

LiDS Newsletter

Volume 8, Number 2 – July 2023

A section associated with the American Statistical Association

ISSN 2473-5159

LiDS website: <https://community.amstat.org/lids/home/>
Published newsletters are archived under *Newsletters*.

Chair's Message



As the Chair of the Lifetime Data Science (LiDS) Section, I am deeply honored to lead this vibrant community of researchers, practitioners, and students who have a common interest in lifetime data science. Working alongside a dedicated executive committee is a privilege, as their invaluable contributions play a crucial role in maintaining LiDS as an attractive and welcoming home for all those committed to promoting lifetime data science.

LiDS has experienced impressive growth over the years. As of July 24, 2023, we have 867 section members. Together, we strive to expand our knowledge, share expertise, and collaborate on cutting-edge research in the realm of lifetime data science. I would like to take this opportunity to highlight some of the section's recent activities.

A significant milestone for our section was the 2023 LiDS Conference, held with the theme "Making an Impact in the Era of Data Science." The conference took place from May 31 to June 2, 2023, at the Marriott City Center in Raleigh, NC. It featured keynote talks by Mei-Cheng Wang (Johns Hopkins University) and Per Andersen (University of Copenhagen), along with three well-received short courses and an impressive lineup of 50 scientific sessions that attracted over 230 participants from around the globe. We proudly presented four Student Paper Awards and three Student Poster Awards to recognize excellent research contributions from the newest generation of survival analysis scholars.

This success would not have been possible without the dedication of multiple parties. Special thanks go to Doug Schaubel (Program Chair) and Mimi Kim (Program Co-Chair) for their tireless efforts and tremendous leadership in assembling the scientific sessions. A heartfelt thank you extends to Shanshan Zhao (Local Organizing Committee Chair) who devoted countless hours to overseeing the conference logistics, and the devoted Local Organizing Committee, consisting of Wenbin Lu (NCSSU), Feng-Chang Lin (UNC-CH), Amy Shi (AstraZeneca), Xiaofei Wang (Duke), and Qingning Zhou (UNC-Charlotte). We are grateful to the Student Paper Award Committee, consisting of Jing Ning (Committee Chair, MD Anderson), Wen Li (University of Texas Health Science Center), Sharon Xie (University of Pennsylvania), and Min Zhang (University of Michigan). We also thank Pamela Shaw (Kaiser Washington Health Research Institute) for offering her expertise in serving on the Student Poster Award Committee. The remarkable work of the Online Platform Committee, chaired by Wenbo Wu (New York University), was invaluable and resulted in the development of a conference app that was praised by attendees. Our student volunteers from UNC-Chapel Hill, UNC-Charlotte, Duke University, and NC State University deserve loud applause for their commendable assistance. Gratitude goes to our conference sponsors, including NIEHS/NIH, NYU Grossman School of Medicine Division of Biostatistics, United Therapeutics, and ViiV Healthcare, for their generous support. We would also like to acknowledge the LiDS Executive Committee members from 2019 to 2023 for their silent yet valuable contributions to making this conference possible. Special thanks to Nicholas Jewell for his leadership during the pandemic, and Ying Ding and Yu Cheng for sharing their experience in organizing the 2019 LiDS conference.

As the curtain closed on the 2023 LiDS Conference, we now look ahead and

* * * * *

In Brief

2023 Election Results

Chair-Elect 2024: Zhezhen Jin
Program Chair-Elect 2024: Mengling Liu
Treasurer 2024–2026: Yifei Sun

2023 LiDS Conference Report

More than 230 participants worldwide

LiDS Sessions at 2023 JSM

Three Invited Sessions
Four Topic-Contributed Sessions
Three Contributed Paper Sessions
One Contributed Poster Session

Upcoming LiDS Webinars

Deep Learning Methods for Survival Analysis
by Ying Ding, University of Pittsburgh
12 p.m. ET on November 28, 2023

Software Review

Excess Hazard Modelling with R Package {GJRM}

* * * * *

LiDS Officers

Chair: Grace Y. Yi
Chair-Elect: (Tony) Jianguo Sun
Past Chair: Douglas E. Schaubel
Admin. Officer 2022–2024: Sharon Xie
Treasurer 2021–2023: Yu Cheng
Program Chair: Ying Ding
Program Chair-Elect: Pamela A. Shaw
Past Program Chair: Jing Ning
COS Representative: Ronghui (Lily) Xu
Webinar Committee Chair: Esra Kurum
Webinar Committee Co-chair: Wenbo Wu
Communications Officer: Wenjie Wang



Figure 1: The 2023 LiDS Executive Committee Members. (The photo was taken at the 2023 LiDS Conference in Raleigh, NC. From left to right: Tony Sun, Wenjie Wang, Wenbo Wu, Douglas Schaubel, Pamela Shaw, Grace Yi, Jing Ning, Esra Kurum, Shanshan Zhao, Lily Xu, Yu Cheng, Sharon Xie, and Ying Ding)

actively plan for the 2025 LiDS conference. A call for proposals to host the 2025 Lifetime Data Science Conference was circulated to section members in June. If interested, please contact one of us: Doug Schaubel (Past-Chair, douglas.schaubel@ennmedicine.upenn.edu), Grace Yi (Chair, gyi5@uwo.ca), or Tony Sun (Chair-Elect, sunj@missouri.edu) before September 30, 2023.

