Economics and Finance Session

Welcome to our session on Economics and Finance, where we examine how data science is revolutionizing our understanding of global markets and economic trends. This theme focuses on the practical application of advanced analytics to decode volatile financial markets, track complex economic indicators, and extract meaningful insights from large-scale financial datasets. By pulling back the curtain on the latest developments in financial technology, these talks will highlight the precise mathematical and statistical techniques that power modern predictive tools and risk assessment models. Whether you are interested in algorithmic trading, macroeconomic forecasting, or data-driven financial decision-making, join us to see how deep quantitative insights are shaping the future of global commerce.

Schedule:
9 July 2026 (Day 2)

Time	Schedule
	Economics and Finance
14:45 – 15:30	Keynote  Speaker: Prof. Zhijie Xiao Professor Boston College Biography: Professor Zhijie Xiao is a Professor of Economics at Boston College. He received his Ph.D. in economics in 1997 from Yale University. From 1997 to 2004, he taught at the University of Illinois at Urbana-Champaign, where he served as an Assistant Professor from 1997 to 2002 and an Associate Professor from 2002

	to 2004. In 2004, he joined Boston College as a Professor of Economics. Xiao received the Multa Scripsit Award from Econometric Theory in 2002 and the Plura Scripsit Award from the same journal in 2013. He is a Fellow of the Journal of Econometrics and has served as an Associate Editor for JASA and the Econometrics Journal. He is currently a Co-Editor of Econometric Theory. Zhijie Xiao has published over 100 articles on various topics in econometrics and empirical finance, including time series analysis, quantile regression, operational research, and semiparametric and nonparametric models. Title: Functional Dynamics in Economic and Financial Time Series Abstract: Understanding dependence structures in time series data is crucial for analyzing and forecasting the underlying time series variables. Traditionally time series models often focus on the evolution of the conditional means or conditional variances, within a given class of conditional distributions. Often such an approach is not sufficiently flexible to accommodate the evolution of the entire conditional distribution. In particular, the correlation measures often fall short in capturing complex, nonlinear, and tail dependencies observed in real-world data. We believe that directly modeling such kind dependence relationships based on the (conditional) distribution/quantile functions can provide a useful approach to address some of these issues. Time series models with functional relationships can provide a useful approach in capturing dependence structure over distributions. In this talk, we study functional dynamic relationships using a linear functional quantile regression model which allows information from the whole previous distribution affecting future behavior of the time series.
15:30 – 15:45	Break

15:45 – 16:15	 Speaker: Prof. Dan Zhu Professor Monash University Biography: Professor Dan Zhu is, currently a Professor/Director of Actuarial Studies at the Department of Econometrics and Business Statistics, Monash University Australia. Her research sits at the intersection of Bayesian Econometrics, Finance, and Actuarial Science, specializing in developing advanced Monte-Carlo methods to solve complex problems in high-dimensional macro-financial systems and risk management. Dan's work has been featured in leading journals across Econometrics, Operations Research, and Actuarial Science. She is also a Fellow of the Actuarial Institute. Title: Structural Macroeconomics with Daily Data: A Matrix-Free Mixed-Frequency VAR Approach Abstract: Financial markets reveal monetary-policy news at a daily or even intraday frequency, while output and prices are observed only monthly or quarterly. This paper argues that the mismatch is not only a measurement problem but an identification problem: aggregating financial variables to the macroeconomic frequency can blur immediate financial responses with delayed real adjustment and change the inferred transmission of monetary policy. I develop a daily Bayesian mixed-frequency VAR in which low-frequency macroeconomic aggregates are treated as latent daily processes observed through aggregation equations. To make the daily system feasible, the long lag polynomial is represented by a low-dimensional basis expansion, and the missing daily macroeconomic paths are drawn with a matrixfree

	sampler that avoids forming or factorising the large precision matrix. In an application to U.S. monetary policy combining quarterly output, monthly prices, and daily financial variables, the daily system delivers immediate financial responses and gradual declines in output and prices after a contractionary shock, without the price puzzle found in low-frequency recursive VARs. The results show that temporal aggregation can obscure structural monetary transmission, and that estimating the system on the daily clock changes the economic conclusions.
16:15 – 16:45	 Speaker: Dr. Ping Chen Associate Professor The University of Melbourne Biography: Dr. Ping Chen is an Associate Professor in the Department of Economics at the University of Melbourne, where she is affiliated with the Centre for Actuarial Studies. She received her PhD in Mathematical Finance and Actuarial Science from the University of Hong Kong and holds an MSc in Probability and Statistics from the Chinese Academy of Sciences. Her research lies at the intersection of actuarial science, mathematical finance, and risk management, with a particular focus on pension systems, stochastic control, Lévy processes, and insurance risk modelling. She has published extensively in leading journals such as Insurance: Mathematics and Economics, ASTIN Bulletin, and Scandinavian Actuarial Journal. Ping Chen is an Associate Actuary of the Actuaries Institute and currently serves as Program Director for the Master of Commerce (Actuarial Studies) and Honours Coordinator at the University of Melbourne.

	Title: Data-Driven Pandemic Risk Management: Integrating Vaccination Optimisation and Catastrophe Bond Design via Neural Networks Abstract: Pandemic risk presents significant challenges for governments, requiring coordinated strategies that simultaneously control disease transmission and manage economic losses. This presentation develops a unified, data-driven framework that integrates epidemiological modelling, optimal intervention design, and financial risk transfer. We first introduce a stochastic compartmental modelling approach combined with neural networks to optimise vaccination strategies under an economic-epidemiological objective. This framework enables policymakers to dynamically minimise both infection outcomes and pandemic-related expenditures, addressing the high dimensionality and analytical intractability of epidemic control problems. Building on the same modelling foundation, we then extend the analysis to pandemic risk transfer through the design and pricing of catastrophe bonds. Using physics-informed neural networks calibrated to compartmental disease dynamics, we incorporate healthcare cost structures across severity levels and construct bond mechanisms that hedge government losses during outbreaks. Two bond designs—proportional and pre-occurrence—are evaluated in terms of pricing sensitivity and hedging effectiveness. Empirical applications based on COVID-19 data demonstrate that the integrated framework provides both optimal intervention strategies and viable financial instruments for pandemic preparedness. By linking public health policy with capital market solutions, this approach offers a comprehensive toolkit for managing pandemic risk under uncertainty.
16:45 – 17:15	Open Discussion