

# NEUS LINK

CENTRE FOR THE CARE OF THE BRAIN, SPINE, NERVE AND MUSCLE • ISSUE 4 • JULY - DECEMBER 2014

PATIENT CARE

EDUCATION

RESEARCH

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# Our Patients, Our Passion



National  
Neuroscience Institute  
SingHealth

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# Passing the Baton: A New Medical Director

Associate Professor Ng Wai Hoe has been appointed to the new role of Medical Director, taking on the leadership role from Professor Lee Wei Ling, who has served as the Institute's Director for 11 years. Assoc Prof Ng will also take over as the new Academic Chair of the SingHealth Duke-NUS Neuroscience Academic Clinical Program (NEUROSC ACP), with effect from 1 January 2015.

Says Assoc Prof Ng, "As I embark on my new role, I would like to express my gratitude to Prof Lee Wei Ling for her strong leadership over the past 11 years which has placed NNI in an excellent position. Prof Lee has always fought for the interest of our staff and ensured that patient welfare is paramount. Personally, I am grateful for her mentorship and trust. While there are certainly challenges ahead, I am quietly confident that Team NNI has the talent and resolve to make NNI a great place for caring, learning and trailblazing."

## Milestones

The world's first  
 digitally-integrated  
 neuroscience  
 centre at SGH

Numerous  
 achievements  
 in research and  
 education

### Advancing Patient Care, Research and Education

Assoc Prof Ng has previously served concurrent roles as Deputy Director of NNI, Deputy Chair of the SingHealth Duke-NUS Neuroscience ACP and Head of the Department of Neurosurgery. He also served as Head of the Department of Neurosurgery at the SGH Campus till June 2014.

He is part of the Clinical Faculty Scheme at the NUS Yong Loo Lin School of Medicine, and his other appointments include Co-Director of Brain and Behaviour at Duke-NUS and Programme Director for the World Federation of Neurosurgical Societies (WFNS) Postgraduate Training Centre. He is also the Executive Editor of the Asian Journal of Neurosurgery, and an Editorial Board Member of major neurological journals such as World Neurosurgery, CNS Oncology and Journal of Clinical Neuroscience.

NNI looks forward to reaching greater heights and further enhancing the Institute's sterling reputation in clinical service, education and research under his leadership.

*“While there are certainly challenges ahead, I am quietly confident that Team NNI has the talent and resolve to make NNI a great place for caring, learning and trailblazing.”*

*- Assoc Prof Ng Wai Hoe*



A world-class  
Neuroradiology  
service

Formation of the  
National Neuroscience  
Research Institute  
Singapore (NNRIS)

Establishment of  
the Neuroscience  
Academic Clinical  
Program  
(NEUROSC ACP)

An International  
Centre of Excellence  
in Parkinson's disease  
by US-based National  
Parkinson Foundation

# Lifetime of Achievements Honoured

Twelve pioneering staff were honoured at NNI's Long Service Awards for being with the Institute for 10 years or more. They received a special thank-you on 28 November 2014, together with NNI's pioneering members. On hand to present the tokens of appreciation was Associate Professor Sitoh Yih Yian, Deputy Director, NNI.

In addition to recognising our staff's commitment, contributions and loyalty, the Long Service Award presentation is an opportunity for NNI to show its appreciation to their dedication, considered to be one of the Institute's greatest strengths.



(From Left) Assoc Prof Sitoh Yih Yian with the Long Service Award recipients; Dr Ong Peck Leong, Assoc Prof Francis Hui, Dr Chua Hoe Chin, Ms Rose Sharon, Dr Sanaullah Khan, Dr Nagaendran Kandiah, Ms Ng Hwee Lan, and Ms Amy Chew.

## Award Recipients

40  
years

**Dr Ong Peck Leong**  
Department of Neurosurgery

30  
years

**Assoc Prof Francis Hui**  
Department of  
Neuroradiology

20  
years

**Dr Chua Hoe Chin**  
Department of Neurology

**Assoc Prof Nigel Tan**  
Department of Neurology

**Ms Rose Sharon**  
Neuroscience Clinics

10  
years

**Dr Sanaullah Khan**  
Department of Neurosurgery

**Dr Nagaendran Kandiah**  
Department of Neurology

**Dr Sim Li Ean**  
Department of Neurology

**Dr Adeline Ng Su Lyn**  
Department of Neurology

**Ms Ng Hwee Lan**  
Department of Neurology

**Ms Amy Lee**  
Human Resource &  
Administration

**Ms Amy Chew Yee Pheng**  
Neuroscience Clinics

# Pioneering Footsteps

In conjunction with Singapore's 50<sup>th</sup> anniversary, NNI has paid tribute to its very own pioneer generation. Laying the foundations of the practice as we know it today, our pioneers demonstrated unwavering perseverance, diligence and vision in their decades of work, leaving a lasting healthcare legacy for generations to come.



*(From Left), NNI's Pioneers, Mr Steven Sobak, Dr Ong Peck Leong, Mr Tien Sin Leong, Mr Ismail Bin Ahmad, Dr Charles Seah, and Dr Chumpon Chantharakulpongsa.*

As part of the tribute, NNI organised a year-end event on 28 November 2014 in the presence of 200 staff, to celebrate the valuable contributions and achievements of NNI's pioneering members.

Staff members were treated to a nostalgic video tracing the history of the medical field and the evolution of Singapore's healthcare system, while Assoc Prof Francis Hui, Chairman of the Medical Board at NNI, presented tokens of appreciation to NNI's pioneers for their outstanding achievements and life-long dedication towards healthcare.

The NNI Pioneers who were awarded were: Mr Steven Sobak, Chief Operating Officer, Dr Charles Seah, Senior Registrar (Neurosurgery), Dr Chumpon Chantharakulpongsa, Senior Consultant (Neurosurgery), Dr Ong Peck Leong, Senior Consultant (Neurosurgery), Mr Ismail Bin Ahmad, Senior Patient Services Assistant (Neuroradiology) and Mr Tien Sin Leong (Neuroradiology).

