

SHANSHAN ZHAO, PH.D.

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CONTACT INFORMATION

Biostatistics and Computational Biology Branch
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EDUCATION

Ph.D., Biostatistics, University of Washington, 2007 – 2012
M.S., Biostatistics, University of Iowa, 2005 – 2007
B.S., Applied Mathematics, Peking University, 2001 – 2005

PROFESSIONAL EXPERIENCE

National Institute of Environmental Health Sciences, NIH, 2015 – Present
Senior Investigator, 2022 – Present
Tenure-Track Investigator, 2015 – 2022
University of North Carolina at Chapel Hill, 2017 – Present
Adjunct Associate Professor, 2023 – Present
Adjunct Assistant Professor, 2017 – 2023
Fred Hutchinson Cancer Research Center, 2012 – 2014
Postdoctoral Research Fellow

HONORS AND AWARDS

NIEHS Special Act Award for Organizing the 2023 ASA LiDS conference, 2023
NIEHS Merit Award for Leadership in Executing the Biostatistics and Bioinformatics Short Courses, 2020
NIEHS Group Special Act Award for Biostatistics and Bioinformatics Short Courses, 2019 (Role: Organizer 2016 – present)
NIEHS Scientific Director's Award for Research Excellence, 2019
ASA Biometrics Section David P. Byar Young Investigator Travel Award, 2014

FUNDED RESEARCH

ZIA ES103307 Statistical Methods in Epidemiology, NIEHS/NIH Intramural Research Grant (PI: Zhao), 2015 – Present

ZIA ES103308 Application of Statistical Methods in Epidemiology Studies, NIEHS/NIH Intramural Research Grant (PI: Zhao), 2015 – Present

PROFESSIONAL ACTIVITIES

Membership

American Statistical Association (ASA), 2008 – present

Eastern North American Region (ENAR), International Biometrics Society, 2017 – present

International Chinese Statistical Association (ICSA), 2015 – present

Western North American Region (WNAR), International Biometrics Society, 2011 – 2012

Alpha Phi Chapter of the Delta Omega Public Health Honorary Society, 2007 – present

Editorial Appointment

Associate Editor, Biometrics, 2018 – present

Academic Editor, PLOS One, 2017 – 2022

Journal Review

Annals of Applied Statistics

Biometrics

Biometrika

Journal of American Statistical Association

Journal of Agricultural, Biological, and Environmental Statistics

Journal of Bioinformatics and Computational Biology

Lifetime Data Analysis

Methodology & Computing in Applied Probability

Metrika

Statistical Methods in Medical Research

Statistics in Medicine

American Journal of Epidemiology

BMC Cancer

BMC Geriatrics

BMC Medical Research Methodology

Cancer Epidemiology, Biomarkers & Prevention

Cancer Reports

Environmental Health Perspectives

Environmental Research

Frontiers in Genetics

Genetics in Medicine

Journal of Medical Systems

Journal of Urology

PLOS One

Paediatric and Perinatal Epidemiology

Pharmacoepidemiology and Drug Safety

Grant Review

Ad-hoc reviewer, Alzheimer's Association, 2023

Service

Chair, ASA Lifetime Data Science Section (LiDS) 2023 Conference Local Organization Committee, 2019 – 2023

Chair, Webinar Committee, ASA Lifetime Data Science Section (LiDS), 2020 – 2021

Organizer, NIH-wide Statistical Methods on Environmental Mixture Working Group, NIH, 2021 – present

Organizer, Biostatistics and Bioinformatics Short Courses, NIEHS/NIH, 2016 – present

Member, Search Committee for NIH Earl Stadtman Investigator in Biostatistics/Bioinformatics, 2019, 2023

Member, NIH Wednesday Afternoon Lecture Series Nomination Committee, 2023

Reviewer, NIH Fellow Award of Research Excellence, 2017 – 2023

MENTORING ACTIVITIES

Postdoctoral Fellow

Rachel Carroll, Postdoctoral Research Fellow, NIEHS, 2016 – 2018

Placement: Assistant Professor, University of North Carolina - Wilmington

Jung In Kim, Postdoctoral IRTA Fellow, NIEHS, 2018 – 2019

Co-advisor: Jason Fine

Placement: Assistant Professor, Penn State University

Ling-Wan Chen, Postdoctoral IRTA Fellow, NIEHS, 2018 – 2020

Placement: Mathematical Statistician, FDA

Angel Davalos, Postdoctoral IRTA Fellow, NIEHS, 2019 – 2023

Placement: Biostatistician, Duke University

Victor Ritter, Postdoctoral IRTA Fellow, NIEHS, 2021 – 2022

Placement: Senior Biostatistician, Stanford University

Ziyue Wang, Postdoctoral IRTA Fellow, NIEHS, 2020 – 2023

Co-advisor: Alison Motsinger-Reif

Placement: Research Scientist, New York University

Myeonggyun Lee, Postdoctoral IRTA Fellow, NIEHS, 2022 – 2024

Placement: Assistant Professor, New York University

Kaizong Ye, Postdoctoral IRTA Fellow, NIEHS, 2023 – Present

Doctoral Dissertation Advised

Yue Jiang, Graduate Student, University of North Carolina at Chapel Hill, 2015 – 2019

