



IAS @ NTU

Institute of Advanced Studies

The Institute of Advanced Studies (IAS) is one of the newest additions to the Nanyang Technological University (NTU) family. IAS @NTU aims to help the



local R&D scene look upstream by advancing the state of knowledge of fundamental science through the promotion of research in select fields and outreach to the next generation of scientists. IAS @NTU evolves around a concept whereby the Institute invites top-class renowned scientists and Nobel Laureates to Singapore for workshops, public lectures, interaction and collaboration with academics, researchers, and students from Singapore. Through the interaction and exposure to and from heavyweight scientists from multidisciplinary fields, IAS hopes to do its part to leapfrog Singapore onto the international R&D scene.

Like IAS at Princeton, IAS @ NTU is also a center for theoretical research and intellectual inquiry leading to advances in knowledge. Additionally, both institutes are guided by a creed to engage in science



outreach, especially to young scientists and budding researchers.

IAS @NTU will eventually also be associated with specific theoretical research areas and programs identified by its management and board of advisors such as Traditional Chinese Medicine (TCM), Biophysics, and Theoretical Physics. Stay tuned for more news on this in future editions of the newsletter!

Prof KK PHUA, who is the Founding Director of IAS, is currently running the Institute. The idea of IAS @NTU was initiated by President of NTU, Prof SU Guanng, who invited Prof KK Phua to be the Founding Director of the Institute.

Prof Phua accepted as his sentiments then were that Singapore needed a Research Institute (RI) for basic and theoretical sciences to augment the many RIs dealing in more upstream research and development (R&D).

With the backing and support of President Su, help from Prof Tony WOO (Vice-President of Research, NTU) and his Research Office, and the assistance of Prof CHANG Ngee Pong (Nanyang Professor; Professor, City College New York; and long-time colleague and collaborator of Prof Phua), IAS @NTU was established in July 2005.

IAS is housed within the Nanyang Executive Centre, next to the NTU Staff Club.

Who's Who @ IAS



Prof PHUA Kok Khoo, more commonly known to his friends as "KK", is an Adjunct Professor of Physics at both NTU & NUS.

A theoretical physicist by training, Prof Phua is currently the President of the South East Asian Theoretical Physics Association. From his

interaction with eminent scientists and Nobel Laureates, he was inspired and encouraged to establish a publishing company that would first and foremost serve the needs of the scientific community by providing publishing and editorial services at a reasonable cost. Hence, World Scientific Publishing Company was set-up. Over some 20 years, under the helm of its Chairman, Prof KK PHUA, WSPC has grown from a small company with just a handful of staff, to a more than a 200-strong enterprise with worldwide offices.

Prof Phua is also very much involved in community service. He serves as the Chairman of the Tan Kah Kee Foundation and many other charitable organisations, and also sits on the Board of numerous academic institutions.

Having taught at Nantah in his younger days, Prof Phua feels a kinship with the spirit of NTU and its campus.

Prof KK PHUA is the Founding Director of IAS @NTU and can be contacted at D-IAS@ntu.edu.sg

IAS International Advisory Panel

IAS is advised and guided by a committee of world-renowned scientists, including Nobel Laureates and Fields Medalists.

International Advisors

- (1) Professor David BALTIMORE (**Nobel Prize in Physiology or Medicine 1975**)
President, California Institute of Technology
- (2) Professor Paul CHU
President, The Hong Kong University of Science and Technology
- (3) Professor Steven CHU (**Nobel Prize in Physics 1997**)
Director, Lawrence Berkeley National Laboratory
- (4) Professor Pierre-Gilles DE GENNES (**Nobel Prize in Physics 1991**)
Ecole Supérieure de Physique et de Chimie Industrielles (ESPCI)
- (5) Professor Masatoshi KOSHIBA (**Nobel Prize in Physics 2002**)
International Center for Elementary Particle Physics, University of Tokyo
- (6) Professor Peter GODDARD
Director, Institute for Advanced Study
- (7) Professor David GROSS
Director, Kavli Institute for Theoretical Physics, University of California at Santa Barbara
- (8) Professor Philip GRIFFITHS
Previous Director, Institute for Advanced Study & Professor, School of Mathematics, Institute for Advanced Study
- (9) Professor Yuan-Tseh LEE (**Nobel Prize in Chemistry 1986**)
President, Academia Sinica
- (10) Professor Anthony J LEGGETT (**Nobel Prize in Physics 2003**)
Department of Physics, University of Illinois at Urbana-Champaign
- (11) Professor Ping-Chung LEUNG
Chairman of the Management Committee of the Institute of Chinese Medicine, The Chinese University of Hong Kong
- (12) Professor Pierre-Louis LIONS (**Fields Medalist 1994**)
Professeur au Collège de France et à l'École Polytechnique
- (13) Professor Douglas OSHEROFF (**Nobel Prize in Physics 1996**)
Department of Physics, Stanford University
- (14) Professor Yum-Tong SIU
Department of Mathematics, Harvard University
- (15) Professor Gerard 't HOOFT (**Nobel Prize in Physics 1999**)
Institute for Theoretical Physics, Utrecht University
- (16) Professor Samuel, Chao-Chung TING (**Nobel Prize in Physics 1976**)
Department of Physics, Massachusetts Institute of Technology
- (17) Professor Gang TIAN
Department of Mathematics, Massachusetts Institute of Technology
- (18) Professor Chen-Ning YANG (**Nobel Prize in Physics 1957**)
Director, Center for Advanced Study, Tsinghua University
- (19) Professor Ahmed ZEWAIL (**Nobel Prize in Chemistry 1999**)
Arthur Amos Noyes Laboratory of Chemical Physics, California Institute of Technology



Past Events

Though it was only set up a few months ago, IAS already has organised three events, jointly with other institutes and schools, to inspire students and faculty staff in sciences and technology.