Turning to other activities, LiDS sponsored a series of compelling sessions for the Joint Statistical Meetings (JSM) 2023 in Toronto, including three invited sessions, four topic-contributed sessions, three contributed paper sessions, and one contributed poster session. Recognizing the importance of nurturing young talent, LiDS held the 2023 Student Paper Competitions. Congratulations to the winners: Xinyang Feng (University of Toronto), Hoai Nam Nguyen (MD Anderson Cancer Center), Emily Roberts (University of Michigan), Stephen Salerno (University of Michigan), and Yangjianchen Xu (University of North Carolina).

Our webinar series continued to serve as a valuable venue for disseminating knowledge and promoting continuous learning in lifetime data science. We engaged with a diverse audience by offering events such as “Survival Models for Spatial Data” by Benjamin Taylor and “Mediation Analysis with Failure Time Outcomes” by Linda Valeri, attracting over 100 participants per session on average. We have two 2-hour short courses lined up: “Deep Learning Methods for Survival Analysis” by Ying Ding, scheduled on November 28, 2023, and “Cure Models” by Ingrid Van Keilegom to be delivered in early 2024. You are invited to participate in these short courses or encourage your trainees to take part in the events.

Before I conclude, I am delighted to share with you that LiDS section members, Jing Ning (MD Anderson Cancer Center) and Elizabeth H. Slate (Florida State University), have been elected as an ASA fellow and an IMS fellow, respectively, this year for their remarkable contributions to our field. Congratulations, Jing and Elizabeth!

I am thrilled to welcome the incoming executive members

who will start their positions in January 2024: Zhezhen Jin (Chair-Elect, Columbia University), Mengling Liu (Program Chair-Elect, New York University), and Yifei Sun (Treasurer, Columbia University). We look forward to working with you!

Finally, I wish you all the best and hope you enjoy the rest of the summer.

Grace Y. Yi, Chair 2023

Nominations Invited for Positions on the Executive Committee



First, it is with great pleasure that we welcome Zhezhen Jin (Columbia University) as the LiDS 2024 Chair-Elect; Mengling Liu (New York University) as the 2024 LiDS Program Chair-Elect; and Yifei Sun (Columbia University) as the incoming LiDS Treasurer. Congratulations to all three on being elected to the LiDS Executive Committee! We thank you for your willingness to serve in your respective capacities and hope that you find doing so to be a rewarding experience.

The Nominations Committee is seeking nominations for two positions on the LiDS Executive Committee (EC): 2025 LiDS Chair-Elect and 2025 LiDS Program Chair-Elect. The annual ASA election of officers, which is coordinated by the ASA Committee on Sections (COS), will be held early in 2024. The deadline for nominations is September 15, 2023. The candidate elected in 2024 for the position of Chair-Elect will serve as Chair-Elect in 2025, Chair in 2026, and Past-Chair in 2027. The candidate elected in 2024 for Program Chair-Elect will be Program Chair-Elect in 2025, Program Chair in 2026, and Past-Program Chair in 2027. In accordance with the Section on Lifetime Data Science charter, the Nominations Committee

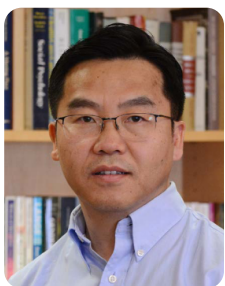
consists of the Past-Chair of LiDS (Douglas Schaubel), the Past-Program Chair (Jing Ning), and a designated LiDS member who is not on the LiDS Executive Committee (Robert Strawderman, University of Rochester), with the LiDS Past-Chair serving as Committee Chair.

The Nominations Committee is responsible for nominating a slate of officers for each annual election which is to be submitted to the ASA by mid-November. There is the opportunity for members of the Section on Lifetime Data Science to nominate candidates for open positions. Such nominations must be signed by at least five members of the Section on LiDS. Nominators should ensure that the nominee is (a) a member of the ASA, (b) a member of the Section on Lifetime Data Science, and (c) is willing to stand for the nomination. Nominations should be sent to the Chair of the Nominations Committee (Douglas Schaubel, douglas.schaubel@penmedicine.upenn.edu) with a copy to the LiDS Administrative Officer (Sharon Xie, sxie@penmedicine.upenn.edu) with the subject “2023 LiDS Nomination”.

In addition to being a vital part of the Section’s functioning, serving on the LiDS Executive Committee offers an excellent way to network and expand one’s service to the profession. We look forward to receiving nominations from energetic and enthusiastic individuals!

Douglas Schaubel, Nomination Committee Chair 2023

2023 Election Results



Chair-Elect 2024 Zhezhen Jin is a Professor in the Department of Biostatistics at Columbia University Mailman School of Public Health. His research interests include survival analysis, resampling methods, longitudinal data analysis, and nonparametric and semiparametric models. He has collaborated on research in the areas of cardiology, neurology, cancer and epidemiology. He serves as an

associate editor for Lifetime Data Analysis, Contemporary Clinical Trials, Communications for Statistical Applications and Methods, and is on the editorial board for Kidney International, Journal of the International Society for Nephrology. He has published over 180 peer-reviewed research papers in statistical and medical journals. In addition, he is a Fellow of the ASA and IMS.