Co-advisor: Jason Fine

Placement: Assistant Professor, Duke University

Gary Lu, Graduate Student, University of North Carolina at Chapel Hill, 2023 – Present

Co-advisor: Jianwen Cai

Doctoral Dissertation Committee Member Served

Adane Fekadu Wogu, Graduate Student, University of North Carolina at Chapel Hill, 2018 – 2020

Advisor: Jianwen Cai

Research Assistants

Kevin Day, Undergraduate Student at Duke University, Summer Research Assistant, NIEHS, 2017 & 2018

Katelyn McInerney, Undergraduate Student at North Carolina State University, NIEHS Summer Intern, 2022

Elizabeth Bersson, Graduate Student at Duke University, NIEHS Summer Intern, NIEHS, 2023

PUBLICATIONS

1. Dalton K.R., Lee M., Wang Z., **Zhao S.**, Parks C.G., Beane-Freeman L.E., Motsinger-Reif A.A., London S.J. (2024). Occupational Farm Work Activities Influence Workers' Indoor Home Microbiome. *Environmental Research*, 243: 117819. PMID: 37662364; PMCID: PMC10473816; DOI: 10.1101/2023.08.17.23293194
2. Carroll R., Ish J.L., Sandler D.P., White A.J., **Zhao S.** (2023). Understanding the Role of Environmental and Socioeconomic Factors in the Geographic Variation of Breast Cancer Risk in the US-Wide Sister Study. *Environmental Research*, 239(Pt1): 117349. PMID: 37821066; PMCID: PMC10841999; DOI: 10.1016/j.envres.2023.117349
* NIEHS Paper of the Year - 2023
* NIEHS Paper of the Month - January 2024
3. Wogu A.F., Li H., **Zhao S.**, Nichols H.B., Cai J. (2023). Additive Subdistribution Hazards Regression for Competing Risks Data in Case-Cohort Studies. *Biometrics*, 79(4): 3010-3022. PMID: 36606409; PMCID: PMC10676749; DOI: 10.1111/biom.13821
4. Wang Z., Dalton K.R., Lee M., Parks C.G., Freeman L.E.B., Zhu Q., Gonzalez A., Knight R., **Zhao S.**, Motsinger-Reif A.A., London S.J. (2023). Metagenomics Reveals Novel Microbial Signatures of Farm Exposures in House Dust. *Frontier in Microbiology*, 14: 1202194. PMID: 37090637; PMCID: PMC10120797; DOI: 10.1101/2023.04.07.23288301
5. Bommarito P.A., Cantonwine D.E., Stevens D.R., Welch B.M., Davalos A.D., **Zhao S.**, McElrath T.F., Ferguson K.K. (2023). An Application of Group-Based Trajectory Modeling to Define Fetal Growth Phenotypes among Small-for-Gestational-Age Births in the LIFECODES Fetal Growth Study. *American Journal of Obstetrics & Gynecology*, 228(3): 334.e1-334.e21. PMID: 36027952; PMCID: PMC9950285; DOI: 10.1016/j.ajog.2022.08.041
6. Bommarito P.A., Cantonwine D.E., Stevens D.R., Welch B.M., Davalos A.D., **Zhao S.**, McElrath T.F., Ferguson K.K. (2023). Fetal Growth Trajectories of Babies Born Large-for-Gestational Age in the LIFECODES Fetal Growth Study. *American Journal of Obstetrics & Gynecology*, 228(3): 340.e1-340.e20. PMID: 36241081; PMCID: PMC9974610; DOI: 10.1016/j.ajog.2022.10.006
7. Chen L., Fine J.P., Bair E., Ritter V.S., McElrath T.F., Cantonwine D.E., Meeker J.D., Ferguson K.K., **Zhao S.** (2022). Semiparametric Analysis of a Generalized Linear Model

