

EAC-ISBA 2022

The 6th EAC-ISBA conference

Eastern Asia Chapter of the International Society for Bayesian Analysis

Feng Chia University, Taichung, Taiwan

July 8-9, 2022 (Hybrid Conference)



$$P(A|B) = \frac{P(B|A)P(A)}{P(B)}$$



INTERNATIONAL SOCIETY FOR BAYESIAN ANALYSIS

EAC-ISBA 2022

Contents

EAC ISBA 2022	1
Program Committee	1
Organizing Committee	1
Timetable	2
Friday, 8 of July	2
Saturday, 9 of July	2
List of Abstracts – Talks	3
Keynote Talk: James O. Berger	3
Keynote Talk: Robert Kohn	4
IT1: Invited Talk Organized by Cathy W. S. Chen & Feng-Chi Liu	5
IT2: Invited Talk Organized by Cathy W. S. Chen & Feng-Chi Liu	7
IT3: Invited Talk Organized by Dipak K. Dey	9
IT4: Invited Talk Organized by Dipak K. Dey	11
IT5: Invited Talk Organized by Edward Meng-Hua Lin	12
IT6: Invited Talk Organized by Jaeyong Lee	14
IT7: Invited Talk Organized by Kazuhiko Kakamu	16
IT8: Invited Talk Organized by Mike K.P. So	18
IT9: Invited Talk Organized by Ming-Hui Chen & Lynn Kuo	20
IT10: Invited Talk Organized by Ruby Chiu-Hsing Weng	22
IT11: Invited Talk Organized by Tony Jhwueng	24
IT12: Invited Talk Organized by Toshiaki Watanabe	26
IT13: Invited Talk Organized by Xia Wang	28
IT14: Invited Talk Organized by Yasuhiro Omori	30
Participants from ASEAN	32
List of Posters	33
Poster Session	33
List of Participants	34
Partner Institutions and Sponsors	35
Sponsors	35

EAC ISBA 2022

International Society for Bayesian Analysis (ISBA) was founded in 1992 with the mission of promoting the research of Bayesian analysis and the application of Bayesian methods. Through sponsorships, conferences, and various activities, ISBA provides the international research community with a platform for the exchange of ideas and the opportunities for collaboration. In recent years Bayesian methods have been widely applied in diverse fields of research, including economics, management, social sciences, public health, epidemiology, education, and big data analysis. With the aid of the rapid advancement of computational power, emerging MCMC (Markov chain Monte Carlo) sampling methods are shown to be effective in solving a wide range of real-world statistical problems, and Bayesian methods are therefore gaining further attention and applications. Asia is the home of many statisticians, and Eastern Asia Chapter of ISBA (EAC-ISBA, <https://www.eac-isba.com/>) is founded with the intention of promoting the regional research and education of Bayesian analysis in Asia. A conference is held annually in East Asia. The record of past conferences is the following:

- The 5th EAC-ISBA Conference: Nov 14 -16, 2021, Online and In-person
- The 4th EAC-ISBA Conference: Jul 13- Jul 14, 2019, Kobe, Japan
- The 3rd EAC-ISBA Conference: July 12-13, 2018, Seoul National University, Seoul, South Korea
- The 2nd EAC-ISBA Conference: June 6-7, 2017, Changchun, Jilin, China
- The 1st EAC-ISBA Conference: December 18, 2016, Shanghai Jiao Tong University, Shanghai, China

The 6th EAC-ISBA conference will be held at Feng Chia University, Taiwan on July 8-9, 2022, which encourages the participation and academic exchange of scholars from around the world.

Program Committee

Cathy W.S. Chen	Ming-Hui Chen
Dipak Dey	Tsai-Hung Fan
Jaeyong Lee	Yasuhiro Omori
Toshiaki Watanabe	Kuo-Jung Lee

Organizing Committee

Ray-Bing Chen	Shen Ming Lee
Kazuhiko Kakamu	Ruby Chiu-Hsing Weng
Tony Jhwueng	Xia Wang
Feng Chi Liu	Edward M.H. Lin

Timetable

Friday, 8 of July

8:50-9:00	Welcome remarks		
9:00-10:00	KT	James O. Berger Duke University	Four types of frequentism and their interplay with Bayesianism
10:00-10:10	Break		
10:10-12:00	Poster session A		
12:00-13:00	Break		
13:00-14:40	IT	Parallel Session A Eastern Areas	IT6
			IT10
			IT12
14:40-16:00	Break		
16:00-17:30	IT	Parallel Session B Eastern Areas	IT1
			IT2
			IT8
17:30-20:00	Break		
20:00-21:40	IT	Parallel Session C Western Areas	IT9
			IT13

Saturday, 9 of July

8:50-9:00	Welcome remarks		
9:00-10:00	KT	Robert Kohn University of New South Wales	TBA
10:00-10:30	Break		
10:30-11:30	IT	Parallel Session D Eastern Areas	IT3
			IT5
			IT11
11:30-13:00	Break		
13:00-14:40	IT	Parallel Session E Eastern Areas	IT7
			IT14
14:40-16:00	Break		
16:00-17:30	Poster session B		
17:30-20:00	Break		
20:00-21:40	IT	Parallel Session F Western Areas	IT4

KT: Keynote Talk, IT: Invited Talk.

List of Abstracts – Talks

Keynote Talk: James O. Berger

Four types of frequentism and their interplay with Bayesianism

James O. Berger

Duke University, Durham, U.S.A.

The majority of statisticians and scientists who use statistics declare themselves to be frequentists, but they typically mean very different things by this declaration. The purpose of this talk is to highlight the major different types of frequentists and to indicate which are compatible with Bayesianism and which are not. The focus is on evaluating common statistical procedures, including multiple testing and sequential endpoint testing, from the different frequentist (and Bayesian) perspectives, primarily from unconditional frequentist perspectives.

Recent developments involving intrinsic priors for uncertainty in linear models

James O. Berger (will present at National Central University)

Duke University, Durham, U.S.A.

Intrinsic and expected posterior priors have been extensively used in dealing with Bayesian model uncertainty for 25 years. But a number of variants of them have been proposed and employed, resulting in some confusion as to what to use. In this talk we recommend and motivate a particular choice that (i) is completely general; (ii) can be represented as a g-mixture prior; (iii) has optimal scaling; and (iv) overcomes the conditional Lindley paradox. The empirical expected posterior prior is also derived and discussed.

