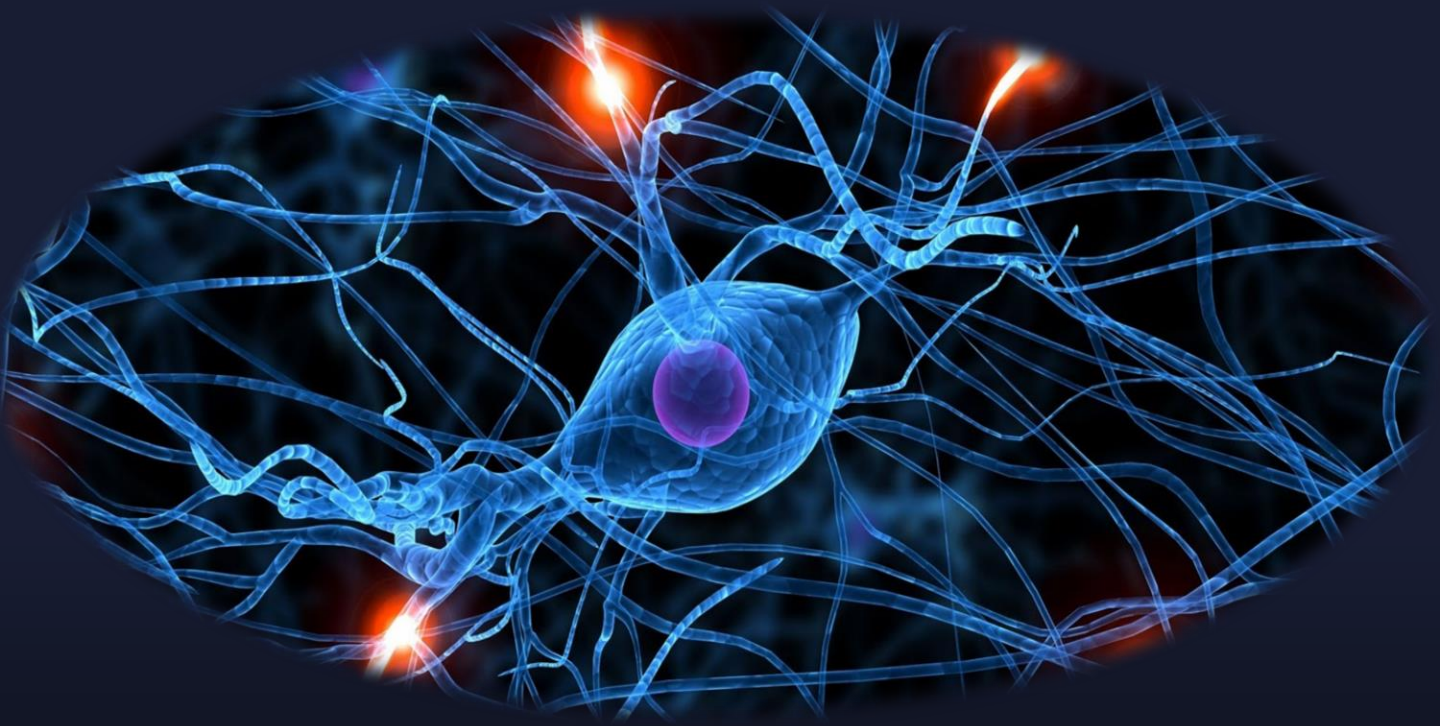
Hong Kong Biomedical Engineering Symposium 2016
Brain and Neuroengineering

Date	Time	Registration	Venue
9 December 2016 (Friday)	8:30am – 5:40pm	Free of Charge	V322, Innovation Tower, Hong Kong Polytechnic University



Speakers of Plenary Lecture

Huazhong University of Science and Technology
Prof. Qingming LUO

The Chinese University of Hong Kong
Dr. Fiona CHEN
Prof. Wing-ho YUNG
Dr. Lin SHI

The City University of Hong Kong
Dr. Leanne Lai-hang CHAN

The University of Hong Kong
Prof. Kwok-fai SO
Ir Prof. Ed WU

The Hong Kong Polytechnic University
Prof. Chetwyn CHAN
Dr. Xiaoling HU
Prof. William WANG