- with Multiple Covariates Subject to Detection Limits. *Statistics in Medicine*, 41(24): 4791-4808. PMID: 35909228; PMC9588684; DOI: 10.1002/sim.9536
8. Kim J., Fine J.P., Sandler D.P., **Zhao S.** (2022). Accounting for Preinvasive Conditions in Analysis of Invasive Cancer Risk: Application to Breast Cancer. *Epidemiology*, 33(1): 48-54. PMID: 34561346; PMCID: PMC8633059; DOI: 10.1097/EDE.0000000000001423
 9. Davalos A.A., Minguez-Alarcon L., van t'Erve T., Keil A.P., Willaims P.L., Meeker J.D., Milne G.L., **Zhao S.**, Hauser R., Ferguson K.K. (2022). Associations between Mixtures of Urinary Phthalate Metabolite Concentrations and Oxidative Stress Biomarkers among Couples Undergoing Fertility Treatment. *Environmental Research*, 212(Pt B): 113342. PMID: 35461852; PMCID: PMC9233083; DOI: 10.1016/j.envres.2022.113342
 10. Ferguson K.K., Bommarito P.A., Arogbokun O., [multiple contributing authors including **Zhao S.**], McElrath T.F., Swan S.H., Sathyanarayana S. (2022). Prenatal Phthalate Exposure and Child Weight and Adiposity from in Utero to 6 Years of Age. *Environmental Health Perspectives*, 130 (4): 47006. PMID: 35452257; PMCID: PMC9031798; DOI: 10.1289/EHP10077
 11. Prentice R., **Zhao S.** (2021). Regression Models and Multivariate Life Tables. *Journal of American Statistical Association*, 116(535): 1330-1345 PMID: 34629570; PMCID: PMC8494047; DOI: 10.1080/01621459.2020.1713792
 12. Wogu A.F., **Zhao S.**, Nichols H.B, Cai J. (2021). Proportional Subdistribution Hazards Model for Competing Risks in Case-Cohort Studies. *American Journal of Applied Mathematics*, 9(5): 165-185. DOI: 10.11648/j.ajam.20210905.12
 13. Goldberg M., D'Aloisio A.A., O'Brien K.M., **Zhao S.**, Sandler D.P. (2021). Early-life Exposures and Age at Thelarche in the Sister Study Cohort. *Breast Cancer Research*, 23(1): 111. PMID: 34895281; PMCID: PMC8666031; DOI: 10.1186/s13058-021-01490-z
 14. Ortega M. T., McGrath J.A., Carlson L, [multiple contributing authors including **Zhao S.**], Botelho J.C., Filie A.C., Shaw N.D. (2021). Longitudinal investigation of pubertal milestones and hormones as a function of body fat in girls. *Journal of Clinical Endocrinology & Metabolism*, 106(6): 1668-1683. PMID: 33630047; PMCID: PMC8118584; DOI: 10.1210/clinem/dgab092
 15. Prentice R., Aragaki A.K, Chlebowski R.T., **Zhao S.**, Anderson G.L., Rossouw J.E., Wallace R., Banack H., Shadyab A.H., Qi L., Snively B.M., Gass M., Manson J.E. (2020). Dual Outcome Intention-to-Treat Analyses in the Women's Health Initiative Randomized Controlled Hormone Therapy Trials. *American Journal of Epidemiology*, 89(9): 972-981. PMID: 32314781; PMCID: PMC7443766; DOI: 10.1093/aje/kwaa033
 16. Carroll R., White A.J., Keil A.P., Meeker J.D., McElrath T.F., **Zhao S.**, Ferguson K.K. (2020). Latent Classes for Chemical Mixtures Analyses in Epidemiology: An Example Using Phthalate and Phenol Exposure Biomarkers in Pregnant Women. *Journal of Exposure Science & Environmental Epidemiology*, 30: 149-159. PMID: 31636370; PMCID: PMC6917962; DOI: 10.1038/s41370-019-0181-y
 17. Keil A.P., Buckley J.P., O'Brien K.M., Ferguson K.K, **Zhao S.**, White A.J. (2020). A Quantile-Based G-Computation Approach to Addressing the Effects of Exposure Mixtures. *Environmental Health Perspectives*, 128(4): 047004. PMID: 32255670; PMCID: PMC7228100; DOI: 10.1289/EHP5838

