

GROWING NEUROSCIENCE IN SINGAPORE

Neuroscience is one of the most widely supported research areas of modern bioscience. While some of the mysteries about the inner workings of the brain and the nervous system have been answered, many are also yet to be solved. Scientists throughout the world continue to be fascinated by the complexities of neuronal organization and function, as well as the array of neuropathologies responsible for morbidity and mortality in so many people.

[READ MORE](#)



Welcome to Our World

Duke-NUS Graduate Medical School's 2010-2011 academic year has begun and the school would like to welcome its 56 new students as they each embark on a career in medicine. While the majority of new students comprise Singapore citizens and permanent residents, there is also a significant number from elsewhere in Asia and from further afield. So, like the classes before them, this latest intake (the 'Class of 2014') comprises a well-balanced mix of students from different backgrounds and cultures.

[READ MORE](#)



Pioneers Present

Research projects completed by the pioneering 'Class of 2011' were recently presented at the Duke-NUS Graduate Medical School's Research Presentation Day.

[READ MORE](#)



New PhDs in High Gear

All of us have a passion for Biology and research, but our similarity ends there. Beyond this, you really cannot get a group more diverse than the PhD class. Some of us recently graduated, while others worked for a couple of years in various industries and capacities.

[READ MORE](#)

SNIPPETS

- [Ngee Ann Kongsi Scholarship for Duke-NUS – First Two Recipients Announced](#)
- [Prime Minister of Kazakhstan Visits Duke-NUS](#)
- [Breaking News at Duke-NUS](#)
- [Building Awareness on Grief and Bereavement in the Community](#)
- [SingHealth and Duke-NUS Host Joint Scientific Congress](#)

A Special Update by DUNES (Duke-NUS Early Career Scientists Association)



Established in 2009, the Duke-NUS Early Career Scientists Association (DUNES) provides avenues for students and researchers at Duke-NUS to improve their career prospects. This includes events to enhance professional skills, develop scientific and social networks, and provide wider community services. The association is run by the early career scientists themselves, with invaluable support from Duke-NUS.

[READ MORE](#)



DUNES Photography Competition

[VIEW SLIDESHOW >](#)



DUNES Coastal Clean-up at Changi Beach

[VIEW SLIDESHOW >](#)



DUNES Table Tennis Tournament

[VIEW SLIDESHOW >](#)

VITAL SCIENCE

Editor: **Greg Lee**

Production and copy-editing: **Adeline Sim**

Vital Science is a quarterly publication produced by the Office of Communications and Development.

This issue's banner showcases the diverse nationalities of the school's first-year class, featuring, from left to right, Evangelos Papadimas (Greek), Kavisha Singh (Indian), Chen Si Xian (Singaporean), Clarissa Tio (Filipino), Apurva Thanju (Nepalese) and Kim Ng (Singaporean).

Duke-NUS Graduate Medical School Singapore

8 College Road, Singapore 169857 | Tel: (65) 6516 7666 | Fax: (65) 6516 7396

Email: info@duke-nus.edu.sg | Web: <http://www.duke-nus.edu.sg>

GROWING NEUROSCIENCE IN SINGAPORE

Neuroscience is one of the most widely supported research areas of modern bioscience. While some of the mysteries about the inner workings of the brain and the nervous system have been answered, many are also yet to be solved. Scientists throughout the world continue to be fascinated by the complexities of neuronal organization and function, as well as the array of neuropathologies responsible for morbidity and mortality in so many people.

In 2007, Duke-NUS and A*STAR recognized the potential of neuroscience research and the need for Singapore to embrace and participate in its ongoing growth by entering into a **Neuroscience Research Partnership (NRP)**. Its main objective is to facilitate the holistic growth of neuroscience in Singapore, rather than at a single institution.

The issue in Singapore is that neuroscience is under-represented in terms of the number of people involved. "So one rationale [for the partnership] is to enhance the number of quality neuroscientists in Singapore generally," explained Dale Purves, Professor and Director of the Neuroscience and Behavioral Disorders Program at Duke-NUS and Executive Director of the A*STAR Duke-NUS Neuroscience Research Partnership.

The arrangement will also allow for the more cost-effective sharing of material and intellectual resources, he added. "Combining makes a lot of sense, enhancing the number of people, making the interactions between the two places [Outram campus and Biopolis] more straightforward." Another goal is also to promote such collaborations with other research institutions and with industry.

The NRP program is focused on basic research in neuroscience with key areas of investigation including the effects of aging, cognitive neuroscience, stem cell brain tumors and cancer, and sleep. These are areas that can have clinical applications that have industry-related impact.

The NRP has a budget that will enable the recruitment of at least two new neuroscientists into the program each year for the next five years. According to Professor Purves, the intention is for these additional neuroscientists to be situated at the Biopolis until, ultimately, there are similar numbers in both sites. "We are looking forward to recruiting," said Professor Purves. "Whereas the other A*STAR institutes have reached their target level of investigators, we're still in a growth phase, albeit a modest one."



*Duke-NUS and A*STAR have teamed up to grow neuroscience in Singapore. Professor Dale Purves (center) with some of the NRP Principal Investigators (left to right: Dr. Suresh Jeyaraj Jesuthasan, Associate Professor Lim Kah Leong, Professor Edward Manser and Associate Professor Thomas Leung.*



*Duke-NUS Professor Dale Purves, Executive Director of the A*STAR Duke-NUS Neuroscience Research Partnership.*



The partnership plans to increase the number of neuroscientists in its Biopolis labs.

Vital Science interviewed two of the NRP's Principal Investigators (PIs), Dr. Suresh Jeyaraj Jesuthasan, based at the Biopolis, and Assistant Professor Marc Fivaz, based at Duke-NUS, to find out more about their research activities:

Interview: Dr. Suresh Jeyaraj Jesuthasan (SJJ), NRP PI, Biopolis

Vital Science: What kind of research are you conducting in your laboratory?

