
# ICSA Bulletin

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## Editorial Staff

# From the Editor

*Chixiang Chen*

Dear ICSA members:

Welcome to the July 2024 issue of the ICSA Bulletin! The first half of 2024 has brought a series of remarkable events sponsored or co-sponsored by our association. As outlined by Dr. Chen, the 2024 president of ICSA, and Dr. Zhao, the 2023-2025 ICSA executive director, we are thrilled to highlight two in-person conferences: the 33rd annual ICSA Applied Statistics Symposium at Vanderbilt University and the 2024 ICSA China Conference in Wuhan, China. These events were attended by numerous scholars from around the world and were exceptionally successful. Our ICSA members demonstrated their enthusiasm by actively participating in keynote lectures, short courses, invited sessions, panel discussions, and poster presentations. It was particularly gratifying to see many young scholars presenting their latest research in fields such as artificial intelligence, machine learning, causal inference, and data integration. Equally heartwarming was the reunion of old friends from across the globe, fostering personal interactions and camaraderie.

To enrich the theme of the 2024 ICSA Bulletin, "Emerging Opportunities in Statistics and Data Science," we are pleased to share several articles that we believe will resonate deeply with your professional journey and research interests. In the "XL-Files" column, Professor Xiao-Li Meng provides insights into "deep statistics" and recounts his memorable experience at the Australian Data Science Network (ADSN) in Adelaide. This article is a reprint from a column originally published in the IMS Bulletin with permission. Additionally, we are honored to feature an invited article from Dr. Hongtu Zhu and his team, which examines the challenges and opportunities facing statisticians in the era of AI, emphasizing the transformative impact of AI innovations and the adaptive role of statisticians. Furthermore, we extend our gratitude for another invited article from Dr. Kelly Zou, offering insights into big data, digital technologies, and artificial intelligence in a Patient-Centric Era. We encourage you to enjoy these articles and share your feedback with us. Please feel free to contact us with any thoughts or ideas you wish to contribute to our society.

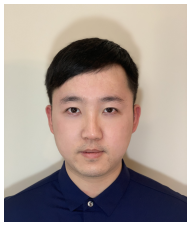
This issue also includes important updates and announcements from the ICSA community. It features messages from the 2024 ICSA President, Dr. Xun Chen, and the 2023-2025 Executive Director, Dr. Jun Zhao. We are pleased to announce the ICSA 2024 executives and members of the committees, the official 2024 ICSA awards, and the candidates for the 2025 ICSA officers. Additionally, the issue contains exciting upcoming news from the ICSA-Taiwan Chapter (ICSDS, 07/2024) and the ICSA-Midwest Chapter (Fall conference of NICASA & ICSA, 10/2024), along with a report from the ICSA Outreach and Engagement Committee. Reports on the ICSA Springer Book Series in Statistics and Statistics in Biosciences are included, along with the semi-annual financial report for 2024 and information on upcoming ICSA-sponsored or co-sponsored meetings and conferences. We hope that this issue will capture your interest and provide significant value to all members, and we eagerly await your feedback. Last but not least, special thanks go to Dr. Biyi Shen (Regeneron Pharmaceuticals) for her efforts in formatting and assembling the files for this issue.

In conclusion, I extend heartfelt gratitude to all contributors, ICSA executives, and committee members who have made substantial contributions to this bulletin. In our next issue, we plan to introduce a new section: Intellectual Communications Across Statistical Communities, inviting world-class experts to interact and share their experiences and insights. I eagerly anticipate your active participation in future issues of the ICSA Bulletin.

See you next time!

Best,

Chixiang



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*Editor-in-Chief, ICSA Bulletin*
*Assistant Professor*
*Department of Epidemiology and Public Health,*
*Department of Neurosurgery,*
*Insitute for Health Computing (Bethesda),*
*University of Maryland, School of Medicine.*

# From the 2024 President, ICSA

*Xun Chen*

Dear ICSA Members, Sponsors, and Friends,

As I flied through the clouds on my trip back home from Nashville, my mind was buzzing with inspiration from the latest ICSA Applied Statistics Symposium, themed of "Data-Driven Decision Making: Unleashing the Power of Statistics". Congratulations to ICSA on another enriching and inspiring annual symposium. A big thank you to all participants, speakers, sponsors, volunteers, and especially to the organizing committee at Vanderbilt University. It was your commitment and support that made this symposium a success.

The 33rd ICSA Applied Statistics Symposium showcased the enduring efforts and achievements of ICSA in fulfilling its mission to promote impactful statistical research, education, and application. To uphold the ICSA legacy requires not only resilience, but also adaptation and enhancement, gradually but consistently. In the spirit of upholding and improving, we initiated a new Outreaching and Engagement Committee late last year, which has generated significant momentum since its inception. Led by Jin Zhu and Qing Yang, the committee has successfully launched a series of career development webinars since last February. Following the successful fireside conversation on empowering statistics in the AI era with a group of renowned statistical thought leaders, the committee is currently planning a new series of webinars to explore different opportunities for advancing cutting-edge statistical research and application in the new data and digital era. Please stay tuned for more valuable learning and sharing opportunities through the ICSA Webinar platform. We have been trying to instill more structured operation model in each key ICSA committee when we renewed these committees in this year, which includes but not limited to defining clear charter, developing comprehensive operational guidance, facilitating knowledge transferring and experience sharing, and proactive planning for successions etc. During a recent EC meeting, we engaged Zhigen Zhao to discuss the Membership Committee's proposals aimed at enhancing membership management and engagement. Worth noting that the active members of ICSA has soared from 1600 to 2200 over the past year! Led by Yichuan Zhao, the Nomination and Election Committee conducted zoom interviews for the first time with 18 pre-selected board and president nominees to better assess their motivation and qualifications. The Award Committee, led by Zhigang Li, is actively evaluating new award options to better recognize diverse statistical achievements and contributions via ICSA. Chengsheng Jiang and Grace Li from ICSA business office are diligently exploring ways to enhance ICSA website and newsletter. And the list can go on and on.

Entering the second half of 2024, in addition to the ongoing initiatives, we will soon initiate the process of electing ICSA president-elect for 2025 and selecting five new board members through online ballots on the ICSA website. We are eagerly looking forward to hearing the "voices" of all ICSA members in this important event. Additionally, under the guidance of Runzi Li and the Publication Committee, we will be appointing a new co-editor for the ICSA flagship journal, Statistics in Biosciences. We are committed to foster a diverse editor team to adeptly guide the journal in meeting the evolving needs across different fields.

As we approach the next major ICSA event in China, where over 800 fellow statisticians, data scientists, and technology entrepreneurs will convene in Wuhan from 6/28 to 6/30 to celebrate the latest advancements in data and statistical science, from theory to practice. I hope to express my wholehearted gratitude to Xinping Cui and our programming committee for their dedicated and unwavering supports in collaborating with the organizing team in Zhongnan University of Economics and Law to make the enriching conference a reality.

Finally, I would like to reiterate that I and the ICSA leadership team are eager to hear ideas and suggestions from you on how to improve various aspects of the ICSA. Please feel free to reach out to me (`Xun.Chen@sanofi.com`), Jun Zhao (ICSA Executive Director, `executive.director@icsa.org`), or chairs of the ICSA committees (listed on the ICSA website) for any ICSA related questions and suggestions. As we all know, ICSA is run entirely by volunteers. Everyone's participation matters. Thank you so much!

*Xun Chen, Ph.D.*
*2024 President,*
*Global Head of Biostatistics and Programing,*
*Sanofi.*

# From the Executive Director 2023-2025

*Jun Zhao*

Dear ICSA members,

As a member-based association, the ICSA provides services for its 2200+ active members and leadership for the statistical community, through the diligent work from the ICSA executives, the board of directors, and all the ICSA officers and volunteers.

Under the leadership of the current president Dr. Xun Chen and other members in the executive committee (EC), some exciting activities and initiatives are occurring during the past half year. Some of them are presented below, while some accomplishments have been written by other colleagues in this issue of the bulletin.

The 33rd annual ICSA Applied Statistics Symposium, themed "Data-driven Decision Making – Unleashing the Power of Statistics" was successfully held at Vanderbilt University in Nashville, TN, USA, from June 16 to June 19, 2023. With the dedicated work from co-chairs Dr. Dandan Liu and Qingxia (Cindy) Chen, and the whole organizing committee, the symposium welcomed over 480 participants from academia, government, and industry. The symposium provided keynote speeches, scientific programs, short courses, poster sessions, and traditional banquet and other social events. In addition, the symposium also provided a recruiting opportunity for industry sponsors, which may lead ICSA to consider the recruiting service routinely in the symposium.

The 2024 ICSA China Conference, themed "Innovation in Data and Statistical Science: Theory, Methodology, and Practice", were held at Donghu Hotel, a scenic place in Wuhan, Hubei Province, China from June 28 to June 30, 2024. The conference was co-sponsored by Zhongnan University of Economics and Law and Huazhong Normal University. The whole organizing committee welcomed around one thousand statisticians, data scientists, and students and friends from academia, government, and industry globally. The conference provided two keynote speeches, one banquet speech, 128 scientific sessions, a poster session, and a banquet with award ceremony. Two short courses were provided before the conference on June 26 and June 27.