## From Third World to First World

For many of these pioneers, they were first-hand to witness the transformation of the neuroscience field from third world to first world standards in Singapore.

In the past, without CT scans or MRIs, neurosurgery patients, while unconscious, had to be lifted and turned in one full circle to allow air to flow into other ventricles, before X-rays could be taken to perform a ventriculogram study. Furthermore, given the “primitive equipment” available, even routine operations could take up to 12 hours.

Mr Tien, who himself has been in healthcare since 1976 before transferring to NNI in 1999, was the manager of an administrative team responsible for establishing the Neuroradiology Department in NNI.

He said, “I had a two-month deadline to recruit staff to run a 24-hour neuroradiological service and set up all equipment, including CT and MRI scans, and a new nuclear medicine service a little later. Setting up the department was challenging, but with the help of my colleagues, nuclear medicine became a full-fledged diagnostic service within a few months from 1 June 1999.”

Mr Ismail, who was recruited by Mr Tien to NNI in 1999, also recalled the technology of yesteryear: “I started working from the early days of manual film processing to digitised images of today. I’ve learnt new work and progressed since the beginning and with the help of Mr Tien, I have managed to train the photo-technicians to perform well in their work in order to do a 24-hour rotating shift.”

# Voices of our Pioneers



*“Having been involved in healthcare since 1971, what keeps me going are the constant challenges for learning and improving. One stays in public healthcare not for the money but to be able to take care of patients better, and to create better systems.”*

**Mr Steven Sobak**



“Having a multidisciplinary approach was primarily for the patients – to treat them better and more holistically. Seeing a patient’s smile is all that I want.”

**Dr Chumpon Chantharakulpongsa**



“I’ve learnt new work and progressed since the beginning and with the help of Mr Tien, I have managed to train the photo-technicians to perform well in their work in order to do a 24-hour rotating shift.”

**Mr Ismail Bin Ahmad**

## Spearheading New Directions

Dr Ong, who is one of Singapore’s earliest neurosurgeons in 1972, recalled how rapid Singapore’s healthcare has advanced since the 1970s. As an integral part of neuroscience’s early years in Singapore, our pioneers were the ones to sow the seeds and chart new paths of growth for the discipline.

Dr Ong, for example, quickly saw the need for subspecialisation in neurosurgery during its early days. He shared, “Back then, neurosurgeons were generalists, Jack of all trades and master of none; with each one performing only a few of each procedure. I stayed back to develop neurosurgery here to a first world standard. I knew it was better to focus on a few things and do them well, rather than do many things in a mediocre manner.”

“Subspecialisation was key to our growth, but we were unable to do that unless we were able to train a lot of people and convince them that it was good for the patients,” he elaborated. It was this foresight that resulted in the development of subspecialties like spinal, tumour and paediatric neurosurgery.

Dr Chumpon is another pioneer who had a hand in the discipline's growth since the time when the only department of neurosurgery in Singapore was at TTSH. Under the guidance of Singapore's fathers of neurosurgery such as the late Dr Tham Cheok Fai, he helped to set up the department of neurosurgery in SGH. Using this as an opportunity to establish a different centre from TTSH, Dr Chumpon harboured the idea of using a multidisciplinary approach towards neurosurgery, with a combined team of surgeons from general surgery to ENT collaboratively involved in each operation. Now because of his efforts, neurosurgery is an intrinsic part of every discipline.

He shared, "Having a multidisciplinary approach was primarily for the patients – to treat them better and more holistically. Seeing a patient's smile is all that I want."

### Caring for Patients, Through the Years

For our pioneers, caring for their patients has kept them going through the years, and under the guidance of mentors, it has been their primary motivation during their long-standing dedication in healthcare.

For Dr Seah, it was mentors such as Dr Tham who inspired him to a lifetime of caring. He shared, "Dr Tham was very kind to me and had taught me a lot since 1981. And for that, I am very thankful as his guidance was very useful in my life experiences."



"Dr Tham was very kind to me and had taught me a lot since 1981. And for that, I am very thankful as his guidance was very useful in my life experiences."

**Dr Charles Seah**



"Setting up the department was challenging, but with the help of my colleagues, nuclear medicine became a full-fledged diagnostic service within a few months from 1 June 1999."

**Mr Tien Sin Leong**



"Subspecialisation was key to our growth, but we were unable to do that unless we were able to train a lot of people and convince them that it was good for the patients."

**Dr Ong Peck Leong**

Dr Seah was residing in Jakarta in 1998 when he was called by Dr Ong, to start a Neurosurgery service with another consultant, at Changi General Hospital (CGH). After neurosurgery was established at CGH in 2001, he remained at NNI, dedicating his time towards patient care.

Mr Sobak shared, "Having been involved in healthcare since 1971, what keeps me going are the constant challenges for learning and improving. One stays in public healthcare not for the money but to be able to take care of patients better, and to create better systems."

NNI's Chief Operating Officer was part of the SGH restructuring in 1989 and regards one of his greatest contributions as first implementing financial counselling at the hospital. Now, financial counselling is a basic and standard service offered across all hospitals in Singapore to help patients understand their financial options.

Dr Chumpon agrees that a dedication to patients is what separates dedicated healthcare practitioners apart: "What drives you should not be business but medicine. And the purpose of medicine is to deliver healthcare to the people."

As we celebrate how far Singapore's healthcare system has come after 50 years, NNI salutes our pioneering generation that has made it all possible.

# Education and Empowerment in Nursing

This year's Neuroscience Nursing Week saw the presence of Dr Robert Blessing and Ms Kelly Blessing, from the Duke University Medical Centre, at NNI. The Blessings were invited to share their dynamic roles in nursing and encourage nurses to enhance their capabilities to improve patient care.

