Technology Awards for their achievements and contributions to scientific research and development in Singapore. These scientists have consistently demonstrated a spirit of innovation, an admirable degree of commitment and a relentless pursuit of excellence. They have made significant breakthroughs and discoveries across the fields of biomedical science, computer science, medical technologies, and optics and photonics, all of which will result in benefits for the wider society.

In particular, I would like to commend the two winners of the top award, the President's Science and Technology Medal. Professor Barry Halliwell and Professor Freddy Boey are both excellent scientists and remarkable leaders in our universities. They have distinguished themselves in making sustained and exceptional contributions to the development of our country through their scientific research as well as the promotion of R&D. They are both role models and mentors to many young scientists here.

As a scholar, Professor Halliwell is amongst the world's most cited researchers in Biology & Biochemistry, Neuroscience & Behaviour, and Pharmacology & Toxicology. In his capacity as Deputy President of Research & Technology in National University of Singapore (NUS), Professor Halliwell has been actively driving NUS's research agenda and promoting a broad base of globally competitive quality research. He is instrumental in cementing research links between the university and other world-renowned universities, many of whom have set up research centres in Singapore.
Professor Freddy Boey is an outstanding academic entrepreneur who has a proven track record of translating scientific research into commercialised products. He has started up six spin-off companies to commercialise his biomedical inventions. Some of them are now run by his former PhD students whom he continues to mentor. His work in medical technology has helped raise Singapore's profile as a location for medical device innovation. As Provost and Deputy President in Nanyang Technological University (NTU), Professor Boey is responsible for the overall management of the university’s academic framework and for charting the research direction of the university.

Scientists play a key role in Singapore's global competitiveness and growth by contributing to knowledge creation and innovation to open up new growth areas, attract investments and create good jobs for our people. I trust that as our scientists continue to persevere in the meaningful work they are doing, they will inspire and ignite the same passion in our next generation of scientists. By pursuing their passion, I am confident that our scientists will cement Singapore’s position as a research and innovation hub, and as Asia’s Innovation Capital.

DR. TONY TAN KENG YAM
President of the Republic of Singapore
A History of The President’s Science & Technology Awards

2009 marked the first year that the President’s Science and Technology Awards were presented. The awards, formerly known as the National Science and Technology Awards since 1987, were elevated to the status of the President’s awards to highlight and give due recognition to the important role research scientists and engineers play in Singapore. The prestige of the President’s awards underpins Singapore’s efforts to raise the level of excellence in research and strengthen the growing community of scientific talent in Singapore.

The President’s Science and Technology Awards constitute three different awards, namely, the President’s Science and Technology Medal, the President’s Science Award and the President’s Technology Award. The winners of the respective awards have been carefully chosen through a rigorous process by a selection committee comprising key representatives from the government, industry, academia and public research institutes.
President's Science & Technology Medal
The President's Science and Technology Medal (PSTM) is awarded to outstanding individuals who have made distinguished, sustained and exceptional contributions and played a strategic role in the development of Singapore through the promotion and management of R&D.

President’s Science Award
The President’s Science Award (PSA) is presented to research scientists and engineers in Singapore who have made outstanding contributions in basic research leading to the discovery of new knowledge or the pioneering development of scientific or engineering techniques and methods.

President’s Technology Award
The President’s Technology Award (PTA) gives recognition to research scientists and engineers in Singapore who have made outstanding contributions to research & development resulting in significant technology with industrial applications.
President’s Science & Technology Medal 2013

Professor Freddy Boey
Deputy President and Provost
Nanyang Technological University

Professor Barry Halliwell
Deputy President,
Research & Technology, &
Tan Chin Tuan Centennial Professor
National University of Singapore
Professor Yu Hao
Department of Biological Sciences
National University of Singapore &
Temasek Life Sciences Laboratory

Professor Boris Luk’yanchuk
Data Storage Institute
Agency for Science, Technology and Research