The ICSA Outreach and Engagement Committee, co-chaired by Dr. Jin Zhou and Dr. Qing Yang, has engaged heavily during the first half of the year. The social media, X at ICSA_Statistics, YouTube at ICSA_Statistics, have delivered ICSA news and events frequently. The committee successfully co-hosted a Fireside Conversation on Empowering Statistics in the Era of AI with Stats Up AI Alliance, which attracted thousands of attendees through Zoom, YouTube Live, YouTube, and other social media. Meanwhile, the committee, through its Webinar subcommittee, launched webinar series early this year. The first of the webinar series is on Career Development. The committee has hosted 4 webinars already, which have earned a lot of attention and applauses. The committee is expanding and considering more topics and welcomes volunteers to join the team.

The Program Committee, led by Dr. Xinping Cui, has lined up ICSA conferences. Hope to see you, your students, and your colleagues in the 2025 Applied Statistical Symposium in Connecticut, the 2026 Applied Statistical Symposium in DC, the 2025 China Conference in Zhuhai, Guangdong, and the 2025 International Conference in Taiwan, among others.

The Award Committee, led by Dr. Zhigang Li, has started to streamline the award nomination and evaluation process. The 2024 award winners were concluded, and the award ceremony was held during the applied statistics symposium. The committee and the EC have initiated a proposal to add more award categories, especially for industry statisticians, and a proposal for the award monetary options to the recipients of the ICSA awards, upon board's approval.

The Nominating and Election Committee, led by Dr. Yichuan Zhao, has concluded the candidates for 2025 president-elect and 2025-2027 new board members for ICSA members' final vote. The committee has started a new process to strength the nomination by adding an interview to candidates. The recorded video clips can be reviewed by the committee members and EC members for evaluation. The president-elect candidates are asked to provide a 2-minutes video clip to strength their influence among the voting members. We hope the members will vote

for their candidates who can show their passion, engagement, involvement, and leadership.

I encourage ICSA members to attend the General Member Meetings to show your support, engagement, and profession. Moving forward, you will find that the general meeting in the Applied Symposium includes the ICSA Awards ceremony, and the general meeting during the JSM includes a social event.

Finally, as usual, I would like to thank the EC, the Board, the standing committees, volunteers, and all the ICSA members for your continuous support to the association, and to make the ICSA stronger. Before I end my update, I'd like to share with you a story of missing data imputation. I organized a meeting with a time slot from 6:00pm to 9:00pm US Central Time. 15 people were invited. They had options to attend online through zoom or physically in a conference room. To have an exact headcount, I surveyed the group before the meeting: 4 responded to attend physically, 2 responded to call-in online, 3 said not to attend, and the rest without responses. I used multiple imputation methods, Bayesian methods, and even ChatGPT, in my prediction. Unfortunately, I failed my prediction. It turns out 4 out of 15 people showed up in the conference room, and none were online.

*Jun Zhao, Ph.D.*
*ICSA Executive Director (2023-2025) ,*
*Senior Director, Statistics,*
*Antengene Corp.*

# ICSA 2024 Executives and Members of the Committees

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Shelly Hurwitz (2017-2024, hurwitz@hms.harvard.edu)
Laura J Meyerson (2020-2024, laurameyerson@msn.com)

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## CONFERENCE COMMITTEES

### 2024 Applied Statistics Symposium

Chair: Dandan Liu (dandan.liu@vumc.org), Qingxia Chen (cindy.chen@vanderbilt.edu)

### 2024 ICSA China Conference

Program Chair: Xinping Cui (xpcui@ucr,edu), Yanqing Wang

### 2024 JSM Local Committee

Chair: Rochelle Fu (fur@ohsu.edu) Team: Yabing Mai, Rui Feng, Chengsheng Jiang, Grace Li, and EC.

### 2025 Applied Statistics Symposium

Chair: Dacheng Liu (dacheng.liu@boehringer-ingelheim.com), Xiaojing Wang (xiaojing.wang@uconn.edu)

### 2025 ICSA International Conference

Chair: Ying Zhang (ying.zhang@unmc.edu), Ming-Chung Chang (mcchang@stat.sinica.edu.tw), Xinping Cui (xpcui@ucr.edu)

## CHAPTERS

### ICSA-Canada Chapter

Joan Hu (Chair, joan_hu@sfu.ca)

### ICSA-Midwest Chapter

Ziqian Geng (Chair, ziqian.geng@abbvie.com)

### ICSA-Taiwan Chapter

Henry Horng-Shing Lu (Chair, hslu@stat.nycu.edu.tw)

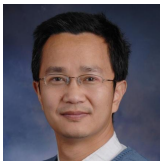
# 2024 ICSA Awards

### 2024 ICSA Distinguished Achievement Award

Yao, Qiwei

Citation:
For distinguished achievements in the areas of high-dimensional time series, dynamic networks, spatiotemporal processes, functional time series, and nonlinear time series.

### 2024 Outstanding Service Award



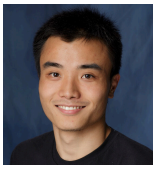
Zhao, Yichuan

Citation: For leadership, mentorship and unselfish support to ICSA.

Hu, Joan

Citation: For long-lasting and far-reaching commitment to serving ICSA.

### 2024 ICSA Outstanding Young Researcher Award



Zhao, Bingxin

Citation:
For outstanding contributions to the fields of imaging genetics/genomics and neuroimaging.

Wang, Jingshen

Citation:
For outstanding contributions to the fields of causal inference for treatment heterogeneity and analyzing streaming data.

# Candidates for 2025 ICSA Officers

## Candidates for ICSA 2025 ICSA President-Elect

Rong Chen, PhD

Distinguished Professor of Statistics and Chair, Department of Statistics, Rutgers University

Runze Li, PhD

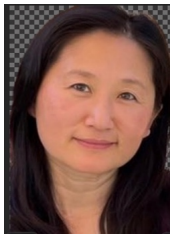
Eberly Family Chair Professor of Statistics, Department of Statistics, The Pennsylvania State University, University Park

## Candidates for ICSA 2025 Board of Directors

Yuanjia Wang
Columbia University

Zhigen Zhao
Temple University

Xinping Cui
UC Riverside



Grace S. Shieh
Academia Sinica, Taipei

Yang Feng
New York University

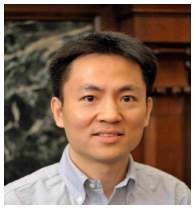
Haitao Chu
Pfizer

Jin Zhou
UCLA

Yushi Liu
Eli Lilly and Company

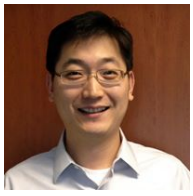
Jingfei Zhang
Emory University

Yuguo Chen
UIUC



Yabing Mai

Boehringer Ingelheim



Meijing Wu
Sanofi

Xinlei Wang

University of Texas at Arlington

Xiaojing Wang
University of Connecticut

Ming Wang
Case Western Reserve University

Eligible ICSA regular members receive further details via e-mail prior to the start of elections, including a summary of the candidates, details on how to access the voting system. Please ensure the Membership Committee has your recent and correct e-mail address on file. For questions, you can reach the Membership Committee in private at `membership@icsa.org`.

# The Spotlight from ICSA 2024 Applied Statistics Symposium (June 16 - July 19, 2024)

*Dandan Liu, Qingxia (Cindy) Chen*

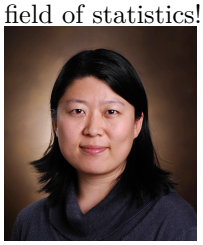
The 33rd annual ICSA Applied Statistics Symposium, themed "Data-Driven Decision Making: Unleashing the Power of Statistics" was an electrifying success! Hosted at Vanderbilt University in Nashville, Tennessee, USA, from June 16th to June 19th, 2024, this remarkable event welcomed over 460 participants from academia, government, and industry, including 78 students, to explore the limitless potential of statistics in the modern world.

The conference program was jam-packed with enriching content, featuring 3 keynote lectures, 1 banquet lecture, 3 invited panel sessions, and 79 invited sessions. Additionally, there were 10 short courses, 33 posters, and 10 oral presentations by the student paper awards recipients. The energy and enthusiasm of all participants were truly inspiring!

On behalf of the organizing committee, we extend our heartfelt appreciation to all individuals and entities who contributed to making this symposium a tremendous success. We would like to thank the ICSA Executive Committee, ICSA Program Committee and ICSA Special Lecture Committee. We would also like to extend our deepest gratitude to the entire conference committee, dedicated volunteers and all the enthusiastic participants.

Furthermore, we are incredibly grateful for the generous financial support provided by our sponsors. Our sincere thanks go to the National Science Foundation, 5 gold sponsors (Department of Biostatistics at Vanderbilt University Medical Center, Abbvie, Pfizer, Boehringer Ingelheim, and The Lotus Group), 9 silver sponsors (Amgen, Bristol Myers Squibb, Everest, Gilead, MDPI Mathematics journal, Merck, Lilly, Sanofi, BeiGene), and 4 bronze sponsors (Regeneron, LLX Solutions, Vanderbilt Data Science Institute, and Vertex). Your contributions helped make this event a grand success!

