香港科技園 HKSTP
Institute for Translational Research

HKSTP MedTech Co-create *in Action*

Talk Series on Biomedical Technologies - in Collaboration with HKMA

What are the latest technologies in precision medicine and their clinical applications – especially with genetic testing and digital technologies? Want to hear from doctors their first-hand experience and insights on their clinical needs? Have some great ideas and looking for partners to co-create and ride on the trend of precision medicine? Come join us for this MedTech Co-create lecture series!

This Continuing Medical Education (CME) lecture series – brought to you by HKSTP MedTech Co-create Program in collaboration with Hong Kong Medical Association (HKMA) – aims to provide medical professionals and technology providers with updates on recent advances in precision medicine, and to provide a platform to stimulate exchanges and collaborations. More technology innovations will be showcased in the series – including use of novel biomarkers and genetic testing to predict diseases and treatment outcomes, and "-omics" data and healthcare analytics to improve health and wellbeing.

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Talk Series 2023

Talk Highlight

Date: 23 March 2023 (Thursday)

Topic: Remote monitoring for cardiovascular disease management

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Speaker: Prof. SIU Chung Wah, David Clinical Professor, Department of Medicine, The University of Hong Kong

Supported by: Comfit Healthcare Devices Limited

Abstract

Cardiovascular disease including stroke and coronary artery disease, has been the major cause of morbidity and mortality globally over the past century. Theoretically, up to 80% of cardiovascular disease can be prevented by prompt preventive measures. However, optimal strategies to monitor a panoply of cardiovascular risk factors followed with prompt implementation of various preventative measures remain challenging. The advances in sensor technology, artificial intelligence-based diagnosis, and instant mobile communications have made possible to develop to remote home-based cardiovascular disease management with the required temporal and spatial granularity to streamline clinical management. In this talk, we will share a few of our ongoing programs on remote heart failure management, and stroke prevention platform using remote physiological monitoring with artificial intelligence-based diagnosis and downstream management pathway. This platform aims to reduce cardiovascular events in high-risk individuals in an efficient and highly automated manner.

Date: 27 April 2023 (Thursday)

Topic: Contemporary Approach to High Risk Percutaneous Coronary Intervention and Heart Failure Management

Speaker: Dr. Sunny TSANG, Associate Consultant, Department of Cardiology, Queen Elizabeth Hospital, Hong Kong

Supported by: OrbusNeich Medical Company Ltd.

Abstract

The term high-risk percutaneous coronary intervention (PCI) refers to a spectrum of procedures in patients with high risk features such as left main/ complex 3-vessel coronary artery disease, intervention on the last patent vessel, LVEF < 35% or extensive comorbidities including severe aortic stenosis or mitral regurgitation. Protected PCI is the latest concept of treating these high-risk patients with elective placement of mechanical circulatory support (MCS). The use of MCS provides a stable environment for the intervention allowing a more complete revascularization as a result.

Guideline-directed medical therapy, with device-based interventions in eligible patients, is the current standard of care for heart failure (HF). With the “4 pillars” HF therapy, 6 additional years of survival can be gained compared with conventional therapy. However, many patients still experience progressive deterioration in their HF status despite the many advances over the

years. It is becoming increasingly clear that medical devices, including MCS, will enhance HF management and improve patient outcomes. The development of new device and medical therapy, associated with management tailored to individual patients, will play a significant role in extending patient lives as well as improving their quality of life.

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Talk Series 2022

December 2021

Artificial intelligence in healthcare industry and its clinical applications

Supported by: Imsight Technology

Abstract

Artificial intelligence (AI), especially deep learning with multiple levels of feature representation, has dramatically improved the state-of-the-art recognition performance in many domains including speech recognition, visual recognition, and natural language processing. Despite breakthroughs in above domains, its application to medical image analysis remains yet to be further explored. This talk will share the progress on developing advanced AI techniques and applications for medical image analysis including volumetric deep learning for high-dimension image analysis, human-in-the-loop collaboration, weakly deep learning for scalable pathology image analysis, etc., with an in-depth dive into predictive, diagnosis and prognostic applications covering X-ray/CT/MRI/ultrasound in radiology, OCT in ophthalmology and whole-slide image in pathology. To further unleash the power of AI integrated into clinical scenarios, future promises and pitfalls will also be discussed. Practical application of AI-driven medical tools will also be demonstrated during the talk to showcase how AI adoptions can benefit healthcare providers.