Professor Li Haizhou, Dr. Ma Bin,
Ms Aw Ai Ti, Dr. Su Jian
Institute for Infocomm Research
Agency for Science, Technology and Research
President’s Science & Technology Medal 2013

Professor Freddy Boey
Deputy President and Provost
Nanyang Technological University

For his distinguished contributions to Singapore’s scientific research landscape, particularly in the bioengineering and nanomedical sector, and his role in nurturing young research talent
Professor Freddy Boey, Nanyang Technological University (NTU) Deputy President and Provost, has a sterling track record of breakthrough commercial applications that have given the “made-in-Singapore” label place of pride on the international stage. Before becoming Provost, he served as the Chair of NTU’s School of Materials Science and Engineering from 2005 to 2010. He was instrumental in leading its transformation into one of the world’s largest materials engineering institutions with about 1,000 undergraduates and close to 250 research students. Through his efforts, the school has developed a solid reputation for materials science research, generating industry leading technologies that can be commercialised.

After 27 years at NTU, Professor Boey has witnessed its transformation from a teaching university into a research-intensive university. He has graduated 33 PhDs and mentored 15 post-doctorates. For Professor Boey, who received the Public Administration Medal (Silver) in 2010, the best ideas are always global. That is why he prefers NTU’s PhD students to do part of their research overseas. His current biomedical research team comprises 12 PhDs and more than 10 post-doctorates and Senior Research Fellows. Under his exemplary mentorship, about 15 of his past and current students and staff have been or are now involved in their own or his start-up companies. Indeed, Professor Boey’s own research in biomaterials for medical devices has contributed to the school’s and NTU’s growing global profile and standing, besides generating a buzz in international healthcare.

Professor Boey’s spirit of experimentation is matched by a prolific output and paired with the belief that his work should improve the lives of others. He also believes in teamwork – each of his inventions involves collaboration with other professors, graduate students and research staff. His first invention is a piezoelectric heart pump that was the world’s smallest when it was unveiled in 2003. At 50 grams, the pump is four times lighter and uses less power than conventional heart pumps. His second in 2004 is a fully biodgradable coronary stent, co-developed with Professor Subbu Venkatraman from NTU, which has been successfully implanted in human patients in Colombia for the past nine months, with no adverse effects. His current inventions, again with Professor Venkatraman, include a fully biodegradable device that helps to plug heart defects like a hole in the heart as well as an injectable nano-liposome-based device to treat glaucoma, developed in collaboration with Dr. Tina Wong from the Singapore Eye Research Institute (SERI). The latter has recently been successfully implanted into several patients in Singapore, showing excellent results.
An exceptional materials science and engineering pioneer, Professor Boey has developed 30 original patents, the majority of which have been licensed. These patents have also resulted in several spin-off companies, which he founded to commercialise some of his biomedical inventions. Several of his biomedical devices have received US Food and Drug Administration (FDA) approval for sale and the Conformité Européenne (CE) mark. These include a surgical tissue retractor that has been sold in the US, India, Japan and Europe as well as a customisable hernia mesh that uses a new functional material to lower the risks of inflammation and infection - the first such surgical mesh approved by the US FDA.
Research and education remain Professor Boey’s abiding passions. He has won more than S$42 million in competitive funding for research, including a prestigious S$10 million individual grant under the National Research Foundation’s (NRF) Competitive Research Programme to develop fully biodegradable cardiovascular implants for hole-in-the-heart conditions. He has also clinched a S$20 million NRF Technion-Singapore grant for his research in nanomedicine for cardiovascular diseases, and a S$1.25 million grant from the NRF Translational Flagship Project. Professor Boey has published 344 top journal papers with a citation of 7,436 and an H-Index of 44.

Professor Boey’s sustained contributions to Singapore’s research and development (R&D) scene are not just in academic and scientific research. He serves as Director on the boards of the Intellectual Property Office of Singapore (IPOS) and the DSO National Laboratories, and is a founding Fellow of the Singapore Academy of Engineers. He is also on the boards of several nationally-funded research centres. He was also an appointed member of both the University Blue Ribbon Commission and the Blue Ribbon Implementation Commission.