Thank you all for your dedication, passion, and enthusiasm in making this symposium an unforgettable experience. We cannot wait for future collaborations and opportunities to continue advancing the field of statistics!



*Dandan Liu, PhD,*
*Associate Professor of Biostatistics,*
*Vanderbilt University.*

*Qingxia (Cindy) Chen, PhD,*
*Professor of Biostatistics,*
*Vanderbilt University.*

# The Spotlight from ICSA 2024 China Conference (June 28 –June 30, 2024)

*Xinping Cui*

The 7th Annual ICSA China Conference was successfully held at Donghu Hotel in Wuhan, Hubei, China, from June 28 to June 30, 2024. Jointly organized by the ICSA, Zhongnan University of Economics and Law (ZUEL), and Huazhong Normal University。The conference's theme was "Innovation in Data and Statistical Science: Theory, Methodology, and Practice," highlighting the advancements and new challenges in artificial intelligence and data science in the big data era. With meticulous preparation, the conference welcomed around 800 statisticians and data scientists from academia,

government, and industry worldwide, including 149 students. The conference program featured two keynote lectures by Dr. Yingying Fan (University of Southern California) and Dr. Huazhen Lin (Southwestern University of Finance and Economics), a banquet lecture by Dr. Jianhua Guo (Beijing Technology and Business University).

The conference also included 128 invited sessions, featuring ten oral presentations by the recipients of five junior researcher awards and five honorable mention awards. The junior researcher awardees are Kaizheng Wang from Columbia University, Song Mei from UC Berkeley , Yeping Zhou from Tongji University, Gen Li from the Chinese University of Hong Kong, and Lujia Bai from Tsinghua University. In addition, there were 30 posters presented. Three young researchers received Best Poster Awards, and another four received Honorable Mentions for their excellent poster presentations. The banquet attracted nearly 500 participants and many participants commented on the sessions both enriching and inspiring.

Before the formal conference, on the 26th-27th, the conference arranged, for the first time, a two-day summer short course at the ZUEL Shouyi campus. Dr. Haoda Fu from Eli Lilly & Co delivered a full-day course on "Tutorial on Deep Learning and Generative AI," and Professor Jian Huang from the Hong Kong Polytechnic University presented a half-day course on "Generative Learning, Denoising Diffusions, and Large Models." The two short courses attracted close to 100 participants and received very positive feedback.

On behalf of the organizing committee, Dr. Xinping Cui would like to express appreciation to everyone who contributed to the success of this memorable conference. We deeply thank the ICSA Executive Committee, ICSA Program Committee, and ICSA Special Lecture Committee. In particular, we acknowledge the hard work of many faculty members and student volunteers led by Dr. Yanqing Wang from the School of Statistics & Mathematics at ZUEL in Wuhan. We extend our sincere thanks for their efforts in planning the meeting programs, and arranging the meeting logistics and social events. Our deep appreciation also goes to all the members of the various conference committees and to all the active participants.

For more information about the scientific program and our conference, refer to `https://icsa.zuel.edu.cn/fhtjxh-Home/single/1665.html`

*Xinping Cui , PhD,*
*Co-Chair of the 2024 ICSA China Conference Executive Committee,*
*Chair of the Program Committee,*
*Professor of Statistics,*
*University of California, Riverside .*

# Report from Statistics in Biosciences (SIBS)

*Hongkai Ji and Jianguo(Tony) Sun*

Statistics in Biosciences (SIBS) is one of the two statistical journals established by ICSA. It publishes articles on the development and application of statistical methods and their interface with other quantitative methods, such as computational and mathematical methods, in biological and life science, health science, and biopharmaceutical and biotechnological science. The journal has three issues each year, consisting of regular articles as well as topic-oriented papers in special issues. See more information on the journal's website, `https://www.springer.com/journal/12561`.

In 2024, the journal has already published 25 articles across two issues, including a regular issue and a special issue titled "Novel Statistical Approaches for Modeling Exposure Mixtures and Health Outcomes,"guest-edited by Dr. Zhen Chen and Dr. Paul S. Albert.

SIBS currently has three special issues in preparation for publication:

- "Machine Learning in Biomedical Sciences" (Guest-editors: Dehan Kong, University of Toronto, and Bingxin Zhao, University of Pennsylvania).
- "Statistical Methods, Algorithms and Applications in Biomedical Data Integration" (Guest-editors: Peter X.-K. Song, University

of Michigan, and Lu Tang, University of Pittsburgh).

Additionally, the journal has issued a Call for Papers for a new Special Memorial Issue for Professor Tze L. Lai, guest-edited by Dr. Ying Lu (Stanford University), Dr. Dylan Small (University of Pennsylvania), and Dr. Lu Tian (Stanford University).

We invite ICSA members and colleagues to propose new special issues for SIBS.

Each year, a small number of papers (typically 1-3) published in the previous year are selected by the current and past editors to receive the SIBS Best Paper Awards. This year's award winners are:

- Jingsi Ming, Jia Zhao, and Can Yang: "scPI: A Scalable Framework for Probabilistic Inference in Single-Cell RNA-Sequencing Data Analysis." Statistics in Biosciences, Vol. 15, Pages 633–656 (2023)
- Junyi Zhang, Zimian Wang, Zhezhen Jin, and Zhiliang Ying: "A Step-Wise Multiple Testing for Linear Regression Models with Application to the Study of Resting Energy Expenditure." Statistics in Biosciences, Vol. 15, Pages 163–192 (2023)
- Yanqing Sun, Qingning Zhou, and Peter B. Gilbert: "Analysis of the Cox Model with Longitudinal Covariates with Measurement Errors and Partly Interval Censored Failure Times, with Application to an AIDS Clinical Trial." Statistics in Biosciences, Vol. 15, Pages 430–454 (2023)

Congratulations to the award recipients!

We extend our gratitude to all our authors, reviewers, readers, and editorial board members for their significant contributions and continuing support. We look forward to working with you to publish more impactful research in 2024 and beyond.

*Hongkai Ji, PhD,*
*Professor,*
*Department of Biostatistics, Johns Hopkins Bloomberg School of Public Health, USA.*

*Jianguo (Tony) Sun, PhD,*
*Professor and Director,*
*Department of Statistics, University of Missouri. USA.*

# Report from the ICSA Springer Book Series in Statistics

*Ding-Geng Chen*

ICSA Book Series in Statistics (Print ISSN: 2199-0980, Electronic ISSN: 2199-0999) was established in the year 2012 between ICSA and Springer. This book series has successfully published twenty-eight (28) books in statistics, biostatistics, bioinformatics, biopharmaceutical biostatistics, data sciences, and public health, as listed online at `https://www.springer.com/series/13402`.

Three books were published in 2024: 1). Modeling Binary Correlated Responses: Using SAS, SPSS, R and STATA, by Jeffrey R. Wilson, Kent A. Loren, and zLori P. Selby; 2). Innovative Designs and Analyses for Small Population Clinical Trials: Development Strategies and Operational Engagement for Pediatric and Rare Diseases, by Jingjing Ye and Lei Nie; and 3). Statistics in Precision Health: Theory, Methods and Applications, by Yichuan Zhao and Ding-Geng Chen.

The ICSA Book Series in Statistics is aimed to showcase research from the International Chinese Statistical Association that has an international reach. It publishes books on statistical theory, applications, and statistical education. All books are associated with the ICSA or are authored by invited contributors. Books may be monographs, edited volumes, textbooks, and proceedings. To all ICSA members, you and your colleagues are professionally welcome to contribute to this book series to make it successful for our International Chinese Statistical Association. Please contact Professor Ding-Geng

Chen at dinchen@asu.edu for your interest.

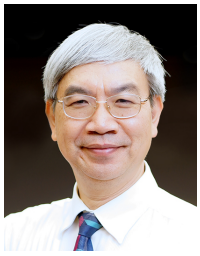
*Ding-Geng Chen , PhD,*
*ASA Fellow,*
*Executive Director and Professor in Biostatistics,*
*College of Health Solutions,*
*Arizona State University,*
*Phoenix, AZ 85004, USA*

# News from the ICSA-Taiwan Chapter

*Henry Horng-Shing Lu*

The first International Conference for Statistics and Data Science (ICSDS 2023) was a collaborative effort between National Yang Ming Chiao Tung University, the Taiwan Chapter of the International Chinese Statistical Association, the Institute of Statistical Science at Academia Sinica, and the Chinese Institute of Probability and Statistics. Building on its success, the second ICSDS is set for July 9-10, 2024, hosted by Department of Statistics at National Chengchi University, the Institute of Statistics at NYCU, and the Taiwan Chapter of ICSA.