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January 2022

Applications of Pharmacogenomics Tests in The Community Healthcare Setting

Supported by: [Codex Genetics]

Abstract

This talk was designed for continued education of clinicians/pharmacists who are interested in clinical Pharmacogenetics, based on a recent lecture delivered by Prof. Bani Tamraz (PharmD./Ph.D., UCSF) in collaboration with Codex. If you are interested in knowing more about pharmacogenetics (PGx), or deal with questions related to PGx test results, commercial or otherwise, then this presentation will be of interest to you.

The role of clinicians/pharmacists in PGx research, education, and implementation is becoming increasingly important as this field rapidly evolves. The objective of this talk is to provide pharmacist/clinicians a more in-depth analysis of most recent evidence in support of specific clinical guidelines associated with 4 commonly used medications among patients in Hong Kong: tacrolimus, simvastatin, escitalopram and clopidogrel. Furthermore, the presentation will discuss the prevalence of actionable PGx variants among Hong Kong Chinese, providing the audience with potential clinical impact of PGx guided medication treatment in this population in general and for these four medications specifically.

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February 2022

Gut Microbiome Diagnostics and Therapeutics in Atopic Dermatitis

Supported by: Biomed Technology Holdings Limited

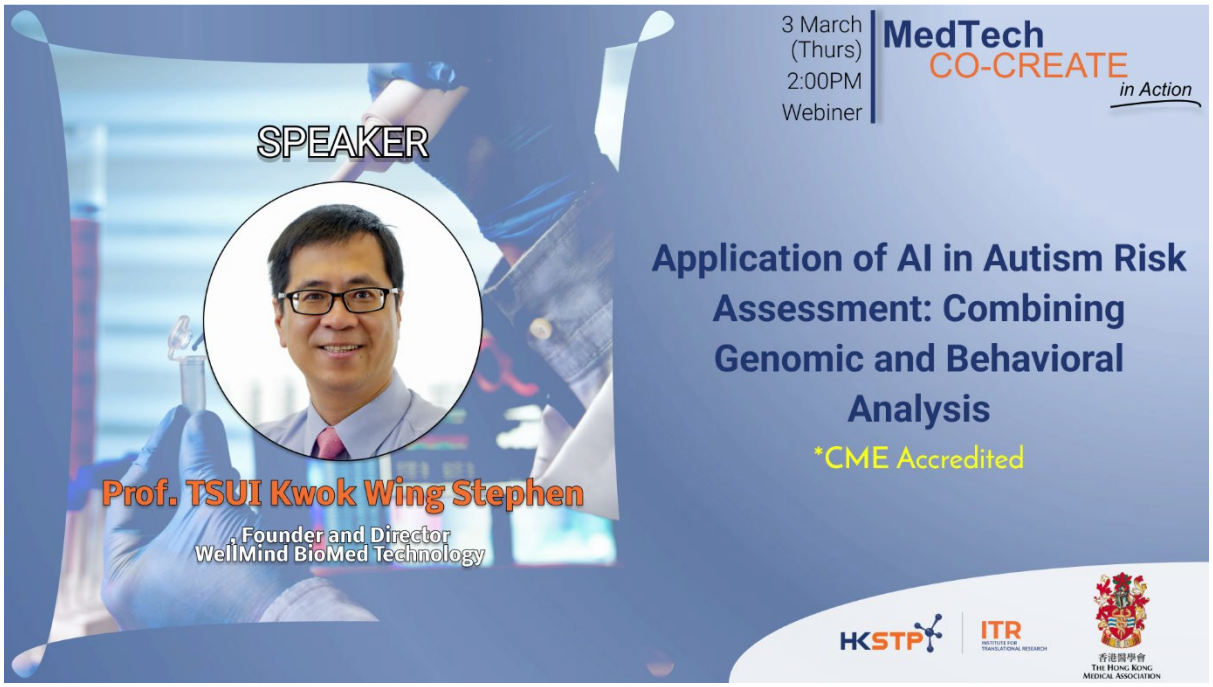
Abstract

Atopic dermatitis (AD) is a common chronic inflammatory skin disease with a worldwide prevalence of approximately 10–20% in children and 2–5% in adults. This distressing “itching disease” can have tremendous physical and quality-of-life impacts on both patients and their family members. The incidence of atopic diseases has increased over the last few decades, especially in industrialized countries, suggesting that a modern lifestyle is one of the major contributing factors to this global epidemic.