SJJ: We work on the regulation of fear responses in vertebrates.

Firstly, we are interested in how the brain computes threat level to come up with an appropriate response. The range of fear responses is well represented in the English language by words like worried, anxious, perturbed, frightened, panicked or petrified.

We work with zebra fish, and use the alarm response, which is an innate fear response to an alarm substance ('Schreckstoff') released from injured fish. In the wild, it is thought that an attack on one member of a school will cause the release of Schreckstoff. The other members of the school detect this and flee. What is interesting to me is that this is a concentration dependent response, meaning you can get either mild fear or panic by varying the concentration of the substance. We want to know why this happens.

Secondly, we work on how neural circuits modulate fear responses. In this case, the question is how internal factors (as opposed to external factors such as pheromones) change a response to a particular danger cue. Anxiety level is one key variable. If you are anxious, your response to mild danger is extreme. We are examining how anxiety levels are regulated, with a particular focus on how the brain computes when anxiety levels should be reduced.

Vital Science: How might your research be translated into clinical practice?

SJJ: We can provide an insight into how anxiety develops, and also suggest a method for screening and identifying drugs that specifically aid the natural anxiety-reducing circuits in the brain. Our approach differs from most labs, which tend to focus on how anxiety is triggered.



Dr. Suresh Jeyaraj Jesuthasan (left) with fellow Principal Investigator Professor Edward Manser.

Interview with Assistant Professor Marc Fivaz (MF), NRP PI, Duke-NUS

Vital Science: What kind of research are you conducting in your laboratory?

MF: Our laboratory employs functional imaging approaches to interrogate biological circuits underlying neuronal development and synapse function in health and disease states. Current areas of research include:

- (1) feedback circuits regulating axon growth and regeneration;
- (2) axonal transport defects in neurodevelopmental and neurodegenerative diseases;
- (3) micro-RNAs in axonal and presynaptic development;
- (4) and calcium signaling at the synapse.



*Assistant Professor Marc Fivaz (center)
with his lab team at Duke-NUS.*

Vital Science: What are the main aims of each of these projects and their potential applications?

MF: Our research into topic (1) aims to identify the intracellular signaling circuits underlying “spontaneous” axonal growth early in development.

Neurons of the central nervous system (CNS) progressively lose this intrinsic capacity for growth as they age. Our long-term goal is to re-activate growth-promoting circuits in adult central nervous system neurons to promote regeneration.

In terms of topic (2), our lab has developed a live-cell imaging assay which we are currently using to identify axonal transport defects in neurons with altered levels of DISC1, a candidate gene for Schizophrenia. We also intend to use it to investigate transport defects in Alzheimer’s and Parkinson’s disease animal models. Our long-term goal is to develop this imaging assay as a diagnostic and drug screening platform for iPSC-derived neurons from individuals affected by neurological disorders.

For topic (3), we are using data mining and candidate-based approaches to screen for micro-RNAs (miRNAs) that regulate axonal growth and pre-synaptic differentiation. We have so far identified one miRNA that regulates axon growth during development and are currently investigating its role in axon regeneration.

Our work on topic (4) involves studying mechanisms that control calcium signaling at the synapse in health and disease states. Using a combination of optical and electrophysiological measurements in cultured neurons and brain slices, we are probing the role of the endoplasmic reticulum (ER) calcium sensor ‘STIM’ in neurotransmission and synaptic plasticity.

[Back >>](#)

Duke-NUS Graduate Medical School Singapore

8 College Road, Singapore 169857 | Tel: (65) 6516 7666 | Fax: (65) 6516 7396

Email: info@duke-nus.edu.sg | Web: <http://www.duke-nus.edu.sg>

Welcome to Our World

Duke-NUS Graduate Medical School's 2010-2011 academic year has begun and the school would like to welcome its 56 new students as they each embark on a career in medicine. While the majority of new students comprise Singapore citizens and permanent residents, there is also a significant number from elsewhere in Asia and from further afield. So, like the classes before them, this latest intake (the 'Class of 2014') comprises a well-balanced mix of students from different backgrounds and cultures.

"We are proud to have such richness and diversity in our cohorts," said Professor Ranga Krishnan, Dean of Duke-NUS, speaking during the school's 'White Coat Ceremony', a formal and symbolic induction to welcome new students.

Official data from the school's admissions department certainly supports the view that the Class of 2014 brings a wide range of life experiences with them. They are all outstanding scholars, having gained Bachelors and Masters degrees, and PhDs in a variety of areas, ranging from the arts, to humanities, to science and engineering, from top universities in Singapore and around the world. Of note, there are two A*STAR National Science Scholars, a US patent holder, two nationally-ranked debaters, and one chess champion. Another student has completed a PhD in engineering and has been a team leader at Intel working on next-generation micro-processing technology.



Medical students from the class of 2014 - Leong Dalun, an engineering graduate from NUS and Giselle Marie, a neuroscience graduate from the University of Toronto are excited to pursue their medical journey at Duke-NUS.

In addition to their academic achievements, some of the new students have excelled as athletes and some are talented performers and musicians. There are two world-class sailors and an internationally recognized fencer. One student is a member of the US National Collegiate Table Tennis Association and there is an American Social Dance bronze medal winner. Notably, the school now has a Peabody (classical music) scholar who has studied at Julliard and competed at the prestigious International Frederic Chopin Piano Competition.



Rich diversity characterizes Duke-NUS.

Delving deeper, Vital Science talked to four new students:

Maeda Momoe attended Johns Hopkins University in Maryland, USA, graduating with a primary major in biomedical engineering and a second major in mathematics. She then obtained a Master of Science in biomedical engineering from Yale University. Since 1999, Momoe has spent most of her life outside her home country of Japan, except for a two month stint at a research lab in Kyoto in 2007. “The labs in Japan have their own dynamics, quite different from the ones in the US.” She also describes her experiences at Duke-NUS in Singapore as unique, with the TeamLEAD set-up being one of the highlights. “It is a completely new learning [experience] for me. The impact it has brought upon me is much larger than I expected. Because of the small class size, I feel closer bonds with my classmates.”