18. Goldberg M., D'Aloisio A.A., O'Brien K.M., **Zhao S.**, Sandler D.P. (2020). Pubertal Timing and Breast Cancer Risk in the Sister Study Cohort. *Breast Cancer Research*, 22(1): 112. PMID: 33109223; PMCID: PMC7590599; DOI: 10.1186/s13058-020-01326-2
19. Wang M., Wasserman E., Geyer N., Carroll R., **Zhao S.**, Zhang L., Hohl R., Lengerich E.J., McDonald A.C. (2020). Spatial Patterns in Prostate Cancer-Specific Mortality in Pennsylvania using Pennsylvania Cancer Registry Data, 2004-2014. *BMC Cancer*, 20(1): 394. PMID: 32375682; PMCID: PMC7203834; DOI: 10.1186/s12885-020-06902-5
20. Carroll R., Lawson A.B., **Zhao S.** (2019). A Data-Driven Approach for Estimating the Change-Points and Impact of Major Events on Disease Risk. *Spatial and Spatial Temporal Epidemiology*, 29:111-118. PMID: 31128619; PMCID: PMC7971716; DOI: 10.1016/j.sste.2018.08.005
21. Carroll R., **Zhao S.** (2019). Trends in Colorectal Cancer Incidence and Survival: The Timing of It All. *Clinical Colorectal Cancer*, 18(2):e261-e274. PMID: 26902887; PMCID: PMC4992660; DOI: 10.1016/j.clcc.2018.12.001
22. Jiang Y., Weinberg C.R., Sandler D.P., **Zhao S.** (2019). Use of Detailed Family History Data to Improve Risk Prediction, with Application to Breast Cancer. *PLOS One*, 14(12):e0226407. PMID: 31846476; PMCID: PMC6917296; DOI: 10.1371/journal.pone.0226407
23. Cheng A., **Zhao S.**, FitzGerald L.M., Wright J.L., Kolb S., Karnes R.J., Jenkins R.B., Davicioni E., Ostrander E.A., Feng Z., Fan J.B., Dai J.Y., Stanford J.L. (2019). A Four-Gene Transcript Score to Predict Metastatic-Lethal Progression in Men Treated for Localized Prostate Cancer: Development and Validation Studies. *Prostate*, 79 (14): 1589-1596. PMID: 31376183; PMCID: PMC6715522; DOI: 10.1002/pros.23882
24. Rubicz R., **Zhao S.**, Geybels M., Wright J.L., Kolb S., Klotzled B., Bibikova M., Troyer D., Lance R., Ostrander E.A., Feng Z., Fan J.B., Stanford J.L. (2019). DNA Methylation Profiles in African American Prostate Cancer Patients in Relation to Disease Progression. *Genomics*, 111 (1): 10-16. PMID: 26902887; PMCID: PMC4992660; DOI: 10.1016/j.ygeno.2016.02.004
25. White A.J., Keller J.P., **Zhao S.**, Carroll R., Kaufman J.D., Sandler D.P. (2019). Air Pollution, Clustering of Particulate Matter Components, and Breast Cancer in the Sister Study: A U.S.-Wide Cohort. *Environmental Health Perspectives*, 127(10):107002. PMID: 31596602; PMCID: PMC6867190; DOI: 10.1289/EHP5131
26. Niehoff N.M., Nichols H.B., **Zhao S.**, White A.J., Sandler D.P. (2019). Adult Physical Activity and Breast Cancer Risk in Women with a Family History of Breast Cancer. *Cancer Epidemiology, Biomarkers & Prevention*, 28 (1): 51-58. PMID: 30333218; PMCID: PMC6325010; DOI: 10.1158/1055-9965.EPI-18-0674
27. Nethery R.C., Sandler D.P., **Zhao S.**, Engal L.S., Kwok, R.K. (2019). A Joint Spatial Factor Analysis Model to Accommodate Data from Misaligned Areal Units with Application to Louisiana Social Vulnerability. *Biostatistics*, 20(3):468-484. PMID: 29659722; PMCID: PMC6659171; DOI: 10.1093/biostatistics/kxy016
28. Kupers L.K., Monnereau C., Sharp G.C., [multiple contributing authors including **Zhao S.**], Relton C.L., Snieder H., Felix J.F. (2019). Meta-Analysis of Epigenome-Wide Association Studies in Neonates Reveals Widespread Differential Methylation Associated

