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I am happy to bring you another issue of OmniScience, a publication of news and views from NUS' Faculty of Science.

Our faculty members put in many hours not only to build up the research that brings them and the University many accolades (Pg 4), they also spend much time behind the scenes in outreach (Pg 8 & 12) and alumni relations (Pg 9). And, at the end of the day, they give back (Pg 14).

If faculty are the bones, then students are the flesh of the University. At Science, there is a strong and vibrant culture of student life. From celebrating Chinese New Year to staging their own drama production (Pg 10), Science students are a varied bunch. As they graduate and become alumni, we are confident that they had an unforgettable journey in NUS.

By now, those of you in Singapore would have read the many reports in the press about the University's effort to support the Raffles Museum of Biodiversity Research (RMBR)'s development into a full fledged natural history museum. Recently, I sent a message of appeal to our students and staff. This letter has been modified and reprinted for this newsletter (Pg 2). Please take some time to read it, and join me in building a legacy for Singapore.



e-OmniSci

NEWS FROM THE FACULTY OF SCIENCE,
NATIONAL UNIVERSITY OF SINGAPORE

e-OmniScience is an electronic publication produced four times a year by the Science Dean's Office about current programmes and activities in the Faculty for alumni and friends.

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Perry Hee | Lawrence Chia**

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Building A Legacy of Our Own: A Natural History Museum for Singapore



Dear Friends,

Southeast Asia has a greater diversity of natural habitats and a larger number of species than the Amazon. These include tropical rainforests, peat and freshwater swamps, mangroves and coral reefs. In 1823, the founder of modern Singapore, Sir Stamford Raffles, had a vision to build a natural history museum for Singapore.

Loss of biodiversity, deforestation, global warming, climate change and other environmental issues have captured the media's attention in the last few years. Not many know, however, that the NUS Raffles Museum of Biodiversity Research (RMBR) has the earliest natural history collections in the region. When natural heritage was regarded as having no value, our dedicated scientists and researchers rescued and guarded some of these collections in the university. For years, this rich

collection had no permanent home, and only a very small fraction could be exhibited to the public through the RMBR.

The RMBR can play a pivotal role in galvanising efforts in biodiversity conservation and environmental awareness in Singapore. A new facility is necessary for us to fulfil this role and to further conserve all these historical gifts for our future generations. RMBR is embarking on a monumental effort to develop a new natural history museum within our NUS campus.

We believe you agree that the conservation of natural history is everyone's duty. We sincerely hope that the whole NUS community will come together in this effort to resurrect this legacy. Please join me and give now!

Thank you.



Andrew Wee
Dean, Faculty of Science

For more information, please visit the RMBR Museum Development Fund website
<http://rmbn.nus.edu.sg/buildingfund/index.html>

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Two NUS teams clinched the Grand Winner and the Most Innovative Awards, respectively, in this year's Food Product Concept Competition organised by the Singapore Food Manufacturers' Association and supported by SPRING Singapore. The teams were from the Food Science & Technology Programme in the Department of Chemistry.



LIM Tit Meng, Associate Professor of Biological Sciences and former Vice-Dean has been appointed CEO of Science Centre Singapore. *Lianhe Zaobao, Jan 7; The Business Times, 7 Jan; The Straits Times, 9 Jan.*

An article to highlight the varied experiences of an NUS Global Merit Scholar featured **Nicolas WELZL**, a Year 2 Food Science & Technology major. He finds that balancing sports and studies makes him a better student. *The Straits Times, 6 Feb.*



NUS, NTU, A*STAR and the King Abdullah University of Science and Technology recently cooperated to develop a material that could completely alter the way 3D films are made. **Liu Xiaogang**, Assistant Professor in the Department of Chemistry said that the new method offered a simple solution by using laser. The new method would be able to help cut down on costs. *Lianhe Zaobao, 25 Jan.*

Professor **Manjunatha KINI's** lifelong fascination with snake venom toxins has led him to make many important potential drug discoveries and to find his wife in Japan. *Tabla!, 8 Jan.*