Joan Huang attended the University of Pennsylvania for her undergraduate studies, graduating with majors in biomedical science and Japanese studies. Joan is well known for her achievements, representing Singapore in sailing in international competitions for much of her teenage years in particular. Winning a gold medal in the Women’s 420 sailing class at the Asian Games in 1998 was certainly a proud moment for Joan and her team-mate, and for Singapore. “[Sailing] has taught me to deal with pressure very well and I think that medicine is also a field that when you are faced with pressure, you have to be calm and analyze and think things through carefully.” Joan emphasized the lessons she learnt in teamwork and communication in her sporting successes. “And it’s very apparent to me that in medicine, you have to communicate. Competitive sailing has taught me that effective communication is very important.”



Fantastic four (from left to right): Eric Cher - 'technopreneur', Joan Huang - champion sailor, Maeda Momoe - Japanese student and Muthukumar Ramanathan - award winning researcher).

Muthukumar Ramanathan from Singapore is one of two A*STAR National Science Scholars in the new class. After graduating with a major in biochemistry from the University of Wisconsin (UW)-Madison, Muthu worked on a research project at UW-Madison testing analogs of vitamin D in mice. By the end of the project, his team had identified two promising analogs that may provide us with a better understanding of how vitamin D is involved in autoimmune diseases such as type 1 diabetes. “I came away with a better appreciation of how research at the bench can have a positive impact in human life, and the immense effort put in by scientists and clinicians to deliver the promise of science to patients. Eventually, I hope to be part of this enterprise and contribute to better healthcare for all.”

Eric Cher, also from Singapore, graduated with a major in bioengineering and a minor in technopreneurship from NUS, which included a year working and studying at the University of Pennsylvania in the US. While there, he took the opportunity to engage actively in the start-up community and to study entrepreneurship and finance. Since 2009, Eric has completed three different biomedical device conceptualization projects. In addition, he initiated a student-run consulting group for start-up companies in Singapore. “These experiences have equipped me with a different perspective towards medicine and I believe that my next 4 years and many more ahead will be closely guided by my strong interest in medical devices,” said Eric. “At the same time, skills such as communication, teamwork and creative thinking ... acquired throughout my undergraduate days will definitely serve me well throughout my studies, especially in this very unique medical school.”

"The medical students enrolled in Duke-NUS are making long term commitments to medical care and research in Singapore. While we have a diversity we can really boast about," said Ms. Lisa Sehgal, Senior Manager, Student Recruitment and Admissions. "That diversity is really a strength. It enriches the classroom experience and is better preparing our students for what they will face once they become practicing clinicians and researchers. We reflect our desire for diversity in the classroom with the 'holistic' approach we take to student admissions. Academics are of course a very important component of an application, but they are not the only thing. We're also looking for leadership skill, an ability to think critically and creatively and an ability to work in teams. What is going to tip an applicant over is his or her compassion, dedication and passion for medical science. That's why we're looking for people who are multidimensional."



*Ms. Lisa Sehgal, Senior Manager,
Student Recruitment and Admissions.*



**Professor Bob Kamei,
Vice Dean of Education.**

Vice Dean of Education Professor Bob Kamei agreed, adding that "Students and faculty benefit from having diversity in our classrooms. It is part of the admissions process and it makes learning in our teams a richer experience. If you're going to be on the leading edge of medical science, you have to look at problems in new ways. If members of your team have not had varied experiences, you're going to tend to think alike, rather than from different perspectives. So the different life and educational experiences you bring to our school, whether or not it is to a first year TeamLEAD team, a clinical care or a research team is very valuable, though not quantifiable."

[Back>>](#)

Duke-NUS Graduate Medical School Singapore

8 College Road, Singapore 169857 | Tel: (65) 6516 7666 | Fax: (65) 6516 7396
Email: info@duke-nus.edu.sg | Web: <http://www.duke-nus.edu.sg>

Pioneers Present

Research projects completed by the pioneering 'Class of 2011' were recently presented at the Duke-NUS Graduate Medical School's Research Presentation Day.

"[Their] research projects have demonstrated the quality of the student and mentor partnerships, with the outcome of both meaningful and exciting work," said Dr. Sandy Cook, Senior Associate Dean of Curriculum Development. "We are very proud of this initial effort and look forward to the future classes' contributions to the biomedical knowledge."

Vital Science talked to four students who presented their projects:



Dixon Grant, mentored by Dr. Woulter Schul from the Novartis Institute of Tropical Disease in Singapore, won the award for the Best Basic Science Research Project for his studies of a novel Dengue Virus (D2Y98P) which is lethal in AG129 mice. Dengue viruses typically do not cause any illness in mice let alone death. Dixon showed that a single mutation in one dengue protein (NS4b) of D2Y98P abrogated the lethal phenotype.

"The protein NS4b is not well understood and my discovery may lead to a better understanding of this protein, and dengue pathogenesis in general," said Dixon. "In addition because the virus I studied was sequenced and well characterized it will be used to aid in drug and vaccine development. The specific mutation in NS4b may also be used to create a lethal phenotype in other dengue viruses allowing them to be studied in mice."



Vincent Tay, mentored by Associate Professor Ang Beng Ti, Department of Neurosurgery at Singapore's National Neuroscience Institute, won the Clinical Science Research Project category for his work on prognostication of intracerebral hemorrhage in the local patient population.

"In particular, the validation of the Hemphill's ICH Score in our large multiethnic patient cohort provided good evidence of its validity and robustness for clinical prognostication and risk-stratification," said Vincent. "Henceforth, it may also present opportunities for international multicenter trials to be conducted in Singapore, with its patient population that is representative of East and Southeast Asia that sees a high incidence of ICH."