The Hygiene Hypothesis, proposed 3 decades ago, stated that reduced exposure to microbes in early childhood affects the natural development of the immune system or immune tolerance, resulting in increased susceptibility to allergic diseases. In recent years, there has been increasing interest in the role of the intestinal microbiota in the disease development of AD. The gut microbiota is involved in regulating a wide range of physiological processes, such as metabolic-endocrine functions, immunological development and regulation, and biosynthesis of various compounds including short-chain fatty acid (SCFA) and neuromediators. Dysbiosis of the human gut microbiota during early childhood have been shown to be a risk factor for a wide range of chronic diseases, including allergies, autoimmune diseases, metabolic diseases, neuropsychiatric disorders, irritable bowel syndrome and inflammatory bowel disease. Implication of gut microbiota in the

development of atopic dermatitis and its potential therapeutic direction will be discussed during the presentation.

March 2022



Application of AI in Autism Risk Assessment: Combining Genomic and Behavioral Analysis

Supported by: WellMind BioMed Technology

Abstract

WellMind BioMed Technology Holdings Limited is a research-focused firm that accelerates the frontier of early detection for autism spectrum disorders (ASD). Our vision at Wellmind is to provide affordable, accessible, and accurate services that aids in the early screening of high-risk autistic children and to improve the quality of life of those afflicted. By merging state-of-the-art genomics, eye and motion tracking, artificial intelligence and behavioral analysis, we are able to identify high-risk individuals before three years of age, which is the golden window for therapeutic and behavioral intervention. An intervention centre named WISE Development Centre was also established at North Point in 2021. Through the seamless integration of the screening and intervention services, we believe precision management of ASD children as well as other children will special educational needs could be provided in near future.

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April 2022

The use of C-peptide and other biogenetic markers in the assessment of patients with diabetes

Supported by: GemVCare™

Abstract

Precision medicine is an emerging trend in the management of patients with diabetes. In recent literature, there is increasing discussion on incorporating biogenetic markers as part of clinical assessment especially for young patients in whom the aetiology of diabetes is not immediately clear. Routinely available biogenetic markers include C-peptide, anti-islet autoantibodies and genetic sequencing for monogenic diabetes. In this presentation, I will provide an overview of these biogenetic markers, their interpretation and clinical implementation.

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12th May 2022

Diagnosis of common and rare neurological diseases: Technological updates and clinical applications

Supported by: Codex Genetics

Abstract

Neurodegenerative disease (ND) refers to the progressive degeneration of neuron structure and function. Rare NDs, such as hereditary spastic paraplegia, spinocerebellar ataxia, and spinal muscular atrophy affect around 1 in 1000 people in HK. Meanwhile, Alzheimer's disease and Parkinson's disease are common NDs that affect up to 8% of individuals aged over 65. Since the early symptoms of neurodegenerative diseases are often similar, for example, muscle weakness, poor coordination, and mood change, the confirmatory diagnosis of the neurodegenerative disease require a long period of time. According to European Rare Diseases Organisation (EURORDIS), 25% of patients had to wait between 5 and 30 years from early symptoms to confirmatory diagnosis of their diseases, and 40% of patients first received a wrong diagnosis. The prolonged diagnostic journey could lead to unsatisfactory treatment progress or delayed disease management.

Approximately 80% of NDs have known genetic markers or genetic risk factors. Therefore, genetic testing for neurodegenerative diseases can help with confirmatory diagnosis at an early stage. With the advent of biomarker-directed therapies for NDs, such as Onasemnogene abeparvovec, Trehalose, and Aducanumab, genetic testing can help also inform personalized treatment plans for medical professionals. The objective of this talk is to provide medical professionals an overview of recent advances in ND biomarkers researches,

and clinical guidelines associated with genetic testing of NDs. Furthermore, the presentation will discuss how genetic testing assisted the diagnosis of rare ND cases.

16th June 2022

Rhinitis, Sinusitis and Nasopharyngeal carcinoma

Supported by: Take2 Diagnostics Limited

Abstract

The causes of rhinitis are mostly due to allergy or infection. It is estimated that allergic rhinitis affects 30-40% of population in the developed countries. The symptoms include rhinorrhea, nasal obstruction, sneezing and itchiness.

Sinusitis is the inflammation of the paranasal sinus. As the epithelial lining of nasal cavity is in continuity with that of paranasal sinuses, inflammation of the sinus cavities is almost always associated with inflammation of nasal cavities. Thus , the term 'rhinosinusitis' is preferred.

Nasopharyngeal carcinoma is prevalent in the Southern China and South East Asia. It most commonly present at the age of 40-60 and is of male predominance. Diagnosis of NPC at its early stage significantly improve the prognosis and the cure rate.