Biological Sciences researchers Assistant Professor **LIU Yih-chen**, and Associate Professors **YANG Daiwen** and **YU Hao** have discovered a switch that could make plants bloom. This could potentially improve crop yields. *The Straits Times, 16 Jan.*

Biological Sciences Professor **Peter K.L. NG** was named one of 50 people to watch this year for his work to preserve biodiversity in the region. He is quoted as saying that there is still a lot to learn about biodiversity. His recent research includes discovering three new crustaceans on Christmas Island. *The Straits Time, 2 Jan; 30 Jan; 6 Feb.*



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Honours and Leadership National Research Foundation Proof-of-Concept (POC) grant



"Kevin Tan and I are honoured to have received this grant, which allows us to generate commercially relevant data on a product that was purely borne out of solving a key research issue in malaria. We are now poised to materialise our research ideas into a product for a growing global market, hopefully making NUS and Singapore proud in the process," said Dr Martin J. LEAR, Assistant Professor of Chemistry, on receiving one of ten Proof-of-Concept (POC) grants from the National Research Foundation for his programme: Florescent-tagged Antimalarials as Commercial Molecular Probes to Diagnose Drug Resistance and to Study Disease. Dr Lear shares this award with Dr Kevin S-W TAN (Department of Microbiology, NUS' Yong Loo Lin School of Medicine). Eight of the ten grants were awarded to NUS. Each project team will receive up to \$250,000. The POC grant provides funding to researchers from universities and polytechnics with the aim of developing products for commercial applications.



National Research Foundation (NRF) Research Fellow

TEO Yik Ying, Associate Professor of Statistics & Applied Probability was among this year's 11 National Research Foundation (NRF) Research Fellows. He holds a joint appointment at the Department of Epidemiology & Public Health at the YLL School of Medicine and is an

adjunct visiting group leader at A*STAR's Genome Institute of Singapore, and chairs the Singapore Genome Variation Project. He is also a member of the Malaria Genomic Epidemiology Network.

"It is a great privilege to be awarded the prestigious NRF Research Fellowship. This will provide vital resources for building a team with analytical expertise in the genetics and genomics of common human diseases and infectious diseases, particularly in research areas where Singapore has strategic advantages given its location in South-East Asia and the multi-racial demography."

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Singapore Millennium Foundation – National University of Singapore Research Horizons Award

Associate Professor of Chemistry LOH Kian Ping and Barbaros OEZYILMAZ, Assistant Professor of Physics are two of four NUS scientists to receive the inaugural Singapore Millennium Foundation – National University of Singapore Research Horizons Awards. The award funds each of them for a year up to \$100,000 each to accelerate the development of paradigm-changing research ideas from conception to implementation. At the end of the year, they compete for Phase II funding of up to \$1 million over two years. A/Prof Loh's proposed work may lead to major novel development in recycling technology. Dr Oezyilmaz is working on superconductivity in graphene.



Adjunct Professor KK Phua elected APS Fellow

Adjunct Professor in the Physics department, Phua Kok Khoo was elected Fellow of the American Physical Society (APS) in December 2009. He is a Founding Director of the Institute of Advanced Studies, NTU, and Chairman and Editor-in-Chief at World Scientific Publishing Co Pte Ltd. He is also the Founding President of the South-East Asia Theoretical Physics Association (SEATPA). Together with Nobel Laureate Professor C N Yang and other senior physicists, he is one of the founding council members of the Association of Asia-Pacific Physical Society (AAPPS).

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New Faces

Biological Sciences

• **G.V. Shivashankar, Associate Professor**

Joined 25 Nov 2009. A/Prof Shivashankar holds a PhD from Ruckerfeller University, USA, in 1999. His research interests are in the areas of mechanobiology, bioimaging and biophysics. He holds a joint appointment with the RCE in Mechanobiology and Bioengineering.

Chemistry

• **YUK Hyun-Gyun, Assistant Professor**

Joined 17 Sep 2009. Dr Yuk holds a PhD from Mississippi State University, USA. His research interests are in the areas of food microbiology and safety.