Tan Tze Chin, mentored by Professor Fong Kok Yong from the Department of Rheumatology & Immunology at Singapore General Hospital, presented a Clinical Science category study showing that children born to women with active systemic lupus erythematosus (SLE) or whose mothers received high dose prednisolone were significantly more likely to have growth deficits than children born to mothers without SLE. In addition, she showed that SLE mothers demonstrated lower mean IQ scores than healthy women, with their children mirroring this trend.

"This study hopes to provide information for SLE patients when they are thinking of family planning," said Tze Chin. "We can offer better patient counselling with regards to pregnancy and growth outcomes of children born to women with SLE. It is particularly relevant in our society where educational achievement is highly valued. Early identification of learning difficulties allows for early intervention which will bring out the full learning potential of the child. This study will form the basis for a prospective study on the current cohort of children regarding their growth and neuropsychological development."



Bianca Chan, mentored by Dr. Olivera Finn, Professor and Chair of the Department of Immunology and Professor of Surgery (joint appointment) at the University of Pittsburgh School of Medicine in the US, presented a Basic Science category research project showing that a flu virus infection stimulates an immune response not only to virus-specific molecules but to many other molecules that are present in tumor cells as well.

“The results of my work indicate that acute infections may help boost the immune system and play a role in long term protection from cancer,” explained Bianca. “Having multiple acute self-limiting infections throughout life, while temporarily uncomfortable, may be nature’s way of generally ‘vaccinating’ us against cancer. The indiscriminate use of virus-specific vaccines to prevent relatively harmless infections may [therefore] short-circuit this safeguard, and the lack of immune stimulation may result in the loss of long-term protection from cancer.”

The new academic year is underway and a new batch of third year Duke-NUS students will have started to plan out their research projects. Vital Science wishes them all the best in their forthcoming endeavours.

[Back>>](#)

Duke-NUS Graduate Medical School Singapore

8 College Road, Singapore 169857 | Tel: (65) 6516 7666 | Fax: (65) 6516 7396

Email: info@duke-nus.edu.sg | Web: <http://www.duke-nus.edu.sg>

New PhDs in High Gear
By: Eric Fang (PhD student)

Question: What happens if you mix 12 research-oriented students together?

Answer: You get the inaugural IBM (Integrated Biology in Medicine) PhD class.

All of us have a passion for Biology and research, but our similarity ends there. Beyond this, you really cannot get a group more diverse than the PhD class. Some of us recently graduated, while others worked for a couple of years in various industries and capacities. I was a mid-career professional looking to switch to something meaningful and this PhD program in Integrated Biology in Medicine found me. To me, it meant that I could be trained in one of Duke-NUS' Signature Research Programs and contribute in that field in time to come.



Associate Professor Scott Summers (far left) with the class on the first day of orientation in July 2010. Classes officially commenced on August 16, 2010.

I was attracted to Duke-NUS because of the high quality of training and its emphasis on translational science. Both Duke and NUS are established research institutions in their own right, which naturally makes Duke-NUS a well-resourced progeny. I have no doubt that I will be exposed to top-notch researchers while I am here and become well-prepared for a career in research.

The extensive use of team learning was also another pull factor. I had limited prior exposure to this field and I figured that I would benefit greatly from such an educational method. It has certainly turned out to be the case.

You might wonder - how has it worked out for me so far? What is the inside scoop? 'In a nutshell', the past 3 months at Duke-NUS has been challenging. We take tests based on pre-assigned readings twice weekly. A typical week doesn't start at 9am on Monday when I step into class... it starts on the weekend when I do my readings.



Eric Fang, Duke-NUS PhD student.

The pace of material covered is very intensive with only 2 days allocated to each topic. Classes are often as “high-octane” as the F1 races. And we often go beyond the established facts and debate scientific opinions that are the open questions of today.

This rite of passage has been an exciting journey. Through these exchanges we learn both the technical know-how and the soft skills required for us to be successful researchers in future.

Although it has only been three months, the 12 of us have built strong bonds and established a good rapport with each other. We are making the first of many steps towards building a strong research network. Conventional wisdom has taught us that diversity in the gene pool ensures our viability as a species. Likewise, it is the diversity of the PhD class that adds vibrancy to the school and brings it to greater heights.

[Back>>](#)

Duke-NUS Graduate Medical School Singapore

8 College Road, Singapore 169857 | Tel: (65) 6516 7666 | Fax: (65) 6516 7396

Email: info@duke-nus.edu.sg | Web: <http://www.duke-nus.edu.sg>

Ngee Ann Kongsi Scholarship for Duke-NUS – First Two Recipients Announced



Board members of Ngee Ann Kongsi and Duke-NUS senior management, in front of the Ngee Ann Kongsi Distinguished Scholars wall.

The first Ngee Ann Kongsi scholarships were recently officially awarded to two outstanding students from Duke-NUS' Class of 2014, Tay Yu Ling and Sophie Cai. Ngee Ann Kongsi, an esteemed philanthropic organization here in Singapore, has pledged S\$3 million towards a Distinguished Scholars Program to help train outstanding doctors at Duke-NUS.

Their scholarships donation, which will be matched dollar-for-dollar by the Government of Singapore, is intended to support exceptional Singaporean and Singapore Permanent Resident students pursuing the Doctor of Medicine (M.D.) degree at Duke-NUS. Up to two scholarships will be awarded annually to students who have excellent academic achievement, with consideration for those with demonstrated financial need.



The Ngee Ann Kongsi Distinguished Scholars Sophie Cai (left) and Tay Yu Ling (right) with Ngee Ann Kongsi President, Dr. Lim Kee Ming.

“Ngee Ann Kongsi is delighted to have the opportunity to support such talented and accomplished students as Yu Ling and Sophie. We have every confidence they will exceed expectations in their medical training and service to the community”, says Dr. Lim Kee Ming, President of Ngee Ann Kongsi.