Program Chair-Elect 2024 Mengling Liu is a Professor in the Department of Population Health at the New York University Grossman School of Medicine. Her research is primarily focused on developing and applying statistical methods and algorithms for analyzing biomedical data, with the goal of identifying important signals and messages from data to improve human health. She led multiple NIH-funded projects as the PI, MPI, or sub-contract PI

on developing innovative statistical methods for the analysis of complex survival and longitudinal data, investigating population

heterogeneity in pooling projects, and building breast cancer risk prediction models.



Treasurer 2024–2026 Yifei Sun is an Assistant Professor in the Department of Biostatistics at Columbia University Mailman School of Public Health. Her primary research interests lie in survival analysis, longitudinal data, and statistical learning. She has been developing statistical methods to address the challenges posed by complex datasets from electronic health records (EHRs), observational studies, clinical trials, and the integration of multiple data sources.

Member Awards: New IMS/ASA Fellows

One out of the 47 newly elected 2023 ASA fellows and one out of the 27 newly elected 2023 IMS fellows are members of our section. Congratulations!

New ASA Fellows

Jing Ning, MD Anderson Cancer Center

For exceptional contributions in statistical methods for valid inferences in the presence of biased data, modelling complex survival data and innovative adaptive clinical trial designs; for outstanding applications of statistics in cancer prevention and treatment; and for excellence in professional service and mentoring.

New IMS Fellows

Elizabeth H. Slate, Florida State University

For substantial contributions to the theory of reparameterization, and for research on oral health and the link between selenium and cancer.

2023 LiDS Student Paper Award Winners

Congratulations to the following winners of the 2023 LiDS student paper competition!

Xinyang Feng, University of Toronto, “Marginal Clustered Multistate Models for Longitudinal Progressive Processes with Informative Cluster Size”

Hoai Nam Nguyen, MD Anderson Cancer Center, “Bayesian estimation of a semi-parametric recurrent event model with competing outcomes for personalized risk prediction among cancer survivors”

Emily Roberts, University of Michigan, “Surrogacy Validation for Time-to-Event Outcomes with Illness-Death Frailty Models”

Stephen Salerno, University of Michigan, “Deep Learning of Semi-Competing Risk Data via a New Neural Expectation-Maximization Algorithm”

Yangjianchen Xu, University of North Carolina, “Proportional Rates Models for Multivariate Panel Count Data”



Figure 2: Mei-Cheng Wang giving the first keynote presentation at the 2023 LiDS conference.

2023 LiDS Conference Report

The 3rd Conference on Lifetime Data Science (“Making an Impact in the Era of Data Science”) was held from May 31 to June 2, 2023 in Raleigh, North Carolina at the Marriott City Center. With the generous sponsorship from NIEHS/NIH, NYU Grossman School of Medicine Division of Biostatistics, United Therapeutics and ViiV Healthcare, we successfully hosted more than 230 participants worldwide.

On the first day (May 31), three exciting short courses were offered with more than 50 attendees, including two half-day courses on “Analysis of Recurrent Event Data” by Jianwen Cai (University of North Carolina at Chapel Hill) and “Pre-

diction Modeling with Censored Data” by Chuan Hong (Duke University), and a full-day course on “Statistical Methods for Time-to-Event Data from Multiple Sources: A Causal Inference Perspective” by Xiaofei Wang (Duke University) and Shu Yang (North Carolina State University). Following the courses, an opening mixer and poster session were held.

The second and third days (June 1–2) both started with insightful presentations by distinguished keynote speakers. Dr. Mei-Cheng Wang (Johns Hopkins University) discussed “Cross-Sectional Data, Epidemic Dynamics and Beyond.” and Dr. Per Kragh Andersen (University of Copenhagen) presented “The Joy of Pseudovalue”. Both days then featured fifty stimulating scientific sessions in total, covering many excit-

