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WELCOME MESSAGE FROM THE CONFERENCE CHAIR

On behalf of the International Academy of Science, Engineering and Technology (International ASET Inc.), the organizing committee would like to welcome you to the 3rd International Conference on Statistics: Theory and Applications (ICSTA’21).

Due to the evolving COVID-19 outbreak and corresponding issues in border entry in European countries, the 3rd International Conference on Statistics: Theory and Applications (ICSTA'21) which was supposed to be held in Prague, Czech Republic will be held virtually instead on July 29 – 31, 2021.

The goal of ICSTA'21 is to gather scholars from all over the world to present advances in the relevant fields and to foster an environment conducive to exchanging ideas and information. This conference will also provide an ideal environment to develop new collaborations and meet experts on the fundamentals, applications, and products of the mentioned fields.

In the third meeting of this conference, two Plenary Speakers and five keynote speakers will share their expertise with the aim of exposing participants to a wide spectrum of applications, and to foster crosspollination of ideas and develop new research interests. In addition, approximately 15 papers will be presented from professors, students, and researchers across the world.

We thank you for your participation and contribution to the 3rd International Conference on Statistics: Theory and Applications (ICSTA'21). We wish you a very successful and enjoyable experience.

Dr. Gangaram Ladde
University of South Florida, USA
Conference Chair
ICSTA’21

Dr. Noelle Samia
Northwestern University, USA
Conference Co-Chair
ICSTA’21
The 3rd International Conference on Statistics: Theory and Applications (ICSTA'21) aims to become the leading annual conference in fields related to Statistics: Theory and Applications. The goal of ICSTA'21 is to gather scholars from all over the world to present advances in the fields related to Statistics: Theory and Applications and to foster an environment conducive to exchanging ideas and information. This conference will also provide an ideal environment to develop new collaborations and meet experts on the fundamentals, applications, and products of the mentioned fields.

ICSTA is an international conference will be held yearly. This conference focus on all aspects Statistics: Theory and Applications. ICSTA Will be held this year virtually due to COVID-19 pandemic.


The proceedings are published in Ottawa, Canada.

All papers were peer-reviewed

The congress proceedings is published under an ISSN and ISBN number

Each paper is assigned a unique DOI number by Crossref

The proceedings is permanently archived in Portico (one of the largest community-supported digital archives in the world)
We would like to thank the following for accepting to act as a member of the Scientific Committee for the ICSTA’21 Conference:

- **Dr. Mylène Bédard**, University of Montreal, Canada
- **Dr. Noelle Samia**, Northwestern University, USA
- **Dr. Dalia Chakrabarty**, Loughborough University, UK
- **Dr. Sujay Datta**, University of Akron, USA
- **Dr. Rosario Delgado de la Torre**, Universitat Autònoma de Barcelona, Spain
- **Dr. Dirk Husmeier**, University of Glasgow, UK
- **Dr. Esra Kurum**, University of California, Riverside, USA
- **Dr. Hosam M. Mahmoud**, George Washington University, USA
- **Dr. Krzysztof Podgórski**, Lund University, Sweden
- **Dr. Jiahua Chen**, University of British Columbia, Canada
- **Dr. Faming Liang**, Purdue University, USA
- **Dr. Michael Evans**, University of Toronto, Canada
The Plenary and keynote information for the 3rd International Conference on Statistics: Theory and Applications (ICSTA'21) is as follows:

**Plenary Speakers**
- Dr. William S. Cleveland  
  Purdue University, USA
- Dr. Jaline Gerardin  
  Northwestern University, USA

**Keynote Speakers**
- Dr. Michael Evans  
  University of Toronto, Canada
- Dr. Jacob M Schauer  
  Northwestern University, USA
- Dr. Jiahua Chen  
  University of British Columbia, Canada
- Dr. Faing Liang  
  Purdue University, USA
- Dr. Xiaoming Huo  
  Georgia Institute of Technology, USA
William S. Cleveland (Bill) received a B.A. in math from Princeton; his thesis advisor was Willy Feller, a famous probabilist. He received a PhD in Statistics from Yale; his advisor was Leonard Jimmie Savage who had resurrected Bayesian statistics by proving it was the optimal approach to statistical decision making. Manny Parzen and Marvin Zelen invited Bill to spend a summer at the Statistics Department of SUNY at Buffalo. Bill then moved on to the Statistics Department at Bell Labs in 1971. For more information please visit: https://2021.icsta.net/keynote-speakers/

Jaline Gerardin is Assistant Professor of Preventive Medicine at Northwestern University. Her group uses quantitative methods to support decision-making around policies to manage infectious disease, focusing on malaria and COVID-19.
ICSTA'21 KEYNOTE LECTURE

**Titles:** On the Analytic Power of Divide & Recombine (D&R)

**Dr. William S. Cleveland, Purdue University, USA**

Michael Evans is a Professor of Statistics at the University of Toronto. He received his Ph.D. from the University of Toronto in 1977 and has been employed there ever since with leaves spent at Stanford University and Carnegie Mellon University. He is a Fellow of the American Statistical Association, has served as an Associate Editor of JASA Theory and Methods 1991-2005, an Associate Editor of the Canadian Journal of Statistics 1999-2006, 2017-present, an Associate Editor of the journal Bayesian Analysis 2005-2015 and an Editor 2015-present and is a subject matter Editor for the online journal FACETS. He served as President of the Statistical Society of Canada 2013-2014.

His research has been concerned with multivariate statistical methodology, computational statistics, and the foundations of statistics.