The Hong Kong University of Science and Technology
Prof. Karl HERRUP

Organiser:

HKIE The Hong Kong Institution of Engineers 香港工程師學會
Biomedical Division 生物醫學分部

Sponsors:

elica Rehab-Robotics TM System Co. Ltd. 東明系統有限公司
SCHMIDT BioMedTech
The Hong Kong Polytechnic University 香港理工大學

Supporting Organisations:

CityU 香港城市大學 City University of Hong Kong
BME Division of Biomedical Engineering
機電工程署 EMSD
Hong Kong MD IA 香港醫療及保健器材行業協會
HKPC
醫院管理局 Hospital Authority
EMB IEEE Hong Kong - Macau Joint Chapter
香港中文大學 The Chinese University of Hong Kong
香港大學 The University of Hong Kong

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Programme Rundown

8:30am - 8:50am	**Registration**
8:50am - 9:00am	**Opening Remarks** Ir Prof. Yongping ZHENG, Chair, HKIE Biomedical Engineering Division; Head, Interdisciplinary Division of Biomedical Engineering
9:00am - 9:35am	**Visible Brain-wide Networks at Single Neuron Resolution with Landmarks** Prof. Qingming LUO, Huazhong University of Science and Technology
9:35am - 10:10am	**Exercise and Brain Health** Prof. Kwok-Fai SO, The University of Hong Kong
10:10am - 10:25am	**Tea Break**

Session Chair: Prof. Jufang HE, The City University of Hong Kong

10:25am - 11:00am	**Optogenetic fMRI Dissection of Cortical Descending Inputs to Midbrain Auditory Processing** Ir Prof. Ed WU, The University of Hong Kong
11:00am - 11:35am	**Re-imagining Alzheimer's Disease – a Glimpse of What Lies Ahead** Prof. Karl HERRUP, The Hong Kong University of Science and Technology
11:35am - 12:10pm	**Studying Neuroplasticity in Vivo: The Case for the Role of the Motor Cortex in Motor Learning** Prof. Wing Ho YUNG, The Chinese University of Hong Kong

Session Chair: Ir Stanley SIU, Electrical and Mechanical Services Department

12:10pm - 12:20pm	**Sponsor Session** Rehab-Robotics Company Limited
12:20pm - 12:30pm	**Sponsor Session** SCHMIDT BioMedTech (H.K.) Limited Shenzhen Delica Medical Equipment Company Limited
12:30pm - 1:50pm	**Lunch**

Session Chair: Prof. Wutian WU, The University of Hong Kong

1:50pm - 2:25pm	**Language, Brain, & Cognitive Decline** Prof. William WANG, The Hong Kong Polytechnic University
2:25pm - 3:00pm	**Quantitative Parametric Mapping of Brain MRI** Dr. Lin SHI, The Chinese University of Hong Kong
3:00pm - 3:35pm	**Voluntary Intention-driven Robot Assisted Upper Limb Rehabilitation after Stroke** Dr. Xiaoling HU, The Hong Kong Polytechnic University
3:35pm - 3:50pm	**Tea Break**

Session Chair: Dr. Lei SUN, The Hong Kong Polytechnic University

3:50pm - 4:25pm	**Multiple Applications of Transcranial Doppler for Stroke Patients** Dr. Fiona CHEN, The Chinese University of Hong Kong
4:25pm - 5:00pm	**Visual Perception Induced by Retinal Implants – Challenges and Future Prospects in Preclinical Studies** Dr. Leanne Lai-Hang CHAN, The City University of Hong Kong
5:00pm - 5:35pm	**Application of Electroencephalogram in Study of Attention Control and Working Memory among Older Adults** Prof. Chetwyn CHAN, The Hong Kong Polytechnic University
5:35pm - 5:40pm	**Closing Remarks**