The conference will mirror the scale of its predecessor, attracting international experts from the United States, China, Taiwan, Canada, the UK, and Italy. It promises an agenda rich in keynote speeches and symposiums, covering diverse aspects of statistics and data science. The two-day event will explore topics like Complex Data in Finance, Text Mining, Bioinformatics, Big Data, Industrial Statistics, Medical and Spatial Statistics, Clinical Trial Design, Time Series, Biostatistics, Actuarial Statistics, Machine Learning, Dimension Reduction, Sparse Modeling, Stochastic Processes, Bayesian Inference, and Nonparametric Statistics. Aimed at promoting the field of statistics, the ICSDS seeks to enhance international academic collaboration, create cooperative opportunities, and drive the progress and development of statistical sciences. This academic forum is expected to be a nexus for sharing innovative ideas, methodologies, and fostering advancements in statistics and data science. More details at WWW: https://infostat.nccu.edu.tw/icsds2024/.



*Henry Horng-Shing Lu, PhD,*
*Distinguished Professor,*
*Institute of Statistics,*
*National Yang Ming Chiao Tung University,*
*Hsinchu, Taiwan.*

# News from the ICSA Midwest Chapter

*Ziqian Geng*

The annual joint fall conference of NIC-ASA & ICSA Midwest Chapter is planned to be held at the Astellas Campus located at Northbrook, IL on October 10 (Thu) -11 (Fri), 2024.

The meeting is planned as a hybrid event that allows both in-person and virtual participants.

Day 1 (October 10, Thursday):
Short Courses: Topics TBD

- Instructor 1: Haoda Fu (Eli Lilly).
- Instructor 2: Bo Lu (Ohio State University)

Day 2 (October 11, Friday):
Keynote Speaker: TBD

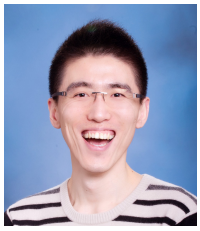
Six Scientific Sessions, topics to be finalized.

Ending Session: Leadership and Career Development (Organizer: Claude Petit, VP, Head of Statistics, Astellas)

Student Focused events:

- Poster Exhibition (all afternoon)
- Roundtable (during lunch)

Registration will remain open until early October. Group registrations are being organized at AbbVie and Astellas.



*Ziqian Geng, PhD,*
*Director, Statistics*
*AbbVie*

# Report from ICSA Webinar

*The ICSA Webinar Sub-Committee*

The ICSA Webinar Sub-Committee successfully launched the "Career Development in Pharmaceutical Industry" series. Since February 2024, we have delivered four monthly webinars, all of which received excellent attendance and high engagement. In total, we have had over 700 registrants and almost 400 attendees with 76 questions raised during the Q&A sessions.

- Soft Skills and Leadership Development – the Lotus Group Series
  - Feb 2024 : No Experience, No Problem
  - Apr 2024 : Get the visibility and recognition
- Knowledge Based Training
  - Mar 2024: Daily work life as a statistician in pharmaceutical industry
  - May 2024: Understanding clinical development

To enhance our advertising and grow our audience pool, we recently established a webinar subscription system. This system aims to further expand our reach and ensure valuable content reaches those who need it.

By developing a robust platform, streamlining our processes, and recruiting a dedicated Tech team, we are well-prepared to broaden our scope and consistently deliver high-quality content. Specifically, we plan to continue the "Career Development in Pharmaceutical Industry" series and launch a new series focused on "Career Development in Academia." We are also excited to invite proposals for additional topics and series from our ICSA members to further expand our offerings. If you are interested in subscribing to our mailing list or participating as a speaker or organizer, please contact us (`https://docs.google.com/forms/d/e/1FAIpQLSe-DFAW5aJZM_VAmCv9got4D_nK1kn8CZUVOoUmLyUt3ArvCA/viewform?usp=sf_link`)

*Jin Zhou, PhD,*
*Associate Professor-in-Residence of Biostatistics,*
*School of Public Health, UCLA.*

*Qing Yang, PhD,*
*Associate Research Professor,*
*School of Nursing, Duke University.*

# ICSA Financial Report

*Profit and Loss: Jan 1, 2024 through Jun 30, 2024.*

| | | |
|---|---|---|
| **Beginning Cash Balance (Bank/Symposium/Paypal accounts)** | **1/1/2024** | **$ 474,202.25** |
| **Income:** | | |
| Membership | | $ 23,380.00 |
| 2024 Donations | | $ 29,000.01 |
| 2024 ICSA Symposium Regitration Fees | | $ 141,302.27 |
| 2024 China Conference Registration Fee | | $ 97,317.00 |
| Springer Science & Taylor Francis | | $ 3,108.35 |
| Job Posting | | $ 150.00 |
| Interest | | $ 40.66 |
| **Total Income** | | **$ 294,298.29** |
| **Expense:** | | **$ (236,729.47)** |
| ICSA Office Cost | | $ (1,052.71) |
| 2023 Applied Statistics Symposium | | $ (161,269.00) |
| 2024 ICSA Symposium Awards and Honorarium | | $ (20,950.00) |
| 2024 Paper, Scholar Awards | | $ (3,000.00) |
| 2024 China - Xinan University | | $ (34,190.00) |
| 2024 China - Awards | | $ (6,500.00) |
| IT Cost | | $ (8,238.77) |
| Institute of Statistical Sciences | | $ (865.33) |
| Paypal Fee | | $ (663.66) |
| **Total Expense** | | **$ (236,729.47)** |
| **Net Total Income** | | **$ 57,568.82** |
| Transfer to Vanguard | | $ (100,000.00) |
| Fee adjustment | | $ (325.97) |
| **Ending Cash Balance (Bank/Symposium/Paypal accounts)** | **########** | **$ 431,445.10** |
| **ASSETS** | | |
| JPHsu | | $ 30,246.47 |
| Bank/PayPal | | $ 431,445.10 |
| Vanguard Investment Balance | | $ 1,408,710.15 |
| **TOTAL ASSETS** | | **$ 1,870,401.72** |
| **LIABILITIES & EQUITY** | | |
| Equity | | |
| Main Accounts Opening Balance Jan 1, 2024 | | $ 469,502.25 |
| *Jan 1 to June 30, 2024 Net Income(+)/Expense(-)* | | *$ 57,242.85* |
| *To Vanguard Account* | | *$ (100,000.00)* |
| 2018 Symposium Bank Accounts Opening Balance Jan 1, 2024 | | *$ 4,700.00* |
| *Jan 1 to June 30, 2024 Net Income(+)/Expense(-)* | | *$ -* |
| *For JP Hsu Account Openning Jan 1, 2024* | | *$ 26,963.19* |
| *Jan 1 to June 39, 2024 Award* | | *$ (550.00)* |
| *Jan 1 to June 30, 2024 Investment Income(+)/Expense(-)* | | *$ 3,833.28* |
| Vanguard investment account opening balance on Jan 1, 2024 | | $ 1,228,448.37 |
| *Transfer from Main Account* | | *$ 100,000.00* |
| *Jan 1 to June 30, 2024 Investment Profit(+)/Loss(-)* | | *$ 80,261.78* |
| **Total Equity** | | **$ 1,870,401.72** |
| **TOTAL LIABILITIES & EQUITY** | | **$ 1,870,401.72** |

*Rui Feng, PhD,*
*Treasurer, ICSA,*
*Associate Professor of Biostatistics,*
*University of Pennsylvania.*

# XL-Files: A Blitz of DS, Stat and AI Down Under

*Xiao-Li Meng*

**Editorial:** This is a reprint from a column article published in the *IMS website* (MARCH 30, 2024; `https://imstat.org/2024/03/30/xl-files-a-blitz-of-ds-stat-and-ai-down-under/`) with IMS' permission.

Here is a moral test (especially for statisticians). Which of the following acronyms baffles you the most: ANOVA, ADSN, ASC, ANU, ABS, or AITA?

Regardless of your answer (or questioning—a moral test??), the eight A's in the above acronyms will forever remind me of my recent eight-day journey through the data science landscape in Australia. (Am I flirting with numerology? Yes: see the Dec 2022 "XL-Files," `https://imstat.org/2022/12/13/xl-files-xl-is-x-or-lx/`). It was an intense and intoxicating whirlwind tour. With a frame now ripe for senior discounts – a charming reminder served by a joyous staff member at the National Museum of Mathematics in New York City – I initially hesitated at the thought of the lengthy voyage through Doha's skies, 24 or 30 hours, west- or eastbound. Yet, it wasn't long before I persuaded myself: what better path to spiritual renewal than to soar closer to the empyrean, or at least beyond the reach of my daily spammers?

My intoxicating tour started on December 8, 2023, inside a colossal wine barrel. If you suspect someone is jesting, that's precisely how I felt upon being invited to give a keynote at the second gathering of the Australian Data Science Network (ADSN) in Adelaide. The humor wasn't that a statistician was addressing data scientists; rather, it was the venue itself—the National Wine Center of Australia. Apparently, Aussie data scientists understand well that effective networking requires much social lubrication.