For more information Please visit: https://2021.icsta.net/keynote-speakers

**Titles:** Distributed Learning of Finite Gaussian Mixtures

**Dr. Jiahua Chen, University of British Columbia, Canada**

Dr. Jiahua Chen received his Master’s degree from the Institute of System’s Science in Academia Sinica in Jan 1985 under the supervision of Professor Ping Cheng, and Ph. D. degree from the University of Wisconsin-Madison in July 1990 under the supervision of Professor Jeff Wu.

For more information Please visit: https://2021.icsta.net/keynote-speakers
Dr. Huo received the B.S. degree in mathematics from the University of Science and Technology, China, in 1993, and the M.S. degree in electrical engineering and the Ph.D. degree in statistics from Stanford University, Stanford, CA, in 1997 and 1999, respectively. Since August 1999, he has been an Assistant/Associate/Full Professor with the School of Industrial and Systems Engineering, Georgia Institute of Technology, Atlanta. He represented China in the 30th International Mathematical Olympiad (IMO), which was held in Braunschweig, Germany, in 1989, and received a golden prize. Statistics – Statistics, since April 2021.
For more information Please visit: https://2021.icsta.net/keynote-speakers

Faming Liang is Distinguished Professor of Statistics at Purdue University. He is ASA fellow, IMS fellow, and the winner of Youden prize in 2017. Faming has wide research interests, including Monte Carlo methods, machine learning, bioinformatics, high-dimensional statistics, and big data.
Jacob Schauer is an assistant professor in the Biostatistics Division of the Department of Preventive Medicine at Northwestern University's Feinberg School of Medicine. His applied research concerns interpretable machine learning for medical diagnoses, as well as various issues in medical social sciences, including health disparities and health literacy. His methodological work focuses on approaches to studying replication, incomplete data meta-analyses, and data privacy. Prior to joining Feinberg, Jacob completed his PhD in statistics from Northwestern University in 2018 and worked as a postdoctoral fellow at the Institute for Policy Research at Northwestern from 2018 to 2020.
LIST OF PAPERS

The following papers were presented at the 3rd International Conference on Statistics: Theory and Applications (ICSTA'21).

Statistics Theory and Applications

**Titles:** Statistical Analysis of Measurements in Exact and Inexact Sciences: An Open Problem  
**Authors:** Lia Queiroz do Amaral, Universidade de São Paulo, Brazil  
[View Paper]

**Titles:** The Concept of Statistical Evidence  
**Authors:** Michael Evans  
[View Paper]

**Titles:** Graph Neural Network Emulation of Cardiac Mechanics  
**Authors:** David Dalton, Alan Lazarus Arash Rabbani, Hao Gao, Dirk Husmeier  
[View Paper]

Robustness of Gaussian Mixture Reduction for Split-and-Conquer  
**Authors:** Qiong Zhang, Jiahua Chen  
[View Paper]

**Titles:** Inference in Cardiovascular Modelling Subject to Medical Interventions  
**Authors:** L. Mihaela Paun, Agnieszka Borowska, Mitchel J. Colebank, Mette S. Olufsen and Dirk Husmeier  
[View Paper]
### Statistics Theory and Applications

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<td>Estimation of Parameters of Logistic Regression with Missing Covariates via Joint Conditional Likelihood Method</td>
<td>Phuoc-Loc Tran, Truong-Nhat Le, Shen-Ming Lee, and Chin-Shang Li</td>
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<td>Change Point Analysis and Clustering Examined Through Chicago Crime During COVID-19</td>
<td>Mena Whalen, Joseph Feinglass, Noelle Samia</td>
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<td>Prediction Model for the Result of Percutaneous Coronary Intervention in Coronary Chronic Total Occlusions</td>
<td>Maria Ganopoulou, Ioannis Kangelidis, Georgios Sianos, Lefteris Angelis</td>
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<td>Generalized Functional Responses in Habitat Selection Fitted by Decision Trees and Random Forests</td>
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<td>Combining Time Series and Sentiment Analysis for Stock Market Forecasting</td>
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<td>Sufficient Dimension Reduction with Deep Neural Networks for Phenotype Prediction</td>
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<td>The Impact of Entity Resolution on Observed Social Network Structure</td>
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<td>Stochastic Version of EM Algorithm for Nonlinear Random Change-Point Models</td>
<td>Hongbin Zhang, Binod Manandhar</td>
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International ASET Inc. would like to thank the following sponsors for their support of ICSTA’21:
The 4th International Conference on Statistics: Theory and Applications (ICSTA’22) will be held on July 28, 2022 - July 30, 2022 | Prague, Czech Republic.

For inquiries and to obtain further information on the conferences, please visit our website please visit our [website](http://www.2022.icsta.net)
You can also email [info@icsta.net](mailto:info@icsta.net) or call us at: +1-613-834-9999
Publication Ethics and Publication Malpractice Statement

The following statement is mainly based on the Code of Conduct and Best-Practice Guidelines for Journal Editors (Committee on Publication Ethics, 2011).

Scientific Committee

Scientific Committee
Scientific committees consisting of experts in the fields are established. The committees oversee the peer-review and publication process. To see the scientific committee members, please follow the link below.

Scientific Committee

Equality and Decisions
One or more reviewer, scientific committee member, or chair, (internal or external), are responsible for evaluating the relevance of the submitted manuscripts to the proceedings, technical and scientific merit, originally, and impact. These evaluations are to be carried out regardless of ethnicity, religion, gender, sexual orientation, political beliefs, and institutions. Successive to peer-review, the Chair has full authority and is solely responsible for the published content and the process thereof.

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This conference proceeding accompanies the conference, meaning a new proceedings will be published every year for the corresponding annual conference of this series.
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