Keynote Talk: Robert Kohn

TBA

Robert Kohn

University of New South Wales, Australia

IT1: Invited Talk Organized by Cathy W. S. Chen & Feng-Chi Liu

Chair: Cathy W.S. Chen, Feng Chia University, Taichung, Taiwan

Organizer: Cathy W. S. Chen & Feng-Chi Liu, Feng Chia University, Taichung, Taiwan

Session title: ASEAN Bayesian Session (I)

Efficient data augmentation techniques for state space models

Linda Siew Li Tan

National University of Singapore, Singapore

Data augmentation improves the convergence of iterative algorithms, such as the EM algorithm and Gibbs sampler by introducing carefully designed latent variables. In this article, we first propose a data augmentation scheme for the first-order autoregression plus noise model, where optimal values of working parameters introduced for recentering and rescaling of the latent states, can be derived analytically by minimizing the fraction of missing information in the EM algorithm. The proposed data augmentation scheme is then utilized to design efficient Markov chain Monte Carlo (MCMC) algorithms for Bayesian inference of some non-Gaussian and nonlinear state space models, via a mixture of normals approximation coupled with a block-specific reparametrization strategy. Applications on simulated and benchmark real datasets indicate that the proposed MCMC sampler can yield improvements in simulation efficiency compared with centering, noncentering and even the ancillarity-sufficiency interweaving strategy.

Creating manifold structures to accelerate MCMC sampling

Alexandre Hoang THIERY

National University of Singapore, Singapore

Consider the observation $y = F(x) + (\text{noise})$ of a quantity of interest x . In Bayesian inverse problems, the quantity " x " typically represents the high-dimensional discretization of a continuous and unobserved field while the evaluations of the forward operator $F(\cdot)$ involves solving a system of partial differential equations. In the low-noise regime, the posterior distribution concentrates in the neighborhood of a nonlinear manifold. As a result, the efficiency of standard MCMC algorithms deteriorates due to the need to take increasingly smaller steps. In this work, we present a constrained HMC algorithm that is robust in the low noise regime. Taking the observations generated by the model to be constraints on the prior, we define a manifold on which the constrained HMC algorithm generates samples. By exploiting the geometry of the manifold, our algorithm is able to take larger step sizes than more standard MCMC methods, resulting in a more efficient sampler. If time permits, we will explain how this idea can be extended to classification problems, by exploiting an auxiliary manifold.

Bayesian Fixed Domain Asymptotics for Spatial Gaussian Process Models

Li Cheng

National University of Singapore, Singapore

Gaussian process models typically contain finite dimensional parameters in the covariance function that need to be estimated from the data. We study the Bayesian fixed-domain asymptotics for the covariance parameters in a universal kriging model with an isotropic Matern covariance function, which has many applications in spatial statistics. We show that when the dimension of domain is less than or equal to three, the joint posterior distribution of the microergodic parameter and the range parameter can be factored independently into the product of their marginal posteriors under fixed-domain asymptotics. The posterior of the microergodic parameter is asymptotically close to a normal distribution with shrinking variance, while the posterior of the range parameter does not converge to any point mass distribution in general. Our theory allows an unbounded prior support for all parameters as well as flexible designs of sampling locations. Our theory has important implications for the asymptotic efficiency and convergence rates of Bayesian posterior prediction. We verify our asymptotic results in numerical experiments.

Mixed Copula based Seemingly Unrelated Quantile Regression Models

Woraphon Yamaka

Chiang Mai University, Chiang Mai, Thailand

In this study, we propose a high dimensional copula to model the dependence structure of seemingly unrelated quantile regression (SUQR) model. We relax the strong assumption of multivariate normal distribution and their linear dependence structure by applying the multivariate exchangeable mixed copula function to construct the covariance matrix of the SUQR model. In addition, as our model contains many parameter estimates, the Bayesian estimation approach is applied to estimate all unknown parameters in the model. Two simulation studies are conducted to examine the accuracy of the Bayesian estimation. We also consider the real-world data to validate our proposed model.

IT2: Invited Talk Organized by Cathy W. S. Chen & Feng-Chi Liu

Chair: Feng-Chi Liu, Feng Chia University, Taichung, Taiwan

Organizer: Cathy W. S. Chen & Feng-Chi Liu, Feng Chia University, Taichung, Taiwan

Session title: ASEAN Bayesian Session (II)

Bayesian Modeling of Zero-Inflated Integer-Valued Transfer Function models

Aljo Clair Pingal^{1,2}, Cathy W.S. Chen¹

¹Feng Chia University, Taichung, Taiwan

²Mindanao State University Iligan, Institute of Technology, Philippine

This study introduces a class of transfer function models that accommodates one or more exogenous variables with a delay parameter, which is in the response of the system to delay. We propose zero-inflated integer-valued transfer function models with generalized Poisson or negative binomial distribution that can describe overdispersion, a large proportion of zeroes, and relation with exogenous variables. We employ Bayesian adaptive Markov chain Monte Carlo (MCMC) methods for modeling the proposed model and further engage Bayesian model selection criteria for model selection. We conduct a simulation study to evaluate the effectiveness of the proposed methods and apply them to real examples.

Bayesian approach to evaluating association between sensitive attributes from randomized response design data and auxiliary information

*Shen-Ming Lee*¹, *Truong-Nhat Le*^{1,2}, *Phuoc-Loc Tran*^{1,3}, *Chin-Shang Li*⁴

¹Feng Chia University, Taiwan

²Ton Duc Thang University, Vietnam

³Can Tho University, Vietnam

⁴University at Buffalo, U.S.A.

The randomized response techniques (RRT) are commonly used to collect sensitive information in surveys in many statistical applications such as behavioral science, epidemiology, and social economics. In this study, we also use this technique to estimate the proportion of individuals with sensitive characteristics in the study population. For two-level sensitivity features, there are two groups of subjects in the population: sensitive and non-sensitive. For an auxiliary variable collected on each of these groups, one is interested in its homogeneity between groups. In other words, the distribution of this auxiliary variable between groups has different susceptibility characteristics. We propose the mixture models to evaluate this relationship. We also propose a Bayesian estimation using data augmentation and MCMC algorithm to estimate the population proportion of a sensitive feature. To evaluate the association between the sensitive variable and an auxiliary information variable that are collected by a randomized response design, we employ two Bayesian model selection criteria, deviance information criterion and marginal likelihood to select the suitable model for the association between the sensitive variable and auxiliary variable. We illustrate the proposed methodology using simulation studies and real example to assess the performance.

Identifying the spatial spillover of recessions among countries: A Bayesian spatial autoregressive logit model

Manh Cuong Dong

Vietnam National University, Vietnam

In this paper, we examine the spillover of recession across countries using a Bayesian spatial autoregressive logit model specification. To deal with the spatial logit framework, a latent Pólya–Gamma distributed variable is employed for the Bayesian Markov-chain Monte Carlo estimation. Using monthly OECD-based Recession Indicators, our empirical results emphasize the importance of examining spatial spillover effects when modeling recessions.

IT3: Invited Talk Organized by Dipak K. Dey

Chair: Xia Wang, University of Cincinnati, U.S.A.

Organizer: Dipak K. Dey, University of Connecticut, U.S.A.