• **ANG Wee Han, Assistant Professor**

Joined 1 Sep 2009. Dr Ang holds a PhD from the Ecole Polytechnique Fédérale de Lausanne, Switzerland. His research interests are in the areas of bioinorganic and organometallic chemistry, and developing transition-metal compounds for targeted chemotherapy.

• **WANG Jian, Assistant Professor**

Joined 2 Jul 2009. Dr Wang holds a PhD from the University of New Mexico, USA. His research interests are in the areas of synthetic organic chemistry, medicinal chemistry and chemical biology.

Mathematics

• **LIU Jie, Assistant Professor**

Joined 1 Jul 2009. Dr Liu holds a PhD from the University of Maryland, USA. His research interests are in the area of scientific computing, with specialisation in computational fluid dynamics and mathematical modelling of speech and hearing.

• **HAN Fei, Assistant Professor**

Joined 1 Jul 2009. Dr Han holds a PhD from the University of California, Berkeley, USA. His research interests are in the areas of differential geometry, topology and mathematical physics.



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Pharmacy

• Joanne Yeh CHANG, Assistant Professor

Joined 3 Sep 2009. Dr Chang hold a PharmD from Temple University, USA. Her research interests are in the areas of internal medicine, chronic disease management and drug evaluation usage in inpatient settings.

• YU Chun Kong Victor, Associate Professor

Joined 17 Aug 2009. A/Prof Yu holds a PhD from the University of California, San Francisco, USA. His research interest is in the area of mitochondrial signalling events in the control of apoptosis.

• HO Han Kiat, Assistant Professor

Joined 1 Jul 2009. Dr Ho holds a PhD from the University of Washington, USA. His research interests are in the areas of pharmaceutical chemistry, and toxicology and toxicokinetics.

Physics

• Kai DIECKMANN, Associate Professor

Joined 14 Aug 2009. A/Prof Dieckmann holds a PhD from the University of Amsterdam, The Netherlands. His research interest is experimental quantum optics and atomic physics in the areas of degenerate Bose and Fermi gases / molecular quantum gases, atomic interferometry, and laser cooling.

Statistics & Applied Probability

• YU Tao, Assistant Professor

Joined 2 Sep 2009. Dr Yu received his PhD from the University of Wisconsin–Madison, USA. His research interests are in the areas of neuro-infomatics, bioinfomatics and biostatistics, and statistical inference for high-dimensional modelling.

• Leontine ALKEMA, Assistant Professor

Joined 23 Jul 2009. Dr Alkema holds a PhD from the University of Washington, Seattle, USA. Her research interests are in the area of Bayesian statistics for probabilistic population projections and poverty measurements.

• Adrian ROELLIN, Assistant Professor

Joined 1 Jul 2009. Dr Roellin holds a PhD from the University of Zurich, Switzerland. His research interests are in the areas of probability theory and applications, Stein's method for distributional approximation, and mathematical modelling in epidemiology.

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Outreach through Research Opportunities By Sow Chong Haur, Assistant Dean (Outreach & Alumni)

Over the years, we have had many students from junior colleges and secondary schools conducting research in our laboratories. Guiding and initiating these students into the research culture is naturally a demanding and exhausting process. However, these students are genuinely curious and enthusiastic about scientific discovery. Some of them are very dedicated to the learning process and put in a lot of effort. As a result, the experience in training these students can be very enriching and rewarding.

Their learning journey usually starts off with a brainstorming session where ideas are discussed and argued. Following which, they will develop their experimental skills and, subsequently, conduct the research project under the guidance of an experienced graduate student.

I am very grateful to my team of supportive graduate students who have put in tireless hours in training these young scientists with me. We conduct regular progress-update presentations and meetings where the junior students take turns to present their findings and challenges encountered in the projects. Besides the development of their knowledge, it is also heartening to see these students grow in confidence when they show good science reasoning in answering our questions. The learning journey is always peppered with exciting days when surprising discoveries are made during the experiments. In some cases, we are pleasantly surprised with the innovative ideas proposed by these students. This is usually followed by many fun-filled days implementating these "cool" ideas.