Professor Boey was conferred the prestigious Imperial College London Fellowship in the Faculty of Medicine in 2012, for his exceptional achievements in medical technology and his outstanding contribution in developing the Lee Kong Chian School of Medicine, a joint medical school between Imperial College and NTU. He was also conferred an honorary doctorate from Loughborough University in December 2011 for his outstanding achievements as an engineer and academic leader. In November the same year, he received the Distinguished Alumni of the Year Award from Monash University in recognition of his achievements as a teacher, researcher and innovator, including his exceptional contributions to nanomedicine, as well as his volunteer work since his student days. In September 2013, Professor Boey was awarded an honorary professorship from Nanjing University of Technology, in recognition of his academic and scientific leadership in NTU.

For his distinguished, continuous and relentless contributions to Singapore’s science and engineering landscape, particularly in advancing the bioengineering and nanomedical sector through R&D and his role in nurturing young research talent, as well as his contributions in developing NTU into a global university with a strong focus on world-class education, research and innovation, Professor Freddy Boey is awarded the 2013 President’s Science and Technology Medal.
On Professor Freddy Boey...

From day one, I was convinced that Professor Boey would be a prolific research worker. This has been shown to be true because at this present moment he has over 300 research publications, come up with close to 25 inventions and started a number of companies which utilise these innovations.

Through his research and innovation, Professor Boey has since become a world-renowned specialist in biomaterials and biosensors. His work, especially in nanomaterials have put Singapore and NTU upfront in the global R&D scene. In particular, he is an excellent example of what our small country, Singapore, can achieve globally in terms of R&D.

Professor Cham Tao Soon  
Senior Advisor, President’s Office  
Nanyang Technological University

Freddy is a multi-faceted researcher who uses his skills and knowledge of materials to find useful solutions to existing problems. He has been very quick to seize opportunities when they arise, be it through research funding or defining a research area, and he is very quick to follow through with relevant research. There are many examples of this, biomedical especially, where he has put his hand to something very useful, perhaps a little bit mundane but with benefits to both patients and the community at large. The result is the quick transfer of his ideas to the marketplace, as evidenced by the many companies he has founded.

Professor Subbu S Venkatraman  
Chair, School of Materials Science & Engineering  
Nanyang Technological University
The countless number of medical device projects that have successfully reached the market to benefit lives all around the world is a testimony of Professor Boey’s vision of advancing medical technology through interdisciplinary collaborations.

It is a privilege to be one of the clinicians working with Professor Boey to bring a scientific breakthrough to the clinic that will greatly benefit patients worldwide. He is a shining example of how future research endeavours should strive to be. That is, to have engineers, scientists and the medical profession working together to improve patient care and lives.

**Associate Professor Tina Wong**  
Senior Consultant Ophthalmologist, Glaucoma Service  
Singapore National Eye Centre

Professor Boey has been instrumental and a driving force in Singapore for translating bio-materials into usable medical devices for helping human health. We have been privileged as a pre-clinical lab to have been involved in many of these translational projects, testing and evaluating such medical devices, and helping to bring them to clinical trials or to commercialisation. His passion, critical and innovative thinking, topical knowledge about devices, spanning across science and technology, has been instrumental in the development of medical devices in Singapore.

**Dr. Philip Wong**  
Chief Executive Officer & Chief Technical Officer  
Innoheart Pte Ltd
Professor Barry Halliwell
Deputy President, Research & Technology, & Tan Chin Tuan Centennial Professor
National University of Singapore

For his outstanding contributions to the development of the research landscape in Singapore and his excellent research on the role of free radicals and antioxidants in human health, nutrition and disease
Professor Barry Halliwell has played a pivotal role in developing research excellence in Singapore in his capacity as Deputy President at the National University of Singapore (NUS) and as a role model in personally conducting excellent research and training local manpower.