Session title: TBA

Precision Matrix Estimation under the Horseshoe-Like Prior–Penalty Dual

Sayantana Banerjee

Indian Institute of Management Indore, India

Precision matrix estimation in a multivariate Gaussian model is fundamental to network estimation. Although there exist both Bayesian and frequentist approaches to this, it is difficult to obtain good Bayesian and frequentist properties under the same prior-penalty dual. To bridge this gap, our contribution is a novel prior-penalty dual that closely approximates the graphical horseshoe prior and penalty, and performs well in both Bayesian and frequentist senses. A chief difficulty with the horseshoe prior is a lack of closed form expression of the density function, which we overcome in this article. In terms of theory, we establish posterior convergence rate of the precision matrix that matches the oracle rate, in addition to the frequentist consistency of the MAP estimator. Efficient EM and MCMC algorithms are developed respectively for the penalized likelihood and fully Bayesian estimation problems. In numerical experiments, the horseshoe-based approaches echo their superior theoretical properties by comprehensively outperforming the competing methods. A protein-protein interaction network estimation in B-cell lymphoma is considered to validate the proposed methodology. Joint work with Khseera Sagar, Jyotishka Datta and Anindya Bhadra.

A Bayesian Quantile Regression Approach to Multivariate Semi-Continuous Longitudinal Data

Kiranmoy Das

Indian Statistical Institute, Kolkata, India

Quantile regression is a powerful tool for modeling non-Gaussian data, and also for modeling different quantiles of the responses. We propose a Bayesian approach of estimating the quantiles of multivariate longitudinal data where the responses contain excess zeros. We consider a Tobit regression approach, where the latent responses are estimated using a linear mixed model. The longitudinal dependence and the correlations among different (latent) responses are modeled by the subject-specific vector of random effects. We consider a mixture representation of the Asymmetric Laplace Distribution (ALD), and develop an efficient MCMC algorithm for estimating the model parameters. The proposed approach is used for analyzing data from the health and retirement study (HRS) conducted by the University of Michigan, USA; where we jointly model (i) out-of-pocket medical expenditures, (ii) total financial assets, and (iii) total financial debt for the aged individuals, and estimate the effects of different covariates on these responses across different quantiles. Simulation studies are performed for assessing the operating characteristics of the proposed approach.

Bayesian Semiparametric Longitudinal Inverse-Probit Mixed Models for Category Learning

Minerva Mukhopadhyay

Indian Institute of Technology, Kanpur, India

Understanding how adult human brain learns to categorize can shed novel insights into the mechanisms underlying experience-dependent brain plasticity. Drift-diffusion processes are popular in such contexts for their ability to mimic underlying neural mechanisms but require data on both category responses and associated response times for inference. Category response accuracies are, however, often the only reliable measure recorded by behavioral scientists to describe learning. Building carefully on drift-diffusion models with latent response times, we derive a novel biologically interpretable class of ‘inverse-probit’ categorical probability models for such data. The model, however, presents significant identifiability and inference challenges. We address these challenges via a novel projection-based approach with a symmetry preserving identifiability constraint that allows us to work with conjugate priors in an unconstrained space. We adapt the model for group and individual level inference in longitudinal settings. Building on latent variable representation of the model, we design an efficient Markov chain Monte Carlo algorithm for posterior computation. We evaluate the empirical performances of the proposed method through simulation experiments. The method’s practical efficacy is illustrated in applications to longitudinal tone learning studies.

Efficient Bernoulli factory MCMC for intractable posteriors

Dootika Vats

Indian Institute of Technology, Kanpur, India

Accept-reject based Markov chain Monte Carlo (MCMC) algorithms have traditionally utilized acceptance probabilities that can be explicitly written as a function of the ratio of the target density at the two contested points. This feature is rendered almost useless in Bayesian posteriors with unknown functional forms. We introduce a new family of MCMC acceptance probabilities that has the distinguishing feature of not being a function of the ratio of the target density at the two points. We present a stable Bernoulli factory that generates events within this class of acceptance probabilities. The efficiency of our methods rely on obtaining reasonable local upper or lower bounds on the target density and we present an application of MCMC on constrained spaces where this is reasonable.

IT4: Invited Talk Organized by Dipak K. Dey

Chair: Jiwon Park, Department of Statistics, University of Connecticut, U.S.A.

Organizer: Dipak K. Dey, Department of Statistics, University of Connecticut, U.S.A.

Session title: TBA

Bayesian iterative screening

Vivekananda Roy

Iowa State University, U.S.A.

TBA

Bayesian data sketching for high dimensional data analysis

Rajarshi Guha Niyogi

Texas A&M University, College Station, TX, U.S.A.

TBA

Bayesian modelling of tree-structured covariances

Karthik bharath

University of Nottingham, U.K.

TBA

New Directions in Bayesian Shrinkage for Structure Learn

Jyotishka Datta

Virginia Tech. Blacksburg, U.S.A.

TBA

IT5: Invited Talk Organized by Edward Meng-Hua Lin

Chair: Edward Meng-Hua Lin, Tunghai University, Taichung, Taiwan

Organizer: Edward Meng-Hua Lin, Tunghai University, Taichung, Taiwan

Session title: Recent Advances in Bayesian application

Description: This session aims to introduce some applications of Bayesian methods in contemporary of Econometrics and industrial Statistics.

A semi-parametric autoregressive joint value-at-risk and expected shortfall modelling framework incorporating realized measures

Richard Gerlach

The University of Sydney, Sydney, Australia

A class of realized semi-parametric conditional autoregressive joint tail risk models is proposed. This class includes novel specifications that allow separate dynamics for Value-at-Risk (VaR) and Expected Shortfall (ES), driven by realized measures of volatility. Further, a measurement equation is added into the models for risk modelling, meaning the models generalize, then extend, parametric Realized-GARCH model into the semi-parametric realm. The models implicitly allow the conditional return distribution, via the relationship between VaR and ES, to change over time, again driven by a realized measure. Semi-parametric two-step estimation cannot be applied to several models in this class. Instead, the pseudo log-likelihood is built based on the asymmetric Laplace distribution. A Bayesian Markov Chain Monte Carlo method is employed for estimation, whose finite sample properties are assessed via simulation. A forecasting study on 1% and 2.5 % quantiles compares the proposed models to 18 competitors, all applied to forecast one-day-ahead VaR and ES for 7 market indices and 7 individual assets. These results are favourable for the proposed model class.

A Bayesian approach to sequential updating lifetime information in degradation analysis

I-Tang Yu

Tunghai University, Taichung, Taiwan

Degradation data feature repeat measures and they can be used to update lifetime information sequentially. In Bayesian analysis, information is summarized in posterior distributions. Because the prior and the posterior distributions are seldom conjugated, an MCMC algorithm needs to be rerun whenever new degradation measures are available. In this work, we propose a procedure to update posterior distributions without rerunning MCMC algorithms. Via sequentially renewing the weights associated with the samples generated from previous posterior distribution, the proposed procedure can be easily implemented. Finally, we analyze an example with the increasing operating current of laser divides. From the results, we can see that the posterior distributions of residual lifetime obtained by our weight-renewing procedure can approximate the posterior distributions obtained by an MCMC procedure properly.

