

Dear HKSMS members,

Due to the COVID-19 pandemic, the Council has decided to hold an online HKSMS Symposium 2021 and Annual General Meeting (AGM) via **Zoom** this year. You are cordially invited to attend the **HKSMS Symposium 2021 and AGM on 9 July 2021 (Friday, 7:00 p.m. - 9:00 p.m.)**.

If you will join the coming symposium and/or AGM, please make your registration via the link below **on or before 30 June 2021**.

**Pre-registration:** <https://forms.gle/iRVoL5CAHaB553GV7>

The Zoom link and meeting information will be sent to registered participants one week before the symposium and AGM.

For enquiries, please contact us by email ([hksms.info@gmail.com](mailto:hksms.info@gmail.com)).

Let's stay healthy and fight against COVID-19 together.

Yours sincerely,



Zhongping Yao

President, HKSMS

## *HKSMS Symposium 2021*

<b>Mode:</b>	<b>Online via Zoom</b>
<b>Dates:</b>	<b>9 July 2021 (Friday)</b>
<b>Time:</b>	<b>7:00 p.m. – 9:00 p.m.</b>
<b>Fee:</b>	Free of charge for HKSMS members Non-members can register upon joining HKSMS

**Detailed Schedule:**

7:00 – 7:50 p.m.	<b>Novel Mass Spectrometry Technology Development and Its Applications</b> Prof. Chung-Hsuan Chen, <i>Genomics Research Center, Academia Sinica</i>
7:50 – 8:15 p.m.	<b>Biomarkers Approach for Horse Doping Control</b> Dr. Hiu Wing (Tony) Cheung, <i>Racing Laboratory, The Hong Kong Jockey Club</i>
8:15 – 8:40 p.m.	<b>Potentiating the Bioefficacy of Dietary Polyphenols through Teaming Up with Functional Gut Bacteria</b> Dr. Danyue (Daisy) Zhao, <i>Department of Applied Biology and Chemical Technology, The Hong Kong Polytechnic University</i>
8:40 – 9:00 p.m.	<b>HKSMS Annual General Meeting 2021</b>

**The 23<sup>rd</sup> Annual General Meeting****9 July 2021 (Friday, 8:40 p.m. - 9:00 p.m.)**

Dear HKSMS Members,

You are cordially invited to attend the 23<sup>rd</sup> Annual General Meeting of the Hong Kong Society of Mass Spectrometry (HKSMS) on 9 July 2021 (Friday) at 8:40 p.m. via ZOOM.

**AGENDA**

- 1. Report from the President**
- 2. Report from the Honorary Treasurer**
- 3. Any other business**

Yours sincerely,



**Zhongping Yao**

**President, HKSMS**

## Plenary Lecture

### Novel Mass Spectrometry Technology Development and Its Applications

Chung-Hsuan (Winston) Chen

Genomics Research Center, Academia Sinica

We developed a few novel mass spectrometry technologies which can be used for detecting particles from atom to single micro/nano particle. They also include bio-particles such as antibodies, cells and virus. We expand the mass range by 10 orders of magnitude for mass spectrometer detection to reach to  $10^{17}$  Daltons. Specific instruments developed include (1) Cell mass spectrometry (2) Biomolecular ion accelerator, (3) Portable mass spectrometer and (4) PM2.5 and PM10 detector.

With our novel mass spectrometry technologies, we developed new platforms for disease biomarker discovery. They include (1) discovery of lung cancer biomarkers from exhaled air (2) discovery of biomarkers for gastric cancer (3) glycoproteomic platform for discovery of pancreatic cancer biomarkers.

### Biography

Prof. Chung Hsuan (Winston) Chen got his B.S. degree from Chemistry Department, National Taiwan University in 1969. He got his Ph. D in Chemical Physics from University of Chicago in 1974, Then, he went to Oak Ridge National Laboratory in USA to become a research staff. In 1989, he became Group Leader of Photophysics. During his tenure at Oak Ridge National Lab, his major effort was placed on development of ultra-sensitive detection technology. They include the first detection of single atom and isotope-selective atom counting. He is also one of the pioneers in developing mass spectrometry for DNA analysis and sequencing. His recent research has focused on novel mass spectrometry technology developments including cell mass spectrometer, accelerator mass spectrometer and portable biomolecular mass spectrometer. In 2007, he was appointed as Director of Genomics Research Center in Academia Sinica. He also has adjunct professor appointment at Chemistry Department, National Taiwan University. He has published more than ~300 papers in referred journals. He obtained 3 R&D-100 awards, He was elected as Fellow of American Physical Society in 1993, and AAAS in 2009 due to his contribution on ultrasensitive detection technology development. He was elected as Academician in Academia Sinica in Taiwan in 2010 due to his contribution on interdisciplinary research.