Professor Halliwell has occupied key roles at NUS and in national bodies that support research for over 15 years. As co-chair of the NUS Life Sciences Curriculum (2004 to 2008), he helped steer the introduction of an integrated life sciences curriculum, which trains manpower for Singapore’s Life Science initiatives. He is currently the Deputy President (Research and Technology) (DPRT) at NUS, a position newly created in 2006 to help NUS increase its research quality and productivity to aid Singapore’s transition to a knowledge-based economy. Professor Halliwell drives the University’s research agenda, promoting a broad base of high-quality research from which several peaks of excellence have grown. This involves playing a key role in the recruitment and mentoring of excellent senior and junior researchers. He also steered the development of an effective research policy framework which helped NUS researchers win 3 of Singapore’s Research Centres of Excellence (RCEs), as well as build other peaks of excellence in a range of areas. As a result, NUS is now highly ranked for its research achievements in several areas relevant to Singapore, from Asian studies...
Professor Halliwell worked closely with other agencies and industry to promote the development of new research initiatives in Singapore, in fields including ageing, clean energy, sustainability, and interactive and digital media. The NUS “Virtual Institute for the Study of Ageing” has achieved high visibility. Strong University-Industry partnerships have developed in several areas, from solar energy to imaging.

Professor Halliwell also assisted the National Research Foundation (NRF) in its mission. One example is CREATE (Campus for Research Excellence and Technological Enterprise). He provided most of the input for the research component of the document that proposed the location of CREATE at NUS, which has led to exciting synergies in research and technology between NUS and CREATE partners.

Professor Halliwell has been a member of several boards which make strategic decisions on R&D in Singapore. For example, he sits on the National Medical Research Council (NMRC) panel that evaluates proposals from the Translational and Clinical Research (TCR) Flagship Programme. He was the co-chairman of the research grant evaluation panel of NMRC from 2007 to 2011. He sits on the executive committee on Environmental and Water Technologies (EWT), providing input on the development of the EWT sector in Singapore, an area in which NUS and Singapore are ranked among the world leaders. Professor Halliwell is widely sought after as a consultant on research strategies to universities, industry, public bodies and other organisations worldwide.

Professor Halliwell was also the Founding Executive Director of the NUS Graduate School of Integrative Sciences and Engineering (NGS). Established in 2003, NGS offers scholarships to encourage students to undertake PhD education that transcends disciplinary boundaries. NGS has trained a diverse talent pool with over 700 PhD graduates and current students, 46% of whom are Singapore citizens or Permanent Residents. NGS rapidly built up strong links with relevant NUS Faculties/Schools/Research Institutes, leading overseas universities and especially with the Agency for Science, Technology and Research (A*STAR). Although Professor Halliwell stepped down as Executive Director in 2008, he still oversees NGS as DPRT.

Despite his heavy administrative duties, Professor Halliwell is a role model in maintaining his personal research, being a leading global expert on the role of antioxidants and free radicals in nutrition, health and disease. An
antioxidant mechanism he discovered that is used by plants to protect against damage (the ascorbate-glutathione cycle) is now often called the Halliwell-Foyer-Asada cycle. It has taken on new importance recently because enhancing it allows crop plants to resist environmental stresses related to global warming, such as heat and drought. Professor Halliwell was a pioneer in establishing the key role of transition metal ions in catalysing free radical reactions in vivo in multiple human disorders, ranging from problems in premature babies to cancer chemotherapy and atherosclerosis. He is renowned for his applications of robust methodology to measure the oxidative damage caused by free radicals in vivo. These methods have, for example, helped to establish a role for oxidative damage in cancer development and in Alzheimer’s and Parkinson’s diseases, among others. They have also been used to identify nutritional strategies to minimise oxidative damage in the human body. Professor Halliwell has also contributed substantially to our understanding of the role of oxidative damage in many other areas, including the mechanisms by which air pollutants (ozone, nitrogen dioxide, cigarette smoke and PM2.5) damage the human body.