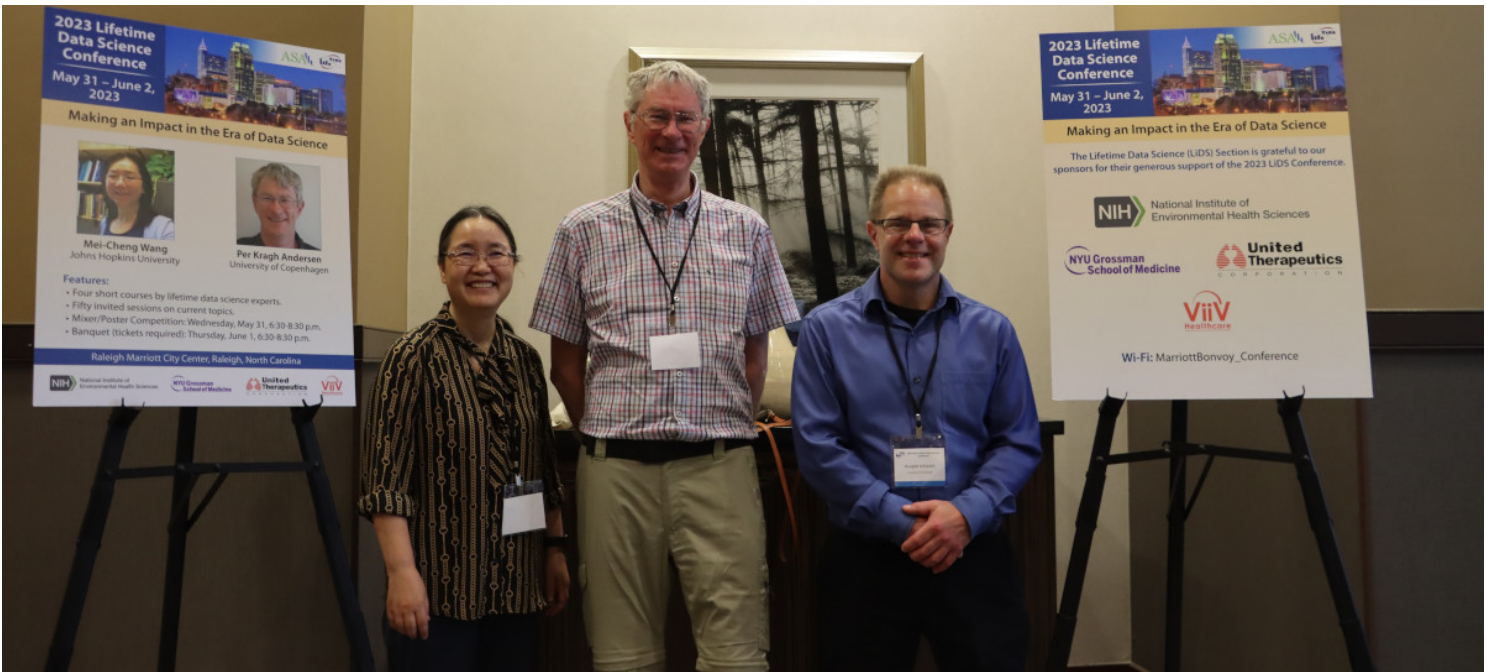


Figure 3: The second keynote speaker, Per Kragh Andersen (middle) with the 2023 LiDS Chair, Grace Yi (left) and 2023 LiDS Conference Program Committee Chair, Douglas Schaubel (right).



Figure 4: 2023 LiDS conference student volunteers with Douglas Schaubel, Per Kragh Andersen, and Grace Yi.

ing developments and applications of event history analysis. We thank all the session organizers/chairs for their hard work and all the speakers for their great visions on these topics.



The Student Paper Award Committee, chaired by Jing Ning (MD Anderson Cancer Center) and its members Wen Li (UT Health Science Center), Sharon Xie (University of Pennsylvania), Min Zhang (University of Georgia), and Hong Zhu (University of Virginia) selected three student paper winners: Xi Fang (Medical College of Wisconsin), Nir Keret (Tel Aviv University), Jinghao Sun (Yale University), and Yuyao Wang (University of California San Diego). Each presented their work during a parallel session dedicated to the student paper award winners.



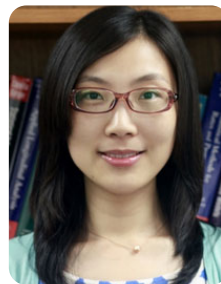
In addition, three students won a Student Poster Award: Samuel Anyaso-Samuel (University of Florida), Xi Ning (University of North Carolina - Charlotte), and Yangfan Ren (Rice University). Thanks are owed to the Student Poster Award Committee (Grace Yi, University of Western Ontario and Pamela Shaw, Kaiser Permanente Washington Health Research Institute). We congratulate all the student award winners for their great achievement, and thank all the judges for their considerable effort to evaluate many submissions with limited time.

Finally, we would like to extend our thanks to the Scientific Program Committee (Douglas Schaubel, Mimi Kim, Grace Yi), Local Organizing Committee (Shanshan Zhao, Wenbin Lu, Feng-Chang Lin, Amy Shi, Xiaofei Wang, Qingning Zhou) and Online Platform Committee (Wenbo Wu, Douglas Schaubel) for their hard work and dedication to make the conference interesting and run smoothly. We are grateful to the current and past LiDS Executive Committees members from 2019 to

2023, and a special mention to Nicholas Jewell for his leadership during the pandemic, as well as Ying Ding and Yu Cheng for their guidance throughout the entire process of the event. We also would like to acknowledge the many student volunteers, from UNC-Chapel Hill, UNC-Charlotte, Duke University, North Carolina State University and NIEHS. It is impossible for a conference to run so smoothly without their hard work. In closing, we thank the 2023 LiDS Conference attendees, many of whom traveled from overseas, for helping us continue the tradition of highly successful conferences. We look forward to the 2025 meeting!

*Douglas Schaubel, Program Committee Chair
Shanshan Zhao, Local Organizing Committee Chair*

LiDS Activities at the 2023 JSM



The 2023 Joint Statistical Meetings (JSM) will be held in Toronto, Canada, during August 5–10, 2023, with the theme “*One Community: Informing Decisions and Driving Discovery*”. We appreciate the session organizers and speakers who chose LiDS as either the primary sponsor or co-sponsor. This year, LiDS has sponsored three invited sessions, four topic-contributed sessions, three contributed sessions and one contributed poster session as the primary sponsor. Please mark your calendar and attend these sessions to support LiDS.