The two recipients have impressive backgrounds. Yu Ling has a B.Sc (Biological Science) and is also an internationally recognized fencer. She recently won the bronze medal for the women’s individual foil event at the Commonwealth Fencing Championships. Sophie received a B.A. (Hons) in biological sciences in the UK, and M.Sc in epidemiology in the US, and is also a recipient of the Goldman Sachs Global Leader Award.

Vital Science caught up with the two recipients for more insights:

Vital Science: How do you feel about the prospect of starting at Duke-NUS and how have you prepared for this significant milestone?

Yu Ling: I think it's really exciting embarking on this journey into medicine. I feel privileged to be in the midst of so many great minds and to be part of such a unique program. Prior to Duke-NUS, I did a hospital attachment at SGH where I learnt a lot - it was an enthralling experience. I also believe it's important to have the right mentality. I ask myself, what sort of doctor I want to be and then relate it back to what I want out of my medical education and life.

Sophie: I am very excited to pursue my medical journey at Duke-NUS. The TeamLEAD approach is a very novel one, where we engage in active team-based learning and discussion. This is definitely a significant milestone in my life. Before starting school, I was [also] fortunate enough to be able to 'shadow' some doctors in the Accident & Emergency and Internal Medicine departments on a short one-week elective attachment at SGH. It was a very educational experience and helped me better appreciate the challenges of practicing medicine and how one has to always keep learning as a doctor.

Vital Science: What does this scholarship mean to you and how has it impacted your medical journey?

Yu Ling: It is an honor to be a recipient of this scholarship. Definitely, it is a great help financially.

Sophie: I am very grateful for the scholarship as it has enabled me to attend Duke-NUS and pursue medicine. As I embark on my medical journey, I am motivated not only to excel in my studies, but more importantly, [to train to] be a good doctor to do my best for patients, as well as to contribute to our society. For the latter, I feel that research will be an integral part to transforming medicine and pioneering new approaches to treatment and therapies. Thus, I hope to pursue both clinical medicine and research in the future, contribute to the field of medicine and ultimately improve the lives of patients.

[Back>>](#)

Duke-NUS Graduate Medical School Singapore

8 College Road, Singapore 169857 | Tel: (65) 6516 7666 | Fax: (65) 6516 7396
Email: info@duke-nus.edu.sg | Web: <http://www.duke-nus.edu.sg>

Breaking News at Duke-NUS

Ground-breaking work by Duke-NUS Graduate Medical School researchers continues to be published in prestigious scientific journals worldwide. Vital Science profiles three particularly important studies reported by the school over the past few months.

Study 1. Surprising new explanation for a well known form of brain signaling

A landmark study revealing new insights into the mechanisms of 'tonic inhibition', a process involving the secretion of the inhibitory neurotransmitter GABA (gamma-amino butyric acid) to control brain activity, has been published in the journal *Science* on November 5.

Conducted by researchers from Duke-NUS Graduate Medical School in Singapore, the Korea Institute of Science and Technology, and Duke University in the US, the study describes two novel and important points about tonic inhibition.

First, it shows that GABA is secreted via ion channels rather than by conventional neurotransmitter secretion mechanisms. It is well established that these ion channels generate electrical signals. However, no previous studies have shown that ion channels are directly responsible for secreting neurotransmitters.

Second, it shows that GABA is secreted from glial cells, an abundant type of brain cell, the function of which is poorly understood. Neurons were previously thought to be solely responsible for GABA secretion, so this is also a major surprise.

"The overall importance of the work is that GABA is the major chemical signal responsible for inhibition of nerve cells, which is known to be important for virtually every aspect of brain function," said Principal Investigator Professor George Augustine from Duke-NUS. "The tonic inhibition that we studied is particularly known to be involved in sleep, memory and cognition. It is also known to be impaired in epilepsy and is also thought to be enhanced by drinking alcohol, which may account for some of the effects observed after drinking."

By establishing a molecular explanation for an important brain signaling mechanism, this work could lead to new targets for drug discovery, said Professor Augustine.

Study 2. Home-based self testing of blood thinner use as good as the doctor's

Patients who monitor themselves at home for proper dosing of the blood thinner warfarin seem to do just as well as patients who are monitored in a doctor's office, according to a study published in the *New England Journal of Medicine* on October 20.

"Home monitoring does appear to be a viable option, especially for patients who find clinic visits present geographic or physical challenges," said the study's co-lead author, Professor David Matchar, an internist with the Durham Veterans Affairs Medical Center, Duke University School of Medicine, and Duke-NUS Graduate Medical School in Singapore.



Professor George Augustine, Principal Investigator with the Neuroscience and Behavioural Disorders Program.



Professor David Matchar, Program Director of the Health Services and Systems Research Program.

In the multi-site study, nearly 3,000 patients with a mechanical heart valve or atrial fibrillation were randomly assigned to either weekly home testing of conventional monthly clinic monitoring of their warfarin use and were followed for between two and five years.

“We found that self-testing was approximately equal, not better, for reducing stroke, major bleeding or death,” said another co-author, Assistant Professor Rowena Dolor from Durham VA Medical Center and Duke University School of Medicine. “However, with home monitoring we saw an increase in the amount of time that patients were receiving the proper dose of warfarin. [And] they also reported improved satisfaction and general quality of life.”

Warfarin is widely used to prevent blood clots which can lead to complications, such as strokes. However, the agent requires careful monitoring and is often underused or misused due to difficulties in its administration.

This study suggests that patients can be trained to use hand-held ‘finger stick’ devices to effectively assess their own international normalized ratio (INR), or how fast their blood is clotting. They can then phone in the results to their physician, who will then be able to offer advice on whether any dosage adjustment is necessary.