Professor Halliwell has published 225 papers in leading international journals since joining NUS. He has trained multiple research assistants, fellows and students, over half of whom are Singapore citizens. His textbook *Free Radicals in Biology and Medicine* is in its fourth edition (published Jan 2008 by Oxford University Press; fifth edition in preparation), and is used worldwide (cited over 19,000 times to date). Thomson Reuters identified Professor Halliwell as a highly cited scientist in three areas, indicative of the broad relevance of his research, namely Biology and Biochemistry, Neuroscience and Behaviour, and Pharmacology and Toxicology. His Hirsch index is 139. He has received numerous awards, including the Lifetime Achievement Award by the American Society for Free Radical Biology and Medicine, Ken Bowman Research Award from the Institute of Cardiovascular Sciences (Canada), Fellow of the American Association for the Advancement of Science and the NUS Outstanding Researcher Award 2012. He received Singapore’s Public Administration Medal (Silver) in 2010.

For his outstanding contributions to the development of the research landscape in Singapore and his excellent research on the role of free radicals and antioxidants in human health, nutrition and disease, Professor Barry Halliwell is awarded the 2013 President’s Science and Technology Medal.
ON PROFESSOR
BARRY HALLIWELL...

What I find most remarkable about Professor Halliwell is his ability to pursue multiple leadership roles at such a high level of achievement and excellence. As Deputy President for Research and Technology at NUS, he has had an instrumental impact on the transformation of NUS’s research. By supporting talented faculty, recruiting top researchers and creating a dynamic and enabling academic environment, he has helped to continually steepen the trajectory of research advancement in the university. At the same time, he has played key leadership roles at the national level, particularly in the biomedical sciences, making important contributions to strategy formulation, programme development, and research review and administration. While doing all these, he has continued to pursue cutting edge research for which he is recognized as a highly cited researcher and a global leader. In particular, his fundamental discoveries in free radical and antioxidant research have many implications for human health and disease, particularly in clinical nutrition and neurodegeneration. This prestigious award is a fitting recognition of his many outstanding and multi-faceted achievements and contributions to global science and to Singapore.

Professor Tan Chorh Chuan
President
National University of Singapore

I came to Singapore because I knew Barry as a thought leader in his field. I stayed because, as a mentor, he gave us the freedom to try, the support to excel and the permission to fail. Even after ten years of working with Barry, the depth of his knowledge and dedication to science continues to be an inspiration.

Dr. Jan Gruber
Department of Biochemistry, & Neurobiology and Ageing Programme
National University of Singapore
Barry is one of the world’s leading scientists, and NUS and Singapore are honoured to have someone of his calibre on our faculty. His deep knowledge of free radical biology and antioxidants allows us to understand what triggers the formation of cancer and degenerative diseases, and how we can counteract such deleterious changes. For someone of his stature, Barry is one of our most unassuming colleagues. He works far too hard, which is a reflection of the high standards that he holds himself up to. We are all deeply indebted to him for playing a leadership role in NUS’s transformation into an internationally-competitive research-intensive university, ranked with the best in the world.

**Professor John Wong**  
Vice Provost, Academic Medicine, &  
Isabel Chan Professor in Medical Sciences  
National University of Singapore

As the Deputy President for Research and Technology at NUS, Barry remains humble, pragmatic, and approachable. His contributions in the area of free radicals impact our understanding of human physiology and diseases related to ageing as well as cancer. He has also inspired other scientists in Singapore to pursue research in this area thus enhancing our international visibility. We co-chaired the BMRC local grant panel for 8 years and I find Barry to be fair, flexible, accommodating yet decisive.