Over the course of three days, the nurses at NNI engaged in in-depth discussions with the Blessings. The Neuroscience Nursing Seminar was held on the third day to encourage nurse from various hospitals and specialist centres in Singapore, to advance their nursing roles.

The entire course of events received an overwhelming response, and the full-day seminar left nurses enriched and inspired to pursue lifelong learning and enhance the purpose behind their profession.

## Excellence in Nursing

An example of empowerment in nursing is Ms Ng Wai May, an Advanced Practice Nurse and Senior Nurse Clinician from NNI. Ms Ng was given the President's Award for Nurses on 30 July 2014.

Well known to many for her cheerful disposition and dedication, Ms Ng has brought pride to the Institute with her contributions to patient care, and NNI hopes to see more of its nurses excel in their professional roles.

The face of nursing has changed, and NNI aims to sustain a solid system to deliver patient-centric care. It is therefore important for nurses to progress and establish themselves as successful advocates and leaders.



*The Blessings with Assoc Prof Nigel Tan (centre), and nurses from NNI.*



*Ms Ng Wai May is an exemplary figure who has excelled in her professional roles and contributions to patient care.*





## Talking Points with the Blessings

The affable Blessings were very open to sharing, and were a delight to chat with. Neuslink shares its conversation with the Blessings:

### How do you view the practices surrounding the nursing profession in NNI?

**Robert:** The nurses definitely seem to care; they are here at the seminar with the intent of advancing their knowledge and skill sets. So they are interested in learning, otherwise I do not think I would see so many of them here. It is nice to see that they care.

### In the past, nurses were committed towards patient care and there was a lack of awareness in going beyond and expanding their career. The face of nursing has evolved now. What is your view on nurses today?

**Robert:** I think as more nurses get involved in patient care and expand their work scope, they are helping patients to a great deal. This is how I see it now and here in NNI.

### There may be situations where nurses may not feel encouraged to pursue their profession. Why do they need to understand the importance of nursing education?

**Kelly:** It makes their job easier (laughs). What physicians need to know is that once they see what an APN (Advanced Nurse Practitioner) can do, they will understand the benefits.

**Robert:** Doctors go into medicine or the health profession for the

same reasons, which is to achieve better patient outcomes. As long as they understand that we are all working together to try to provide the best patient outcome, then that makes it a little easier. We have to remind everyone in our messages that we all are here for the same reasons.

### In your opinion, what is required of an institution to be recognised as a centre of excellence in patient care, education and research?

**Robert:** Opportunities for professional growth for nurses would be one of the most important ways for an institution to show that it cares for the growth of its nurses.

In the areas of education, research and advancement of clinical practice, with reference to the three pillars of healthcare that NNI works on, it is important to instill on every level, from physicians, to nurses and to allied health professionals, the need to be strongly involved in all the three areas.

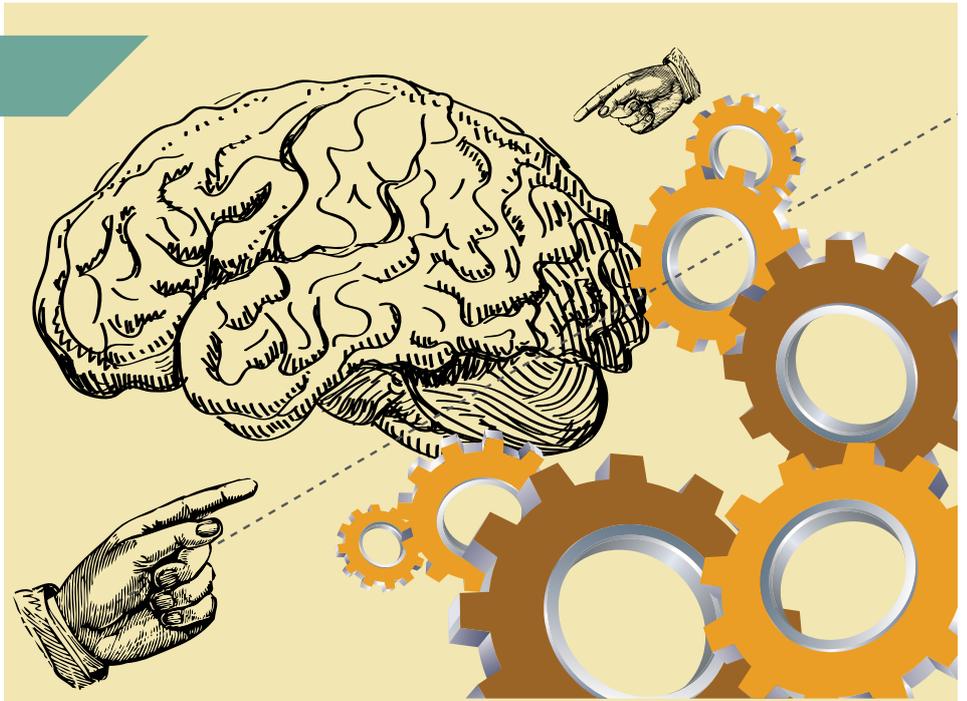
Another important thing is collaboration with everybody. The physicians must collaborate with their nurses; it has to be a team approach in order for an institute to be a centre of excellence in every aspect.

## Public Forum

# Living Without Pain



*Assoc Prof Ng Wai Hoe was one of the speakers at the Public Forum, offering surgical solutions for pain management.*



Held on 13 September 2014, NNI's annual public forum on pain management, 'Living Without Pain', was jointly organised by NNI's Department of Neurosurgery and TTSH's Pain Management Clinic.

Neuropathic pain is a chronic condition suffered by millions over the world, and presents a major challenge to the medical community. The forum provided expert advice on the condition, assessing pain, and advice on treatment options including

surgical options such as spinal cord stimulation.