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The Class of 1963 returns

by Perry Hee, Associate Director (Outreach & Corporate Relations)

Friday 15 Jan marked a very special day for a very special group of Science alumni from the Class of 1963. All were students in the pioneer batch of the Pre-University class of 1959 in the then University of Malaya (in Singapore). The following year, they were admitted to Science for their University studies, graduating in 1963. Since then, all have had successful careers in Singapore and Malaysia, including Physics major Mr Wee Heng Tin, who rose to the position of Director General of Education at the Ministry of Education. They have also continued their friendships over time and distance.

Dr Goh Chong Jin led the group of 8 alumni to visit and reconnect with the Faculty of Science. Reminiscing and sharing memories of their undergraduate days with Dean of Science Professor Andrew Wee and his deanery members, the group was also briefed on developments in the Faculty and the University over the last decade.



From Left – Ng Kok Lip, Wee Heng Tin, Hwang Chin Hor, Huan Kim Huan, Prof Andrew Wee (Dean of Science), Ng Yew Seng, Foo Yoke Foon, Mrs Yee Chee San, Yee Chee San, Goh Chong Jin, Dr Lawrence Chia (Advisor)

In the afternoon, the group was led on a tour of the Shaw Foundation Alumni House, followed by a dialogue session chaired by Office of Alumni Relations Director A/Prof Teo Choo Soo. To commemorate their visit, each alumnus was presented with his personal Alumnus Card.

From the Class of ...

www.science.nus.edu.sg/alumni/alumninews.htm

1996

KUA Han Wei, BSc(Hons),

MSc 1999 Physics, has been recognised as the second fastest triathlete in the world. Dr Kua is a faculty member of the School of Design and Environment, NUS.

1980

William TAN, BSc Biology, has created a foundation to continue his humanitarian causes. Since being diagnosed with blood cancer, Dr Tan has become painfully aware of his mortality. The foundation will provide for worthy causes both locally and internationally, and has already received pledges. His current project is Cycle of Hope where Dr Tan has been raising funds for The Straits Times Pocket Money Fund.

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Science Chinese New Year Reunion Dinner

by Lee Wei Kit, Vice President
(Internal Affairs), 30th Management Committee
NUS Students' Science Club



Science Club which aims to engage the Science alumni and include them in the Science family.

This year, other than the Science alumni, current Science students were also invited to participate in the celebrations as well. The event started at 7.00 pm, followed by some games to warm up the participants and bring up the Chinese New Year atmosphere. The highlight of the evening was brought to a climax with a *lou hei*, a Chinese New Year dish where diners toss slices of raw fish with shredded vegetables mixed with sweet, sour, salty and spicy condiments and sauces. Participants indulged in the company of friends, relived memories and had an all round great time. We hope future Science Chinese New Year reunion dinners will serve as a platform to build stronger



From Left - Xu Yuling '07, Amy Chin-Huei Tyan '09, Dawn Lim '09, Hui Xuan Goh '09, Kelvin Dai Jibo (year5), Stephanie Ho '08, Johann Shane '09 and Xie Ziyang '09.

The Science Chinese New Year Reunion Dinner was held on 5 Feb 2010 at NUS Faculty of Science Students' Hub. This is an annual event organised by the NUS Students'

relations whilst updating alumni on the happenings in the Faculty of Science.

We are glad to have support from the Science Dean's Office and NUS Office of Alumni Relations this year.

We see the value in the returning Science alumni's contributions to our Faculty and our Club, and look forward our alumni coming back to share their talent and valuable experiences with us. It is through the gathering of Science students and sharing of memories that we can establish a stronger sense of identity with the NUS Faculty of Science. Science Club wants to establish a memorable experience from the very first step into NUS as freshmen that will linger even beyond graduation.

See you next year!