**Professor Hong Wanjin**  
Executive Director, Institute of Molecular and Cell Biology  
Agency for Science, Technology & Research
PROFESSOR YU HAO
Department of Biological Sciences
National University of Singapore &
Temasek Life Sciences Laboratory

For his outstanding research in plant functional genomics and its biotechnological applications to economically important crops
In the last decade, Professor Yu Hao has been dedicated to uncovering the molecular genetic mechanisms of plant reproductive development, with a focus on flowering time control, floral organ development, and phytohormone signalling. Flowering plants are the most diverse and ecologically successful group of organisms on earth. They reproduce in an unpredictable environment through generating flowers that contain reproductive organs. As this reproductive process determines yield in crop plants and affects the survival of plant varieties that are adapted to changing environment and climatic conditions, Professor Yu’s research on plant reproductive development provides important solutions to vital problems relevant to our everyday life, such as the supply of food, medicine, and bioenergy.

Using *Arabidopsis* as a model plant, Professor Yu’s laboratory integrates molecular genetic approaches with deep sequencing, proteomics and bioimaging tools to study the fundamental mechanisms of cell proliferation and differentiation. Several of his recent findings provided ground-breaking understanding in plant reproductive development. His lab found the first regulator that controls the transport of florigen that is synthesised in leaves, but transported to the shoot tip to generate flowers. This finding contributes significantly to addressing the famous “Florigen” question raised in 1930s, and provides the key information for manipulating flowering time in crops. His major recent breakthroughs also include the discovery of a conserved genetic pathway determining inflorescence architecture across flowering plants and a “Relief of Repression” mechanism that balances plant growth and defence through modulating two phytohormone pathways.

These major findings have not only contributed greatly to plant science, but also provided essential gene resources and mechanisms for classical breeding and genetic engineering of economically important crops. Based on the fundamental discoveries in plant reproductive development of *Arabidopsis* and the platform technologies established, Professor Yu’s laboratory is creating novel and high-value varieties with desirable flower and seed traits for rice, orchid and oil palm.

Professor Yu’s research has gained wide international recognition and was published in many prestigious journals. The research materials generated in his lab have been distributed to over 60 labs in more than 18 countries. He has been invited to serve as Editorial Board member for international refereed journals published by 7 publishers, including reputable ones published by PLoS, Springer, and Oxford University Press. He was invited as reviewer for 36 international refereed journals, including top-notch ones like *Science* and *Nature Genetics*, and also as reviewer for 11 foreign and local grant agencies. He was the recipient of Singapore National Academy of Science Young Scientist Award (2006), NUS Young Researcher Award (2007), Singapore Youth Award for Science and Technology (2007), Dean’s Chair Professorship in Faculty of Science, NUS (2011), and Outstanding Scientist Award in Faculty of Science, NUS (2011).

For his outstanding research in plant functional genomics and its biotechnological applications to economically important crops, Professor Yu Hao is awarded the 2013 President’s Science Award.
Professor Boris Luk’yanchuk
Data Storage Institute
Agency for Science, Technology and Research

For his outstanding contributions to the theory of laser-matter interactions and light scattering by nanoparticles, in particular to Fano resonance in plasmonic materials
Professor Boris Luk’yanchuk, a principal scientist in Advanced Concepts and Nanotechnology with the Data Storage Institute (DSI), has played a vital role spanning 14 years in the development of modern Data Storage Technologies (DST). He has been instrumental in the development of various scientific projects related to advanced concepts in DST.

Professor Luk’yanchuk’s efforts were further recognised with the publication of pioneering papers in the theory of laser-matter interactions, plasmonics and modern optics. Among the recent discoveries of Professor Luk’yanchuk and his team are the following five achievements:

- The creation of laser beam with longitudinally polarised light (*Nature Photonics* 2, 501 (2008));
- Pioneering investigation of Fano resonance in plasmonic materials and metamaterials (*Nature Materials* 9, 707 (2010));
- Nanoscopy with virtual image and super resolution (*Nature Communications* 2, 218 (2011));
- Creation of “magnetic light” by laser induced magnetic moments in dielectric materials with high refractive index (*Nature / Scientific Reports* 2, 492 (2012))
- First realisation of the Kerker’s resonance in optical range (directional light scattering by spherical silicon nanoparticles) (*Nature Communications* 4, 1527 (2013)).

