



Department of Electronic Engineering
The Chinese University of Hong Kong

Research Seminar

Responsible Development of Clinical Speech Analytics

Si-oi (Herman) Ng, Ph.D

College of Health Solutions, Arizona State University

3:30 pm, February 13, 2025
Room 418, Ho Sin Hang Engineering Building



Clinical speech analytics involves analyzing acoustic properties and linguistic content of human speech to assess health conditions. The core premise is that neurological, mental, or physical deficits affecting speech production can be objectively evaluated through automated analysis of speech. The technology has the potential to significantly enhance patient care by providing an additional stream of information for health assessment. Clinical speech AI for automatic diagnosis, prognosis, and longitudinal tracking of health conditions typically follow the supervised learning paradigm that has succeeded in consumer-oriented speech applications. However, clinical speech analytics faces unique challenges, including the need for condition-specific speech elicitation tasks, limited dataset availability, sensitive setups for speech data collection, diverse speech representation and classifier training strategies, and uncertain diagnostic labels. These differences mean that machine learning approaches successful in other contexts may not perform as well when applied in real-world clinical settings. With translation to real-world clinical applications in mind, this seminar will cover key components required for robust development of clinical speech models. Key topics include: 1) Overview of pipeline for clinical speech models as a Software-as-a-Medical Device (SaMD) tool; 2) Design of speech elicitation tasks for different clinical conditions; 3) Clinical speech data collection; 4) Development and analytical validation of clinically-focused speech features; 5) Development and clinical validation of clinical prediction models, post-deployment monitoring; 6) Ethical and participant consideration for clinical speech analytics.

About Speaker

Si-Ioi Ng received the B.Eng. and Ph.D. degrees in electronic engineering from the Chinese University of Hong Kong in 2018 and 2023, respectively. His doctoral study combined speech processing, clinical expertise, and machine learning to classify Cantonese-speaking preschool children with speech sound disorders. He is currently a Postdoctoral Scholar with the College of Health Solutions, Arizona State University, Tempe, USA. His recent research focuses on developing machine learning based clinical speech analytics to assess neurodegenerative disorders based on speech biomarkers. He co-organized a tutorial session on responsible development and translation of clinical speech analytics in INTERSPEECH 2024.