Visible Brain-wide Networks at Single Neuron Resolution with Landmarks

Professor Qingming Luo
Huazhong University of Science and Technology

Deciphering the fine morphology and precise location of neurons and neural circuits are crucial to enhance our understanding of brain function and diseases. Traditionally, we have to map brain images to coarse axial-sampling planar reference atlases to orient neural structures. However, this means might fail to orient neural projections at single-cell resolution due to position errors resulting from individual differences at the cellular level. Here, we present a high-throughput imaging method that can automatically obtain the fine morphologies and precise locations of both neurons and circuits, employing wide-field large-volume tomography to acquire three-dimensional images of thick tissue and implementing real-time soma counterstaining to obtain cytoarchitectonic landmarks during the imaging process. The reconstruction and orientation of brain-wide neural circuits at single-neuron resolution can be accomplished for the same mouse brain without additional counterstains or image registration. Using our method, mouse brain imaging datasets of multiple type-specific neurons and circuits were successfully acquired, demonstrating the versatility. The results show that the simultaneous acquisition of labeled neural structures and cytoarchitecture reference at single-neuron resolution in the same brain greatly facilitates precise tracing of long-range projections and accurate locating of nuclei. Our method provides a novel and effective tool for application in studies on genetic dissection, brain function and the pathology of the nervous system.

Biosketch:

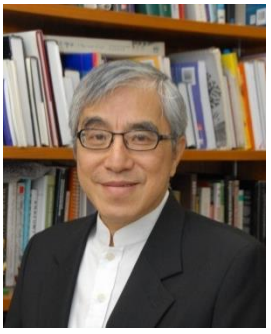
Professor Luo is the Vice-President of Huazhong University of Science and Technology and Executive Deputy Director of Wuhan National Laboratory for Optoelectronics. He is an elected Fellow of The American Institute for Medical and Biological Engineering (AIMBE), The International Society for Optics and Photonics (SPIE), The Institution of Engineering and Technology (IET) and The Optical Society (OSA). His research interests focus primarily on multi-scale optical bioimaging and cross-level information integration. Since 1996, he has been devoted to new techniques and novel applications in life sciences, including laser speckle imaging (LSI) and combination with optical intrinsic signal imaging (ISI), small animal imaging of fluorescence diffusion optical tomography (fDOT) coregistered with micro-CT, micro-optical sectioning tomography (MOST), and functional near infrared (NIR) imaging. Dr. Luo holds 60 patents and has co-authored more than 200 papers in peer-reviewed journal, including Science, Nature Cell Biology, Nature Communications, PNAS, Optics Letters, Optics Express and Journal of Biomedical Optics, with an h-index of 45 according to Google Scholars. He won the Cheung Kong Professorship of Ministry of Education of China in 1999, the National Science Fund for Distinguished Young Scholars in 2000, the second place prize in State Natural Sciences Award in 2010, China's Top Ten Major Scientific Progress, and the second place prize in State Technological Invention Award in 2014.

Exercise and Brain Health

Professor Kwok-Fai So
The University of Hong Kong

Previous work in rats has shown that voluntary running increases plasma levels of adiponectin, with a concurrent decrease in depression-like behaviors. However, the exact mechanisms underlying the positive effects of exercise on depression are unclear. Thus, we have investigated the possible role of adiponectin in modulating neurogenesis and depression-like behaviors. Adiponectin is secreted from adipocytes and just like exercise, is known to exhibit anti-inflammatory and anti-diabetic properties. We have studied the relationship between the effects of exercise and adiponectin on the brain in mice and showed that adiponectin can pass the blood–brain barrier and that running increased hippocampal adiponectin levels. Administration of adiponectin decreased depression-like behaviour and promoted hippocampal neurogenesis. Running had the same effects, but not in mice with a genetic knockout of adiponectin. The proliferation-promoting effect of adiponectin was mediated by adiponectin receptor 1. These results show that exercise-induced hippocampus neurogenesis and antidepressant effects are mediated by adiponectin.