However, the presenting symptoms of rhinitis, sinusitis and NPC can be quite similar and impose clinical difficulties in the diagnosis and management of these illness. In this presentation, the ways of distinguishing the three disease entities and an overview of their management are discussed.

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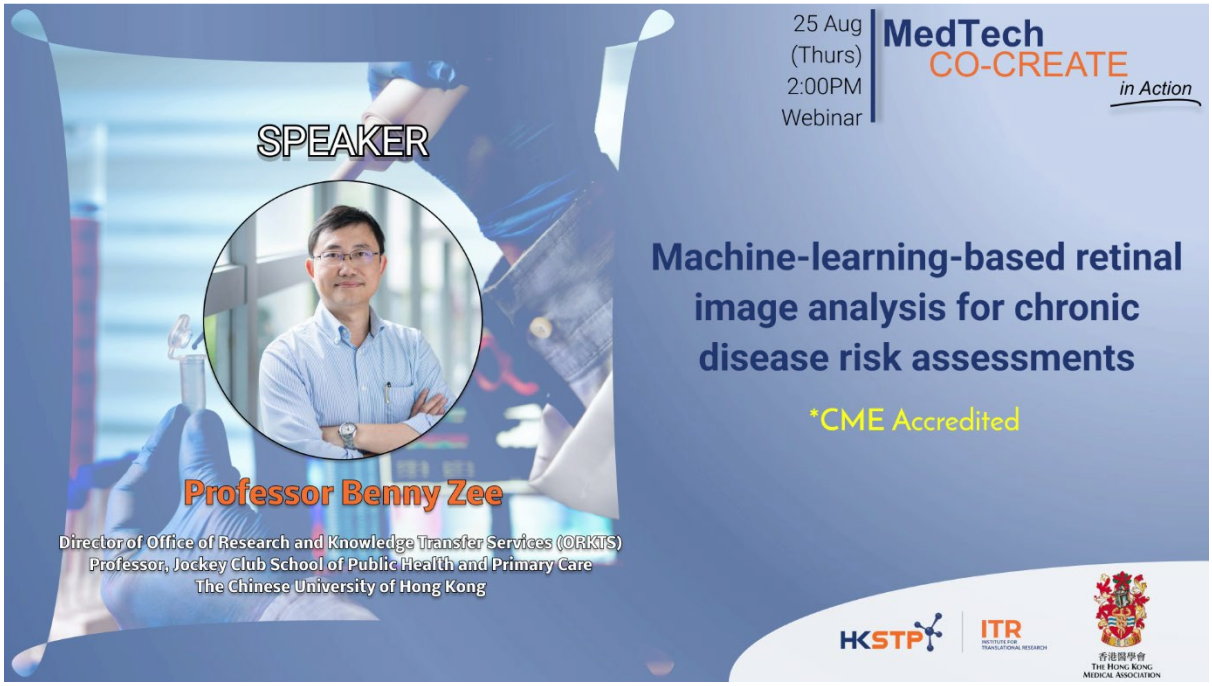
25th Aug 2022



Machine-learning-based retinal image analysis for chronic disease risk assessments

Supported by: Health View Bioanalytics

Speaker: Professor Benny Zee

Director of Office of Research and Knowledge Transfer Services (ORKTS)

Professor, Jockey Club School of Public Health and Primary Care The Chinese University of Hong Kong

Abstract

Due to rapid scientific and technological advancement in the last decades, we now possess high-speed computing power, increased data mobility due to the internet, and an efficient cloud computing environment that gives us unlimited resources to store and process information. Therefore, artificial intelligence (AI), machine learning and big data analytic approaches to solving real-world problems are natural consequences.

In this talk, we present an example of a machine-learning-based approach for early detection of the risks of chronic diseases such as stroke and cognitive health decline using the automatic retinal image analysis (ARIA) method. It serves as an illustration of how these new technologies can be applied in the community to improve the health and wellness of the population.

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15th Sept 2022 **(Rescheduled to 16th Nov 2022)**

Current landscape of treatment-directed molecular testing in cancer

Supported by: ACT Genomics (Hong Kong) Limited

Speaker: Dr Kirsty Wai Chung Lee, Chief Medical Officer, ACT Genomics Holdings Company Limited

Abstract

Rapid advances in 2 decades of genomic and digital technology has revolutionized precision cancer medicine.

This has lead to increasing complexity for doctors trying to arrange and counsel patients to undergo testing. This complexity conflicts with the time required to achieve a comprehensive diagnosis efficiently, yet time is the most precious resource for cancer patients, and a crucial determinant of treatment outcomes. This talk will update on the framework for helping cancer patients to get ready for treatments as soon as possible. It will also touch upon some of the necessary tests that need to be done to ensure that side effects or complications are identified in a timely manner.

