Biostatistics and Health Session

Welcome to our session theme on Biostatistics and Health, where we highlight the transformative impact of data science on medical research and healthcare delivery. This series of talks showcases how advanced mathematical and statistical techniques serve as the backbone for modern healthcare tools—from tracking disease patterns to optimizing patient care. Attendees will explore the latest breakthroughs in biostatistics, discovering how turning vast amounts of complex health data into actionable insights directly contributes to life-saving medical advancements. Whether you are a healthcare professional, a data enthusiast, or simply passionate about the future of medicine, join us to see how quantitative science is shaping a healthier world.

Schedule:

10 July 2026 (Day 3)

Time	Schedule
Health and Biostatistics	
9:15 – 10:00	Keynote  Speaker: Prof. Jian Qing Shi Professor Southern University of Science and Technology Biography: Professor Jian Qing Shi is a Professor of Statistics in the Department of Statistics and Data science at Southern University of Science and Technology (SUSTech) and the National Center for Applied Mathematics Shenzhen. He also

	serves as Director of the Center for Biostatistics at SUSTech. He is the chief scientist of a National Key R&D Program of China (PI, 11.1 million RMB). Before joining Sustech in 2020, he was a Reader in the School of Mathematics, Statistics & Physics at Newcastle University UK, where he also serves as Assistant Director of the Cloud Computing for Big Data CDT. He was a Turing Fellow at the Alan Turing Institute UK. He has also been a visiting research fellow at the Newton Institute at Cambridge University and at SAMSI in the USA. His research interests include functional data analysis, Bayesian nonparametric analysis for big data, missing data, meta-analysis and applications in medicine and system control. He has published more than 120 peer-reviewed papers in leading statistics and medical research journals, including JRSSB, Biometika, JASA, Nature Medicine and British Medical Journal. With his team, he has produced many influential and original research contributions, receiving recognition across the statistics and data science community, including two recent international best paper awards. Title: Statistical Learning for Multimodal Data and its Applications in Aging Abstract: Wearable devices and other modern equipment have been widely used to collect process and image data, along with other health-related measurements, for medical research. As data collection becomes increasingly large-scale and complex, there has been growing interest across statistics and data science in methods and algorithms for analyzing such data. In this talk, I will focus on how to analyze multi-modal data, including free-living gait data, cognition data gathered from questionaries, 24-hour ECG recordings and EEG data. I will also present some of the achievements of my research team in applying statistical models and AI tools to aging-related research.
10:00 – 10:15	Break

10:15 – 10:45	 Speaker: Prof. Guoliang Tian Professor Southern University of Science and Technology Biography: Professor Guoliang Tian has been engaged in medical statistics research at the University of Maryland at Baltimore for six years, and served as an Associate Professor in the Department of Statistics and Actuarial Science at the University of Hong Kong for eight years. From June 2016 to present, he has been a Full Professor at the Department of Statistics and Data Science in Southern University of Science and Technology. His current research directions include the application of EM/MM/US/SeLF algorithms in statistics, statistical analysis of continuous proportional data on (0,1) intervals and multivariate continuous proportional data, & continuous symmetrical and asymmetrical data analysis. He has published over 160 SCI papers, 3 English monographs, and 2 English textbooks published by Science Press. He was the AE of four international statistical journals and is currently the AE of the SII (Statistics and Its Interface). Hosted two National Natural Science Foundation general projects, and participated in one National Natural Science Foundation key project. Title: A new MM algorithm for root--finding problems Abstract: The minorization-maximization (MM) algorithm is an optimization technique to iteratively calculate the maximizer of a concave target function rather than a root-finding tool. In this paper, we in the first time develop the MM algorithm as a new method for seeking the root x* of the univariate nonlinear

	equation g(x)=0. The key idea is to transfer the root--finding issue to iteratively calculating the maximizer of a concave target function by designing a new MM algorithm. According to the ascent property of the MM algorithm, we know that the proposed algorithm converges to the root x^* and does not depend on any initial values, in contrast to Newton's method. Some mathematical and statistical examples are provided to demonstrate the proposed algorithm. [This is a joint work with Dr. Xun-Jian LI and Shuang LI]
10:45 – 11:15	 Speaker: Prof. Hon Keung Tony Ng Professor Bentley University Biography: Professor Hon Keung Tony Ng is a Professor in the Department of Mathematical Sciences at Bentley University (Waltham, MA, USA). He is Co-Editor of Communications in Statistics—Simulation and Computation and serves as Associate Editor for IEEE Transactions on Reliability, Naval Research Logistics, Sequential Analysis, and Statistics & Probability Letters. His research interests include reliability, censoring methodology, degradation modeling, ordered data analysis, nonparametric methods, and statistical inference. He has published over 200 refereed papers and co-authored Precedence-Type Tests and Applications (Wiley, 2006) and Fiber Bundles: Statistical Models and Applications (Springer, 2023). He has also co-edited the books Ordered Data Analysis, Modeling and Health Research Methods; Statistical Modeling for Degradation Data; Statistical Quality Technologies: Theory and Practice; Bayesian Inference and Computation in Reliability and Survival Analysis; and Recent Advances on Sampling Methods and Educational Statistics. He is a Senior

	Member of IEEE (2008), an elected member of ISI (2008), a Fellow of ASA (2016), and a Senior Member of ASQ (2025). Title: Stochastic-Process and Parametric Modeling for Uncertainty-Quantified Drug Dissolution Profile Similarity Abstract: Dissolution profile comparison is important to pharmaceutical development and regulatory decision-making, yet the most widely used model-independent metrics, difference factor f1 and similarity factor f2, provide limited uncertainty quantification for similarity conclusions. Building on a degradation-modeling perspective, this talk presents stochastic-process and parametric modeling approaches that treat dissolution as a monotone cumulative process, enabling principled inference for dissolution similarity. I will first introduce a stochastic-process framework for modeling dissolution increments and show how parametric bootstrap can be used to construct confidence intervals for f1 and f2, yielding tests that can control error rates and improve power relative to common multivariate benchmarks. Then, I will broaden the perspective to fit a parametric model to dissolution data and use the fitted model to generate bootstrap samples for uncertainty-quantified decisions. The talk will highlight simulation evidence and real-data illustrations demonstrating how different modeling assumptions capture key dissolution features and how this impacts similarity conclusions.
11:15 – 11:45	Open Discussion