Biosketch:



Professor So is the director of GHM Institute of CNS Regeneration at Jinan University, Guangzhou, China; Chair of Anatomy in the Department of Ophthalmology and the State Key Laboratory of Brain and Cognitive Sciences, Jessie Ho Professor in Neuroscience, The University of Hong Kong; member of the Chinese Academy of Sciences, member of the Advisory Committee/ 2011 Program, member of Consultative Committee/ the national 973 Program (www.973.gov.cn/), Director of China Spinal Cord Injury Network (ChinaSCINet), Director of Hong Kong Spinal Cord Injury Fund (HKSCIF), Co-Chairman of the Board of Director of the ChinaSCINet (www.chinascinet.org), and Editor-in-Chief of Neural Regeneration Research (www.nrronline.org). Received PhD. degree from MIT. He is one of the pioneers in the field of axonal regeneration in visual system. He was the first to show lengthy regeneration of retinal ganglion cells in adult mammals with peripheral nerve graft. He is currently using multiple approaches to promote axonal regeneration in the optic nerve and spinal cord. His team identifies neuroprotective and regenerative factors including: exercise, wolfberry, trophic factors, peptide nanofiber scaffold, and environmental manipulation. 1995 obtained the Natural Science Award of the National Natural Science Foundation of China. 1999 was elected Member of the Chinese Academy of Sciences. 2015 was elected US National Academy of Invention Fellow. He is the author and co-author of over 390+ publications and co-inventors of 26 patents.

Optogenetic fMRI Dissection of Cortical Descending Inputs to Midbrain Auditory Processing

Professor Ed Wu
The University of Hong Kong

The cortex contains extensive descending projections, yet their impact on brainstem sensory processing remains poorly understood. In the central auditory system, the auditory cortex contains widespread projections to nuclei of the auditory midbrain, called the inferior colliculus (IC), which integrates almost all ascending signals from multiple brainstem nuclei and is the origin of several important auditory processing properties. In this study, we developed a number of auditory fMRI methods to map the auditory processing functions in the IC of rodent models. We further employed these fMRI techniques, together with cortical ablation or cortical optogenetic neuromodulation, to interrogate how cortex inputs influence the IC BOLD responses to external auditory stimuli. Our experimental findings directly revealed the large-scale influences of cortical descending projections, from both auditory and visual cortices, on the IC auditory processing in the midbrain.

Biosketch:

Professor Wu is a Chair and Lam Woo Professor of Biomedical Engineering at the University of Hong Kong (HKU). He obtained his BEng in Electrical Engineering from Tianjin University in 1984, MSc in Medical Physics from University of Wisconsin – Madison in 1988, and PhD in Radiological Sciences from University of California – Irvine in 1993. From 1990 to 2003, Dr. Wu worked in Columbia University on the 3D PET and high-field MRI system engineering, first as an Assistant Professor and later as an Associate Professor of Radiology and Biomedical Engineering. Dr. Wu joined HKU in 2003. His present research focus is to develop state-of-the-art MRI methodologies for in vivo microstructural and functional characterization of biological systems in vivo, particularly the CNS systems, using diffusion, spectroscopy, fMRI, resting-state fMRI, and optogenetic approaches. Dr. Wu is an elected Fellow of IEEE, ISMRM and AIMBE, and Asia Pacific Editor of NMR in Biomedicine. He is the 2016/2017 President of Oversea Chinese Society for Magnetic Resonance in Medicine.

Re-imagining Alzheimer's Disease – a Glimpse of What Lies Ahead

Professor Karl Herrup
The Hong Kong University of Science and Technology

The case can be made that while we cannot eliminate beta-amyloid from our models of Alzheimer's disease, we must diminish its importance. My lab has been assembling new data whose main goal is to recreate our conceptual model of AD. Three approaches deserve particular highlight. The first involves the unexpected discovery of a senescent phenotype in small patches of neurons in the center of neurodegenerative loci of the Alzheier's brain. The resulting secretion of senescence associated secretory proteins from these 'zombie-like' cells blocks normal Wnt signaling in the surrounding healthy neurons, causing their death. The second is an exploration of the early functional failure of the DNA damage response protein, ATM, in neurons at risk for death in the AD brain. The third and newest approach examines the role of oligodendrocyte abnormalities in the progression of dementia in general and Alzheimer's disease in particular. The broad message of these three stories is that there are potentially fresh and valuable ways to re-arrange the data that we have and "re-imagine" our disease model.