Study 3. Secrets of neural stem cell growth unveiled

A novel feedback mechanism that controls the delicate balance of brain stem cells either renewing themselves as stem cells or differentiating into a dedicated type of neuron (nerve cell), has been reported by Duke-NUS scientists in the November 16 issue of *Developmental Cell* journal.

The researchers showed that Zif, a newly discovered protein that is important for inhibiting overgrowth of neural stem cells in fruit flies (genus *Drosophila*), ensures that a neuroblast proliferation factor (known as aPKC) maintains appropriate levels in neural stem cells.

“There is a Zif-related protein in humans, and its function remains to be analyzed,” said Assistant Professor Wang Hongyan from the Neuroscience & Behavioral Disorders Program at Duke-NUS. “Our finding has paved the way for future study of this human protein in the context of diseases, including glioblastomas, the most severe form of brain tumors... [It is] absolutely possible to manipulate Zif function into a form of therapy [against diseases, including cancer].”

Assistant Professor Wang added that her team are now looking to determine the mechanisms of neural stem cells’ self-renewal in mammals. “We are looking for the right collaborators,” she said. “We will also continue to use *Drosophila* as a powerful model system to uncover critical players in neural stem cell self-renewal so that we can understand the network involved in this regulation.”



Assistant Professor Wang Hongyan, Principal Investigator with the Neuroscience and Behavioural Disorders Program.

[Back>>](#)

Duke-NUS Graduate Medical School Singapore

8 College Road, Singapore 169857 | Tel: (65) 6516 7666 | Fax: (65) 6516 7396
Email: info@duke-nus.edu.sg | Web: <http://www.duke-nus.edu.sg>

SingHealth and Duke-NUS Host Joint Scientific Congress

The inaugural SingHealth Duke-NUS Scientific Congress, held at Singapore's Suntec Convention Centre from October 15-16, 2010, attracted more than 2,100 medical practitioners, academics, researchers and overseas healthcare leaders. Officially opened by Guest of Honor Deputy Prime Minister Teo Chee Hean, the two-day congress provided an ideal opportunity for lively debates on pioneering research going on at SingHealth and Duke-NUS in particular.

“SingHealth is boosting its focus on translational clinical research, and we have had promising results with an increasing number of clinician scientists and researchers successfully securing competitive grant funding for their research projects and winning national level science awards,” said Professor Tan Ser Kiat, Group CEO, SingHealth, adding that, **“the congress marks a major milestone in SingHealth’s plan to pursue academic medicine in partnership with Duke-NUS.”**



Guest of Honour Mr Teo Chee Hean, Deputy Prime Minister & Minister for Defence, gives his opening speech.



An invigorating percussion performance wows the crowd at the opening ceremony.

In addition to discussions on latest clinical and research advances, the congress addressed broader aspects of public healthcare in Singapore, such as bridging medical education and quality care, developing clinical investigators and scientists, providing age-friendly patient care services, and using medical technology to further improve research and patient care.

Duke-NUS and SingHealth have a strong commitment to combine their resources in a bid to speed up the translation of scientific discoveries to the market. The ongoing active academic exchange between the two groups' clinician-educators and clinician-scientists has been described as far-reaching, going far beyond the usual level of collaboration that might be expected between a medical school and a hospital group.

Professor David Matchar, Co-Organising Chairperson of the Congress and Program Director for Health Services & Systems Research at Duke-NUS said: “There is an urgent need to address the needs of a shifting demographic in Singapore and internationally. The Congress’ theme speaks of the importance of crossing traditional barriers: barriers between researchers and practitioners, generalists and specialists, among all variety of health care providers, and across traditional health care entities and the community. This will be a celebration of our rich and innovative enterprise.”



Professor the Lord Darzi of Denham gives his Keynote Lecture on 'Innovation in the Care of People with Complex and Chronic Illnesses'.



The inaugural scientific congress jointly hosted by SingHealth and Duke-NUS opened on a successful note.

Over 600 presentations, abstracts and papers on research breakthroughs covering a wide spectrum of topical issues in healthcare and biomedical sciences were presented at the congress. Our congratulations go to the following researchers and students on their award achievements:

STUDENT AWARDS

Best Oral Paper (Clinical Research) Award

Evaluation of Two Clinical Classification Schemes and a Rapid Test for the Diagnosis of Acute Dengue	Ms. Shera Chaterji (4th year Duke-NUS medical student)
--	--

Best Poster Award (Health Services & Systems Research)

Predictors and Adverse Outcomes of Inadequate or Excessive Gestational Weight Gain in Singaporean Women	Ms. Koh Huishan (4th year Duke-NUS medical student)
Cost-Utility Analysis of Penetrating Keratoplasty and Deep Anterior Lamellar Keratoplasty for the Treatment of Keratoconus	Mr. Timothy Koo (Duke University)

RESEARCH FACULTY AWARDS

Best Oral Paper (Basic Sciences) Award

IC261 Induces Cell Cycle Arrest and Apoptosis of Human Cancer Cells via a CK1δ/ε Independent Mechanism	Dr. Cheong Jit Keong (Program in Cancer & Stem Cell Biology)
Positive Feedback from PI3K to Ras is Required for Cell Polarization and Migration	Ms. Elisabeth Tan (Program in Neuroscience & Behavioral Disorders)

Best Poster Award (Basic Science)

A Functional Alternative Splicing Mutation in Human Tryptophan Hydroxylase-2	Assistant Professor Zhang Xiaodong (Program in Neuroscience & Behavioral Disorders)
--	---

Best Oral Papers (Health Services & Systems Research)

Depressive Symptoms Among Older Singaporeans: Do Living Arrangements and Social Networks Matter?	Dr. Chetna Malhotra (Program in Health Services & Systems Research)
--	---

Prime Minister of Kazakhstan Visits Duke-NUS



Prime Minister of Kazakhstan, His Excellency Karim K. Massimov (center right) made his first official visit to Duke-NUS on October 13, 2010. Mr. Karim Massimov was welcomed by members of the Duke-NUS senior management team, including Professor Ranga Krishnan, Dean (center left).