Fortuitously, I had just published my first article in a wine magazine, FONDATA. (Not kidding; if you want proof, check out Episode 32 of the Harvard Data Science Review podcast: `https://hdsr.mitpress.mit.edu/podcast`). This provided an apt theme–or at least a title–for my keynote: "Seeking Simplicity in Statistics, Complexity in Wine, and Everything Else in Fortune Cookies." FONDATA has graciously permitted me to reproduce the article in the IMS Bulletin, allowing me to share my oenological journey through several upcoming "XL-Files." As a teaser, it includes an ANOVA assessing the impact of wine tasting order on preference ranking, based on a blind tasting of four Rieslings (from the XL-cellar), conducted by two teaching fellows of the Gen Ed course: "Real Life Statistics–Your Chance for Happiness (or Misery)" (`https://statistics.fas.harvard.edu/statistics-your-chance-happiness-or-misery`)

Presenting ANOVA at a data science conference might seem to be masochistic–are statisticians so removed from the age of deep learning that they still reminisce about techniques devised by R.A. Fisher, buried 60 years ago (and, incidentally, not far from the wine center)? Well, I ventured—perhaps under the influence of you-now-know-what–that ANOVA and deep learning accomplish the same task, that is, separating revelatory variations (patterns) from obfuscatory variations (noises).

Admittedly, deep learning reveals patterns with a power (and peril) ANOVA could never match, unthinkable in Fisher's time due to its computational demands. Yet, they share the fundamental idea of leveraging the most salient data variations for inference and prediction. Crafting a complex wine requires much more effort than a simple one, yet the essence of fermentation remains unchanged across all worthy wines (at least in English, since the Chinese translation of the term wine, "酒", could refer to anything from Chateau Lafite to Chateau La-Gee—a distinction made clear by a promotional bottle in a Chinese supermarket, explicitly stating its mix of p percent grape juice and (1−p) percentage of alcohol. I, of course, was humbled by the explicit declaration, which included the exact p value).

Leaving Adelaide was heart-wrenching, for I had no time to visit any winery (or Fisher's tomb). My schedule demanded that I rush to teach a short course on December 10 before delivering the Foreman Lecture on December 11 at the Australian Statistical Conference (ASC) in Wollongong. The five-hour short course on "Deep statistics for more rigorous and efficient data science," nano-sizes a graduate-level course, "Deep Statistics: AI and Earth Observations for Sustainable Development," that I developed and taught since the spring of 2022. In case you are put off by "deep" or "AI" in the title, the course is a deep collaboration with the AI and Global Development Lab (`https://liu.se/en`

/research/global-lab-ai) led by Adel Daoud of Linkoeping University, over many deep contemplations with him and the course teaching assistant–and my PhD student–James Bailie.

Deep statistics studies three key environments for inferences and learning from data: multisource, multiphase, and multiresolution. The short course focused on the first two, while the Foreman lecture dived into the last: "Multi-resolution Meandering: Personalized Treatments, Individual Privacy, Machine Unlearning, and a World without Randomness."

The journey from Wollongong to Canberra, on December 12, was significantly more relaxed, thanks to my ANU (Australian National University) host' s thoughtful arrangements. They had arranged for two students to pick James and me up; one managed the driving while the other steered the conversation, aiding our adjustment to the new time zone. Upon our arrival, it was exceptionally delightful to partake in a warm outdoor graduation celebration, with healthy hors doeuvres (veggie beef sticks) and beverages (fermented grape juice). For James, an ANU alumnus, Canberra's gentle breeze and Boston's harsh freeze must be a day-and-night pairing, even without differentiating the time zones.

The following morning, James and I delivered a paired keynote speech on "Privacy, Data Privacy, and Differential Privacy," kicking off the 2023 AI in Society Workshop by ANU's Center for Harmonizing Machine Intelligence. It was an intellectual buffet, surveying much food for thought, with topics such as "Design Justice AI," "Critical AI in the Art Museum," "Chasing Storms with AI-enhanced DAS," "Virtues of Robot Inaction," "Human–Machine Aesthetics," and yes, "AITA and Daily Moral Decisions."

I asked myself AITA for having never asked or even thought about that question. Those of you who are on higher moral ground or are more introspective might be pleased to know that AITA is a subject of a serious study on daily moral decisions, thanks to the Reddit forum (you can search "reddit aita"), accumulating over 100,000 everyday moral dilemmas. It is a fascinating data set to dig into, with some surprises—see https://cmlab.dev/post/aita_overview/. My epiphany came when I realized that any time I consider AITA beneath me, it's the time to ask AITA about having that thought.

Feeling morally enlightened, James and I went on to visit Australia Bureau of Statistics (ABS), also in Canberra; for James, it was another homecoming, having worked at ABS before (to my great fortune) joining Harvard. We spent the entire December 14 meeting with ABS researchers, discussing challenges from handling data quality in automated systems to producing statistics from unlinkable data. Many ABS challenges humbled me, especially because they require more qualitative (and quality) thinking than quantitative analysis. Thanks to five years (and counting) of exposure to the qualitative world via editing Harvard Data Science Review, I have learned that the qualitative paradigm is just as conceptualizable, contemplable, and construable as the quantitative world, albeit along different dimensions (see for example, "Why the Data Revolution Needs Qualitative Thinking": https://hdsr.mitpress.mit.edu/pub/u9s6f22y/release/4). The ABS discussions were a field test for what I had learned, though practicing is always more arduous than preaching or reading about it.

The finale of the eight-day blitz was a presentation I relish giving to statistical agencies, "Miniaturizing Data Defect Correlation: A Versatile Strategy for Handling Non-Probability Samples." Whereas the examples I used were US-centric (predicting the 2016 presidential election and assessing 2021 COVID vaccination uptake), the underlying issues and methodologies obviously transcend borders.

Reflections on such issues continued after an outdoor Christmas lunch, where I was introduced to the game of number toss. To end this delayed trip diary for those who love numbers, please indulge me bragging about my beginner's luck. The game requires each player to toss a wooden baton at twelve consecutively numbered wooden pins, placed on the ground in reasonable proximity to each other. If only one pin is knocked down, the added score is the number on the pin. But if multiple pins are hit, the added score is simply the number of pins knocked down. All the knocked-down pins will be repositioned at the locations where they fall, for the next player. Whoever first reaches a total score of exactly 50 wins the game. If you overshoot 50, then your score gets reduced to 25, and the game continues.

In my first try, I won the game after six single hits, which involved four different pins, with numbers that happened to be consecutive, {n, n+1, n+2, n+3}. What is n? And what were my six hits?

Don't ask me how I did afterwards, as I don't even remember what Aussie beverages were served at the lunch. But I do have a visual memory of the departing day when the Champagne-fueled minivan took a whole day to get to the Canberra airport–driving through wineries is apparently not for the faint-livered.

(In case you feel "XL-Files" is dedicating too

much space to Australia's data science landscape, I wish to express my sincere appreciation to my gracious hosts, particularly those from ASC, for their unwavering invitations spanning three years. My calendar for 2027, however, remains notably unoccupied, save for the commemoration of my department's 70th anniversary–a milestone that promises another extensive installment of XL-Files. Stay tuned...)

*Xiao-Li Meng, Ph.D.*
*Whipple V. N. Jones Professor of Statistics*
*Department of Statistics*
*Harvard University*

# On Statistics in the age of AI

*Qiang Sun, Chengchun Shi, Gao Shan, Hongtu Zhu*

## 1. Introduction

In recent years, the rapid expansion of data and advancements in artificial intelligence (AI) have significantly influenced various sectors, profoundly shaping industries, societies, and daily life. This evolution has invigorated the research community, and the field of statistics is no exception. Many statisticians now find themselves both exhilarated and apprehensive about the implications of this new AI era for the future of their discipline. Discussions are happening everywhere, both online and offline.

One of the earliest discussions emerged from the National Science Foundation (NSF) workshop: "Statistics at a Crossroads" [1]. The workshop concluded:

"The field of Statistics is at a crossroads: we either flourish by embracing and leading Data Science or we decline and become irrelevant."

Shortly after this workshop, the COVID-19 pandemic hit, disrupting the entire world. As people were getting used to remote work as a new normal, the launch of ChatGPT [2] in 2022 stunned everyone, fueling rapid investment and public attention toward AI. Since then, subsequent iterations of ChatGPT have evolved rapidly, far surpassing earlier versions. From 2021 to 2023, we witnessed significant innovations like Imagen 1 & 2 and DALL-E 1, 2, and 3, which can generate photorealistic images and human-like art at unprecedented levels [3]. Just two months ago, the release of Sora demonstrated the ability to produce highly detailed videos with intricate camera movements and expressive characters [4]. The pace of progress in AI is accelerating remarkably.

AI, which heavily relies on black-box neural networks, has undeniably transformed workflows, daily life, and research across many fields. For example, recent AI technologies like ChatGPT and Copilot have significantly influenced how the authors of this article approach their work. Against this backdrop, on February 24, 2024, a conversation started among members of the North American Statistics and Biostatistics WeChat group about the rise of powerful GPT models. They pointed out that statisticians currently lack, and likely will not soon develop, similar breakthroughs within their field. This prompted the one member to raise question on PhD training:

"Is there any difference between today's statistics education curriculum and that of 30 years ago?"

As also highlighted by [1], statistics education has stagnated, at least on a relative basis. This observation ignited lively and intense discussions among the group, touching on various topics like education, research, publication venues, and professional culture. Despite the heated debates on specific issues, most group members agreed that statistics needs to transform.

