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Editorial of the 10th Anniversary Issue

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EDITORIAL

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Editorial of the 10th Anniversary Issue

The inaugural issue of *Statistical Theory and Related Fields* (STARF) was published in 2017. Our purpose in establishing the STARF was to promote the development of statistical theory and methodology, particularly through research motivated by important problems arising in other disciplines. We also hoped that the STARF would serve as a platform for international academic exchange, especially between statisticians in Chinese mainland and their colleagues around the world. On the occasion of the journal's tenth anniversary, we would like to look back briefly on its development and introduce the eleven papers collected in this anniversary issue.

The STARF is jointly sponsored by East China Normal University (ECNU) and the Chinese Association for Applied Statistics (CAAS). In 2021, the STARF was granted a CN number by the National Press and Publication Administration of China and obtained a publishing license from the Shanghai Press and Publication Administration. In the same year, the STARF appointed a new editorial board, which included several distinguished statisticians.

In addition to publishing papers, we have organized four International Workshops on Statistical Theory and Related Fields, as well as the International Workshop on Precision Medicine. In 2026, the First Mao Shisong Statistical Education Doctoral Forum was held to encourage academic exchange among doctoral students in statistics and related fields. These meetings have provided opportunities for participants to present their work, exchange ideas, and discuss problems of common interest. We hope to continue organizing such meetings in the years ahead.

The eleven papers in this anniversary issue cover a wide range of topics in statistical theory, methodology, and applications. Jiang, Wand and Ghosh establish precise asymptotic normality results for maximum likelihood estimators in Gaussian linear mixed models with crossed random effects. Their theory allows unbalanced cell counts and crossed random slopes, and can be used in constructing confidence intervals, carrying out Wald tests, and calculating sample sizes. Delong, Gatti and Wüthrich develop calibration bands for mean estimates in the exponential dispersion family. The bands lead to tests of calibration and auto-calibration that do not rely on asymptotic approximations and can be used with samples of any size.

Two other papers take up questions about the foundations of inference. Berger, García-Donato and Pericchi examine prior probabilities on models in Bayesian variable selection. After discussing the problems with equal model prior probabilities and a widely used choice based on Jeffreys' suggestion, they study alternatives and show how the preferred choice depends on the degree of sparsity required. Chuanhai Liu discusses inferential models as a way to assess scientific uncertainty without specifying a prior distribution. He explains the role of auxiliary variables and calibrated predictive random sets, and relates inferential models to fiducial inference, confidence theory, and other approaches to uncertainty assessment.

Sampling and study design are addressed in two papers. Yu Liu, Yukun Liu and Jing Qin consider the integration of probability and non-probability samples when participation

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depends on the study variable, so that the usual ignorability assumption does not hold. They propose a likelihood-based framework for estimating finite population means, develop three estimators, and establish their asymptotic normality. Zhang and Yue study locally *D*-optimal designs for generalized measurement error models. They establish a general equivalence theorem and show that, under certain conditions, an optimal design can be obtained as a product of designs for the measurement error and classical regression components.

This issue also contains two contributions motivated by medical research. Wang et al. study how to evaluate individualized treatment rules for a broader population than the patients represented in a clinical trial. Using real-world data, they propose a consistent estimator of treatment benefit and derive two composite features that preserve consistency while reducing the variability of the resulting inference. Sun et al. examine the assessment of associations between biomarkers and clinical outcomes. They discuss why statistical significance alone may not indicate clinical relevance and propose incremental predictability as a more interpretable measure of the information a biomarker adds to outcome prediction.

The remaining papers deal with statistical learning, time series, and reliability. Su et al. review diffusion models for distribution learning, focusing on their mathematical foundations and on how errors in score estimation and numerical sampling affect the discrepancy between generated and target distributions. Wei and Deng propose a graph-adjusted clustering approach to forecasting related time series. Motivated by trends in social-media discussions, the method groups series with similar patterns and applies autoregressive models within the groups. Zhuang et al. review multi-phase degradation models, including the identification of phase changes, parameter estimation, remaining useful life prediction, and maintenance decisions.

Over the past decade, advances in computing and the growing use of machine learning have brought new problems to statistical research. Many of these problems raise important questions about statistical inference, uncertainty assessment, and the validity of new methods. The STARF will continue to welcome original contributions to statistical theory and methodology, including research motivated by problems arising in other disciplines.

We thank the authors of this anniversary issue for their contributions, and the reviewers and members of the editorial board, past and present, for their work over the years. We are grateful to East China Normal University, the Chinese Association for Applied Statistics, and Taylor & Francis for their continued support. We also thank the organizers and participants of the workshops and doctoral forum. We hope the STARF will continue to serve statisticians and researchers in related fields in the years to come.

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