Dr. Mara Catherine McAdams, Operations Director of the Clinical Performance Centre at Duke-NUS, demonstrates the use of the K-Plus Cardiopulmonary Simulators in the SIM lab which forms part of the curriculum training for students.

[Back>>](#)

Duke-NUS Graduate Medical School Singapore

8 College Road, Singapore 169857 | Tel: (65) 6516 7666 | Fax: (65) 6516 7396
Email: info@duke-nus.edu.sg | Web: <http://www.duke-nus.edu.sg>

Building Awareness on Grief and Bereavement in the Community

By: Ivan Woo, Senior Research Executive

Lien Centre for Palliative Care

The first of many Singapore community bereavement public education forums was held recently at the Central Singapore Community Development Council in conjunction with World Hospice and Palliative Care Day on October 9, 2010.

The morning session of the forum began with a presentation to a room packed with professionals by project manager Mr Ivan Woo on "Current debates on inclusion of prolonged grief disorder in DSM-V". Mr Woo shared with the audience the arguments for and against the inclusion of prolonged grief disorder in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders. This was followed by a panel discussion on assessment and intervention for bereaved individuals.

In the afternoon session, which was open to the general public, attendance was also high. The presentation delivered – "Preparation for a good farewell: What have we learnt from end-of-life caregivers?" – was based on findings from a qualitative study conducted by the Lien Centre for Palliative Care in 2009. This was followed by a panel discussion made up of experts on grief and bereavement from the major ethnic groups in Singapore and a former family caregiver. The panel provided insights on possible ways to cope with the challenges that come with the need to bid a final farewell to a dying loved one.

As part of the Singapore Community Bereavement Project, these education forums are designed to stimulate awareness on grief and bereavement among professionals and members of the general public. The project, a collaboration involving the Lien Centre for Palliative Care, Assisi Hospice and HELP Family Service Centre, is funded by the Tote Board Community Healthcare Fund through the Ministry of Health and the Lien Centre for Palliative Care.

The overwhelming response for the October forum shows that there is a great need for more such information to be made available to members of the community in Singapore. Positive responses received from feedback forms indicated that the event was a success. Over 90 percent of the professionals agreed that it had proven useful in clarifying issues related to the medicalization of grief and would help them in their effort to support a bereaved individual. Similarly, members of the general public expressed positive feedback on how their session had boosted their confidence and given them ideas on bidding farewell to a dying loved one.



The panel of experts in active discussion.



Members of the public/professionals listen attentively.



Former family caregiver sharing.



Educational panels enhanced the learning experience.

[Back>>](#)

Duke-NUS Graduate Medical School Singapore

8 College Road, Singapore 169857 | Tel: (65) 6516 7666 | Fax: (65) 6516 7396

Email: info@duke-nus.edu.sg | Web: <http://www.duke-nus.edu.sg>

About DUNES

Established in 2009, the Duke-NUS Early Career Scientists Association (DUNES) provides avenues through which students and researchers at Duke-NUS can improve their career prospects. This includes events to enhance professional skills, develop scientific and social networks, and provide wider community services. The association is run by the early career scientists themselves, with invaluable support from Duke-NUS.

DUNES Symposium 2010

The highlight of the DUNES calendar is the annual symposium, an opportunity for early career scientists to showcase their research findings and network with other researchers - vital skills for a successful career in science. In an attempt to broaden the scope of this year's symposium held on October 8, DUNES reached out not only to staff and students at Duke-NUS, but also to the wider SGH campus and other major research institutes.

Submissions were received from across Singapore, promoting the integration of Duke-NUS into the wider research culture. The research presented was of exceptional quality and eclectic in its diversity. In addition, this year's symposium boasted career talks by internationally recognized research and industry scientists who gave up their time to encourage and guide the next generation of scientists in what it takes to have a successful scientific career.

The day began with the first keynote speaker, Dr. Robert Clarke, Senior Lecturer and Breast Cancer Campaign Research Fellow, who described his unconventional journey to research independence and scientific success. It was a uniquely personal insight from Dr. Clarke. His message: that success doesn't have to fit into a formula.

The second part of the morning and first afternoon sessions were dedicated to presentations from early career scientists, on everything from classical biochemistry to regional sociology. The final session was a keynote presentation by Dr. Rosemary Tan, CEO of Veredus Laboratories, who gave valuable insights into the world of commercial and industrial science. She described an intuitive and fortuitous path to negotiate the "cut-throat" world of business.

The symposium closed with an open-forum session with Professor William Muller, a straight-talking Canadian Scientist who highlighted the importance of being committed and passionate about science. Attendees then had the opportunity to network with academic staff and keynote speakers over wine and cheese. With over 100 registrants and many more additional attendees at the sessions, this year's symposium was a great success.



The DUNES symposium attracted more than 100 registrants (not including those 'blown in' by the 'winds' of popular attendance).



DUNES encourages everyone who attends its activities to register. Registration gives the association the Weight it needs to keep providing beneficial activities to early career scientists across Singapore. Those wishing to register can do so on the DUNES website: www.dunes.sg.



Professor William Muller 'charges up' the audience of junior scientists, highlighting the importance of being passionate about their work.



Good scientists aren't afraid to ask tough questions.



The symposium ended with a casual wine and cheese mixer where staff and students had an opportunity to mingle with other researchers as well as the local and international keynote speakers.