Speakers from NNI included Assoc Prof Ng Wai Hoe, the Institute's Medical Director and Senior Consultant from the Department of Neurosurgery, and Dr Ang Kexin, Associate Consultant from the Department of Neurology. They were joined by TTSH-PMC specialists, Dr Vincent Yeo, Clinical Director, Head of Chronic Pain Service and Senior Consultant, and Dr Stephen Chan, Head of Acute Pain Service and Consultant.

## Dementia Awareness Day



NNI held its annual Dementia Awareness Day on 11 October 2014, offering complimentary cognitive evaluation to highlight the health and social benefits for the elderly.

Spearheaded by Dr Nagaendran Kandiah, Senior Consultant, Department of Neurology, the initiative aims to create an awareness of dementia and concerns facing the elderly in Singapore.

The last event saw NNI working together with the People's Association, to bring together over 200 participants from the Toa Payoh Central and Toa Payoh West constituencies. Bilingual forum sessions also ran concurrently to inform the public on the importance of early and regular cognitive evaluation.

# Reaching Out with Care and Concern



In August 2014, the Amyotrophic Lateral Sclerosis (ALS) Ice Bucket Challenge created waves over the world, but one realisation that arose from these events was that many people were not aware of Motor Neuron Disease (MND). It is important for people to not only know what they are raising funds for, but to learn more about the condition and its implications.

The social model of disability says that disability is caused by the way society is organised, rather than by a person's impairment. When more people are knowledgeable about MND, there will be more effort taken to remove barriers that restrict life choices and adopt more adaptive technology (e.g. easy access to wheelchairs and communication aids).

## Connecting with New Bonds and Support

Patients find that sharing their experiences with other patients with the same condition helps them manage going through this common trial together. They somehow feel supported by each other and hopefully can learn from each other's coping mechanisms. As an institution centred on patient care, NNI has established various support groups for patients including the Motor Neuron Disease/ALS Support Group (MND/ALS Support Group).



The MND/ALS Support Group was set up by NNI's Department of Neurology, primarily Dr Mavis Ang Kexin, an Associate Consultant, with the guidance of Associate Professor Umapathi Thirugnanam, a Senior Consultant. The current Support Group had its first meeting on 4 June 2011, and has matured ever since. Patients and caregivers have bonded with and supported each other more than before.

Patients afflicted by this complicated disease have led very full lives before they were diagnosed. As recounted by Dr Ang, one patient participated in triathlons, and others included an international school principal and an army commander.

"The progressive weakness of their muscles, the loss of roles that used to define them, and the body distortion certainly brings much suffering and misery. But deep within, they are still the same person. I think that since we are part of society, we have to assist them in continuing to be themselves. Many have been exemplary in the way they continue to lead their lives to the best that they can," said Dr Ang.

Patients and caregivers are more than welcome to attend the support group. To know more about the MND/ALS Support Group or view the session schedules, please visit [www.nni.com.sg/patients/pt-education-resources/patient-support/Pages/mnd-als-support-group.aspx](http://www.nni.com.sg/patients/pt-education-resources/patient-support/Pages/mnd-als-support-group.aspx).

## Motor Neuron Disease/ALS Support Group

- Quarterly sessions; each includes an introductory talk, mass exercise and discussions.
- A platform for education, care and support for caregivers and people living with motor neuron disease, and a network for service provision.
- Currently helmed by a core team of Neuromuscular specialists at NNI; Assoc Prof Umapathi Thirugnanam, Dr Kamal Verma, Dr Josiah Chai, Dr Kalpana Prasad, Sister Kamilah Bte Shekh Jabin, Dr Chan Yeow, along with allied health professionals and volunteers.

## Motor Neuron Disease (MND)

In MND, motor nerves become damaged and eventually stop working. There are various subtypes of MND. In each type, symptoms tend to start in different ways. However, as the disease progresses, the symptoms of each type tend to overlap.

### Types of MND

- Amyotrophic Lateral Sclerosis (ALS)
- Progressive Bulbar Palsy (PBP)
- Progressive Muscular Atrophy (PMA)
- Primary Lateral Sclerosis (PLS)

# At the Stroke of Time

Over the past years, NNI has set out to educate patients on stroke prevention, provide learning platforms on stroke care, carry out research studies across basic science, translational, clinical and health services and be actively involved in clinical trials. The previous issue of Neuslink showcased the collaborative efforts of clinicians and basic scientists in advancing stroke care. We will now take a look at other stroke care initiatives that the institute has been involved in.

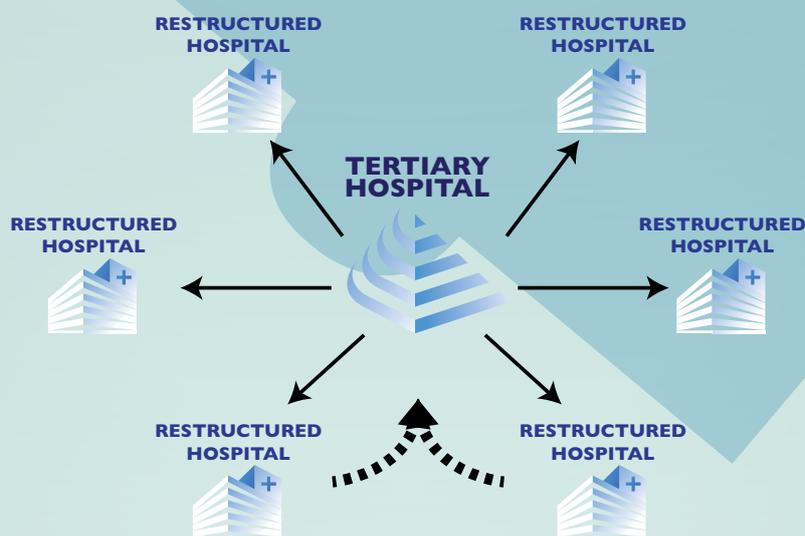
## The Stroke Programme

- Currently the largest and most comprehensive patient-based clinical programme within NNI.
- Enforces a highly skilled multidisciplinary team.
- Works with patients and their family members by devising individualised rehabilitation programmes, as well home care.
- Educates caregivers on managing patients at home, and on the available community resources.
- Post-discharge stroke patients are usually managed in conjunction with their family physicians.