- with Birthweight. *Nature Communication*, 19 (1): 1893. PMID: 31015461; PMCID: PMC6478731; DOI: 10.1038/s41467-019-09671-3
29. Sikdar S., Joehanes R., Joubert B.R., [multiple contributing authors including **Zhao S.**], Bustamante M., Levy D., London S.J. (2019). Comparison of Smoking-Related DNA Methylation Between Newborns from Prenatal Exposure and Adults from Personal Smoking. *Epigenomics*, 11 (13): 1487-1500. PMID: 31536415; PMCID: PMC6836223; DOI: 10.2217/epi-2019-0066
 30. Kazmi N., Sharp G.C., Reese S.E., [multiple contributing authors including **Zhao S.**], Gaunt T.R., Lawlor D.A., Relton C.L. (2019). Hypertensive Disorders of Pregnancy and DNA Methylation in Newborns: Findings From the Pregnancy and Childhood Epigenetics Consortium. *Hypertension*, 74 (2): 375-383. PMID: 31230546; PMCID: PMC6635125; DOI: 10.1161/HYPERTENSIONAHA.119.12634
 31. Reese S.E., Xu C.J., den Dekker H.T., [multiple contributing authors including **Zhao S.**], Duijts L., Koppelman G.H., London S.J. (2019). Epigenome-Wide Meta-Analysis of DNA Methylation and Childhood Asthma. *Journal of Allergy and Clinical Immunology*, 143 (6): 2062-2074. PMID: 30579849; PMCID: PMC6556405; DOI: 10.1016/j.jaci.2018.11.043
 32. **Zhao S.**, Leonardson A., Geybels M., McDaniel A., Yu M., Kolb S., Zong H., Carter K., Siddiqui J., Cheng, A., Wright J.L., Pritchard C.C., Lance R., Troyer D., Fan J., Ostrander E.A., Dai J., Tomlins S., Feng Z., Stanford J.L. (2018). A Five-CpG DNA Methylation Score to Predict Metastatic-Lethal Outcomes in Men Treated with Radical Prostatectomy for Localized Prostate Cancer. *Prostate*, 78(14):1084-1091. PMID: 29956356; PMCID: PMC6120526; DOI: 10/1002/pros.23667
 33. Prentice R.L., **Zhao S.** (2018). Nonparametric Estimation of the Multivariate Survivor Function: the Multivariate Kaplan-Meier Estimator. *Lifetime Data Analysis*, 24 (1): 3-27. PMID: 27677472; PMCID: PMC5373162; DOI: 10.1007/s10985-016-93830y
 34. Carroll R., Lawson A.B., **Zhao S.** (2018). Temporally dependent accelerated failure time model for capturing the impact of events that alter survival in disease mapping. *Biostatistics*, 20(4):666-680. PMID: 29939209; PMCID: PMC8136284; DOI:10.1093/biostatistics/kxy023
 35. Carroll R., **Zhao S.** (2018). Gaining Relevance From the Random: Interpreting Observed Spatial Heterogeneity. *Spatial and Spatial Temporal Epidemiology*, 25: 11-17. PMID: 29751888; PMCID: PMC7983284; DOI: 10.1016/j.sste.2018.01.002
 36. FitzGerald L.M., **Zhao S.**, Leonardson A., Geybels M., Kolb S., Lin D.W., Wright J., Eeles R., Kote-Jarai Z., Giles G.G., Southey M.C., Schleutker J., Tammela T.L., Sipeky C., Penney K.L., Stampfer M.J., Gronberg H., Wiklund F., Stattin P., Hugosson J., Karyadi D.M., Ostrander E.A., Feng Z., Stanford J.L. (2018). Germline Variants in IL4 and MGMT are Associated with Prostate Cancer-Specific Mortality: An Analysis of 12,082 Prostate Cancer Cases. *Prostate Cancer and Prostatic Diseases*, 21 (2): 228-237. PMID: 29298992; PMCID: PMC6026113; DOI: 10.1038/s41391-017-0029-2
 37. Kim S.S., Meeker J.D., Carroll R., **Zhao S.**, Mourgas M.J., Richards M.J., Aung M., Cantonwine D.E., McElrath T.F., Ferguson K.K. (2018). Urinary trace metals individually and in mixtures in association with preterm birth. *Environmental International*, 121: 582-590. PMID: 30300816; PMCID: PMC6233299; DOI: 10.1016/j.envint.2018.09.052