A Bayesian analysis in long- and short-term financial volatility components with mixture distributions

Edward M.H. Lin, Yu-Hsiu Lin

Tunghai University, Taichung, Taiwan

In forecasting market volatility studies, the consideration of incorporating external information associate with volatility components is an important and challenging issue. From related literatures on volatility models, there are many evidences to show that using intraday range data as the volatility measure will construct more accurate volatility forecasts than using daily return. Therefore, we will investigate whether using the mixed frequency data to incorporate the threshold conditional autoregressive range model with mixture distributions, which could capture the long- and short-term volatility components, can improve the prediction ability of the volatility model. In this study, we conduct the following issues: (1) to propose a nonlinear range-based volatility model incorporating the long- and short-term volatility components to take volatility forecasting. (2) Considering mixture generalized Beta type 2 distribution are ordered to capture more features of the implied volatility. (3) we employ the Bayesian approaches to estimate parameters to estimate the different type of unknown parameters of the proposed nonlinear model simultaneously. (4) The GB2 density could be represented in various flexible distributions, then we conduct simulation studies to explore the effect of forecasting among its change of shape parameters. (5) We explore whether the long- and short- term volatility components and mixture distribution can improve the forecast performance through empirical analysis.

IT6: Invited Talk Organized by Jaeyong Lee

Chair: Jaeyong Lee, Seoul National University, South Korea

Organizer: Jaeyong Lee, Seoul National University, South Korea

Session title: Bayesian inference for high-dimensional covariance structures

Description: Bayesian inference for high-dimensional covariance structures

Bayesian Optimal Two-sample Tests in High-dimension

Kyoungjae Lee

Sungkyunkwan University, Seoul, South Korea

On recommend tolerably my belonging or am. Mutual has cannot beauty indeed now sussex merely you. It possible no husbands jennings ye offended packages pleasant he. Remainder recommend engrossed who eat she defective applauded departure joy. Get dissimilar not introduced day her apartments. Fully as taste he mr do smile abode every. Luckily offered article led lasting country minutes nor old. Happen people things oh is oppose up parish effect. Law handsome old outweigh humoured far appetite. Now residence dashwoods she excellent you. Shade being under his bed her. Much read on as draw. Blessing for ignorant exercise any yourself unpacked. Pleasant horrible but confined day end marriage. Eagerness furniture set preserved far recommend. Did even but nor are most gave hope. Secure active living depend son repair day ladies now. Affronting discretion as do is announcing. Now months esteem oppose nearer enable too six. She numerous unlocked you perceive speedily. Affixed offence spirits or ye of offices between. Real on shot it were four an as. Absolute bachelor rendered six nay you juvenile. Vanity entire an chatty to.

Scalable and optimal Bayesian inference for sparse covariancematrices via screened beta-mixture prior

Seongil Jo

Inha University, Incheon, South Korea

In this paper, we consider a high-dimensional setting where the number of variables p can grow to infinity as the sample size n gets larger. We assume that most of off-diagonal entries of the covariance matrix are zero. Several Bayesian methods for sparse covariance matrices have been proposed, but their computational speed is too slow, making them almost impossible to apply even to moderately high dimensions (e.g., $p \approx 200$). Motivated by this, we propose a scalable Bayesian method for large sparse covariance matrices. The main strategy of the proposed method is as follows: we first safely reduce the number of effective parameters in a covariance matrix, and then impose shrinkage priors only for selected nonzero off-diagonal entries. To this end, we suggest using the sure screening by keeping only the off-diagonal entries whose absolute sample correlation coefficients are larger than a threshold and furnishing the rests with zeros. It turns out that the proposed prior achieves the minimax or nearly minimax rate for sparse covariance matrices under the Frobenius norm. Therefore, it is not only computationally scalable but also optimal in terms of posterior convergence rate.

Estimation of conditional mean operator under the bandable covariance structure

Kwangmin Lee

University of Wisconsin-Madison, U.S.A.

We consider high-dimensional multivariate linear regression models, where the joint distribution of covariates and response variables is a multivariate normal distribution with a bandable covariance matrix. The main goal of this paper is to estimate the regression coefficient matrix, which is a function of the bandable covariance matrix. Although the tapering estimator of covariance has the minimax optimal convergence rate for the class of bandable covariances, we show that it is sub-optimal for the regression coefficient; that is, a minimax estimator for the class of bandable covariances may not be a minimax estimator for its functionals. We propose the blockwise tapering estimator of the regression coefficient, which has the minimax optimal convergence rate for the regression coefficient under the bandable covariance assumption. We also propose a Bayesian procedure called the blockwise tapering post-processed posterior of the regression coefficient and show that the proposed Bayesian procedure has the minimax optimal convergence rate for the regression coefficient under the bandable covariance assumption. We show that the proposed methods outperform the existing methods via numerical studies.

Adaptive posterior concentration for high dimensional Bayesian factor models

Ilsang Ohn

Inha University, Incheon, South Korea

High-dimensional factor models are efficient and powerful tools for modeling the dependency structure of high-dimensional data which have wide applications in genomics study, finance and so on. One of the challenging and crucial tasks involved in the inference of a high dimensional factor model is determining the factor dimensionality. Although a number of frequentist estimators of the factor dimensionality have been proposed and shown to be consistent, theoretical properties of a Bayesian estimator such as concentration properties of the posterior distribution are rarely studied despite its practical usefulness. To fill this gap, we propose a novel prior distribution for a high dimensional factor model and thoroughly investigate theoretical properties of the posterior distribution. Under the proposed prior, we show that the posterior distribution asymptotically concentrates at the true factor dimensionality, and more importantly, the posterior consistency is adaptive to the unknown sparsity level of the true loading matrix. We also prove that the proposed prior attains the optimal detection rate of the factor dimensionality. Moreover, we obtain a near optimal posterior contraction rate of the covariance matrix. Numerical studies are conducted and showed superiority of the proposed method compared with other competitors.

IT7: Invited Talk Organized by Kazuhiko Kakamu

Chair: Shonosuke Sugawara, The University of Tokyo, Japan

Organizer: Kazuhiko Kakamu, Nagoya City University and Shintaro Hashimoto Hiroshima University

Session title: Bayesian Methods and Their Applications

Bayesian Sparse Estimation for Nonnegative Data

Yasuyuki Hamura¹, Takahiro Onizuka², Shintaro Hashimoto³, Shonosuke Sugawara³

¹ JSPS Research Fellow, Kyoto University, Japan

² Hiroshima University, Japan

³ The University of Tokyo, Japan

In this talk, we develop a new class of continuous global-local shrinkage priors tailored to Bayesian inference on a sequence of sparse positive values where most of underlying means are concentrated around a certain value. The proposed prior is shown to have theoretical properties such as desirable Kullback-Leibler risk bound under sparsity and tail-robustness for large signals. We propose an efficient sampling algorithm to carry out posterior inference. The performance of the proposed method is illustrated through simulation and real data examples.