Biosketch:

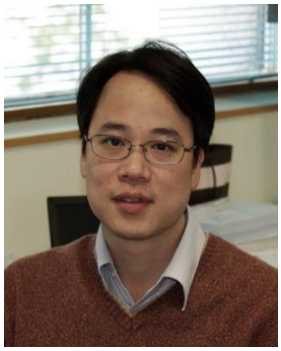
Professor Herrup received his Bachelor's degree from Brandeis University in Waltham, MA and his Ph.D. in Neuroscience from Stanford University in 1974. After two postdoctoral fellowships – in Neurogenetics at Children's Hospital/Harvard Medical School, and in Neuropharmacology at the Biozentrum in Basel Switzerland – he joined the faculty of the Human Genetics Department of Yale Medical School in 1978 as an Assistant, then Associate, Professor. He became Director of the Division of Developmental Neurobiology at the E. K. Shriver Center in Waltham, MA in 1988. In 1992 he moved to the Departments of Neurosciences and Neurology at Case Western Reserve University Medical School and University Hospitals of Cleveland. While there, he directed the University Alzheimer's Center from 1999 through 2005. In 2006 he moved to the Piscataway/New Brunswick campus of Rutgers University to become Professor and Chair of the Department of Cell Biology and Neuroscience. In addition to this leadership role in a large public university, he helped to found the Brain Health Institute, a unique public/private partnership devoted to basic research with relevance to clinical neuroscience. In July 2012, he moved to Hong Kong to become the Head of Life Sciences at Hong Kong University of Science and Technology. His work includes a strong translational interest that directs his studies towards a few select human neurodegenerative diseases including Alzheimer's, a very common late-life dementia, and ataxia-telangiectasia, a very rare multisystem disorder of childhood. Dr. Herrup has authored a large number of highly cited papers and until 2010 served as the founding Senior Editor of the Neurobiology of Disease section of the Journal of Neuroscience.

Studying Neuroplasticity in Vivo: The Case for the Role of the Motor Cortex in Motor Learning

Professor Wing Ho Yung
The Chinese University of Hong Kong

Neuroplasticity underlies use-dependent modification of brain circuits and therefore behaviors. The motor cortex plays a key role in motor control as its output directly generates movement. However, it is known that the motor cortex also exhibits a high degree of plasticity that may be important in both health and disease. Based on extracellular multi-unit recordings from freely moving rats, we investigated the dynamics of neurons in the output layer 5b (L5b) of the primary motor cortex during the training of a forelimb reaching for food task. We found a subpopulation of task-recruited layer 5b neurons that not only became more movement-encoding during motor learning, but their activities were also more temporally aligned to motor execution. These observations were accompanied by the emergence of reproducible neurodynamics of the L5b neuronal ensemble and training-induced long-term synaptic plasticity of inputs to these neurons recorded *in vivo* in the freely behaving rats. However, these phenomena were highly disrupted by local denervation of dopaminergic inputs originating from the midbrain ventral tegmental area. Our findings therefore support that dopaminergic innervation arising from the midbrain plays critical roles in the process of acquiring novel motor skills, via its capacity to facilitate long-term synaptic plasticity that taks place in the motor cortex.

Biosketch:



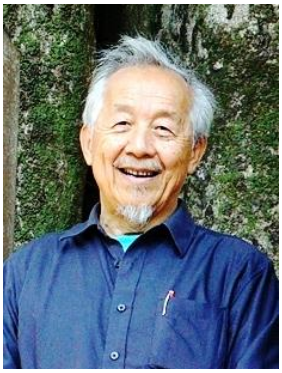
Professor Wing-Ho Yung graduated from The Chinese University of Hong Kong with first class honors, majoring in biology and biochemistry. Supported by the Commonwealth Scholarship and the Croucher Foundation Fellowship he received the D.Phil. degree and postdoctoral training from the University of Oxford in the field of cellular neurophysiology. After returning to the Chinese University of Hong Kong in the early 90's, he continued his research in neuroscience and obtained a BSc degree in Computing and Information System from University of London. Currently, he is the President of the Hong Kong Society of Neuroscience and the Honorary Secretary of the Federation of Asian-Oceanian Neurosciences Societies. Professor Yung's main research interest is on synaptic plasticity and neurodegenerative disorders and has publications in these areas in journals including Science, Nature Neuroscience, Neuron and PNAS.