## Tele-stroke Service

- Introduced in 2010 as a pilot project by NNI, Singapore Health Services (SingHealth) and Changi General Hospital (CGH).
- Operates around the clock, seven days a week, and on a Hub and Spoke model.
- Neurologists and the Emergency Department (ED) staff work together to develop a care plan based on the established stroke protocols.
- Led by Dr Rajinder Singh, Senior Consultant from the Department of Neurology at NNI, the Tele-stroke service is currently provided to CGH and Khoo Teck Puat Hospital (KTPH).
- Ensures immediate attention for acute stroke patients within the crucial three-hour window with significant improvement in care outcomes.

## The Tele-stroke “Hub and Spoke” Model



### The Stroke Services Improvement Team

The Ministry of Health (MOH) established the Stroke Services Improvement (SSI) Team in February 2014, to implement improvement efforts for stroke care, from symptom recognition to acute hospital management to intermediate and long-term care at a nationwide level in Singapore.

SSI aims to streamline and optimise stroke care through four key areas:

- To reduce onset-to-door times by improving public awareness and educating at-risk individuals;
- To optimise door-to-needle duration for stroke thrombolysis;
- To improve the care of patients with acute stroke in the hospital especially the first few days of hospitalisation; and
- To streamline collection of standardised measures of stroke severity and functional outcomes.

As a key initiative, SSI has worked with the National Registry of Diseases Office (NRDO) to suggest revisions to measures collected as well as facilitate meetings with NRDO officers and all restructured hospitals. SSI will also commence training for nurses in all six restructured hospitals on standardised stroke outcome measures of stroke severity and functional outcomes.

In addressing issues on stroke care for the hospitals NNI provides neurological services to, SSI has been working closely with the stroke clinicians from NNI. As NNI covers neurological care at Tan Tock Seng Hospital (TTSH), Singapore General Hospital (SGH), KTPH and CGH, collaboration between NNI and SSI is vital for the success of the SSI programme, including potential improvement in the transition to step-down care, outpatient services and stroke prevention.



(From Right) Assoc Prof Deidre Anne Se Silva, Senior Consultant from the Department of Neurology (NNI - SGH Campus) leads the SSI Team as the chair, and is joined by APN Ng Wai May from the Department of Neurology (NNI - TTSH Campus) as the Management Executive, SSN Siti Rohaida as the Programme Executive, and Ms Celine Chung, as the Programme Manager.

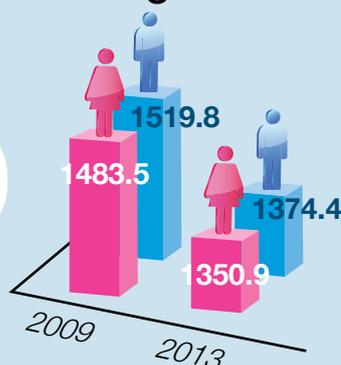
### Aged 35-44 Years



### Aged 45-54 Years



### Aged 75 Years



## Stroke Trends in Singapore

(Per 100,000 Population)

\*Source: Singapore Stroke Registry Interim Annual Registry Report, Trends In Stroke in Singapore 2009-2013, National Registry of Diseases Office (NRDO)

# Evolving Stroke Frontiers

*Assoc Prof Deidre Anne De Silva, Dr Daniel Oh, Assoc Prof Benjamin Ong, Assoc Prof Ng Wai Hoe, and Assoc Prof Francis Hui at the 15<sup>th</sup> Singapore Stroke Conference.*



As part of the World Stroke Day events worldwide, the Singapore Stroke Conference is held biennially by NNI to educate healthcare professionals and researchers on the latest developments in the treatment and management of stroke. The 15<sup>th</sup> edition of the conference was held from 7 – 8 November 2014, and was chaired by Dr Daniel Oh, a Consultant and stroke specialist from NNI's Department of Neurology.

The conference was opened by Associate Professor Benjamin Ong, Director of Medical Services, from the Ministry of Health (MOH), who said, "NNI has taken the lead to enhance its treatment of stroke in consultation with its team of specialists, which has helped to enhance care and improve outcomes for patients. Other stroke-related initiatives like stroke education and tele-medicine for stroke have been introduced in partnerships between hospitals and community nursing homes as well. This integrated approach towards care management allows for seamless transitions, maximising the benefits of treatment and therapy while improving patients' quality of life."

In addition, he also introduced the Stroke Services Improvement (SSI) Team, an establishment by MOH to streamline and optimise stroke care in Singapore.

## Enriching Lectures and Discussions

Themed "Evolving Stroke Frontiers", the conference featured presentations on quality stroke care treatment and care by prominent local and foreign specialists. Delegates were keen to deepen their knowledge from these lectures, which comprised topics on clinical and research observations in newer treatment options, trials, novel oral anticoagulation drugs (NOACs), as well as rehabilitation methods and therapy.

The conference received a regional participation of more than 300 delegates from Singapore as well as Malaysia, Australia, Sri Lanka, India, Philippines, Thailand, Indonesia and Vietnam. They were mostly from the clinical, nursing, allied health, and research specialties.



# 14th Advanced Neuroradiology Course



The 14th edition of the annual Advanced Neuroradiology Course, held on 16 - 17 October 2014, was a resounding success. The Course was fully subscribed and attended by over 200 participants from Singapore and from the region.

Organised by NNI's Department of Neuroradiology, the two-day course aimed to update and highlight advances in the practice of Neuroradiology, as well as Head and Neck Radiology, from a multidisciplinary approach.

International and local faculty presented their lectures and generously shared their expertise gained from exemplary cases. There were stimulating discussions between faculty and participants on current issues and future trends surrounding diagnostic and interventional procedures. The evening Case Review session for local and foreign radiology residents was an engaging experience for the young radiologists-in-training.