## Invited Lecture

### Biomarkers Approach for Horse Doping Control

**Hiu Wing (Tony) Cheung, Kin-Sing Wong, Terence S. M. Wan and Emmie N. M. Ho**

*Racing Laboratory, The Hong Kong Jockey Club*

Doping control is essential to maintaining the integrity of horseracing and equestrian competitions. The rapidly-increasing number of new prohibited substances, often with fast elimination kinetics, and emergence of new prohibited practices such as gene manipulation continue to present a great challenge to the capability of direct detection approaches. Biomarkers research has been routinely applied to improving diagnosis, prognosis, and monitoring of the burden and therapeutic response of many diseases. Biomarkers may also be useful to identify non-physiological responses elicited by prohibited substances and practices<sup>1</sup>.

Herein we describe the application of three ‘omics’ profiling methods for identifying biomarkers for doping control in horses. Our methods have included transcriptomics, proteomics, and metabolomics, which are the studies of the entire collection of respectively RNA transcripts, proteins, and metabolites. Whole blood RNA was extracted for mRNA profiling by next-generation sequencing (NGS). Plasma proteins and metabolites were extracted and analysed by liquid chromatography-tandem high resolution mass spectrometry.

Findings from two proof-of-concept experiments will be presented<sup>2,3</sup>. Administration trials of inhalation with a potential erythropoiesis-stimulating gas (Krypton) or oral ingestion with a selective androgen receptor modulator (RAD140) were conducted in retired racehorses. Plasma samples were analyzed by label-free proteomics profiling using data-independent acquisition method. Multivariate statistical analysis using orthogonal projection on latent structures-discriminant analysis (OPLS-DA) has identified predictive biomarker candidates that enabled the detection of horses administered with Krypton up to 14 days post administration or RAD140 up to 7 days post administration. These findings highlighted the feasibility of using omics profiling and statistical modeling to identify biomarkers for horse doping control. Ongoing studies continue to identify and refine the list of biomarkers that can be broadened to detect different prohibited substances/practices with the same erythropoiesis-stimulating or anabolic effects.

#### References:

1. Reichel C. OMICS-strategies and methods in the fight against doping. *Forensic Sci Int.* 2011 Dec 10;213(1-3):20-34. doi: 10.1016/j.forsciint.2011.07.031. Epub 2011 Aug 20. PMID: 21862249.
2. Wong KS, Cheung HW, Choi TLS, Kwok WH, Curl P, Mechie SC, Prabhu A, Wan TSM, Ho ENM. Label-free proteomics for discovering biomarker candidates for controlling Krypton misuse in castrated horses (geldings). *J Proteome Res.* 2020 Mar 6;19(3):1196-1208. doi: 10.1021/acs.jproteome.9b00724. Epub 2020 Feb 25. PMID: 32050764.
3. Cheung HW, Wong KS, To NS, Bond AJ, Farrington AF, Prabhu A, Curl P, Wan TSM, Ho ENM. Label-free proteomics for discovering biomarker candidates of RAD140 administration to castrated horses. *Drug Test Anal.* 2020 Dec 4. doi: 10.1002/dta.2988. Epub ahead of print. PMID: 33277807.

## Invited Lecture

### Potentiating the Bioefficacy of Dietary Polyphenols through Teaming Up with Functional Gut Bacteria

Danyue (Daisy) Zhao

*Department of Applied Biology and Chemical Technology, The Hong Kong Polytechnic University*

To address the ever-increasing health problems from the aging populations and the unhealthy dietary habits, modern societies continue to call for effective, safe and sustainable alternative therapies. Polyphenols represent a group of bioactive dietary component ubiquitous in plant-based diet. In recent decades, there is a growing public interest in these phytonutrients due to their essential roles in strengthening antioxidant defense and preventing chronic diseases. Yet, their bioefficacy is largely limited by their poor oral bioavailability, which also arouses controversies over the actual molecules in action. Following a polyphenol-rich diet, the non-absorbed phenolic compounds will enter the lower gut where they are extensively metabolized by gut microbiota into small phenolic metabolites and are systemically present at much higher levels than their precursors. Our previous studies have explored the metabolism and bioavailability of phenolic compounds of various dietary sources, and revealed the potential of microbial-derived phenolic metabolites in preventing or attenuating hallmarks of psychological and metabolic disorders. Our recent studies, through exploring the metabolic regulation by phenolics at the microbiota and individual strain levels, highlight the importance of functional gut bacteria in extending the health benefits of polyphenols. The comprehensive bioanalysis involved in these studies also exemplifies the use of mass spectrometry-based metabolomics techniques for characterizing tissue-specific biomarkers and elucidating complex phenolic-microbial interactions. Our research findings also support novel synbiotic regimens for management of psychological and metabolic disorders via promoting tissue-specific accumulation of microbial-derived bioactive metabolites. Through teaming up with functional gut bacteria, dietary polyphenols may hold greater promises for disease prevention in the future.