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Science students bring you Closer to the Arts by Kesavan Thanagopal, Producer, outofthe|BLUE

On 20 Jan, outofthe|BLUE (oot|B), the Faculty of Science's theatre interest group staged its second production, Patrick Marber's *Closer* at the University Cultural Centre's Theatre. The play served a unique blend of comedy, tragedy and melodrama. Thought to be one of the toughest of plays, this group of undergraduates managed to not just pull it off, but garner a commendable number of positive comments.

"Closer was a very daring production which explored complex issues such as love, lust and betrayal which was splendidly expressed by the actors. Despite having some tedious scenes, the play was able to evoke a myriad of emotions ranging from shock to sadness and even moments of happiness. The setting and the costumes contributed to overall experience."

Shilpa S Nath
Life Sciences
Year 2

"It was something like putting together raw emotions of anger love and hate wrapped in a tortilla and served with cheese. Very provocative. Very real!"

Xu Jinwei Jereld
Chemistry
Year 3

oot|B is already planning another performance next year. Preparations for its next play are underway! To get updates on the group's activities, please visit <http://sciootb.blogspot.com/>



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Dunman High School student and teacher get published in ACS Nano

Much of our outreach efforts are to teachers in schools. One way is through Maths and Science UPDATES teachers' workshops, which was reported in *e-OmniSci* Jan 2010. In addition, we also give teachers the opportunity to encourage high-achieving students to take part in the research experience. One such teacher is alumnus Mr CHIA Guo Hao, BSc(Hons) 2004 Physics, from Dunman Secondary School.

The long hours Gary FOO spent poking around Physics Department's Scanning Electron Microscope lab last year paid off when this Dunman High School student and Guo Hao, his Physics teacher, were listed as authors in the 7 Jan issue of the American Chemical Society's online publication *ACS Nano*. The web article described detailed studies of three different capillary-assisted techniques for the formation of large-scale multiwalled carbon-nanotube (MWNT) -based microstructures. See abstract: <http://pubs.acs.org/doi/abs/10.1021/nn9012109>

Also through the encouragement of Guo Hao, three other Dunman High School students were selected by MOE to represent Singapore in the Taiwan International Science Fair 2010. PHUA Yi Hui, Nicole CHEW and Siswo HARTOYO, spent a good portion of last year in the Physics Department working on their research project, "Carbon Nanotubes as Efficient Nanosieve for Controlled Assembly of Nanoparticles". They were supervised by graduate student Sharon LIM, BSc(Hons) 2007, and Associate Profesor SOW Chong Haur. The presentation by Yi Hui won them the 2nd Award.

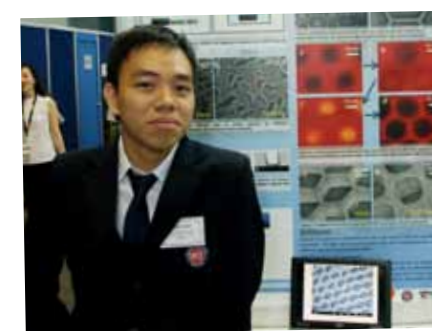
Teachers who wish to know more about research opportunities for students in the Faculty of Science may contact A/Prof Sow Chong Haur at scisowch@nus.edu.sg.

"Doing research in NUS under a scientist as mentor has showed me how alive Physics is." – Gary Foo, Dunman High School, 2009

"The opportunity for students and teachers to work in a research laboratory can effectively bridge the gap between learning about science content and learning about science itself." – Mr Chia Guo Hao, teacher, Dunman High School.



Phua Yi Hui and Nicole Chew at the Taiwan International Science Fair 2010.



Gary Foo posing with his poster at the Singapore Science & Engineering Fair 2009.

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Science Focus 2009

By See Sin Hon, Assistant Manager (Outreach)

Science Focus 2009 was held on 8 to 10 Dec 2009. It is jointly organised by the Faculty of Science and the Gifted Education Branch of the Ministry of Education (MOE), and sponsored by Shaw Foundation.