## 2. A fireside conversation

To identify actionable initiatives for possibly transforming our discipline, Prof. Xihong Lin of Harvard University initiated and led a fireside discussion, which quickly garnered substantial support from the ICSA and the Stats Up AI Alliance. Prof. Jin Zhou from UCLA, a member of the ICSA's Outreach and Engagement Committee, expressed interest in cohosting the event. Led by Xihong, members of the Stats Up AI Alliance collaborated effectively with other ICSA members. Some prepared a list of questions, while others designed the flyer and drafted

the announcement. Several members volunteered to moderate, invite external speakers, or speak at the event themselves. The team showed immense enthusiasm and dedication to the discussion.

This event featured three panels, with the following sample questions:

- Panel I: Statistical Discipline and Research Community
  - With AI drawing attention from researchers and the public alike, what challenges and threats do theoretical and applied statisticians face? What opportunities exist? How can the community come together to address these challenges and leverage opportunities?
  - What unique strengths distinguish statisticians from other ML and AI researchers? How can statisticians make a distinct impact in the age of AI? What weaknesses exist, and to what extent should statisticians adopt an engineering mindset to assume leadership roles in the scientific ecosystem, especially in light of AI's growing influence?
- Panel II: Statistical Journals
  - What limitations and challenges do statistical journals face in the age of AI?
  - Should statistical journals modify their peer review processes?
- Panel III: Statistical Education and Resources
  - What are the key weaknesses and gaps in current statistical education and training programs to meet the workforce demand in the AI era? How should graduate and undergraduate curricula be updated to prepare students for AI research? Should parts of the curriculum be expanded or reduced? What new components should be added, and what should be removed to make space?
  - How can we foster a culture of inquiry within statistics through education and resources to encourage more statisticians to embrace interdisciplinary education initiatives at the AI interface? How can we provide students with practical, action-oriented training in this statistical AI domain?

## 3. Social medias

In preparation for the fireside chat, the Stats Up AI Alliance and ICSA launched an extensive promotional campaign across various social media platforms, including X (formerly Twitter), LinkedIn, WeChat Official Accounts, and RED, as well as within academic circles. This initiative successfully engaged over 10,000 individuals, with promotional posts shared online more than 700 times. Educators, students, and professionals showed remarkable enthusiasm, reaching out with messages and expressing a strong desire to learn more about the event's agenda and how to access the content afterward.

## 4. The summary of the fireside conversation

Finally, March 17 arrived, and the fireside chat was set to begin. Prof. Tian Zheng from Columbia University opened the event by expressing gratitude to the association and esteemed panelists, emphasizing the value of their insights and underscoring the importance of the topic. Following Tian's remarks, Prof. Xihong Lin elaborated on the chat's significance, highlighting the crucial role of statistics in understanding and influencing scientific research and societal decision-making in the AI era. She outlined the event's structure, which consisted of **three focused sessions** on the challenges and opportunities in statistical theory, methods, and applied research in the age of AI.

The first session of the conversation is on the challenges and opportunities for statistical theory and methods in the era of AI. Prof. Hongtu Zhu from UNC-Chapel Hill's discourse further illuminated the pressing challenges and burgeoning opportunities at the intersection of statistics and AI, emphasizing the transformative impact of academic innovations like ImageNet and convolutional neural networks. Prof. Jiashun Jin from Carnegie Mellon University shared insightful observations and suggestions regarding AI and theoretical statistics based on his academic experience and collaboration with Google. Prof. Tianxi Cai from Harvard University discussed the vast opportunities and pressing action items in the field of statistics, particularly in the context of AI's growing influence and the increasing amount of complex data. By reviewing the development of certain fundamental deep learning algorithms, Haoda Fu from Eli Lilly emphasized the need for Architecture-Algorithm Co-Design thinking, identifying four areas for development: low-

level programming, data structures, optimization, and design patterns. Prof. Tracy Ke from Harvard explored the intersection and distinct roles of statistics and AI, sharing an enlightening experiment on topic modeling using Large Language Models. She highlighted the clear role of theory in statistics to inspire new methods and identify method limitations in AI. Prof. Harrison Zhou from Yale explored the relationship between statistical theory, AI foundations, and their applications in data science. He also suggested incorporating AI researchers into editorial boards of journals and encouraging junior faculty to publish in top AI conferences, emphasizing the need for statisticians to be part of the AI evaluation process. Prof. David Donoho, in his discussion, provided a reflective view on the evolving landscape of statistical decision theory, AI, and their applications in data science. He discussed the perceived threat of AI overshadowing statistics, suggesting that statisticians should adopt a more welcoming approach towards AI, perhaps even "wearing AI T-shirts," to foster participation and collaboration.

The second session focused on how to improve the publication process in the era of data science and AI. Prof. Annie Qu as the current editor of the Journal of American Statistics Association (JASA) highlighted the problem of slow journal publication, particularly problematic in the rapidly advancing field of AI. She advocated for early rejection of papers with little potential and proposed rewarding diligent associate editors and referees to encourage better and faster reviews. Announcing a special issue in JASA on science and AI, Qu expressed hope for fostering the integration of statistics and AI to advance scientific discovery. Following Annie Qu's discussion on the publication process, Ji Zhu as the editor of Annals of Applied Statistics (AoAS) emphasized the importance of innovation not just from the authors' standpoint but also from the perspective of the journal editors, associate editors, and reviewers. He floated the idea of open reviews post-acceptance to foster discussion and increase visibility. He advocated for dual publications to make significant impacts, suggesting that discoveries be published in domain-specific journals while sophisticated statistical modeling is featured in statistical journals. Prof. Chengchun Shi compared the publication processes between statistical journals and machine learning conferences. He proposed several changes to improve the efficiency of the statistical publication process, including short review cycles, reducing the number of rounds, increasing number of references, and broadening the scope of journals. Prof. Xiao-Li Meng from Harvard shared his thoughts on the three "P"s (Proactive, Promoting, and Process) for statistical journals. He suggested statistical journals to be more Proactive in directing statistical research within the data science ecosystem; he stressed Promoting communication with the broader data science community; he also highlighted the need for journals to focus more on the data science Process rather than just the end products. Following these discussions, Prof. David Donoho provided a reflective critique on the evolution of statistical publication and research in light of the rapid changes brought by advancements in computer science and artificial intelligence.

The third session centers on statistical education in the age of AI. Prof. Wenyi Wang from MD Anderson compared statistics and computational biology in attracting students and fundings. She emphasized the crucial role of statistics in the age of AI and called for better leadership training in statistics and efforts to attract more talents to the field. Prof. Hulin Wu from University of Texas addressed the pressing question: Should statistics training expand to encompass data science and artificial intelligence (AI)? He discussed the current transition from statistics to data science and highlighted the challenge of balancing expansion into new fields while preserving statistics' distinct identity and principles. Prof. Qiang Sun from University of Toronto discussed the evolution of statistical training in the era of data science and AI. He pointed out the discipline's shift towards production, emphasizing that statistical work must translate into products for the greater benefit of science and tech. He proposed a bold reimagining of the curriculum to include deep learning, AI, and essential engineering skills and advocated for a more flexible and inclusive mindset in faculty and student recruitment. He also encouraged publishing in machine learning and data science journals and conferences. Prof. Bin Yu from University of California at Berkeley discussed the evolving nature of statistics in relation to data science and AI, emphasizing the interdisciplinary nature of these fields. She suggested integrating machine learning as part of a statistics curriculum to tackle the emerging challenges in AI, particularly focusing on trustworthiness, safety, and alignment with human intent. In particular, she discussed her efforts with Prof. R. Barter to integrate ML and statistics in their new book "Veridical data science: The Practice of Responsible Data Analysis and Decision Making" (MIT Press, 2024) (free on-line version at `vdsbook.com`). Highlighting the changes in academic courses over the past decade, Prof. David Donoho pointed out shifts from traditional subjects

to more current topics like machine learning. This signifies a transformative period for educational curriculums across mathematics and computer science departments. In conclusion, Dr. Donoho and fellow panelists advocated for proactive efforts to remodel statistics education to meet the demands of a rapidly changing world while maintaining the discipline's fundamental principles.

## 5. A conclusion

The fireside chat on March 17 provided a comprehensive examination of the challenges and opportunities facing statisticians in the age of AI. The discussions highlighted the transformative impact of innovations in AI and emphasized the critical need for statisticians to adapt. From refining statistical theory and methods to improving publication processes and modernizing education, panelists emphasized the importance of embracing interdisciplinary collaboration, expanding the curriculum to include emerging technologies, and maintaining the core principles of the field. By proactively addressing these challenges, statisticians can remain at the forefront of research, influencing AI development and leveraging their unique strengths to shape the future of data science. Finally, the videos of this fireside conversation can be found at ICSA Youtube [5] and StatsUpAI Youtube [6].