Papers by Professor Luk’yanchuk yielded high international reputation and citation. His paper on Fano resonance in plasmonic materials and metamaterials, in particular, has earned the highest citation among the papers published by A*STAR Institutes over the last few years.

In recognition of his outstanding achievements, Professor Boris Luk’yanchuk was awarded the IES Prestigious Engineering Achievements Award 2004 (Team). He is an Honorary Professor of Johannes Kepler University in Linz, Austria and Fellow of the Optical Society of America. Given Professor Luk’yanchuk’s depth of knowledge in the field of modern physics, he was appointed Chair of a few International Conferences in Singapore that included Symposia of ICMAT Conferences. He is also the topical editor of *Journal of Optics* and the editor of many Special Issues of *Applied Physics A*.

Professor Luk’yanchuk’s accolades also include novel discoveries in laser cleaning, laser thermochemistry, laser ablation, plasmonics, optics and photonics, and nanoscopy with virtual image. He was responsible for the investigation of interference phenomena in the near field, and suggested combining “nano-Fano” with “nano-vortices” in nanostructures. This method permits control of a topological charge on a nanoscale, giving rise to a promising application for future information technologies and quantum optics.

For his outstanding input to the theory of laser-matter interactions and light scattering by nanoparticles, in particular to Fano resonance in plasmonic materials, Professor Boris Luk’yanchuk is awarded the 2013 President’s Science Award.
President’s Technology Award 2013

Professor Li Haizhou  
Dr. Ma Bin  
Ms Aw Ai Ti  
Dr. Su Jian  
Institute for Infocomm Research  
Agency for Science, Technology and Research

For their outstanding contributions to human language technology that have empowered the industry and benefited the Asian society

Professor Li Haizhou, an internationally-renowned scientist, and his team Dr. Ma Bin, Ms Aw Ai Ti, and Dr. Su Jian have made a remarkable breakthrough in human language technology that transforms the interface of mobile applications and breaks down the language barriers for Asian society.

Among the 7,105 living spoken languages that Ethnologue documented in 2013, 2,304 are spoken by Asians, representing more than half of the world’s population. However, traditional human language technologies were developed using English and other major languages as the benchmark, which cannot be applied to many Asian languages. Over the past nine years, Professor Li and his team pioneered new approaches to speaker recognition, multilingual speech recognition, tonal language processing, as well as lexical, syntactic, semantic and discourse analysis. These novel inventions now serve as the foundation of the Abacus language engine, a commercial grade technology solution for the Bahasa Indonesian, English, Malay, Mandarin Chinese, Thai, and Vietnamese languages. Abacus accurately converts continuous speech into text, identifies the accents, dialects, and languages being spoken, establishes a speaker’s identity by his/her voice, and translates languages between one another.

The technological breakthrough is significant. The Abacus engine achieved a leading performance in US National Institute of Standards and Technology (NIST) international benchmarking competitions, including NIST Language Recognition Evaluation 2007, NIST Speaker Recognition Evaluation 2008...
From left to right: Ms Aw Ai Ti, Dr. Su Jian, Dr. Ma Bin, Professor Li Haizhou
From left to right:
Professor Li Haizhou,
Dr. Ma Bin, Dr. Su Jian,
Ms Aw Ai Ti
and 2012, and NIST Text Analysis Conference 2011, representing the state-
of-the-art in academia and industry. In developing the Abacus engine, the
team addressed the unique research problems that Asian languages face, such as multilingual speech and tonal language processing, and
translation between Asian languages. The team also formulated a novel
industry process for rapid technology deployment that has been adopted
widely by the industry.

