NUS National University of Singapore | iHealthtech Institute for Health Innovation & Technology

"Innovating Health" Distinguished Speaker Seminar Series

Professor Tony Hu

Distinguished Professor of Biochemistry and Molecular Biology, Biomedical Engineering, and Microbiology

Weatherhead Presidential Chair in Biotechnology Innovation

Founding Director of the Center for Intelligent Molecular Diagnostics

Tulane University, USA

Precision Infectiology: Decoding Host-Pathogen Dialogues for Next-Generation Diagnostics

22 SEP 2025, MON, 2 PM – 3 PM

NUS, College of Design and Engineering, Building E7, Level 3, Seminar Room 4

Hosted by: Professor Lim Chwee Teck, iHealthtech Director

Conventional diagnostics that solely detect pathogens are often inadequate, missing latent infections, failing to predict drug resistance, and struggling with sensitivity. This talk will present a paradigm shift: moving beyond pathogen detection to deciphering the host-pathogen dialogue. I will unveil how we leverage extracellular vesicles (EVs) as dual-purpose biomarkers that capture both pathogen identity and the host's immune response. Using novel nanotechnology, we engineer highly sensitive assays to detect these EVs for early diagnosis of diseases like TB and COVID-19 from a simple blood draw, even when standard PCR fails. Furthermore, I will demonstrate how we integrate machine learning to decode complex genomic data, predicting antimicrobial resistance with unprecedented accuracy without prior expert rules. Finally, I will showcase our translation of these discoveries into rapid, portable, and self-powered devices designed for point-of-care use in global health settings. Our work provides a new roadmap for precision infectiology, transforming diagnostics from a mere snapshot into a dynamic tool to guide therapy and improve outcomes worldwide.

Speaker Biography | Dr. Tony Hu is a professor at Tulane University, where he also served as the Weatherhead Presidential Chair in Biotechnology Innovation and founded the Center for Intelligent Molecular Diagnostics. Dr. Hu is a Fellow of the National Academy of Inventors (NAI), the American Institute for Medical and Biological Engineering (AIMBE), and the International Academy of Medical and Biological Engineering (IAMBE). His research integrates engineered multi-omics, nanomedicine, machine learning, and nanotechnology to develop innovative diagnostic and prognostic assays for infectious diseases and cancer. He has authored over 170 high-impact publications and holds over 30 patents, with 14 licensed by biotech companies. His work has been funded by the NIH, DOD, Gates Foundation, and WHO. Dr. Hu has trained 82 researchers from 21 countries and is a co-founder of four biotechnology startups.

Register here

【Link to the registration form】

Email: ask.iht@nus.edu.sg