With excellent feedback from both faculty and participants, the annual Course is well placed for further regional growth.



# NNI Education Day

Staff from NNI gathered at NNI's second Education Day on 29 October 2014 to share their education experiences.

Organised by the team from the NNI Education Office, the event was a chance for all health professionals in NNI to come together and learn in an interactive manner.

Education Day was graced by the Guest-of-Honour, Professor Chay Oh Moh, Campus Director for Education at KK Women's and Children's Hospital (KKWCH).

Following a luncheon, staff members from the various departments gathered to share innovative teaching methods that could be used to boost the learning experience. Also acknowledged at this event were mentors, who have initiated educational programmes and attained honourable achievements for their roles as educators. Together, everyone had an enjoyable time in learning together as one Community of Practice.



# NNI Spine Course



Having taken place on September 27 last year at the Academia, the NNI Spine Course was attended by 32 spine surgeons and trainees; 17 from Singapore and 15 from other Asia-Pacific regions.

Themed The Thoracolumbar Spine – Contemporary Solutions: Open and MIS, the workshop comprised lectures and case studies relating to spine neurosurgery. The focal point of the programme was a hands-on cadaveric simulation session, which intended to educate the attendees on advanced surgery techniques. The session was performed and guided by expert spine surgeons from NNI's Department of Neurosurgery from both TTSH and SGH campuses.

Hosted by Dr Shree Kumar Dinesh, a Consultant and spine specialist from NNI's Department of Neurosurgery, the NNI Spine Course was pleased to receive positive ratings from the attendees' feedback.

# Community Care Partner Outreach

The NNI-Community Care Partners Programme (CCPP) held its annual CCPP Workshop on 20 September 2014 at the NNI Exhibition Hall. Titled 'Maintaining Well Being in Parkinson Disease', the event took on a new format and was hosted by Course Director, Dr Tay Kay Yaw, a Consultant from the Department of Neurology at NNI.

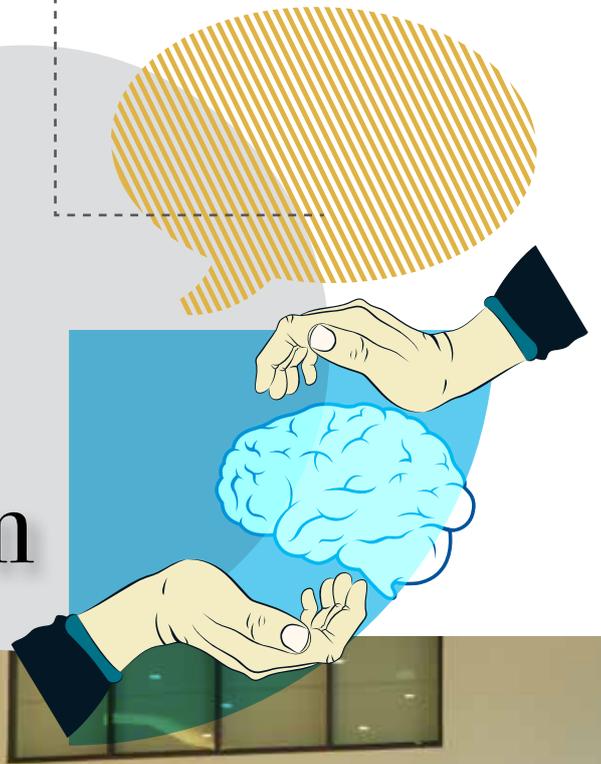
The event held discussions on the management of people with Parkinson Disease (PD) with CCPP partners updated on the essentials in dealing with the daily routine of patients. Lecture topics covered pharmaceutical, psychological, nutritional and psychosocial elements for maintaining well being in PD.

The highly interactive sessions were welcomed by participants, who enjoyed communicating and presenting their ideas, and took the opportunity to share their thoughts on the caring of PD patients during the interactive sessions.





# The Inaugural NNI Neuro-Oncology Symposium



*(From Left) Dr Carol Tang, Assoc Prof Lim Kah Leong, Assoc Prof Christopher Ang Beng Ti, Prof Wong Tien Yin, and Assoc Prof Ng Wai Hoe at the first Neuro-Oncology Symposium.*

NNI was proud to host its first-ever Neuro-Oncology Symposium on 10 October 2014, inviting medical professionals from various institutions to learn more on findings in the area of brain tumour research, particularly malignant gliomas, which unfortunately is a common primary brain tumour.

Organised by Associate Professor Christopher Ang Beng Ti, Head and Senior Consultant at the Department of Neurosurgery, NNI-SGH Campus, and Dr Carol Tang, Senior Research Scientist from NNI's Neuro-Oncology Research Laboratory, the symposium was graced by Professor Wong Tien Yin, Group Director of Research, SingHealth.

In his opening speech, Prof Wong stressed on the importance of collaboration in order to advance research, as it is a vital factor and driving force for many medical research programmes around the world.

The symposium showcased current studies and potential research directions in neuro-oncology at NNI, and collaborations with other research institutions, namely the National Cancer Centre Singapore (NCCS), Duke-NUS Graduate Medical School (Duke-NUS), National University Health System (NUHS), Singapore Institute for Neurotechnology (SINAPSE) and Singapore Bioimaging Consortium (SBIC).

With the symposium, the organising committee aims to spur neuro-oncology research further in Singapore and also promote collaborative efforts in translational research directed towards this aggressive disease.



# Tapping on Multidisciplinary Expertise

As an institute that believes in improving patient care through innovative practice, NNI has actively encouraged its clinicians and researchers to engage in multidisciplinary collaborations and locally relevant research.