38. Rosen E.M., Brantsaeter A.L., Lise A., Carroll R., Haug L., Singer A.B., **Zhao S.**, Ferguson K.K. (2018). Maternal Plasma Concentrations of Per- and Polyfluoroalkyl Substances and Breastfeeding Duration in the Norwegian Mother and Child Cohort. *Environmental Epidemiology*, 2(3): e027. PMID: 30298140; PMCID: PMC6173485; DOI: 10.1097/EE9.0000000000000027
39. Dong J., Buas M.F., Gharahkhani P., Kendall B.J., Onstad L., **Zhao S.**, Anderson L.A., Wu A.H., Ye W., Bird N.C., Bernstein L., Chow W.H., Gammon M.D., Liu G., Caldas C., Pharoah P.D., Risch H.A., Iyer P.G., Reid B.J., Hardie L.J., Lagergren J., Shaheen N.J., Corley D.A., Fitzgerald R.C., Stomach and Oesophageal Cancer Study (SOCS) Consortium, Whitman D.C., Vaughan T.L., Thrift A.P. (2018). Determining Risk of Barrett's Esophagus and Esophageal Adenocarcinoma Based on Epidemiologic Factors and Genetic Variants. *Gastroenterology*. 154 (5): 1273-1281. PMID: 29247777; PMCID: PMC5880715; DOI: 10.1053/j.gastro.2017.12.003
40. Sharp G.C., Arathimos R., Reese S.E., Page C.M., Felix J., Kupers L.K., Rifas-Shiman S.L., Liu C., The Cohorts for Heart and Aging Research in Genomic Epidemiology Plus Methylation Alcohol Working Group, Burrows K., **Zhao S.**, Magnus M.C., Duijts L., Corpeleijn E., DeMeo D.L., Litonjua A., Baccarelli A., Hivert M., Oken E., Snieder H., Jaddoe V., Nystad W., London S.J., Relton C.L., Zuccolo L. (2018). Maternal Alcohol Consumption and Offspring DNA Methylation: Findings from Six General Population-Based Birth Cohorts. *Epigenomics*. 10(1): 27-42. PMID: 29172695; PMCID: PMC5753623; DOI: 10.2217/epi-2017-0095
41. Felix J.F., Joubert B.R., Baccarelli A.A, Sharp G.C., [multiple contributing authors in alphabetical order including **Zhao S.**], Agha G., Relton C.L., Jaddoe V.W.V, London S.J. (2018). Cohort Profile: Pregnancy And Childhood Epigenetics (PACE) Consortium. *International Journal of Epidemiology*. 47 (1): 22-23. PMID: 29025028; PMCID: PMC5837319; DOI: 10.1093/ije/dyx190
42. **Zhao S.**, Geybels M.S., Leonardson A., Rubicz R., Kolb S., Yan Q., Klotzle B., Bibikova M., Hurtado-Coll A., Troyer D., Lance R., Lin D.W., Wright J.L., Ostrander E.A., Fan J.B., Feng Z., Stanford J.L. (2017). Epigenome-Wide Tumor DNA Methylation Profiling Identifies Novel Prognostic Biomarkers of Metastatic-Lethal Progression in Men Diagnosed with Clinically Localized Prostate Cancer. *Clinical Cancer Research*, 23 (1): 311-319. PMID: 27358489; PMCID: PMC5199634; DOI: 10.1158/1078-0432.CCR-16-0549
- ★ NIEHS Paper of the Month - September 2016
43. Carroll R., Lawson A.B., **Zhao S.** (2017). Assessment of Spatial Variation in Breast Cancer-Specific Mortality Using Louisiana SEER Data. *Social Science & Medicine*, 193: 1-7. PMID 28985516; PMCID: PMC5659900; DOI: 10.1016/j.socscimed.2017.09.045
44. Reese S.E., **Zhao S.**, Wu M.C., Joubert B.R., Parr C.L., Håberg S.E., Ueland P.M., Nilsen R.M., Middttun Ø., Vollset S.E., Peddada, S.D., Nystad W., London S.J. (2017). DNA Methylation Score as a Biomarker in Newborns for Sustained Maternal Smoking during Pregnancy. *Environmental Health Perspectives*, 125 (4): 760-766. PMID: 27323799; PMCID: PMC5391987; DOI: 10.1289/EHP333