Invited sessions sponsored by LiDS

- Monday, August 7, 8:30–10:20 a.m. CC-801B. **Recent Advances in Survival Risk Prediction**
 - Organizer: Kevin (Zhi) He
 - Chair: Kevin (Zhi) He

- Speakers: Li-Xuan Qin, Fatema Khorassani, Ying Ding, Donglin Zeng
2. Tuesday, August 8, 10:30 a.m.–12:20 p.m. CC-206D. **The Statistical Analysis of Complex Time-to-Event Data**
 - Organizer: Lu Mao
 - Chair: Po-Kuei Chen
 - Speakers: Alexandra Bühler, Lu Mao, Douglas Schaubel, Limin Peng
 3. Thursday, August 10, 8:30–10:20 a.m. CC-206D. **Emerging Lifetime Data Analysis Methods Based on Non-Conventional Survival Models**
 - Organizer: Chenxi Li
 - Chair: Chenxi Li
 - Speakers: Sheng Luo, Jelena Bradic, Jong-Hyeon Jeong, Gongjun Xu

Topic-contributed sessions sponsored by LiDS

1. Monday, August 7, 2:00–3:50 p.m. CC-717A. **Recent Advancements for Survival, Risk and Cure Analysis**
 - Organizer: Xuelin Huang
 - Chair: Sijin Wen
 - Speakers: Alexander Tsodikov, Jon Steingrimsson, Xuelin Huang, Ruosha Li, Fangya Mao
2. Tuesday, August 8, 8:30–10:20 a.m. CC-206D. **LiDS Student Paper Award Presentations**
 - Organizer: Jing Ning
 - Chair: Ruitao Lin
 - Speakers: Stephen Salerno, Xinyang Feng, Nam Nguyen, Yangjianchen Xu, Emily Roberts
3. Wednesday, August 9, 8:30–10:20 a.m. CC-703. **Recent Results on Causal Inference with Survival Data**
 - Organizer: Ingrid Van Keilegom, Jad Beyhum
 - Chair: Ingrid Van Keilegom
 - Speakers: Bo Zhang, Samuele Centorrino, Haben Michael, Yu Cheng, Malka Gorfine
4. Thursday, August 10, 10:30 a.m.–12:20 p.m. CC-206C. **Meaningful Inference with Composite Endpoints in Clinical Trials**
 - Organizer: Ludovic Trinquart
 - Chair: Amit Bhattacharyya
 - Speakers: Ying Lu, Roland Matsouaka, Brian Claggett, Jingyi Lin, Mickaël De Backer

Contributed paper sessions sponsored by LiDS

1. Monday, August 7, 10:30 a.m.–12:20 p.m. CC-706. **Association Analysis, Causal Inference, and Dynamic Prediction with Survival Data**
 - Chair: Ying Ding
 - Speakers: Juyoung Park, Cheng Zheng, Jarcy Zee, Na Bo, Chien-Lin Su, Youngjoo Cho
2. Tuesday, August 8, 2:00–3:50 p.m. CC-201D. **New Designs and Methods for Analyzing Complex Survival Data**
 - Chair: Na Bo
 - Speakers: Prabhathi Withana Gamage, Tracy Bergemann, Eric Kawaguchi, Qingning Zhou, Yang Wang, Chun Yin Lee, Trevor Craney
3. Wednesday, August 9, 2:00–3:50 p.m. CC-205A. **New Developments for Recurrent Events or Competing Risks Data Analysis**
 - Chair: Lang Zeng

- Speakers: Russell Stocker, Elizabeth Chase, Huijun Jiang, Fangyi Chen, Jay Xu, Yiyuan Huang, Wayne Nelson

Contributed poster session sponsored by LiDS

1. Tuesday, August 8, 10:30 a.m.–12:20 p.m. CC-Hall E. **Association Analysis, Causal Inference, and Dynamic Prediction with Survival Data**
 - Chair: Jacob Bien
 - Speakers: Michelle Sonnenberger, Xuerui Yang, Amy Zhou, Mina Kim, Jisun Lim, Danush Wijekularathna, Kaeum Choi

Ying Ding, Program Chair 2023

Upcoming LiDS Webinars

- Title: Deep Learning Methods for Survival Analysis
- Presenter: Ying Ding, Department of Biostatistics, University of Pittsburgh, PA, USA
- Date and Time: November 28, 2023 at 12 p.m. ET (This course will be taught via Zoom)
- Sponsor: Lifetime Data Science Section
- Registration Deadline: TBA



Webinar Description This webinar covers recent developments in deep learning-based methods for survival data analysis and provides case studies to apply these methods. Part 1 will introduce various neural networks for analyzing time-to-event data under different censoring mechanisms. Part 2 will introduce deep learning methods for estimating individualized/conditional average treatment

effects for survival outcomes under the causal inference framework. In each part, we will demonstrate the implementation of the methods using R and Python and use case studies to illustrate the applications of these methods for biomedical and health research.