Bayesian Trend Filtering for Functional Data via Shrinkage Priors

Tomoya Wakayama, Shonosuke Sugawara

The University of Tokyo, Japan

With the recent progress of instruments and computers, the importance of functional data analysis, which is one of the methods to handle high-dimensional data efficiently, has been increasing. The context of time series data is no exception, and although many methods have been proposed, they lack flexibility and are difficult to estimate trends with sharp changes. Also, few methods evaluate uncertainty (e.g., Bayesian credible intervals), and applying functional data to decision-making is still challenging. Therefore, we propose a trend estimator for functional time series data using a shrinkage prior, which can capture sharp changes and evaluate uncertainty and thus solve the above challenges. Both the number of sampling points and sampling locations at each time are allowed to be non-homogeneous in this model. Hence we show this is effectively applicable to missing data experimentally.

Bayesian quantile trend filtering on graphs

Takahiro Onizuka¹, Shintaro Hashimoto¹, Shonosuke Sugawara²

¹ Hiroshima University, Japan

² The University of Tokyo, Japan

With the recent progress of instruments and computers, the importance of functional data analysis, which is one of the methods to handle high-dimensional data efficiently, has been increasing. The context of time series data is no exception, and although many methods have been proposed, they lack flexibility and are difficult to estimate trends with sharp changes. Also, few methods evaluate uncertainty (e.g., Bayesian credible intervals), and applying functional data to decision-making is still challenging. Therefore, we propose a trend estimator for functional time series data using a shrinkage prior, which can capture sharp changes and evaluate uncertainty and thus solve the above challenges. Both the number of sampling points and sampling locations at each time are allowed to be non-homogeneous in this model. Hence we show this is effectively applicable to missing data experimentally.

Dynamic shrinkage by fused Markov processes

Kaoru Irie

The University of Tokyo, Japan

We consider the idea of Bayesian fused lasso—combining multiple penalty functions into a prior density in the context of dynamic shrinkage. To shrink the current state variable to its previous value and zero, we use two conflicting penalty functions to define the transition density of a Markov process. The resulting density has the mixture representation that shows equivalence to conditionally dynamic linear models, enabling efficient posterior computation by forward filtering and backward sampling. Using simulated datasets, we demonstrate that the new prior contributes to the improved posterior and predictive analyses of dynamic linear models by its flexible shrinkage patterns.

IT8: Invited Talk Organized by Mike K.P. So

Chair: Mike K.P. So, The Hong Kong University of Science and Technology, Hong Kong
Organizer: Mike K.P. So, The Hong Kong University of Science and Technology, Hong Kong
Session title: Bayesian methods for network analysis

Linkage Vector Autoregressive Model

Manabu Asai¹, Mike K.P. So²

¹Soka University, U.S.A.

²The Hong Kong University of Science and Technology, Hong Kong

This paper extends the dynamic panel data model by allowing linkage structure, in order to develop a new linkage vector autoregressive model. Unlike the network autoregressive model suggested by Zhu et al. (2017), our linkage structure is unobservable. We suggest a Bayesian Markov chain Monte Carlo technique for estimating the new model. Simulation and Empirical results indicate that the new linkage model provides an alternative competitive to the existing models.

Bayesian Modeling of Ranking Data in a Social Network with Applications to Movie Recommendation

Jiaqi Gu¹, Philip L.H. Yu²

¹The University of Hong Kong, Hong Kong

²The Education University of Hong Kong, Hong Kong

In the era of the social media, individuals are interacted through a social network, and personal preference of an item may be influenced strongly from his/her peers or friends in the network. So far, traditional ranking models do not account for such social network dependency. In this talk, we introduce a new class of models called social order statistics (SOS) models to learn ranking data in social networks. A flexible formulation of weight matrices in the spatial model is adopted to provide diverse network effects among the individuals for different items. Efficient MCMC algorithms are developed to perform Bayesian inference in a parallel manner for large networks with even a few thousand nodes. Simulations and empirical applications to movie recommendation reveal that our proposed algorithms make accurate and efficient predictions on missing ranks, even in the absence of exogenous variables.

Multi-view Dynamic Latent Space Model on Ordinal Network Data

Thomas W.C. Chan¹, Amanda M.Y. Chu², Mike K.P. So¹

¹The Hong Kong University of Science and Technology, Hong Kong

²The Education University of Hong Kong, Hong Kong

Network is a common tool on studying the relationship among a group of individuals. The relationship could change over time and consist of interactions in multiple views at distinct levels. This kind of data are common in various aspect of study, including but not limited to the relationship of abusing several substances among a group of individuals, the change in return and volume of multiple stocks, and the interactions among protein. To thoroughly analyze the relationship among the individuals, we propose a model using the observed covariates to explain the interactions. We also introduce a latent space to both display the unobserved relationship on a plot, and provide extra adjustment on the level of interaction based on the effect on individual level.

IT9: Invited Talk Organized by Ming-Hui Chen & Lynn Kuo

Chairs: Ming-Hui Chen, University of Connecticut, U.S.A.

Organizers: Ming Hui Chen & Lynn Kuo, University of Connecticut, U.S.A.

Session title: Recent Development on Bayesian Prior Elicitation, Information Measure, and Posterior Computation

Description: This session features three speakers from a young generation of Bayesian statisticians. The topics cover prior elicitation for leveraging historical longitudinal data, Bayesian measures for investigating conflict among data sets from multiple studies, and developments of the partition weighted kernel (PWK) estimator for computing the marginal likelihood. In all of three presentations, novel computational algorithms will be discussed and several interesting real applications and case studies will be presented. Statisticians from both academic and industry who would like to know how to elicit priors, how to compare two data sets, and how to compute Bayes factors efficiently will be very interested in this unique invited session.

A New Bayesian Approach for Analyzing longitudinal data by Leveraging Multiple Historical Data in the Presence of Missing Data

AoLan Li

University of Connecticut, U.S.A.

Missing data are routinely encountered in longitudinal studies. Also, historical longitudinal data are often available from previous clinical trials. In this paper, we develop a new Bayesian approach to analyze the longitudinal data by leveraging multiple historical data via the power priors. A semi-conjugate non-informative but proper initial prior is also proposed. Various Bayesian model assessment criteria, including the marginal likelihoods, the Deviance information Criteria (DIC), and the conditional predictive ordinates (CPOs), are used to determine the amount of information borrowing from the historical longitudinal data. Efficient Monte Carlo methods are developed for computing these Bayesian criteria. An in-depth analysis of the longitudinal data from a real application is carried out to demonstrate the usefulness of the proposed methodology.