45. Valeri L., Reese S.L., **Zhao S.**, Page C.M., Nystad W., Coull B.A., London S.J. (2017). Misclassified Exposure in Epigenetic Mediation Analyses. Does DNA Methylation Mediate Effects of Smoking on Birthweight? *Epigenomics*, 9 (3): 253-265. PMID: 28234025 PMID: PMC5331915; DOI: 10.2217/epi-2016-0145
46. Park Y.M., O'Brien K.M., **Zhao S.**, Weinberg C.R., Baird, D.D., Sandler, D.P. (2017). Gestational Diabetes Mellitus May be Associated With Increased Risk of Breast Cancer. *British Journal of Cancer*, 116 (7): 960-963. PMID: 28208154; PMID: PMC5379146; DOI: 10.1038/bjc.2017.34
47. Sharp G.C., Salas L.A., Monnereau C., Allard C., [multiple contributing authors in alphabetical order including **Zhao S.**], Nystad W., London S.J., Felix J.F., Relton C.L. (2017). Maternal BMI at the Start of Pregnancy and Offspring Epigenome-Wide DNA Methylation: Findings From the Pregnancy and Childhood Epigenetics (PACE) Consortium. *Human Molecular Genetics*, 26 (20): 4067-4085. PMID: 29016858; PMID: PMC5656174; DOI: 10.1093/hmg/ddx290
48. Shui I.M., Wong C., **Zhao S.**, Kolb S., Ebot E.M., Geybels M.S., Rubicz R., Wright J.L., Lin D.W., Klotzle B., Bibikova M., Fan J.B., Ostrander E.A., Feng Z., Stanford J.L. (2016). Prostate Tumor DNA Methylation is Associated with Cigarette Smoking and Adverse Prostate Cancer Outcomes. *Cancer*, 122 (14): 2168-2177. PMID: 27142338; PMID: PMC4930391; DOI: 10.1002/cncr.30045
49. Geybels M.S., Wright J.L., Bibikova M., Klotzle B., Fan J.B., **Zhao S.**, Feng Z., Ostrander E.A., Lin D.W., Nelson P.S., Stanford J.L. (2016). Epigenetic Signature of Gleason Score and Prostate Cancer Recurrence after Radical Prostatectomy. *Clinical Epigenetics*, 8:97. PMID: 27651837; PMID: PMC5024414; DOI: 10.1186/s13148-016-0260-z
50. Schade G.R., Holt S.K., Zhang X., Song D., Wright J.L., **Zhao S.**, Kolb S., Lam H.M., Levin L., Leung Y.K., Ho S.M., Stanford J.L. (2016). Prostate Cancer Expression Profiles of Cytoplasmic ER β 1 and Nuclear ER β 2 are Associated with Poor Outcomes Following Radical Prostatectomy. *Journal of Urology*, 195: 1760-1766. PMID: 26804755; PMID: PMC4871721; DOI: 10.1016/j.juro.2015.12.101
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and Adults: Results From a Vaccine Safety Datalink Study. *American Journal of Public Health*, 99 Suppl 2: 389-397. PMID: 19797753; PMCID: PMC4504385; DOI: 10.2105/AJPH.2008.151332

BOOKS

Prentice R.L., **Zhao S.** (2019). The Statistical Analysis of Multivariate Failure Time Data: A Marginal Modeling Approach. Chapman & Hall/CRC Press.

SOFTWARE

mhazard

A R package for multivariate survival function estimation and regression

<https://cran.r-project.org/web/packages/mhazard/index.html>

LAmortBrCaShiny

A R Shiny App for an application of the AFT survival model to SEER breast cancer data in Louisiana

<https://github.com/carrollrm/LAmortBrCaShiny>

STAFF

BUGS code for a spatio-temporal accelerated failure time model. Some of these models include an automation step as part of the temporal fitting component

<https://github.com/carrollrm/STAFF>

Semi-mLOD

R code for handling a generalized linear model with multiple covariates subject to limit-of-detection through semiparametric AFT models of the true covariate values

<https://github.com/lingwanchen/Semi-mLOD>

PRESENTATIONS

1. An Overview of Correction Methods for Environmental Mixtures Subject to Detection Limits. ENAR (March 2024, invited)
2. Empowering Environmental Health Research Through Innovative Statistical Methods. NAEHS Council Meeting (February 2024, invited)
3. Recent Advances in Multivariate Survival Data Analysis. ASA LiDS Conference (May 2023, invited)
4. Assessing the Effects of Multiple Exposures Subject to Limit of Detection. ENAR (March 2022, Invited)
5. Identifying Multivariate Growth Trajectories via the Bayesian Tensor Mixture Model. Biostatistics and Computational Biology Branch, NIEHS/NIH (January 2022, Invited)
6. Assessing the Effects of Multiple Exposures Subject to Limit of Detection. Biostatistics and Bioinformatics Branch, NICHD/NIH (October 2021, Invited)

