Tutorial Session

Welcome to our upcoming tutorial session, where we bridge the gap between cutting-edge data science and real-world analytical challenges. This series features two distinct but equally powerful explorations into advanced quantitative methods. First, we will dive into Spatiotemporal Zero-Inflated Regression Analysis, uncovering how to model complex data that varies across both time and space, especially when dealing with data sets heavily weighted with zeros. Then, we will shift focus to the cutting edge of AI with an Introduction to Reinforcement Learning, demonstrating how these dynamic machine learning models are being applied to revolutionize risk assessment and decision-making in Actuarial Science. Whether you are looking to master intricate spatial statistics or explore the future of predictive insurance modeling, these sessions offer valuable, practical insights for researchers and practitioners alike.

Schedule:
8 July 2026 (Day 1)

Time	Schedule
Tutorial Session	
14:30 – 15:30	 Speaker: Prof. Maozai Tian Professor Renmin University of China Biography: Professor Maozai Tian received his Ph.D. from Nankai University in 2001. He also holds an M.A. from the University of Hunan (1998) and a B.S. from the National University of Defense Technology (1991). He is currently a Professor in the School of Statistics and a Doctoral Advisor at Renmin University of China, where he also serves as the Vice Director of the Center for Applied Statistics.

	His extensive research portfolio focuses on advanced statistical methodologies, including quantile regression, big data modeling, Bayesian inference, and functional data analysis. Over his career, he has held numerous prestigious visiting and research positions globally, including stints at Yale University, Columbia University, the University of Melbourne, and Humboldt University. He has also been a prolific author, publishing a wide range of books on topics such as multivariate statistical analysis, hierarchical quantile modeling, and big data prediction. Professor Tian is a highly cited researcher with numerous publications in leading journals such as the Journal of the Royal Statistical Society (Series A and B), Biostatistics, and Science China Mathematics. His work frequently addresses complex applications in fields ranging from medical research and epidemiology to environmental health and economics. In addition to his academic roles, he has been recognized as a "Flying Apsaras Scholar" of Gansu Province since 2013. Title: A Spatiotemporal Zero-Inflated Regression Analysis with Applications Abstract: The tutorial covers basic topics in spatiotemporal zero-inflated regression and their applications. Asia is a principal source of global migration, and its intra-regional movements profoundly reshape the political, economic, and ecological landscapes of Asian nations. To address the spatiotemporal zero-inflated and dispersion present in migration data, as well as the need for interpretable inference on the overall mean, we develop a spatiotemporal marginalized zero-inflated Conway–Maxwell–Poisson (MZICMP) regression model. This model transcends the limitations of conventional zero-inflated approaches by employing a dispersion parameter that accommodates equidispersion, overdispersion, and underdispersion, and by jointly modeling excess zeros and the marginal mean through the inclusion of country-level covariates, smooth temporal effects, and spatial random effects. For parameter estimation, we implement a Bayesian Markov Chain Monte Carlo (MCMC) algorithm that combines Gibbs sampling with Metropolis–Hastings steps. Simulation demonstrates the model's efficacy in capturing both temporal autocorrelation and spatial zero-inflation patterns, and an empirical application to 1990–2020 intra-Asian out-migration reveals:

	(1) the share of secondary industry and the share of tertiary industry both show significant negative correlations with out-migration flows, whereas battle-related deaths and the total volume of bilateral trade exhibit positive correlations; (2) the average out-migration trend among Asian countries was relatively high during the period 2005–2010, then declined in 2015–2020; the model results indicate a satisfactory capture of this temporal pattern; and (3) after controlling for observed factors, certain countries in Southwest Asia still show elevated overall out-migration flows, likely influenced by unobserved spatial effects.
15:30 – 15:45	Break
15:45 – 16:45	 Speaker: Prof. Hailiang Yang Professor Xi'an Jiaotong-Liverpool University Biography: Professor Hailiang Yang, ASA and HonFIA, received his PhD degree from the University of Alberta and his Master degree in actuarial science from the University of Waterloo. He is currently a professor in the Department of Financial and Actuarial Mathematics at Xian Jiaotong-Liverpool University (XJTLU). Before joining XJTLU, he worked at the University of Hong Kong for 27 years. His research focuses on actuarial science and mathematical finance. He has worked with many leading figures in the field. He has supervised more than 20 PhD students, and his graduate students are, in many cases, now well-known researchers in their own right. Furthermore, he was an editor of Insurance; Mathematics and Economics from 2018 to 2025 and an associate editor of six other journals. In addition, he is an Associate of the Society of Actuaries, and he was elected as an Honorary Fellow of the Institute and Faculty of Actuaries and a Corresponding Member of the Swiss Association of Actuaries in 2014. He is an elected member of the International Statistical Institute (ISI). He received an

	Outstanding Research Award from the University of Hong Kong in 2013–2014. Title: Introduction to Reinforcement Learning and Applications in Actuarial Science Abstract: This talk provides an introduction to reinforcement learning (RL) and explores its applications in actuarial science. Unlike supervised learning, RL enables an agent to learn optimal decision-making through trial-and-error interactions with a dynamic environment, making it particularly suited for sequential risk problems. We begin by explaining core RL concepts—policy, reward, value function, and exploration-exploitation trade-off. The second presents some examples on actuarial applications, including optimal (re)insurance strategies, and equity-linked insurance products. The talk concludes with a brief introduction to recent developments of RL.