Bayesian Concentration Ratio and Dissonance

Wei Shi

Amgen, U.S.A.

We propose two new classes of Bayesian measure to investigate conflict among data sets from multiple studies. The first (“concentration ratio”) is used to quantify the amount of information provided by a single data set through the comparison of the prior and its posterior distribution, or two data sets according to their corresponding posterior distributions. The second class (“dissonance”) quantifies the extent of contradiction between two data sets. Both classes are based on volumes of highest density regions. They are well calibrated, supported by simulation, and computational algorithms are provided for their calculation. We illustrate these two classes in three real data applications: a benchmark dose toxicology study, a missing data study related to health effects of pollution, and a pediatric cancer study leveraging adult data.

PWK: Theory, Refinement, and Applications

Yu-Bo Wang

Clemson University, U.S.A.

The marginal likelihood, also known as the normalizing constant of a posterior kernel that is assigned with proper priors, is used to measure the overall model fitting to the data but usually analytically intractable. Due to the intuitive interpretation and computational challenges, it has received great attention in Bayesian literature. In this work, following the recent developments of partition weighted kernel (PWK) estimator and its variation (lowest radial distance method), we revisit and address several relevant issues in PWK, and develop an improved marginal likelihood estimator. In addition to the backup of a series of theories, simulation studies under the high-dimensional settings are conducted to examine the empirical performance of the new estimator. Last, we apply the proposed method to an analysis of the longitudinal data with historical data sets to determine the power prior.

IT10: Invited Talk Organized by Ruby Chiu-Hsing Weng

Chair: Ruby Chiu-Hsing Weng, National Chengchi University, Taiwan

Organizer: Ruby Chiu-Hsing Weng, National Chengchi University, Taiwan

Session title: Bayesian methods and applications

Bayesian analysis for correlated count data models

Chia-Hui Huang

National Chengchi University, Taiwan

Multivariate count data with informative termination times are considered in this study. We assume that, for each event type, the number of occurrences follows a semiparametric Poisson model, the termination time follows a Weibull distribution, and both models share with a gamma frailty variable to accommodate the association structure. We further model the joint distribution of the frailty variables implicitly through the multivariate normal distribution. The resulting modeling presents a new family of Poisson and Weibull mixed distributions, and the dependence among count data can be obtained from the given multivariate normal assumption. A Bayesian inference method based on a Markov chain Monte Carlo algorithm is conducted to obtain the estimates of the parameters. The simulation studies demonstrate the utility of the proposed models and the finite-sample properties of the model parameters. A real data analysis is used to illustrate application of the methodology.

Bayesian Clustering Method for Large-Scale Text Data And Its Application

Charlotte Wang

National Taiwan University, Taiwan

In qualitative study, researchers usually would like to extract key information from interviews, texts or documents to figure out phenomena. When analyzing large-scale text data, using text mining techniques which transform unstructured text data into structured numeric data to explore information is usually more efficient. The techniques include word segmentation, feature selection, cluster and classification. In this talk, I will introduce a Hamming distance-based Bayesian clustering statistical method, which is used to extract key information from texts. In addition, the proposed method is applied to analyze news or legal judgments which are related to caring for tragic cases in long-term care.

Bayesian structure selection approaches for categorical responses via multi-task learning

Chi-Hsiang Chu

Tunghai University, Taiwan

In this project, we concentrate on the Bayesian structure selection problems for the single response and multiple categories. Based on multinomial probit model, we transform problem of that on single response with multiple categories into multiple responses by introducing certain latent variables. Then we add the group structure for coefficient matrix of multiple responses and identify the relevant variables for the response. This selection problem can be treated as the multi-task learning problems. Finally, we will investigate the structure selection problem with sparsity of group and apply to the medical data set.

On extensions of Elo-type rating systems

Ruby Chiu-Hsing Weng

National Chengchi University, Taiwan

Since the invention of Elo system (Elo, 1978) in the late 1950s for rating tournament chess players, the rating system and variants thereof have been used successfully by leagues organized around two-player games. Many have extended Elo in various ways, including incorporating margins of victory, providing a Bayesian framework. This talk focuses on Bayesian Elo-type rating systems. We will extend and unite several existing rating systems.

IT11: Invited Talk Organized by Tony Jhwueng

Chair: Tony Jhwueng, Department of Statistics, Feng-Chia University, Taichung, Taiwan
Organizer: Tony Jhwueng, Department of Statistics, Feng-Chia University, Taichung, Taiwan
Session title: Bayesian Methods and Some Applications

Bayesian Estimation for an Item Response Tree Model for Nonresponse Modeling

Yu-Wei Chang

National Chengchi University, Taiwan

Nonresponse data are common in achievement tests or questionnaires. The TR4 model is an Item Response tree model for modeling some potential mechanisms underlying nonresponses so that the estimates of parameters of interest would not be biased due to missing not at random (Rubin, 1976). TR4 has two notable degenerate cases, both with insightful practical meanings. When TR4 is fitted to data originated from some degenerate cases, there exist model identifiability issues so that the existing frequentist inference for the TR4 model is not suitable. In the current study, we propose a Bayesian estimation procedure that incorporates the Markov chain Monte Carlo technique for estimating the TR4 model. We conducted simulation studies to demonstrate the effectiveness of the Bayesian estimation procedure in solving the model unidentifiability issue. In addition, the TR4 model is further extended in the present study to effectively accommodate the complexity underlying some real data. The advantage of the extended models over TR4 is demonstrated in the real data analysis where we apply our method to the data of a geography test for college admission in Taiwan.

An Explainable Artificial Intelligence and Bayesian Approach to Identify the Effect of Genetic Variants on Phenotype

Yu-Chung Wei

National Changhua University of Education, Taiwan

Next-generation sequencing enables efficient detection of various types of genetic variants and then assesses their association with phenotypes. Although a massive of machine learning methods have been developed, most of these algorithms just focus on high accuracy instead of interpretability. The lack of interpretability makes the machine learning methods hard to apply to medical and genetic issues. In this research, a Bayesian machine learning procedure for the association study was proposed. The predictive model was used to predict phenotype from genetic variants. The post-hoc explanative model was used to display the importance of phenotype-relevant genetic variants.