Part 1: Deep Learning for Survival Analysis and Predictions

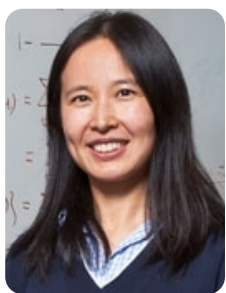
- Neural networks for right-censored survival data with time-independent or time-dependent covariates
- Case Study 1: Prediction of Progression of AMD (Age-related Macular Degeneration)
- Neural networks for interval-censored (and left truncated) survival data
- Case Study 2: Prediction of Development of AD (Alzheimer's Disease)

Part 2: Deep Learning for Causal Survival Analysis

- CATE (conditional average treatment effect) for survival outcomes
- Deep learning approaches for estimating CATE with survival outcomes
- Case Study 3: Childhood Asthma EHR data analysis

Esra Kurum, Webinar Committee Chair

Treasurer's Report



The beginning balance of the LiDS Section account on January 1, 2023 was \$41,148.59. Some expenses and income from the 2023 LiDS conference are still pending. The total income during the period between January 1 and June 30 is estimated to be \$104,217.11, which covers the membership dues, the registration fee and sponsorship for the 2023 LiDS conference. On the other hand, the estimated expenses during this time period are \$107,629.40 including honorarium, meeting expenses, and awards/plaques. The ending balance on June 30 is then estimated to be \$37,736.30.

Beginning Balance	12/31/2022	\$41,148.59
Income		
Membership due, Alloc Int/Div		\$1,032.00
Registration		\$82,185.11
Sponsorship for LiDS 2023		\$21,000.00
Net share—CE/Conf/Proceedings		\$0.00
Total Income		\$104,217.11
Expense		
Honorarium		\$3,600.00
Meeting expenses		\$98,779.40
Bank/Paypal charges & credit card fees		\$0.00
Awards/Plaques		\$5,250.00
Total Expense		\$107,629.40
Net Total Income		(\$3,412.29)
<hr/>		
Ending Balance	6/30/2023	\$37,736.30

Yu Cheng, Treasurer 2021–2023

Call for Invited and Topic-Contributed Session Proposals



The 2024 Joint Statistical Meetings (JSM) will be held in Portland, Oregon during August 3–8, 2024. The theme for 2024 is “**Statistics and Data Science: Informing Policy and Countering Misinformation**”. The LiDS Program Committee is soliciting proposals for an invited session and two topic-contributed sessions for the 2024 JSM. In addition, LiDS will submit up to two proposals for additional invited sessions that are open for competition among the ASA Sections, Interest Groups, the Leadership Support Council, and the Council of Chapters.

An invited session can include two to six participants with a variety of formats. The online submission of invited session proposals opens on July 13, 2023 and closes on September 7, 2023. A topic-contributed session must have five presentations (including discussants). The online submission of topic-contributed session proposals opens on November 15, 2023 and closes on December 7, 2023. The regular contributed abstract submission opens on December 1, 2023 and closes on February 1, 2024,

and a draft manuscript must be received by May 31, 2024. All proposals should be submitted via the online submission process.

You will need to have the following information to submit your session proposal via the online submission process at <https://ww2.amstat.org/meetings/jsm/2024/submissions.cfm>:

- Session Type (invited)
- Session Subtype (e.g., papers or panel)
- Sponsor: Please select “Lifetime Data Science Section” as the sponsor, and a maximum of two additional potential sponsors can be selected.
- Title of Session
- Brief session description and information for each presenter (title of presentation, name, affiliation, address, phone, email, names of co-authors). Abstracts are NOT required for submission at this time.
- Theme (yes or no): Designate if the session has topics relevant to the JSM theme.
- Applied (yes or no): Designate if the session has topics relevant or will have special appeal to applied statisticians.
- Estimated audience size: Please select the estimated audience size that the session will attract.
- Organizer: name, affiliation, address, phone and email.
- Chair: name, affiliation, address, phone and email.
- Discussants (if any): name, affiliation, address, phone and email.

Please contact Pamela Shaw at pamela.a.shaw@kp.org should you have any question regarding the LiDS-sponsored invited sessions.

Pamela Shaw, Program Chair-Elect 2023

New Articles from Lifetime Data Analysis



Lifetime Data Analysis is the only journal dedicated to statistical methods and applications for lifetime data. The journal advances and promotes statistical science in various applied fields that deal with lifetime data, including actuarial science, economics, engineering, environmental sciences, management, medicine, operations research, public health, and social and behavioral sciences. The journal can be accessed at <https://link.springer.com/journal/10985>.

Volume 29, Issue 3 of Lifetime Data Analysis has been published in July 2023:

- Investigating non-inferiority or equivalence in time-to-event data under non-proportional hazards *by* K. Möllenhoff, & A. Tresch. Pages 483–507
- Semiparametric predictive inference for failure data using first-hitting-time threshold regression *by* M.-L.-T. Lee, & G.A. Whitmore. Pages 508–536
- On a simple estimation of the proportional odds model under right truncation *by* P. Liu, K.C.G. Chan, & Y.Q. Chen. Pages 537–554
- Consistent and robust inference in hazard probability and odds models with discrete-time survival data *by* Z. Tan Pages 555–584

- Incorporating delayed entry into the joint frailty model for recurrent events and a terminal event *by* M. Böhnhstedt, J. Gampe, M.A.A. Caljouw, & H. Putter. Pages 585–607
- Latency function estimation under the mixture cure model when the cure status is available *by* W.C. Safari, I. López-de-Ullibarri, & M.A. Jácome. Pages 608–627
- A semi-parametric weighted likelihood approach for regression analysis of bivariate interval-censored outcomes from case-cohort studies *by* Y. Lou, P. Wang, & J. Sun. Pages 628–653
- Regression models for censored time-to-event data using infinitesimal jack-knife pseudo-observations, with applications to left-truncation *by* E.T. Parner, P.K. Andersen, & M. Overgaard. Pages 654–671
- Combined estimating equation approaches for the additive hazards model with left-truncated and interval-censored data *by* T. Lu, S. Li, & L. Sun. Pages 672–697