7. Assessing the Effects of Multiple Exposures Subject to Limit of Detection. Division of Biostatistics, Department of Preventive Medicine, University of Tennessee Health Science Center (April 2021, Invited)
8. Explained Variance Decompositions for Mediation Effect Sizes with Multiple Exposures. International Chinese Statistical Association Symposium (December 2020, invited)
9. Explained Variance Decompositions for Mediation Effect Sizes with Multiple Exposures. Joint Statistical Meetings (August 2020, invited poster)
10. Accommodating Assay Limit-of-Detection in Environmental Mixture Analysis. ENAR (March 2020, invited and organizer)
11. Accommodating Assay Limits of Detection in Environmental Mixture Analysis. Biostatistics Branch, Division of Cancer Epidemiology & Genetics, NCI (November 2019, invited)
12. Accommodating Assay Limits of Detection in Environmental Mixture Analysis. Department of Mathematics and Statistics, University of North Carolina at Charlotte (October 2019, invited)
13. Statistical Methods for Multivariate Failure Time Data Analysis. Joint Statistical Meetings, Denver CO (August 2019, invited)
14. Accommodating Assay Limits of Detection in Environmental Mixture Analysis. Joint Statistical Meetings, Denver CO (August 2019)
15. Assessing Spatial and Temporal Variation in Breast Cancer Incidence and Mortality. International Chinese Statistical Association Symposium, Raleigh NC (June 2019, invited)
16. Statistical Methods for Multivariate Failure Time Data Analysis. ENAR, Philadelphia PA (March 2019, invited)
17. Assessing Spatial and Temporal Variation in Breast Cancer Incidence and Mortality. Baylor College of Medicine (February 2019, invited)
18. Assessing Spatial and Temporal Variation in Breast Cancer Incidence and Mortality. Superfund Research Center, Texas A&M University (February 2019, invited)
19. Statistical Methods for Joint Modeling of Multiple Time-to-Event Data. Department of Statistics, Texas A&M University (February 2019, invited)
20. Statistical Methods for Joint Modeling of Multiple Time-to-Event Data. Biostatistics Seminar Series, University of Pittsburgh (September 2018, invited)
21. Semiparametric Regression Methods for Bivariate Failure Time Outcomes. Joint Statistical Meetings, Vancouver, BC (July 2018, invited)
22. Disease Risk Assessment and Prediction. NIEHS Epigenetic & Stem Cell Biology Laboratory Seminar (November 2017, invited)
23. Analyzing Mortality Following Breast Cancer Diagnosis in Louisiana SEER Data via a Spatial Accelerated Failure Time Model. Joint Statistical Meetings, Baltimore, MD (August 2017)

24. Statistical Methods for Multivariate Failure Time Data Analysis. International Chinese Statistical Association Symposium, Chicago, IL (June 2017, invited)
25. Statistical Methods for Multivariate Failure Time Data Analysis. ENAR Spring Meeting, Washington D.C. (March 2017)
26. Better Use of Family History Data to Predict Breast Cancer Risk. Joint Statistical Meetings, Chicago, IL (August 2016)
27. Better Use of Family History Data to Predict Breast Cancer Risk. International Chinese Statistical Association Symposium, Atlanta, GA (June 2016, invited)
28. Statistical Methods for Risk Assessment and Prediction. NIEHS Retreat, Raleigh, NC (April 2016, invited)
29. Regression Methods for Bivariate Failure Time Data. NIEHS Biostatistics and Computational Biology Branch Seminar (March 2016, invited)
30. Regression Methods for Bivariate Failure Time Data. Joint Statistical Meetings, Seattle, WA (August 2015)
31. Measurement Error Correction Methods in Mediation Analysis with Failure Time Data. NIEHS, RTP NC (April 2014, invited)
32. Measurement Error Correction Methods in Mediation Analysis with Failure Time Data. University of Nevada, Reno NV (January 2014, invited)
33. Estimation from a Two-Stage Biomarker Study Allowing Early Termination for Futility. Joint Statistical Meetings, Montreal Canada (August 2013)
34. Measurement Error Correction Methods in Mediation Analysis with Failure Time Data. Department of Biostatistics, University of Texas MD Anderson Cancer Center (June 2013, invited)
35. Measurement Error Correction Methods in Mediation Analysis with Failure Time Data. Joint Statistical Meetings, San Diego, CA (August 2012)
36. Measurement Error Correction Methods in Mediation Analysis with Failure Time Data. Department of Biostatistics, University of Washington, Seattle, WA (September 2011)
37. Statistical Performance of Group Sequential Methods for Evaluating Post-Marketing Vaccine and Drug Safety: A Simulation Study. WNAR student paper competition, Seattle, WA (June 2010).
38. Statistical Performance of Group Sequential Methods for Evaluating Post-Marketing Vaccine and Drug Safety: A Simulation Study. Department of Biostatistics, University of Washington, Seattle, WA (October 2008)
39. Statistical Performance of Group Sequential Methods for Evaluating Post-Marketing Vaccine and Drug Safety: A Simulation Study. Joint Statistical Meetings, Denver, CO (August 2008)