Study Rate of Evolution Along Phylogenetic Tree using Generalized AutoRegressive Conditional Heteroskedastic (1,1) Model

Tony Jhwueng

Feng Chia University, Taichung, Taiwan

Over the last decades there has been increased attention on studying the rate of evolution. Various statistical models were developed for detecting heterogeneity rates among a group of related species evolved along a given phylogenetic tree. Current existing models assume that the rate variables have no correlated relationship with each other. This may not cover a scenario where the rates detected on the two successive nodes (ancestor – descendant) shall be considered with a certain level of correlation. In this work we propose the use of the generalized autoregressive conditional heteroskedastic (GARCH) (1, 1) model for modeling the rate of evolution. A Markov chain Monte Carlo blended with Gibb's sampling scheme is developed for parameter estimation and inference.

IT12: Invited Talk Organized by Toshiaki Watanabe

Chair: Toshiaki Watanabe, Hitotsubashi University, Japan

Organizer: Toshiaki Watanabe, Hitotsubashi University, Japan

Session title: TBA

Measuring regional economic uncertainty

Jouchi Nakajima

Bank of Japan, Japan

TBA

An empirical study about recession and the COVID-19 pandemic in Japan

Yoshihiro Otsuka

Tohoku Gakuin University, Japan

This work estimates the turning points of business cycle, the growth rates of business condition and shocks in Japan by using the latest macro data series including the COVID-19 pandemic. This pandemic has been a big shock for the global economy, but COVID-19 crisis in Japan is different from other countries. The Japanese economy reached a peak in October 2018, going through a phase of contraction. It was shocked by the COVID-19 crisis during the recession. In this work, we utilize the Markov switching factor model incorporating the skewed and heavy tailed distribution, and the stochastic volatility process for estimating the business cycles and large shocks. Moreover, we assume the skewness parameter shifts depending on the boom and recession regime. In this presentation, we will show that shocks for the business cycles during recession and the COVID-19 pandemic, and the comparison with the public dating regarding turning points, and the features of COVID-19 crisis in the Japan.

Dynamic factor, leverage and realized covariances in multivariate stochastic volatility

Yuta Yamauchi

Nagoya University, Japan

In the stochastic volatility models for multivariate daily stock returns, it has been found that the estimates of parameters become unstable as the dimension of returns increases. To solve this problem, we focus on the factor structure of multiple returns and consider two additional sources of information: first, the realized stock index associated with the market factor, and second, the realized covariance matrix calculated from high frequency data. The proposed dynamic factor model with the leverage effect and realized measures is applied to ten of the top stocks composing the exchange traded fund linked with the investment return of the S&P500 index and the model is shown to have a stable advantage in portfolio performance.

IT13: Invited Talk Organized by Xia Wang

Chair: Xia Wang, University of Cincinnati, U.S.A.

Organizer: Xia Wang, University of Cincinnati, U.S.A.

Session title: Bayesian Hidden Markov Model and Its Applications

Bayesian spline-based hidden Markov models with applications to circadian and sleep analysis

Sida Chen

University of Cambridge, U.K.

B-spline-based hidden Markov models (HMMs) use B-splines to specify the emission distributions and offer a more flexible modelling approach to data than conventional parametric HMMs. We introduce a fully Bayesian framework for inference in these models where the number of states may be unknown along with other model parameters. We propose the use of a trans-dimensional Markov chain inference algorithm to identify a parsimonious knot configuration of the B-splines while model selection regarding the number of states can be performed based on the marginal likelihood within a parallel sampling framework. The flexibility of a Bayesian approach allows us to extend the modelling framework in a relatively straightforward way and we demonstrate this by developing a hierarchical conditional HMM to analyse human accelerometer activity data for circadian and sleep modelling.

Covariate-Modulated Large-Scale Multiple Testing under Dependence

Pengfei Wang

Dongbei University of Finance and Economics, China

Large-scale multiple testing, which calls for tens of thousands of hypothesis testings simultaneously, has been applied in many scientific fields. Conventional multiple testing procedures often focused on the control of false discovery rate (FDR) and largely ignored covariate information and the dependence structure among tests. In this paper, we propose an FDR control procedure, termed as Covariate-Modulated Local Index of Significance (cmLIS) procedure, for large-scale multiple testing. The cmLIS procedure not only takes into account local correlations among tests but also accommodates the covariate information by leveraging a covariate-modulated hidden Markov model (HMM). In the oracle case that all parameters of the covariate-modulated HMM are known, we show that the cmLIS procedure is valid and optimal in some sense. According to whether the number of mixed components in the non-null distribution is known, we provide two Bayesian sampling algorithms for parameter estimation. Extensive simulations are conducted to demonstrate the effectiveness of the cmLIS procedure over state-of-the-art multiple testing procedures. Finally, we apply the cmLIS procedure to dosage response data.

Scalable Bayesian inference for coupled hidden Markov and semi-Markov models

Panayiota Touloupou

University of Birmingham, U.K.

Bayesian inference for coupled hidden Markov models frequently relies on data augmentation techniques for imputation of the hidden state processes. Considerable progress has been made on developing such techniques, mainly using Markov chain Monte Carlo (MCMC) methods. However, as the dimensionality and complexity of the hidden processes increase some of these methods become inefficient, either because they produce MCMC chains with high autocorrelation or because they become computationally intractable. Motivated by this fact we developed a novel MCMC algorithm, which is a modification of the forward filtering backward sampling algorithm, that achieves a good balance between computation and mixing properties, and thus can be used to analyse models with large numbers of hidden chains. Even though our approach is developed under the assumption of a Markovian model, we show how this assumption can be relaxed leading to minor modifications in the algorithm. Our approach is particularly well suited to epidemic models, where the hidden Markov chains represent the infection status of an individual through time. The performance of our method is assessed on simulated data on epidemic models for the spread of *Escherichia coli* O157:H7 in cattle.

Optimal multiple testing for nonparametric hidden Markov models using empirical Bayes methods

Kweku Abraham

University of Cambridge, U.K.

The optimality of Bayes rules for classification problems is a classical fact of decision theory. The optimality of similar procedures in multiple testing settings, with risks measured by the False Discovery Rate (FDR) and True Discovery Rate or similar quantities, is less famous but perhaps of equal significance. Constructing these procedures requires knowledge of key model parameters: in the case of a two-state hidden Markov model (HMM) this means the transition matrix of the hidden Markov chain and the emission densities (i.e. the distributions of the data conditional on whether the underlying chain is in the “null” state or the “alternative”). I will explain conditions on the model parameters, and on estimators thereof, under which an empirical Bayes (plug-in) procedure asymptotically matches the performance of an “oracle” Bayes procedure allowed exact knowledge of these parameters. These conditions, which allow for nonparametric modelling of the emission densities, are natural and can be expected to hold in many settings where multiple testing for HMM is used.