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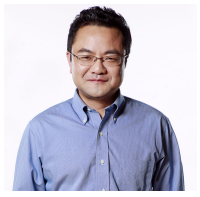

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# Big Data, Digital and Artificial Intelligence (AI) in a Patient-Centric Era: Perspectives of the Most Valuable Data & Insights Initiative Award Winner

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## 1. A New Era of Statistics and Data Science in Healthcare

Nowadays, the healthcare industry has seen a rapidly emerging fields through statistical and technological advancements. The key ingredient is data science, where big data, real-world data (RWD), digital innovation, and artificial intelligence (AI) are key elements. "Artificial intelligence (AI) and machine learning are critical to the U.S. Department of Health and Human Services (HHS) in accomplishing our mission to enhance the health and well-being of all Americans." [1]

Specifically, AI "enables computer systems to perform tasks normally requiring human intelligence." Within the scope of AI, machine learning (ML) is "a type of artificial intelligence, gives computers the ability to learn without being programmed by humans." Within the scope of ML, "deep learning (DL) systems learn from large amounts of data to subsequently recognize and classify related, but previously unobserved, data." [2]

On the other hand, the European Commission proposed the first EU regulatory framework for AI. The proposed regulatory framework on AI included a number of specific objectives: "ensure that AI systems placed on the Union market and used are safe and respect existing law on fundamental rights and Union values; ensure legal certainty to facilitate investment and innovation in AI; enhance governance and effective enforcement of existing law on fundamental rights and safety requirements applicable to AI systems; facilitate the development of a single market for lawful, safe and trustworthy AI applications and prevent market fragmentation." [3]

Recently, in the latest amendments to the Commission's proposal, the European Parliament would like to see that "AI systems are overseen by people, are safe, transparent, traceable, non-discriminatory, and environmentally friendly." Given the broad spectrums of AI applications, the definition of AI can be "designed to be technology-neutral, so that it can apply to the AI systems of today and tomorrow." [4] "The EU wants to regulate AI to ensure better conditions for the development and use of this innovative technology. AI can create many benefits in improved healthcare and other aspects in terms of social determinants of health" [5, 6]

## 2. Big Data and Real-World Data in Healthcare

To conduct sophisticated analyses or apply complex algorithms, the input data, ideally of high quality, are critical. As scientific discoveries and methodologies continue to advance, RWD and their companion technologies, such as digital and AI, which often employ statistical methods and data science tools, offer powerful ways for pharmaceutical industry to generate evidence. Since the 21st Century Cures Act in 2016, the U.S. Food and Drug Administration has defined real-world evidence (RWE) as "evidence generated from

real-world data (RWD) outside randomized controlled trials (RCTs)." Subsequently, "real-world evidence (RWE) is the clinical evidence about the usage and potential benefits or risks of a medical product derived from analysis of RWD." [7]

The European Commission, on the other hand, is establishing an overarching and comprehensive European Health Data Space (EHDS) for the purpose of regulation. The EHDS "is a health specific ecosystem comprised of rules, common standards and practices, infrastructures and a governance framework..." Its aims include: "empowering individuals through increased digital access to and control of their electronic personal health data, at national level and EU-wide, and support to their free movement, as well as fostering a genuine single market for electronic health record systems, relevant medical devices and high risk AI systems; providing a consistent, trustworthy and efficient set-up for the use of health data for research, innovation, policy-making and regulatory activities." [8]

Central to and critical for generating and harnessing big data and RWD, as well as for adopting and deploying AI is digital medicine, which "describes a field, concerned with the use of technologies as tools for measurement, and intervention in the service of human health." Below can be why digital medicines can be ripe for the adoption of AI, since "digital medicine products are driven by high-quality hardware and software that support the practice of medicine broadly, including treatment, recovery, disease prevention, and health promotion for individuals and across populations." [9]

## 3. An Award-Winning Book

We have recently published a book "Real-World Evidence in a Patient-Centric Digital Era", that provided methods, perspectives, examples, and insights on the innovative application of RWE to meet patient needs and improve healthcare, with a focus on the pharmaceutical industry. [10, 11] The authors have presented an overview of key analytical issues and best practices. Special attention is paid to the development, methodologies, and other salient features of the statistical and data science techniques that are customarily used to generate real- world evidence. It provides a review of key topics and emerging trends in cutting- edge data science and health innovation. Several key highlights and special features include the following: (1) Provided an overview of statistical and analytic methodologies in RWE to generate insights on healthcare, with a special focus on the pharmaceutical industry. (2) Examined timely topics of high relevance to industry such as bioethical considerations, regulatory standards, and compliance requirements. (3) Highlighted emerging and current trends and provides guidelines for best practices. (4) Illustrated methods through examples and use- case studies to demonstrate impact. (5) Provided guidance on software choices and digital applications for successful analytics. [10]

Table 1 lists the topics in the entire book. Through extensive multi-year efforts, this cutting-edge project is a timely development for the biopharmaceutical medical researchers, health technology innovators, data scientists, epidemiologists, population health analysts, health economists, outcomes researchers, policymakers, and analysts in the healthcare industry.

This book was jointly written by several authors and co-edited by Drs. Kelly H. Zou, PhD, PStat®, FASA, Lobna A. Salem, MD, MBA, and Amrit Ray, MD, MBA. [10] The authors have won Reuters Events Pharma USA's Most Valuable Data & Insights Initiative Award. Announcements by Reuters Events Pharma USA also included being the finalists of two additional awards, including digital innovation and partnerships in emerging markets. [11]

## 4. AI Algorithms and Applications in Pharma

In three recent publications, we have explored commonly used algorithms in the data science community, as well as the type of AI examples in the pharm industry, as well as best practices in digital innovations through "bring your own device" (BYOD) designs. [12-14]

**Table 1**. List of topics in Zou et al. (2022) [10]

| Chapter | Topic |
|---|---|
| Preface | Real-world evidence and digital innovation to combat noncommunicable diseases |
| 1 | Real World Evidence Generation |
| 2 | Applications of RWE for Regulatory Uses |
| 3 | Ethics & Bioethics |
| 3 | Real- World Data, Big Data and Artificial Intelligence: Recent Development and Emerging Trends in the European Union |
| 4 | Patient centricity and Precision Medicine |
| 5 | Health Information Technology |
| 6 | Digital Health Technologies and Innovations |
| 7 | Economic Analysis and Outcome Assessment |
| 8 | Partnerships and Collaborations |
| 9 | Global Perspective: China Big Data Collaboration to Improve Patient Care |
| 10 | The Future of Patient-Centric Data-Driven Healthcare |

## 5. Benefits and Impact via Patient-Centricity

In terms of benefits through innovative patient-centric statistical and data science methodologies and algorithms, practitioners may evaluate medication adherence, patient preference, patient voice, patient journey, and precision medicine, and patient engagements to better understand the complex set of predictors and behaviors of patients within the healthcare system. To adequately explore and make inferences on these outcomes, a high-quality data framework is necessary, especially for regulatory use, given the fact that RWD is typically from routine clinical practice with varying degrees of "messiness"within such data. [15] For example, adherence to medication is one of the most complex behaviors of patients. Strategies for measuring and improving adherence require innovative and sophisticated "beyond-pill"solutions, which new technologies may help. [16]

Finally, RCTs alone may not adequately address the complex intersection of many diseases and comorbid conditions, which are patient centric and require us to find alternate ways of getting evidence to support such gaps. [17] Big data, RWD, digital and AI can support patients for generalizability across the spectrum of various characteristics and comorbid conditions, by taking into account the tradeoff between potential benefits and risks, as well as the data privacy rules such as Health Insurance Portability and Accountability Act of 1996 (HIPAA) in the United States, [18] General Data Protection Regulation (GDPR) in the European Union, [19] cross-border data transfers, [20] and an AI bill of rights. [21] Most recently, The U.S. White House's executive order on AI reshapes the uses of AI in healthcare, ranging from drug/therapy research to hospital/clinical care. AI will play increasing roles in the biopharma industry, along with issues associated with ethics, transparency and trustworthiness. [22]