Articles in Volume 29, Issue 2 are:

- Special issue dedicated to Ørnulf Borgan *by* S.O. Samuelsen, & O.O. Aalen. Pages 253–255
- Bivariate pseudo-observations for recurrent event analysis with terminal events *by* J.K. Furberg, P.K. Andersen, S. Korn, M. Overgaard, & H. Ravn. Pages 256–287
- Estimating distribution of length of stay in a multi-state model conditional on the pathway, with an application to patients hospitalised with Covid-19 *by* R.H. Keogh, K. Diaz-Ordaz, N.P. Jewell, M.G. Semple, L.C. de Wreede, H. Putter, & for the I. Investigators. Pages 288–317
- Phase-type models for competing risks, with emphasis on identifiability issues *by* B.H. Lindqvist Pages 318–341
- Analysis and asymptotic theory for nested case-control designs under highly stratified proportional hazards models *by* L. Goldstein, & B. Langholz. Pages 342–371
- The partly parametric and partly nonparametric additive risk model *by* N.L. Hjort, & E.A. Stoltenberg. Pages 372–402
- Cox regression can be collapsible and Aalen regression can be non-collapsible *by* S.O. Samuelsen Pages 403–419
- A boosting first-hitting-time model for survival analysis in high-dimensional settings *by* R. De Bin, & V.G. Stikbakke. Pages 420–440
- On logistic regression with right censored data, with or without competing risks, and its use for estimating treatment effects *by* P.F. Blanche, A. Holt, & T. Scheike. Pages 441–482

Mei-Ling Ting Lee, Editor-in-Chief, Lifetime Data Analysis

Software Review: Excess Hazard Modelling with R Package {GJRM}

Net survival

Excess hazard modeling is one of the main tools in population-based cancer survival research (Eletti et al. 2022). This framework allows for direct modeling of the survival due to cancer in the absence of information on the cause of death, which is common in population-based cancer epidemiology studies. The main quantity of interest in cancer survival research is the *net survival*, which represents the survival probability under the assumption that the individuals can only die due to cancer (Perme, Stare, and Estève 2012). In this framework, the idea

is to separate the hazard associated to other causes of death from that associated to cancer. This is done by assuming an additive decomposition of the individual hazard function, $h(\cdot)$, into two parts: the hazard associated to other causes of death, $h_O(\cdot)$, and the hazard associated to cancer, $h_E(\cdot)$ (Perme, Stare, and Estève 2012):

$$h(t | \mathbf{x}) = h_O(\text{age} + t) + h_E(t | \mathbf{x}),$$

where age is the age at diagnosis of cancer and \mathbf{x} represents the available patient characteristics. The hazard associated to other causes of death, $h_O(\text{age} + t)$, is typically replaced by the population hazard rate $h_P(\text{age} + t | \mathbf{w})$, which is obtained from life tables based on available characteristics denoted by the generic vector $\mathbf{w} \subset \mathbf{x}$. The survival function associated to the excess hazard, $S_N(t | \mathbf{x}) = \exp\left\{-\int_0^t h_E(r | \mathbf{x}) dr\right\}$, is denoted as the (individual) *net survival*. The GJRM R package implements a unifying link-based additive modeling framework for the excess hazard that allows for the inclusion of many types of covariate effects, including spatial and time-dependent effects, using any type of smoother, such as thin plate, cubic splines, tensor products and Markov random fields (Eletti et al. 2022). GJRM implements many other (survival) models; the reader is referred to Marra and Radice (2023) for details.

Analysis of inequalities in net survival

Next, we present an example of the use of this package for analyzing inequalities in net survival by deprivation level. We use data from a cohort of female lung cancer patients from The Simulacrum (<https://www.cancerdata.nhs.uk/simulacrum>) data set. The Simulacrum is a synthetic cancer data set which imitates some of the data held securely by the National Cancer Registration and Analysis Service (NCRAS) within NHS Digital. The subset of interest can be found at this GitHub repository <https://github.com/FJRubio67/LBANS>. We first load the data:

```
library(GJRM)
load('data_lung.Rda')
```

We now define the hazard rates required to define the penalized likelihood function.

```
hrate.select <- df$hrate[df$status == 1]
```

Next, we define the model equation, which includes a monotonic spline model for the baseline excess hazard, non-linear effect of age, time-varying effect of age, and the categorical variable indicating the deprivation level.

```
eq.GJRM <- list(
  time ~ s(log(time), bs = "mpi") + s(aged, bs='cr') +
    ti(log(time), aged) + dep.2 + dep.3 + dep.4 + dep.5
)
```

Next, we fit the excess hazard model with three links: Proportional Hazard (PH), Proportional Odds (PO), and probit.

```
mod.PH <- gamlss(
  eq.GJRM, data = df, surv = TRUE, margin = 'PH',
  cens = status, type.cens = "R", hrate = hrate.select
```



```

)
mod_PO <- gamlss(
  eq_GJRM, data = df, surv = TRUE, margin = 'PO',
  cens = status, type.cens = "R", hrate = hrate.select
)
mod_probit <- gamlss(
  eq_GJRM, data = df, surv = TRUE, margin = 'probit',
  cens = status, type.cens = "R", hrate = hrate.select
)