The aim of Science Focus is to expose students to understand discoveries and applications of science through lectures, group discussions and laboratory work. SF is opened to first year Junior College and Year 5 Integrated Programme (IP) science students who have the desire to widen their knowledge beyond the Science and Mathematics syllabuses of the A level curriculum.

Students can select to attend electives from a wide array of topics to meet the 12-hour elective requirement. The series of talks are conducted in the Faculty of Science by scientists from NUS and other research institutes. Upon completion, the participants receive a Certificate of Participation.

For Science Focus 2009, 160 participants from 13 junior colleges and IP schools signed up for electives of their choice. Many of the participants expressed that they benefitted from the electives and will recommend it to their fellow schoolmates in the future.



"The maths modelling of biological warfare was a new experience and gave me a new insight into how maths can be applied in real life situations. The lecture on medicinal plants instilled in me a new respect for TCM."

"The practical experience is so different from the one in school. It's really eye-opening."

"Made me change my mind about physics."

"Great exposure to different topics. Lectures were really interesting."

"I found out what learning chemistry in university could be like."

"Gardens are worth a lot more than I thought."

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Physics Prof Raja gives \$15,000 towards a prize for experimental laboratory module

Department of Physics recently received a gift of \$15,000 from retired Professor Arthur Rajaratnam. To honour the man and his gift, the Arthur Rajaratnam Prize was introduced to encourage more students to continue their pursuit of physics.

This prize recognises students who have excelled at experimental training during their coursework in physics. A cash incentive of \$200 will be awarded to two top performing students in Level 2000 and Level 3000 experimental laboratory modules every year.

Professor Arthur Rajaratnam headed the Department from 1969 to 1982 and helped initiate the Centre for Ion Beam Applications whose applications are relevant to areas including biophysics, nuclear microscopy of degenerative diseases and semiconductor micromachining.

Long time colleague and friend, Professor Bernard Tan Tiong Gie, Director of Maritime Studies, says of the prize: "We hope to recognise specifically the performance of students in experimental work during their time at the University. We hope that this might spur renewed interest in the subject and help students appreciate the importance of physics to industries such as manufacturing, engineering, defence and energy among many others."

To find out more about the prize from the Physics website: www.physics.nus.edu.sg



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Apr

- 1** CRISP Awards Ceremony
- 8** Science Lunchtime Talk
Professor Tan Ser Peow (Mathematics)
- 10** Science Communication Congress
- 15 – 16** Pharmacy: Educating Pharmacists (Asia)
2010
- 16** An Evening Dedicated to Conserving
Singapore's Biodiversity: Zoological
Explorations in Singapore
- 17** Outreach: Science Research Congress
- 23** Science Faculty Teaching Workshop

May

- 8** Semester 2 ends
- 8** Science Research Programme Congress
- 11** Maths & Science UPDATES: Teachers'
Workshops – Pharmaceutical Chemistry
- 15** Science Faculty Open House
- 18** Maths & Science UPDATES: Teachers'
Workshops – CSI Singapore; Bloodstains
& Fingerprints
- 25** Maths & Science UPDATES: Teachers'
Workshops – Nanotechnology for
the Classroom
- 31** Outreach: Statistics Enrichment Camp

June

- 3 – 5** Outreach: Physics Enrichment Camp
- 23 – 25** Food and Feed Extrusion short course
- 25 – 26** Probability Approximations and Beyond:
A conference in honour Louis Chen on his
70th birthday

July

- 5** Statistics Consulting Centre Opening
- 5 – 15** NUS Commencement Ceremonies
- 8** Bukit Timah Campus Alumni Reunion
& 50 Anniversary
- 9** Maths & Science UPDATES: Teachers'
Workshops – Enzymology Workshop
- 9 – 12** Asian Conference on Clinical Pharmacy
(ACCP) 2010
- 10** NUS Homecoming
- 16** Commencement Dinner
- 23** Dean's Welcome Tea for Freshmen
- 28** CHAOS 2010 Finals

For updates, please refer to the NUS Science website:
www.science.nus.edu.sg