100 Years of Physics Symposium in Singapore was jointly organised by NTU and NUS, the Institute of

Advanced Studies (IAS) and School of Physical & Mathematical Sciences (SPMS) were the NTU's representatives for the event. As part of the World Year of Physics 2005, the Symposium was a unique outreach to a wider non-physics community and the next generation of scientists & engineers.

The Symposium's opening ceremony was held at NTU on 10 August 2005 and graced by the Minister of Education, Mr. Tharman SHANMUGARATNAM. Speakers on that day included Nobel Laureate Professor Robert B LAUGHLIN, 1991 Wolf Prize Winner Professor Alex PINES and 1991 Imperial Prize Winner Dr Akira TONOMURA. Other prominent speakers include 1995 Templeton Prize Winner, Professor Paul DAVIES.

The Symposium was well attended with participants from the educational, public and private sectors in the Asia-Pacific Region. The students, researchers, teachers and many others used this opportunity to get up-close with the prominent speakers in frontier physics research.

An educational forum and a regional cooperation panel discussion tied up the symposium, and paved the way for future cooperation between institutes from different countries.



an e-proceeding on its website www.100yearsofphysics.org

As part of the objective to reach out to a wider non-physics community and future researchers and scientists, the organisers of the symposium had also maintained

A Visit by Nobel Laureate in Physics (1996), Professor Douglas OSHEROFF,



was organised by IAS in the following month, September 2005. Professor Osheroff, an international advisor of IAS, gave a public lecture on the topic "Global Warming &

Energy Policy for the 21st Century" on 20 September 2005. On the same day, he had an interactive session with NTU's School of Physical and Mathematical Sciences's undergraduates and spoke about his experience and journey to obtaining the Nobel Prize.

To extend to the other students and staff of NTU, IAS also organised a dialogue session for NTU's staff and students to interact with Professor Osheroff on 23 September 2005.

The visit not only allowed the students and staff to learn from Professor Osheroff, it also motivated them to forge ahead with their research interests.



IAS Jointly Organised A Public Lecture on Traditional Chinese Medicine (TCM) with NTU's School of Biological Sciences.

Invited speaker, Professor LEUNG Ping-Chung spoke on the "The Challenge of Research on Chinese Medicine, Some Clinical Trials Using Chinese Medicine - Methodology, Difficulties." Professor Leung is a Professor of Orthopaedics & Traumatology, Faculty of Medicine, and the Chairman of the Management Committee of the Institute of Chinese Medicine, The Chinese University of Hong Kong. He touched on his experiences on evidence based clinical trials for the Chinese medicine, from preparations of the herbal compounds to the interpretations of results.

The visit by Professor Leung had also ignited a fruitful discussion between Professor Leung's team and SBS on potential TCM research.



Future Events

In its pipeline for 2006, IAS has started to organise three workshops - spintronics, multiscale modeling and biophotonics. These workshops are jointly organised by IAS, relevant schools & departments of NTU, as well as prestigious overseas institutions.

Spintronics Workshop

First in line is the spintronics workshop, tentatively scheduled in May 2006. This workshop is jointly organised by NTU, University of Maryland (USA), Stanford University (USA), and Hong Kong University (Hong Kong). Committee members include Professor K K PHUA, Director of IAS, Professor ZHANG Shou-Cheng from Stanford University, Professor Sankar DASSARMA from University of Maryland, Professor Hideo OHNO from Tohoku University and Professor ZHANG Fuchun from Hong Kong University.

Workshop on Multiscale Modeling with Applications

Another workshop planned for 18-22 December 2006 is the applied mathematics workshop, co-organised by NTU and California Institute of Technology, USA. Committee members for this workshop include Professor Thomas HOU, Charles Lee Powell Professor of Applied and Computational Mathematics, California Institute of Technology, and Professor LING San from School of Physical & Mathematical Sciences, NTU.

Biophotonics Workshop

A biophysics workshop, has been scheduled for 2006. This workshop is co-organised with Professor Steven CHU, Nobel Prize winner in Physics 1997, together with his research team at Lawrence Berkeley National Laboratory, and Professor KAM Chan Hin from School of Electrical & Electronic Engineering, NTU.

IAS Lectures & Visits

There will also be lectures and visits by eminent Scientists throughout the year.

For more details on these lectures and visits, please visit the IAS website.

Do you want to have the latest information on IAS's workshops & public lectures?

Visit IAS's website at <http://www.ntu.edu.sg/IAS>.

Editorial Board

- ✧ Professor KK Phua, Director, Institute of Advanced Studies (Editor-in-Chief)
- ✧ Adjunct Professor CS Hew, Institute of Advanced Studies
- ✧ Professor NP Chang, City College of City University of New York
- ✧ Associate Professor LC Kwek, National Institute of Education

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