Dr Kevin Tan, a Senior Consultant from the Department of Neurology, echoes this belief. He currently runs the Neuroimmunology and Neuroinfectious Diseases Programme. From seeing patients with autoimmune neurologic diseases in the programme, he has set up the Neuroimmunology Database and Tissue Repository, which he comprehensively maintains. This is used in the study of diseases such as Multiple Sclerosis (MS) and other autoimmune diseases in the Singapore setting.

According to Dr Tan, for this programme to provide better care for patients with such complex and chronic diseases, there is a need to build a bigger team with diverse expertise: "We are seeing more patients with autoimmune neurologic diseases because

of better diagnostics and awareness by doctors, but do not always know the best ways to treat or help them as this is a rapidly evolving field. It is best to have more trained doctors, nurses and allied health staff to manage them as more patients are identified."

In the area of neuroimmunology, collaboration with other specialists, who may be treating the same patients for symptoms affecting other organ systems, or have expertise in autoimmunity, is also important. The same goes for neuroinfectious diseases, where there is often an overlap of care provision from different medical disciplines.

This multidisciplinary approach is also important for research that would help to bolster clinical care: "Working with other doctors is not just about caring of patients, but it is also to be involved in research with other disciplines to improve treatments and outcomes for patients," he says.

*"Working with other doctors is not just about caring of patients, but it is also to be involved in research with other disciplines to improve treatments and outcomes for patients."*

*- Dr Kevin Tan*

## Transformations through Neurotechnology

The neurotechnological realm of minimally invasive, robotic procedures is teeming with innovative advancements as teams from NNI and their collaborators work towards pushing the boundaries with life-saving surgical procedures.

The Wireless Implantable Neuroprobe Microsystem for Motor Prosthesis is one such neurodevice programme; involving The Institute of Microelectronics (IME) and Institute for Infocomm Research (I2R) under the Science and Engineering Research Council (SERC). NNI is a collaborator in this programme, along with NUS, Duke-NUS, and NUHS.

The neuromotor prosthetic device can replace or restore lost motor functions by routing movement-related signals from the

brain around damaged parts of the nervous system. These signals are directly routed to external effectors such as robot arm, wheel chair, or even patients' own muscles via electrical stimulation. The device certainly holds new potential and paves the way for neurotechnology to restore independence for humans with paralysis.



## Neurotechnological Projects at NNI

### NNI Research Studies

- Experimental Study on Image-guided Robotic Neurosurgery
- Brain-Computer Interface for Stroke Rehabilitation

### Collaborations with Other Research Institutions

- Data Collation in Neurocritical Care (iSYNCC)
- Ultrasound Catheter Based Minimally Invasive Sonothrombolysis for Haemorrhagic Stroke (In collaboration with ASTAR IME)
- Photoacoustic Imaging for Glioma Excision (PAGE) (In collaboration with SINAPSE)
- Wireless Intracranial Microsystem for Multimodality Neuromonitoring of Severe Head Injury Patients (In collaboration with ASTAR IME)

# Publishing Scientific Discoveries

In NNI's journey of research progression, two studies have made it to the prominent and highly regarded Nature Communications journal in the past year.

## Shedding Light on Evaluating Potential Risks and Monitoring Progression of Parkinson Disease

Researchers from NNI and the National University of Singapore (NUS) embarked on a collaboration to create the first highly sensitive two-photon, small-molecule fluorogenic probe to evaluate the potential risk for PD and monitor its progression. The findings were published in Nature Communications in 2014.

The study was co-led by Associate Professor Lim Kah Leong, from NNI as well as from the Department of Physiology at NUS Yong Loo Lin School of Medicine, and Professor Yao Shao Qin from the Department of Chemistry, Faculty of Science at NUS.

The team's study found that patients with PD have elevated levels of Monoamine Oxidase B (MAO-B) in human B-lymphocytes (a type of white blood cell), but not in fibroblasts. With the chemical probe, a compound that fluoresces when it

*"This suggests that MAO-B activity in peripheral blood cells of a patient might serve as an accessible and economical biomarker to evaluate the potential risk of an individual for this disease."*

*- Assoc Prof Lim Kah Leong*

reacts with the MAO-B enzyme, physicians can potentially track the risk of PD in a patient and monitor its progress. This is done by measuring the intensity of light generated by the probe, which corresponds to the amount of MAO-B expressed.

"This suggests that MAO-B activity in peripheral blood cells of a patient might serve as an accessible and economical biomarker to evaluate the potential risk of an individual for this disease," said Assoc Prof Lim.

The small molecule probe, designed and synthesised by the NUS team, addresses the inadequacies of existing probes with its high sensitivity and ability to detect MAO-B with greater precision. The fluorescence label on the probe also allows it to be detected via high-resolution imaging techniques in tissues and organs at depths of up to one millimetre. The probe also has no apparent toxicity in most mammalian cells, as such, the probe is potentially a functional, non-invasive and cost-effective tool.

"Our findings for this study provide important starting points for using small molecule imaging techniques to explore MAO-B further at the organism level, and in fact, opens up future prospects for non-invasive imaging-based diagnostic applications," said Dr Li Lin, the first author of the paper and a Post-doctoral Fellow from Prof Yao's laboratory.

The NNI research team will set out to validate the effectiveness of their probe in detecting MAO-B in a larger pool of patient samples, with an aim of eventually developing the probe into a commercial test kit to monitor the progression of PD.



Assoc Prof Lim Kah Leong (second from right) was involved in the study with Dr Zhang Chengwu (second from left), a Post-Doctoral Fellow from the Neurodegeneration Research Laboratory at NNI. Dr Zhang co-authored the paper with Dr Li Lin.

### Uncovering a Novel Function of the Amyloid Precursor Protein

A research team led by Dr Zeng Li, Principal Investigator and Senior Research Scientist from the Neural Stem Cells Laboratory at NNI, uncovered a novel function of the Amyloid Precursor Protein (APP), one of the main pathogenic culprits of Alzheimer's Disease. Also involved in the study were investigators from Duke-NUS and the Agency for Science and Technology (A\*STAR).