## Disclosure

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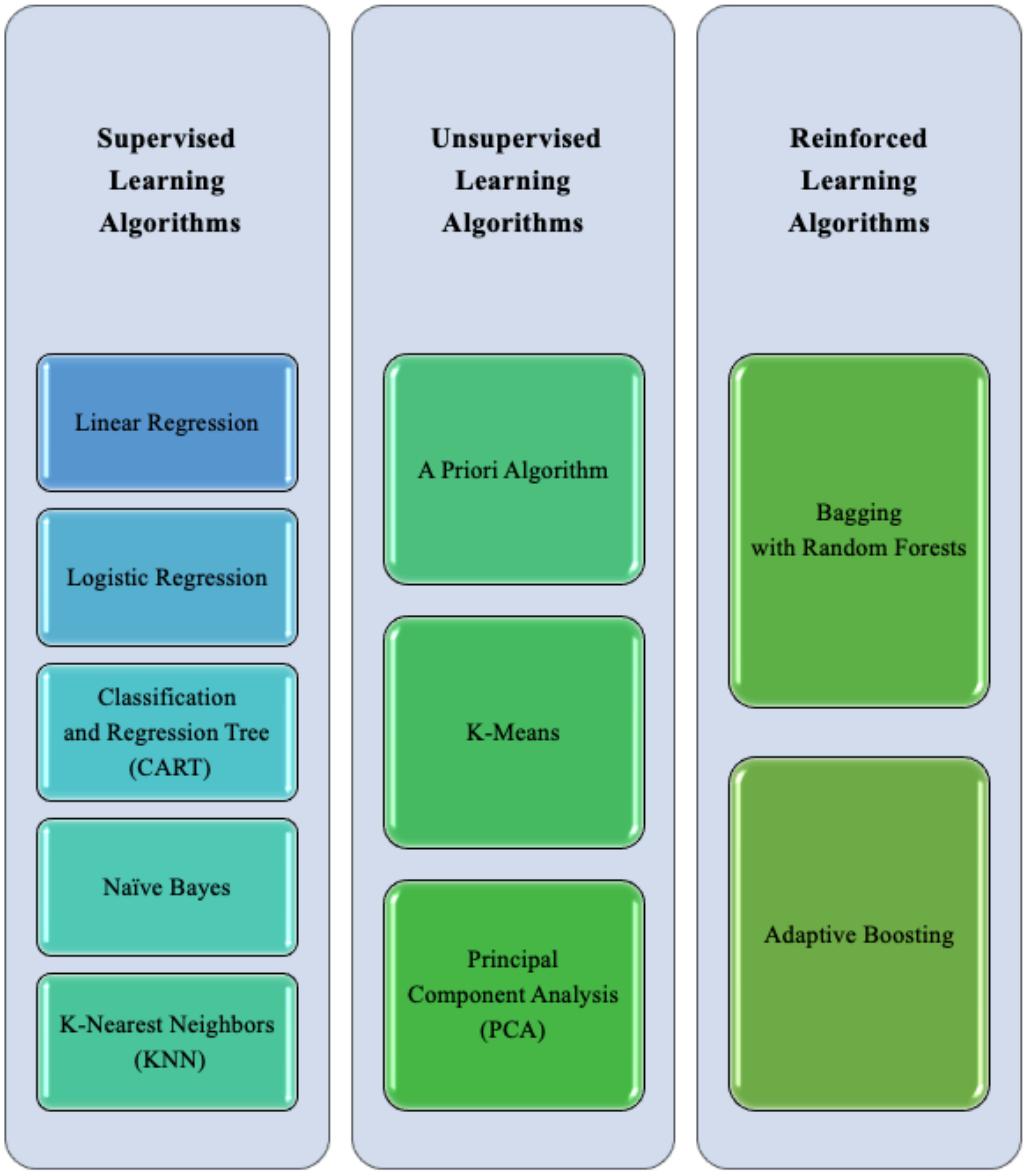


**Figure 1**. Commonly used ML algorithms. [12]C

19/UploadedImages/BIOP%20Report/BioPharm_Winter2023_Final_1_.pdf). It is republished in ICSA Bulletin with permission from Biopharm Report.

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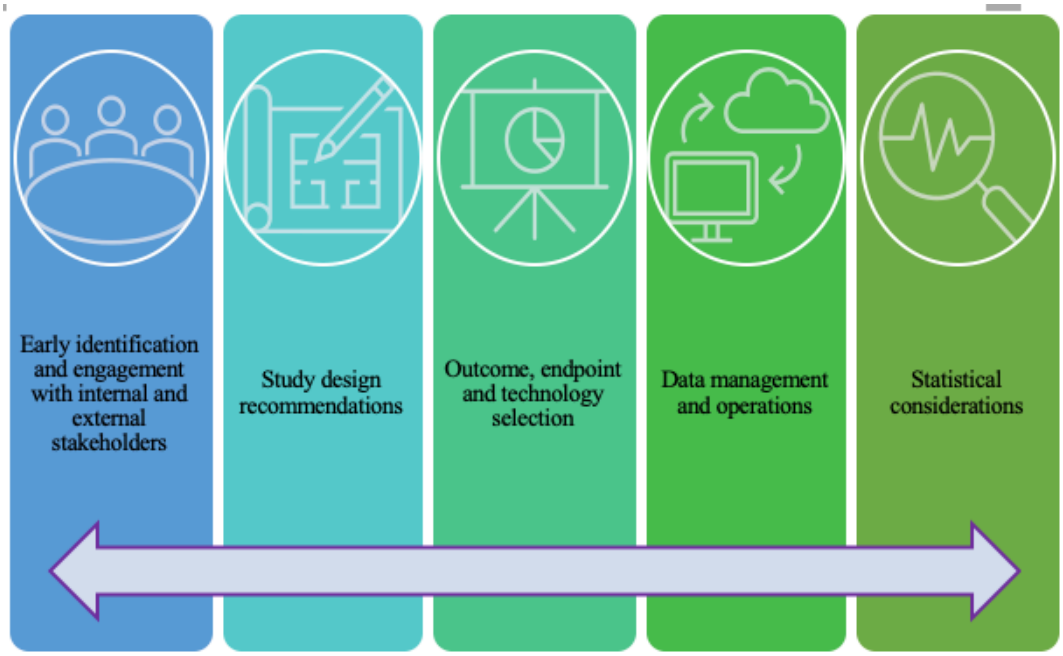


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# Upcoming Events

Please find below a list of upcoming ICSA meetings and co-sponsored meetings. This list also appears on the ICSA website. If you have any questions, please contact the ICSA Executive Director (executive.director@icsa.org).

## ICSA Sponsored Meetings:

### ICSA 2025 Applied Statistical Symposium

*Jun 2025*
The 2025 ICSA Applied Statistics Symposium will be held on Jun, 2025. For detailed information, please contact Qiqi Deng (qiqi.deng@modernatx.com) and Xiaojing Wang (xiaojing.wang@uconn.edu).

## ICSA Co-sponsored Meetings:

### International Indian Statistical Association (IISA) 2024 conference

*Dec 27 – Dec 31, 2024*

IISA 2024 conference website is now live (IISA 2024 Conference (intindstat.org))! The conference will be held at Cochin University of Science and Technology, India (https://cusat.ac.in/) between Dec 27 - Dec 31, 2024. KISS is currently accepting the invited session proposals. ICSA members are encouraged to organize invited sessions and/or attend the conference. Please notify the chair of the ICSA Program Committee Professor Xinping Cui (xpcui@ucr.edu), or the ICSA Executive Director Dr. Jun Zhao (executive.director@ICSA.org) on ICSA organized/sponsored sessions.

Timelines:

- 1st February 2024 Invited Session Proposal Submission Opens
- 31st March 2024 Deadline for submitting Invited sessions
- 31st March 2024 Early bird registration begins
- 31st March 2024 Abstract Submission opens (Contributed & Invited)
- 31st March 2024 Student Paper/Poster Competition Opens
- 31st July 2024 Early Bird Registration ends
- 31st July 2024 Student Paper Competition Submission deadline
- 15th November 2024 Regular Registration Ends

Please read the guidelines and submit your session proposals here https://www.intindstat.org/conference2024/invitedSessionProposal
Please reach out to IISA2024@intindstat.org with any question.

## Online Training and Seminars:

### Stay tuned on ICSA Webinar Series in 2024

The ICSA (Webinar subcommittee, Outreach and Engagement Committee) is planning a series of webinars, with topics ranging from career development, statistical knowledge, to cutting edge statistical methodologies. ICSA members and friends will be notified of future Webinar information through emails, ICSA websites, social media (e.g., X, WeChat), and other social media platforms. The ICSA Webinar Subcommittee is planning the Career Development Webinar Series:

- Soft Skills and Leadership Development in the Pharmaceutical Industry – The Lotus Group series
  - No Experience, No Problem – Launching a Prosperous Career in the Pharmaceutical Industry (Feb 2024)
  - Elevating Careers Through Recognition and Visibility (April 2024)
  - Effective Communication at Work (September, stay tuned)
- Basic Knowledge Training in the Pharmaceutical Industry
  - Daily Work Life as a Statistician in Pharmaceutical Industry (March 2024)
  - Clinical Development Plan - Understanding the Big Picture as a Statistician in the Pharmaceutical Industry (May 17, 2024)

Records and slides are available in this link: `https://www.icsa.org/webinars/past-webinars/`.

## Healthcare Innovation Technology: The Pod of Asclepius

Looking to stay up to date on developments in health care technology around the world? The American Statistical Association is sponsoring "The Pod of Asclepius", a new podcast where data scientists, statisticians, engineers, and regulatory experts discuss the technical challenges in their healthcare domain.

We have over 20 episodes published and available on YouTube, Podbean, iTunes, Stitcher, Podchaser, Tune In Radio, and Google Play.

Looking for a good place to start? Check out the following newly released episode links:

- The Logic of Statistics with Keith O'Rourke
- Causal Inference (The Mixtape) with Scott Cunningham

The easiest way to catch new episodes is to subscribe via our channels....

- Youtube: `https://www.youtube.com/channel/UCkEz2tDR5K6AjlKw-JrV57w`
- Podbean: `https://podofasclepius.podbean.com`
- You can see our full schedule on the website: `www.podofasclepius.com`

Fall Series: The Philosophy of Data Science

The series is aimed at incoming statistics and data science students (but will be of significant interest to the general statistics / data science community). The topics will focus on how scientific reasoning is essential to the practice of data science.

For detailed information, please visit: `https://www.podofasclepius.com/philosophy-of-data-science`.