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27th Oct 2022

Patient-derived organoids for cancer drug matching: Technology updates and clinical case sharing

Supported by: Invitrocue (Hong Kong) Ltd

Speaker: Dr. POON Ming Chun, Darren, Specialist in Clinical Oncology/ Honorary Consultant in Clinical Oncology

Abstract

Tumor heterogeneity among patients contributes to the individual differences in tumor progression and therapeutic response. Despite recent advances in NGS-based precision oncology, the majority of cancer patients do not present druggable mutations. In most circumstances treatment decision has to be made empirically with the only support of general guidelines. As of today method to predict chemotherapy outcome for individual patient remains an unmet clinical need in oncology diagnostics.

Patient-derived organoids (PDOs) is a developing 3D cell-based technology; patient's tumor cells are grown in the laboratory to form many "mini tumors" in dish. Organoid technology has a wide range of applications in medicine. Tumor organoids conserve the biological characteristics including key molecular signatures and oncogenic alterations of the primary tumor, thus hold great promise for personalized medicine. The individual PDOs can serve as

a promising tool in the laboratory settings to select the most effective chemotherapy or targeted therapy out of several equivalent treatment options for the individual patient. Case sharing will be given on triple-negative breast cancer (TNBC). TNBC remains the most challenging breast cancer subtype to treat. The cases are offered for in vitro drug sensitivity test using PDOs generated from their own surgical tumor specimens. A good correlation of PDO drug responses with clinical treatment outcomes has been observed. Growing evidence suggests that PDOs is a valuable preclinical model in guiding treatment decisions and rationalizing a more personalized treatment approach.

3rd Nov 2022

Era of Minimal Invasive Surgery in Cardiology

Supported by: OrbusNeich

Speaker: Dr. LUK Ngai Hong, Vincent,
Specialist in Cardiology
Honorary Clinical Assistant Professor (HKU)
Honorary Consultant (St. Paul's Hospital)
The Heart Clinic, a member of Virtus Medical Group

Abstract

Surgery was one of the gold standards for difficult coronary artery disease and valvular heart disease. Yet those patients are mostly elderly with high surgical risk. In Chinese population in

general patients are even more reluctant for open heart surgery. Not until recent years with the advancement of technology and totally change the management strategy. And more and more patients can be treated at the same time with less risk and shorter recovery time. There're two hurdles in cardiac intervention : calcified coronary artery disease , valvular heart disease. Different treatment modalities are now available for treating different valvular heart diseases by transcatheter approach (aortic valve, mitral valve, tricuspid valve). And with the help of newly developed technology, calcified coronary artery disease can be treated with better surgical outcome with much lower risk

1st Dec 2022

AI-empowered local bone quality assessment system for osteoporotic bone fracture risk evaluation and surgical planning 智能骨科診療系統的研發與產業化

Supported by: BONE'S TECHNOLOGY LIMITED

Speaker 1: Prof. LU, Weijia William, Ng Chun-Man Professor in Orthopaedic Bioengineering, Dept of Orthopaedics, The University of Hong Kong

Speaker 2: Dr Marvin Chi MA, Chief Executive Officer at Bone's Technology Limited

Abstract

人體結構中骨骼系統是重要的組成部分，同時也是人體各項機能的支架，如果人體的

骨骼出現問題，活動、造血等多個方面都會受到一定的影響。我們幾乎每一個人都無法避免骨質疏鬆症、骨關節炎、椎間盤突出、骨折、脫臼等骨骼系統疾病，這不但嚴重危害人體健康，也令每一個家庭承受著經濟負擔和精神痛苦，給社會帶來了巨大的負擔。

我們將骨科診療數字化，通過人工智能及生物力學技術，解決骨科診療過程中核心的骨質量測量問題。我們提出了骨量-結構-強度局部骨質量評估理論，通過區域化骨密度、三維形態學和骨強度精準評價骨質量並輔助手術規劃。我們結合手術規劃、個體化耗材及智能硬件，完成智能骨科賽道全流程佈局。

提出的骨科診療一體機可以針對每一個病人，設計個體化的手術方案，最符合人體力學強度和結構的數字植入物和手術導板。通過診療一體機，抓住了臨床市場入口，快速進入醫院，積累數據，實現產品迭代。以一體機為旗艦，博志打造了完整的產品矩陣，重新定義骨科診療。