Language, Brain, & Cognitive Decline

Professor William Wang
The Hong Kong Polytechnic University

As with all our behaviors, our complex language is supported by an assemblage of brain mechanisms which mediate and interpret the various stimuli our body receives from the outside world, and which plan, organize and produce various internal and external responses. These mechanisms include perceiving in several parallel modalities, recognizing objects & events and analyzing them in light of information stored in various parts of the brain from prior experience, and finally, registering emotions internally, and speaking, signing, or writing responses back to the outside world. As some of these mechanisms break down due to age-related diseases, there are corresponding impairments in language processing. By examining such impairments with the newly developed methods of brain imaging we may learn more deeply about the brain, and design ways of intervention, to alleviate or to prevent.

Biosketch:



Professor Wang Shiyuan（王士元）grew up in China, and received his higher education in the U.S. After teaching at Berkeley for 30 years as Professor of Linguistics, he moved to Hong Kong. Currently he is Chair Professor of Cognitive Sciences in the Department of Chinese and Bilingual Studies at the Hong Kong Polytech University. He is the founding editor of the Journal of Chinese Linguistics, an Academician of Academia Sinica, and an Honorary Professor of Peking University. He has been awarded fellowships from the Guggenheim Foundation (USA), and from centers for advanced studies in: Stanford (USA), Stockholm (Sweden), Kyoto (Japan), and Bellagio (Italy). He has lectured widely on two areas of research: the evolution of the languages and peoples of China, and the cognitive neuroscience of language across the life-span.

Quantitative Parametric Mapping of Brain MRI

Dr. Lin Shi
The Chinese University of Hong Kong

Human brain mapping algorithms, especially the exploratory parametric mapping methods, enables unique quantitative understanding of the "hidden" information in neuroimages. With these algorithms, one could be able to observe abnormal brain structure or function, and interpret the multimodal brain imaging in a unified space. In this talk, the speaker will give a brief review of the development of such voxel-wise brain mapping methods for MRI and introduce several recent representative works conducted in our group.

Biosketch:

Dr. Shi is an Assistant Professor in the Department of Medicine & Therapeutics, Faculty of Medicine, The Chinese University of Hong Kong. Her research interest lies in the field of multimodal neuroimage analysis. She has been awarded the Best Young Engineer's Paper Award, by Biomedical Division, The Hong Kong Institution of Engineers in 2008. Dr. Shi is the inventor of 3 filed US patents related to medical imaging and quantification techniques. She is a member of the Chinese Dementia Research Association (CDRA).

Voluntary Intention-driven Robot Assisted Upper Limb Rehabilitation after Stroke

Dr. Xiaoling Hu
The Hong Kong Polytechnic University

Safe and effective rehabilitation trainings are in great demand to help stroke survivors regain their independency in the daily life. Upper Limb functions are highly related to daily activities. Motor recovery in the upper limb usually is more difficult than the lower limb after stroke due to the diversity of the motion patterns of the upper limb. Effective neurorehabilitation after stroke depends on intensive practice of the paretic limbs with voluntary efforts as early as possible. However, difficulties are encountered in sensing and involving the voluntary intention/efforts from stroke survivors during the long term physical training. A series of voluntary intention-driven robotic systems have been designed and applied in upper limb rehabilitation after stroke at The Hong Kong Polytechnic University, in collaboration with local hospitals. Clinical trials have been conducted on both subjects with subacute and chronic strokes. Significant motor improvements have been achieved after the device assisted training.