IT14: Invited Talk Organized by Yasuhiro Omori

Chair: Yasuhiro Omori, University of Tokyo, Japan

Organizer: Yasuhiro Omori, University of Tokyo, Japan

Session title: Bayesian econometrics

Realized stochastic volatility models with skew-t distributions

Makoto Takahashi

Hosei University, Japan

Predicting volatility and quantiles of financial returns is essential to measure the financial tail risk such as value-at-risk and expected shortfall. There are two important aspects of volatility and quantile forecasts: the distribution of financial returns and the estimation of the volatility. Building on the traditional stochastic volatility model, the realized stochastic volatility model incorporates realized volatility as the precise estimator of the volatility. Using three types of skew-t distributions, the model is extended to capture the well-known characteristics of the return distribution, namely skewness and heavy tails. In addition to the normal and Student's t distributions, included as the special cases of the skew-t distributions, two of them contain the skew-normal, and hence allows more flexible modeling of the return distribution. The Bayesian estimation scheme via a Markov chain Monte Carlo method is developed and applied to major stock indices. The estimation results show that the negative skewness is evident for both indices whereas the heavy tail is largely captured by the realized stochastic volatility, and thus demonstrate that the model with the skew-normal distribution performs well. On the other hand, the prediction results suggest that incorporating both skewness and heavy tail to daily returns is important for volatility and quantile forecasts, especially in a high-volatility period.

Tree boosting for learning probability measures

Naoki Awaya

Duke University, U.S.A.

Learning probability measures based on an i.i.d. sample is a fundamental inference task, but is challenging when the sample space is high-dimensional. Inspired by the success of tree boosting in high-dimensional classification and regression, we propose a tree boosting method for learning high-dimensional probability distributions. We formulate concepts of "addition" and "residuals" on probability distributions in terms of compositions of a new, more general notion of multivariate cumulative distribution functions (CDFs) than classical CDFs. This then gives rise to a simple boosting algorithm based on forward-stagewise (FS) fitting of an additive ensemble of measures, which sequentially minimizes the entropy loss. The output of the FS algorithm allows analytic computation of the probability density function for the fitted distribution. It also provides an exact simulator for drawing independent Monte Carlo samples from the fitted measure. Typical considerations in applying boosting—namely choosing the number of trees, setting the appropriate level of shrinkage/regularization in the weak learner, and the evaluation of variable importance—can all be accomplished in an analogous fashion to traditional boosting in supervised learning. Numerical experiments confirm that boosting show competitive predictive performance with the state-of-the-art single-tree learner and is computationally efficient.

A Multivariate Randomized Response Model for Mixed-type Data

Yasuhiro Omori

University of Tokyo, Japan

To identify and reduce various sources of serious drug administration errors in the hospitals, we recently conducted comprehensive online surveys on nurses in Hong Kong. The data consists of multiple binary and ordinal categorical responses to the sensitive questions concerning the administration errors for each nurse. To protect their data privacy from answering these sensitive questions honestly, the randomized response technique is applied when collecting these data. To investigate various effects of the covariates for the nurse, the joint modeling of the multiple binary and ordinal data is proposed under the restriction of randomizing the categorical responses to the sensitive questions. We develop the efficient Markov chain Monte Carlo estimation method of the proposed model using latent variables in the framework of the multivariate probit model. Our empirical study reveals the sources of drug administration errors and shows the appropriate direction for drug administration policies in the future.

Participants from ASEAN

Name	Affiliation	Title	Nation
Alexandre Hoang Thiery	Department of Statistics and Data Science, National University of Singapore	Creating manifold structures to accelerate MCMC sampling	Singapore
Aljo Clair Pingal	Department of Statistics, Feng Chia University	Bayesian Modeling of Zero Inflated Integer-valued Transfer Function Models	Philippines
Dootika Vats	Indian Institute of Technology	Efficient Bernoulli factory MCMC for intractable posteriors	India
Kiranmoy Das	Indian Statistical Institute	A Bayesian Quantile Regression Approach to Multivariate Semi-Continuous Longitudinal Data	India
Li Cheng	Department of Statistics and Data Science, National University of Singapore	Bayesian Fixed Domain Asymptotics for Spatial Gaussian Process Models	Singapore
Linda Siew Li Tan	Department of Statistics and Data Science, National University of Singapore	Efficient data augmentation techniques for state space models	Singapore
Manh Cuong Dong	Faculty of Development Economics, VNU University of Economics and Business, Vietnam National University	Identifying the spatial spillover of recessions among countries: A Bayesian spatial autoregressive logit model	Vietnam
Minerva Mukhopadhyay	Indian Institute of Technology	Bayesian Semiparametric Longitudinal Inverse-Probit Mixed Models for Category Learning	India
Sayantana Banerjee	Indian Institute of Management	Precision matrix estimation under the Horseshoe-like prior-penalty dual	India
Truong Nhat Le	Department of Statistics, Feng Chia University	Bayesian model assessments in evaluating the association between the sensitive attribute and auxiliary data under randomized response technique	Vietnam
Woraphon Yamaka	Center of Excellent in Econometrics, Faculty of Economics, Chiang Mai University	Mixed Copula based Seemingly Unrelated Quantile Regression Models	Thailand

List of Posters

Poster Session

A poster title

Another poster title

List of Participants

Name	Affiliation
Charlotte Wang	National Taiwan University
Chi-Hsiang Chu	Tunghai University
Chia-Hui Huang	National Chengchi University
Dootika Vats	Indian Institute of Technology
Dwueng-Chwuan Jhwueng	Feng Chia University
Edward M.H. Lin	Tunghai University
I-Tang Yu	Tunghai University
Ilsang Ohn	Inha University
Jaeyong Lee	Seoul National University
Jouchi Nakajima	Bank of Japan
Kaoru Irie	University of Tokyo
Kazuhiko Kakamu	Nagoya City University
Kiranmoy Das	Indian Statistical Institute
Kwangmin Lee	University of Wisconsin-Madison
Makoto Takahashi	Hosei University
Minerva Mukhopadhyay	Indian Institute of Technology, Kanpur
Naoki Awaya	Duke University
Richard Gerlach	The University of Sydney
Ruby Chiu-Hsing Weng	National Chengchi University
Sayantan Banerjee	Indian Institute of Management Indore
Seongil Jo	Inha University
Shintaro Hashimoto	Hiroshima University
Shonosuke Sugasawa	The University of Tokyo
Takahiro Onizuka	Hiroshima University
Tomoya Wakayama	The University of Tokyo
Yasuhiro Omori	University of Tokyo
Yasuyuki Hamura	JSPS Research Fellow, The University of Tokyo
Yoshihiro Otsuka	Tohoku Gakuin University
Yu-Chung Wei	National Changhua University of Education
Yu-Wei Chang	National Chengchi University
Yuta Yamauchi	Nagoya University

Partner Institutions and Sponsors

EAC ISBA Meeting 2022 is sponsored by ISBA, Feng Chia University, National Cheng Kung University, and the Ministry of Science and Technology (MOST), and Ministry of Education of Taiwan.

Sponsors



INTERNATIONAL SOCIETY FOR BAYESIAN ANALYSIS