The team discovered that APP can control the growth and maturation of newborn brain cells, which are critical for the maintenance of a healthy brain function. APP does this by regulating a target known as microRNA-574-5-p. Besides this target, the human body has many microRNAs to regulate the expression of different genes for proper cellular functions.

The study also identified that microRNA-574-5-p normally promotes the production of newborn neurons in the brain. In turn, the APP antagonises it to ensure the timely birth of new neurons to support normal brain function. Without the newborn neurons, neuron expression can go unregulated and cause brain activities to go haywire.

*“Brain-specific microRNAs control neurogenesis during brain development, and their misregulation is implicated in other devastating psychiatric disorders like autism and schizophrenia. So, this discovery also sheds light on ongoing collaboration work between our team and Dr Zeng’s group to elucidate genetic and cellular mechanisms of autism.”*

*- Assistant Professor Shawn Je, Duke-NUS; a collaborator from the study.*

“Our findings highlight that microRNA-574-5p may be a potentially useful new target for drug development against Alzheimer's disease,” said Dr Zeng Li, the principal investigator of the study. “We are just starting to understand how misregulated microRNA-574-5p expression can cause our brain activities to go wrong, and much more work needs to be done.”

The research team intends to further their research by investigating the mechanisms of how the APP regulates microRNA-574-5p in association with the impairment of newborn neurons as seen in Alzheimer's disease. Eventually, they hope to develop the microRNA into a biomarker for the disease. This discovery certainly enhances the team's research in other neurodevelopmental conditions and brain disorders.

“This important study suggests a link between a key neurodegenerative disease gene and regulation of microRNAs in the brain. We are at an early stage of understanding how this microRNA might impact disease progression and associated behavior, but the prospects are exciting,” said Professor Stephen Cohen, A\*STAR's Institute of Molecular and Cellular Biology (IMCB); a global expert on microRNA biology.

Dr Zeng Li (centre) with her team of Researchers at the Neural Stem Cells Laboratory at NNI.





National  
Neuroscience Institute  
SingHealth

# 4<sup>th</sup> SINGAPORE INTERNATIONAL NEUROCOGNITIVE SYMPOSIUM

Connecting the Dots - From Young to Old

26 – 28 March 2015

Singapore Marriott Hotel

320 Orchard Road, Singapore 238865

## GUEST FACULTY

Koji Abe, Japan	José Luis Molinuevo, Spain
Claudia Lai, Hong Kong	Phillip Poi, Malaysia
Oscar Lopez, USA	Asita de Silva, Sri Lanka
Simeon Marasigan, Philippines	Wiesje M. Van der Flier, The Netherlands
Bruce Miller, USA	Claude Wischik, United Kingdom

## WELCOME RECEPTION

27 March 2015 @ Gardens by the Bay includes:

- Buffet dinner
- 1 ticket to Flower Dome per delegate
- Two-way coach transfer to Gardens by the Bay

*\*Welcome Reception is inclusive as part of registration fees for Scientific Programme.*

## WHO SHOULD ATTEND

Neurologists, Psychiatrists, Geriatricians, Rehabilitation Physicians, General Practitioners, Researchers, Nurses and Allied Health Professionals

## SYMPOSIUM REGISTRATION FEES

(Amount payable in Singapore Dollars and inclusive of GST)

Registration Category	Early Registration Registration AND Payment must be made before <b>5 MARCH 2015</b>	Normal Registration Registration AND Payment received after <b>20 MARCH 2015</b> will be considered as On-site Registration
<b>a) Scientific Programme (27 – 28 March 2015)</b>		
<sup>1</sup> Delegates	S\$400.00	S\$450.00
<sup>2</sup> Trainees, Nurses, Allied Health Professionals and other Medical Professionals	S\$340.00	S\$390.00
<b>b) Pre-Symposium Workshop (26 March 2015)</b>		
• Each workshop <b>with</b> registration for Scientific Programme		S\$70.00
• Each workshop <b>without</b> registration for Scientific Programme		S\$100.00

**Note:**  
<sup>1</sup> Associate Consultants, Consultants, Senior Consultants and Researchers are considered as Delegates. Others will be considered as Trainee.  
<sup>2</sup> Trainee/Student identification or proof of qualifying trainee/student status MUST accompany the registration form to qualify for Trainee/Student fees. Proof of status is also required when registering on-site.  
 \*This Symposium is for healthcare professionals only.



**Scan** the QR Code to find out about the Symposium or visit <http://www.nni.com.sg/Education/Doctor-Healthcarepro/Medical-eventsandconf/Pages/NNI4thNeurocognitiveSymposium-2015.aspx>

### CALL FOR ABSTRACT SUBMISSIONS

Closing Date: **21 FEBRUARY 2015**  
 Please see [www.nni.com.sg](http://www.nni.com.sg) for submission form and guidelines  
 Register before **5 MARCH 2015** to enjoy early registration fees!

## ENQUIRY AND SECRETARIAT

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# EVENTS CALENDAR 2015

## January

**17<sup>th</sup>** Neuroscience Seminar for Family Physicians:  
Pain Management

## February

**6<sup>th</sup>** Neuroscience ACP Research Day

## March

**21<sup>st</sup>** My Stroke Journey Public Forum

**26<sup>th</sup> - 28<sup>th</sup>** 4<sup>th</sup> Singapore International Neurocognitive  
Symposium

## April

**9<sup>th</sup> - 10<sup>th</sup>** The 1<sup>st</sup> NNI Glioma Fluorescence Seminar

**11<sup>th</sup>** Public Forum: Parkinson Disease

**25<sup>th</sup>** Neuroscience Seminar for Family Physicians:  
General Neurology

## July

**11<sup>th</sup>** Neuroscience Seminar for Family Physicians:  
Movement Disorders & Dementia

## ENQUIRY AND REGISTRATION

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*\*Event dates are subjected to changes.*



# NEUS LINK

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