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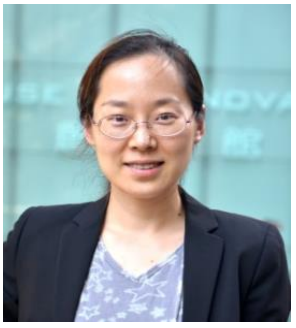


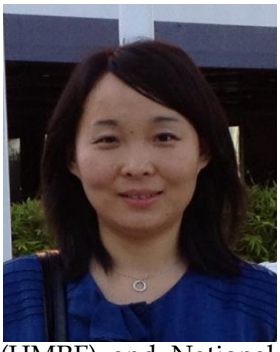
Dr Hu received her PhD in Electronic Engineering from The Chinese University of Hong Kong in 2002. Since graduation, she has been devoting herself in the area of Biomedical Engineering at PolyU. She took up the post of Assistant Professor in the Interdisciplinary Division of Biomedical Engineering in July 2015. Her research interests include neural engineering, biomechatronic engineering, bio-signal processing, stroke rehabilitation, sports medicine, wearable technology, and quantitative measurement for diagnosis and evaluation. Her latest work, Rehabilitation Sleeve – A Functional Electrical Stimulation (FES) and Robot Hybrid System, won a Gold Medal and a Special Merit Award at the 43rd International Exhibition of Inventions of Geneva, 2015.

Multiple Applications of Transcranial Doppler for Stroke Patients

Dr. Fiona Chen
The Chinese University of Hong Kong

Transcranial Doppler (TCD) is a non-invasive ultrasound technology to diagnose large artery disease on a real time, beat-to-beat basis. Based on Doppler Effect Phenomenon, TCD identify arterial stenosis by calculating arterial blood flow velocity. In clinical practice, TCD serves as a screen tool (1) in stroke patients to diagnose intracranial large artery disease (ICAD) and detect microembolic signals; (2) in subarachnoid hemorrhage patients, bedside detection of vasospasm In carotid endarterectomy patients, perioperative evaluation of blood flow velocity to monitor for re-occlusion and hyper-perfusion; (3) in patients with extracranial carotid disease, evaluate tandem stenosis and collateralizing channels. Our research team for the time in the world reported that ICAD is a most common cause of ischemic stroke in Chinse population, which was verified by other Asian populations. Targeting this unique cerebral vascular disease in Chinese, we performed a series of clinical studies by using TCD to investigate the prevalence of ICAD in our local stroke patients, to explore the stroke mechanisms in patients with ICAD and to evaluate the effects of novel drugs or interventional therapies. Till now, we have set up a mature platform to perform any kinds of clinical studies by monitoring cerebral blood flow velocity and MES. By collaborating with oversea research institutes, we developed a set of evaluating cerebral autoregulation in stroke patients. In conclusion, TCD is a widely-used screening tool for stroke or SAH patients and a powerful investigation tool for research purpose.

Biosketch:



Dr. Chen received a PhD degree from Chinese University of Hong Kong and a Master Degree from the Sun Yat Sun University in Guagzhou. Currently, she is a Research Assistant Professor, Department of Medicine and Therapeutics, Faculty of Medicine, Chinese University of Hong Kong. Her research interests include various aspects of cerebrovascular disease, such as the pathological mechanisms, neurosonology, cerebral hemodynamics and neuroimaging of stroke in Chinese population. She holds many research grants in stroke-related research such as funding from the Hong Kong Innovation and Technology Fund (ITF), Health and Medical Research Fund (HMRF) and National Natural Science Foundation of China (NSFC). In 2011, with other tea members they got the Natural Science Award, Class I, of the Higher Education Outstanding Scientific Research Output Awards organized by the Ministry of Education. Dr. Chen is in charge organizing several international and local scientific conference and TCD training course and co-ordinates foreign exchange with other universities, other departments and research institutes. She helps to supervise PhD students and oversea visiting scholars (from Mainland China and Southeast Asia) and instruct them to design clinical project and to write scientific papers. Till now, she has published more than 70 peer-reviewed articles in SCI-indexed scientific journals, including Stroke, International Journal of Stroke and Cerebrovascular Disease.