[Back >>](#)

Duke-NUS Graduate Medical School Singapore

8 College Road, Singapore 169857 | Tel: (65) 6516 7666 | Fax: (65) 6516 7396

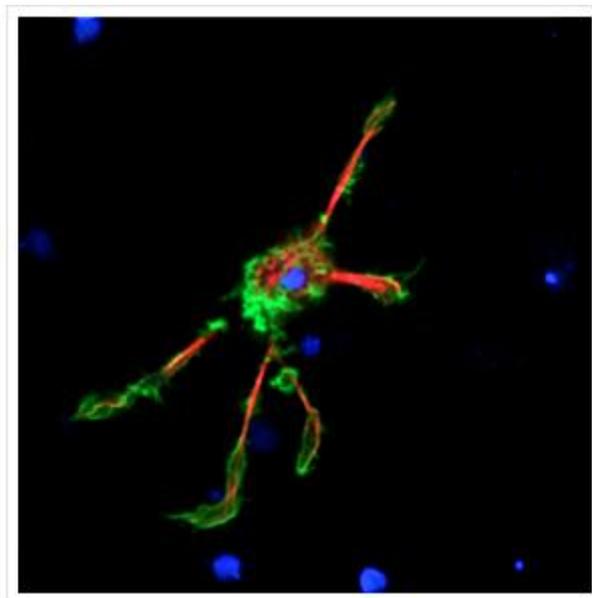
Email: info@duke-nus.edu.sg | Web: <http://www.duke-nus.edu.sg>

DUNES Photo Competition

As part of the annual symposium, scientists and non-scientists were invited to enter a photo competition. Two new categories were introduced this year (non-scientific and mobile phone) and below are the pictures by this year's winners.



*Non Scientific Category - Lost Souls
(Soon Chun Siong)*



*Scientific Category - Cell Fashion Show
(Gisela Garcia-Alvarez)*



*Mobile Phone Category - Love
(Bryan Tan)*

[Back >>](#)

Duke-NUS Graduate Medical School Singapore

8 College Road, Singapore 169857 | Tel: (65) 6516 7666 | Fax: (65) 6516 7396

Email: info@duke-nus.edu.sg | Web: <http://www.duke-nus.edu.sg>

Coastal Clean-up Day at Changi Beach

DUNES encourages involvement in activities that not only benefit its target members but also the community at large. This year the focus was environmental, with an inaugural Coastal Clean-up Day organized in conjunction with the International Coastal Clean-up Singapore 2010. Every year, on the third Saturday of September, volunteers at Singapore's coastal areas to collect and record the amount of rubbish found on the beach. The aim of the project is to create awareness of the detrimental effect of plastic debris to the island's marine life and to collect data to support efforts to keep Singapore clean and green.



The dedicated team of Duke-NUS staff and students doing their bit to help the Singapore environment.



These tools aren't just good for picking up rubbish!



Changi beach never looked so good.

[Back >>](#)

Duke-NUS Graduate Medical School Singapore

8 College Road, Singapore 169857 | Tel: (65) 6516 7666 | Fax: (65) 6516 7396

Email: info@duke-nus.edu.sg | Web: <http://www.duke-nus.edu.sg>

Table Tennis Competition

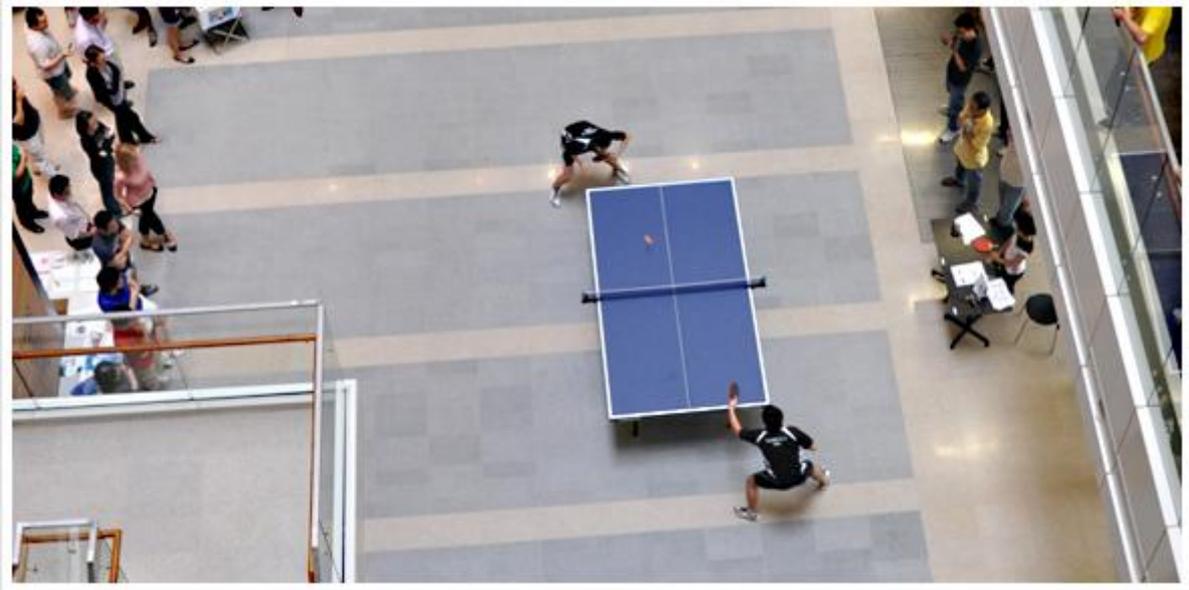
All work and no play makes Jack a dull boy. DUNES recognizes the importance of work-life balance and, as such, organized a table tennis competition on September 3, 2010. Players of all skill levels from all departments and classes within the school came together to fight it out for the bragging rights to be called Duke-NUS champions.



Old School versus New School.



Who doesn't like to show off a little bling?



Players from the Singapore national youth team showing us how it's meant to be done.

[Back >>](#)

Duke-NUS Graduate Medical School Singapore

8 College Road, Singapore 169857 | Tel: (65) 6516 7666 | Fax: (65) 6516 7396

Email: info@duke-nus.edu.sg | Web: <http://www.duke-nus.edu.sg>