```

Then, we select the best model based on the Akaike Information Criterion.

```

AIC(mod_PH, mod_PO, mod_probit)
#           df   AIC
# mod_PH    33.8 37672
# mod_PO    34.0 37589
# mod_probit 34.4 37571

best_mod <- mod_probit

```

We now calculate the net survival for deprivation I and deprivation V patients using the selected model.

```

ind.dep1 <- (df$dep.1 == 1); data.dep1 <- df[ind.dep1, ]
ns.dep1.plot <- hazsurv.plot(
  best_mod, type = 'surv', newdata = data.dep1,
  t.range = c(0,5), ls = 100, intervals = TRUE,
  n.sim = 1000, plot.out = FALSE,
  print.progress = FALSE
)
ind.dep5 <- (df$dep.5 == 1); data.dep5 <- df[ind.dep5, ]
ns.dep5.plot <- hazsurv.plot(
  best_mod, type = 'surv', newdata = data.dep5,
  t.range = c(0,5), ls = 100, intervals = TRUE,
  n.sim = 1000, plot.out = FALSE,
  print.progress = FALSE
)

```

Finally, we plot the net survival for deprivation I (Least deprived) vs. deprivation V (Most deprived) patients to illustrate the gap in net survival between these groups.

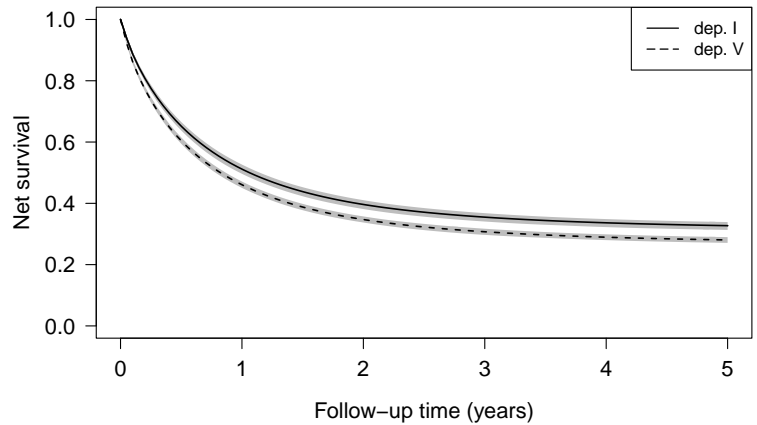
```

vec <- seq(0,5, length.out = 100);
ns1 <- ns.dep1.plot$s; ns5 <- ns.dep5.plot$s
nsCI1 <- ns.dep1.plot$CIs; nsCI5 <- ns.dep5.plot$CIs;
plot(vec, ns1, xlab = 'Follow-up time (years)',
  ylab = 'Net survival', las = 1, type = 'l', lwd = 1.5,
  ylim = c(0,1), cex.axis = 1.25, cex.lab = 1.25)
polygon(c(vec, rev(vec)), c(nsCI1[,2], rev(nsCI1[,1])),
  col = "grey", border = NA)
polygon(c(vec, rev(vec)), c(nsCI5[,2], rev(nsCI5[,1])),
  col = "grey", border = NA)
lines(vec, ns1, lwd = 1.5, lty = 1)
lines(vec, ns5, lwd = 1.5, lty = 2)
legend('topright', legend = c('dep. I', 'dep. V'),
  lwd = 1.2, lty = c(1,5))

```

References

Eletti, A., G. Marra, M. Quaresma, R. Radice, and F. J. Rubio. 2022. “A Unifying Framework for Flexible Excess Hazard Modelling with Applications in Cancer Epidemiology.” *Journal of the Royal Statistical Society: Series C* 71: 1044–62.



Marra, G., and R. Radice. 2023. *GJRM: Generalized Joint Regression Modeling*.

Perme, M. P., J. Stare, and J. Estève. 2012. “On Estimation in Relative Survival.” *Biometrics* 68 (1): 113–20.



Giampiero Marra
Professor of Statistics
Department of Statistical Science
University College London
Gower Street
London WC1E 6BT, UK
Email: giampiero.marra@ucl.ac.uk



Rosalba Radice
Professor of Statistics
Bayes Business School
City, University of London
106 Bunhill Row
London EC1Y 8TZ, UK
Email: rosalba.radice@city.ac.uk



Manuela Quaresma
Assistant Professor in Statistics
Department of Non-communicable
Disease Epidemiology
London School of Hygiene & Tropical
Medicine
Keppel Street, London WC1E 7HT, UK
Email: Manuela.Quaresma@lshtm.ac.uk



Alessia Eletti
Ph.D. student in Statistics
Department of Statistical Science
University College London
Gower Street
London WC1E 6BT, UK
Email: alessia.eletti.19@ucl.ac.uk



Javier Rubio Alvarez
Lecturer in Statistics
Department of Statistical Science
University College London
Gower Street
London WC1E 6BT, UK
Email: f.j.rubio@ucl.ac.uk