Visual Perception Induced by Retinal Implants – Challenges and Future Prospects in Preclinical Studies

Dr. Leanne Lai-Hang Chan
City University of Hong Kong

Neural implant aims at restoring lost functions of mankind with artificial means. The rapid development of technology leads to the success of deep brain stimulator and cochlear implant that restore motion and auditory functions of patients. Retinal prostheses (implant) are designed to treat outer retinal diseases, like age-related macular degeneration (AMD) and retinitis pigmentosa (RP), which blind hundreds of thousands each year worldwide. Despite the progress of potential treatment of RP including gene therapy and transplantation, no effective treatment is yet available. Clinical trials of the prototype retinal prostheses have shown the promise of giving the blind to see again. In this talk, I will introduce the state-of-the-arts visual prostheses and how individual recipient of the implants are able to detect light and perform visually guided tasks with a low-resolution implant. I will discuss the challenges towards a high resolution retinal implant. I will present results on the effect of retinal-electrode distance on evoked response and how one can optimize the electrical parameters to safely and efficiently stimulate the degenerated retina. The alterations in the visual cortical properties under retinal degeneration will be discussed. Future prospects of retinal implant will also be discussed.

Biosketch:

Dr. Chan received her B.Eng. degree in Electrical and Electronic Engineering from the University of Hong Kong (HKU). She then went to University of Southern California (USC) for graduate school, earning degrees in Electrical Engineering (M.S. 2004) and Biomedical Engineering (Ph.D. 2009). During her graduate studies, her research contributed in the retinal prosthesis testbed development at the Biomimetic MicroElectronic Systems Engineering Research Center at USC. After graduation, she joined the Saban Research Institute at Children's Hospital of Los Angeles as a postdoctoral fellow in the Developmental Neuroscience Program. She was appointed as Assistant Professor of Electronic Engineering at City University of Hong Kong in December 2011. Her research interest is mainly focused on the neural device interface, stimulating electrode array, in vivo electrophysiology on visual system, and plasticity induced by neural implant.

Application of Electroencephalogram in Study of Attention Control and Working Memory among Older Adults

Professor Chetwyn Chan
The Hong Kong Polytechnic University

This presentation is to highlight the potential use of electroencephalogram in unfolding neurodegeneration effect on attentional and working memory processes among older adults. The content is based on the work of researchers and students in Applied Cognitive Neuroscience Laboratory, The Hong Kong Polytechnic University. High temporal resolution offered by electroencephalogram particularly event-related potential (ERP) can help disentangle early and late neural processes associated with functional task performed by the subject. Contrast group method such as younger versus older subjects, or older versus patient subjects would allow study of the impact of neurodegeneration on modulating specific neural processes. Better understanding on the modulation effects would help explain the functional decline of older adults in life and the functional deficits manifested in patients suffered from specific medical conditions such as dementia and stroke.

Chan et al. will demonstrate how the use of experimental paradigms and group contrasts elicit the targeted ERP components such as N200, P300 and SME which inform neurodegeneration of the attentional and working memory functions. Besides, the potential therapeutic effects of electrical stimulation and mnemonic strategy on modulating N200 and P200 among the patients with mild cognitive impairments will be explored.

Biosketch:

Professor Chetwyn Chan is Chair Professor of Rehabilitation Sciences at The Hong Kong Polytechnic University. He takes a concurrent appointment as Associate Vice-President (Learning and Teaching). He is psychologist and occupational therapist by profession. Prof. Chan is elected fellow of American Psychological Association and fellow of Hong Kong Psychological Society. He is associate editor of Journal of Occupational Rehabilitation and editorial board member of Journal of Vocational Rehabilitation, Pain Practice, Rehabilitation Psychology, and WORK. He has published more than 140 scientific papers with most of them appearing in international prestigious journals. His research focuses on cognitive neuroscience and its application to self-regulatory and cross-modal learning, aging and neuroprotection for dementia, and stroke rehabilitation. In Hong Kong, Prof. Chan is member of the vice-chair The Hong Kong Society for Rehabilitation. He is honorarium advisor to the Council of SAHK, and member of Hospital Government Committee of Princess Margaret Hospital, Kwai Chung Hospital and McLehose Medical Rehabilitation Centre.