The team’s recent achievements have put Singapore on the world map.
Professor Li was elected as a Board Member of the International Speech
Communication Association (ISCA) in 2009 and the Vice President of ISCA
in 2013. He was named one of two Nokia Visiting Professors 2009 by the
Nokia Foundation. Dr. Su Jian was elected as an Executive Committee
Member of the Association for Computational Linguistics (ACL) in 2012.
Their work has also been published as an ‘Invited Paper’ in the Proceedings
of the IEEE in 2013, the most highly-cited general interest journal in electrical
engineering and computer science, and honoured as ‘The Most Cited Article’
in Elsevier Speech Communication during 2008-2013. One major outcome of
the team’s research is the establishment of the Baidu-I²R Research Centre
(BIRC) in Singapore. In 2012, the internet giant Baidu and I²R set up BIRC
as Baidu’s first overseas joint laboratory to further the research of speech
information processing and Asian language processing. The establishment
of BIRC is an endorsement of the team’s technological achievements.

The Abacus language engine has become one of the most sought after
solutions internationally for text input, question and answering, spoken
dialogue, and voice biometrics in mobile applications. For the past three
years, the Abacus engine has been licensed to more than 15 leading
international companies to enable many innovative products. In particular,
the Abacus engine was adopted in 2012 to power the Lenovo A586, the
world’s first voiceprint smartphone. The team also contributed to ITU-T
F.745 and H.625 international standards for network-based speech to
speech translation in 2010.

For their outstanding contributions to human language technology that
have empowered the industry and benefitted the Asian society, Professor
Li Haizhou, Dr. Ma Bin, Ms Aw Ai Ti and Dr. Su Jian from the Institute for
Infocomm Research (I²R) are awarded the 2013 President’s Technology
Award.
The Young Scientist Awards (YSA) recognise young researchers, aged 35 years 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. This award is organised by the Singapore National Academy of Science (SNAS) and supported by A*STAR.
Assistant Professor Chi Yonggui Robin
School of Physical and Mathematical Sciences
Nanyang Technological University

For his research on fundamental and application advancements of organocatalysis and organic synthesis
Assistant Professor Qiu Cheng Wei
Faculty of Engineering
National University of Singapore

For his research on complex light-matter interaction and optical micromanipulation
Dr. Khor Chiea Chuen
Genome Institute of Singapore
Agency for Science, Technology & Research

For his research on genetics and heredity
We would like to thank the judges of the respective judging committees and the main committee for their invaluable time and effort in selecting the winners. They are:

**President’s Science & Technology Awards Main Committee**  
Mrs Ow Foong Pheng (Chairman), Dr Raj Thampuran, Dr Benjamin Seet, Dr Tan Geok Leng, Prof Lee Eng Hin, Mr Jen Kwong Hwa, Prof Tan Chorh Chuan, Prof Bertil Andersson, Mr Yeoh Keat Chuan, Prof Low Teck Seng, Ms Janet Ang, Dr Koichi Matsubara, Mr Lu Yoh-Chie

**President’s Science Award Selection Committee**  
Prof Lee Eng Hin (Chairman), Dr Benjamin Seet, Prof Lam Kong Peng, Prof Alfred Huan, Prof Ling San, Prof Andrew Wee, A/Prof Lim Tit Meng, A/Prof Yeoh Khay Guan, Prof Paul Matsudaira, Dr Lee Ellen Dreschler, Dr Dermot Kelleher, Dr Thierry Diagana

**President’s Technology Award Selection Committee**  
Mr Jen Kwong Hwa (Chairman), Dr Tan Geok Leng, Mr Quek Gim Pew, Mr Alok Mishra, Mr Heng Chiang Gnee, Dr Terunori Fujita, Prof Lam Khin Yong, Prof Douglas Jones, Ms Shirley Wong, Prof Chew Yong Tian, Mr Jeff Schmidt

**Young Scientist Award Selection Committee**  
Prof Andrew Wee (Chairman), Prof Leo Tan Wee Hin, Prof Ling San, Prof Lye Kin Mun, Prof Philip Keith Moore, A/Prof Thomas Liew, Dr Jürgen Lindner, Dr Lerwen Liu, Dr Lim Sai Kiang, Prof David Becker, Dr James R. White, Ms Elizabeth Su, Dr R. Senthil

We would also like to thank everyone who helped to make this President’s Science and Technology Awards Ceremony and Dinner memorable.