

# SHANSHAN ZHAO, PH.D.

Updated November 2020

## CONTACT INFORMATION

Biostatistics and Computational Biology Branch  
National Institute of Environmental Health Sciences  
111 T.W. Alexander Dr., Bldg 101, Rm A328  
Research Triangle Park, NC 27709  
Tel: 984-287-3702  
Email: shanshan.zhao@nih.gov

ORCID ID: 0000-0002-5828-4881

Research ID: O-6830-2017

## 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**, January 2015 – Present  
Tenure-Track Investigator

**University of North Carolina at Chapel Hill**, April 2017 – Present  
Adjunct Assistant Professor

**Fred Hutchinson Cancer Research Center**, October 2012 – December 2014  
Postdoctoral Research Fellow

## HONORS AND AWARDS

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

Lead author of NIEHS Intramural Paper of the Month, September 2016

ASA Biometrics Section David P. Byar Young Investigator Travel Award, 2014

Tuition Scholarship, University of Washington, 2007 – 2012

Pfizer Award for Graduate Students, University of Washington, 2007 – 2009

Tuition Scholarship, University of Iowa, 2005 – 2007

## **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

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

International Chinese Statistical Association (ICSA), 2015 – present

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

### **Editorial Appointment**

Academic Editor, PLOS One, 2017 – present

Associate Editor, Biometrics, 2018 – present

### **Journal Review**

Annals of Applied Statistics

Biometrics

Journal of Bioinformatics and Computational Biology

Methodology & Computing in Applied Probability

Statistical Methods in Medical Research

Statistics in Medicine

American Journal of Epidemiology

BMC Geriatrics

BMC Medical Research Methodology

Frontiers in Genetics

Genetics in Medicine

Journal of Urology

PLOS One

Paediatric and Perinatal Epidemiology

Pharmacoepidemiology and Drug Safety

### **Service**

Chair, Webinar Committee, ASA Lifetime Data Science Section, 2020 – present

Chair, Lifetime Data Science 2023 Conference Local Organization Committee, 2019 – present

Organizer, Biostatistics and Bioinformatics Short Courses, NIEHS/NIH, 2016 – present  
Reviewer, NIH Fellow Award of Research Excellence, 2017 – 2020  
Member, Search Committee for NIH Earl Stadtman Investigator in Biostatistics/Bioinformatics, 2019  
Member, Search Committee for Chief of Biostatistics and Computational Biology Branch, NIEHS/NIH, 2017

## MENTORING ACTIVITIES

### Postdoctoral Fellow

Rachel Carroll, Postdoctoral Research Fellow, NIEHS, 2016 – 2018  
Current Position: Assistant Professor, University of North Carolina at Wilmington  
Jung In Kim, Postdoctoral IRTA Fellow, NIEHS, 2017 – 2019  
Current Position: Assistant Professor, Penn State University  
Ling-Wan Chen, Postdoctoral IRTA Fellow, NIEHS, 2018 – 2020  
Current Position: Mathematical Statistician, FDA  
Angel Davalos, Postdoctoral IRTA Fellow, NIEHS, 2019 – present  
Co-advisor: Kelly Ferguson  
Ziyue Wang, Postdoctoral IRTA Fellow, NIEHS, 2020 – present  
Co-advisor: Alison Motsinger-Reif, Stephanie London

### Doctoral Dissertation Advised

Yue Jiang, Graduate Student, University of North Carolina at Chapel Hill, 2015 – 2019  
Co-advisor: Jason Fine  
Current Position: Assistant Professor, Duke University

### Doctoral Dissertation Committee Member Served

Adane Fekadu Wogu, 2018-2019, UNC-CH Biostatistics  
Advisor: Jianwen Cai

### Research Assistant

Kevin Day, Summer Research Assistant, NIEHS, 2017/2018  
Current Position: Undergraduate Student, Duke University

## TEACHING ACTIVITIES

Teaching Assistant, Department of Biostatistics, University of Washington, Spring 2011  
Graduate Tutor, Department of Biostatistics, University of Washington, 2010 – 2011  
Statistical Consultant, Department of Biostatistics, University of Washington, Spring 2009  
Statistical Consultant, Biostatistic Consulting Center, University of Iowa, 2005-2006

## PUBLICATIONS

### Published

1. Prentice R., **Zhao S.** (2020). Regression Models and Multivariate Life Tables. *Journal of American Statistical Association*. PMID: 31128619; PMCID: PMC Journal - In Process; DOI: 10.1080/01621459.2020.1713792.

2. 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*. PMID: 32314781; PMCID: PMC7443766; DOI: 10.1093/aje/kwaa033.
3. 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.
4. 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(112): 047004. PMID: 33109223; PMCID: PMC7590599; DOI: 10.1186/s13058-020-01326-2.
5. 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*. PMID: 32375682; PMCID: PMC7203834; DOI: 10.1186/s12885-020-06902-5.
6. 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*. PMID: 31128619; PMCID: PMC Journal - In Process; DOI: 10.1016/j.sste.2018.08.005.
7. Carroll R., **Zhao S.** (2019). Trends in Colorectal Cancer Incidence and Survival: The Timing of It All. *Clinical Colorectal Cancer*. PMID: 26902887; PMCID: PMC4992660; DOI: 10.1016/j.clcc.2018.12.001.
8. 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*. PMID: 31846476; PMCID: PMC6917296; DOI: 10.1371/journal.pone.0226407.
9. 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.
10. 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.
11. Carroll R., White A.J., Keil A.P., Meeker J.D., McElrath T.F., **Zhao S.**, Ferguson K.K. (2019). 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*. PMID: 31636370; PMCID: PMC6917962; DOI: 10.1038/s41370-019-0181-y.

12. 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*. PMID: 31596602; PMCID: PMC6867190; DOI: 10.1289/EHP5131.
13. 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.
14. 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.
15. 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.
16. 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.
17. 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.
18. **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*. PMID: 29956356; PMCID: PMC6120526; DOI: 10/1002/pros.23667.
19. 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.
20. 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*. PMID: 29939209; PMCID: PMC Journal - In Process; DOI:10.1093/biostatistics/kxy023.
21. 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: PMC Journal - In Process; DOI: 10.1016/j.sste.2018.01.002.
22. 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.
23. Nethery R.C., Sandler D.P., **Zhao S.**, Engal L.S., Kwok, R.K. (2018). A Joint Spatial Factor Analysis Model to Accommodate Data from Misaligned Areal Units with Application to Louisiana Social Vulnerability. *Biostatistics*. PMID: 29659722; PMCID: PMC Journal - In Process; DOI: 10.1093/biostatistics/kxy016.
24. 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.
25. 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*. PMID: 30298140; PMCID: PMC6173485; DOI: 10.1097/EE9.0000000000000027.
26. 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.
27. 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.
28. 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.

29. **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.
30. 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.
31. 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.
32. 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 PMCID: PMC5331915; DOI: 10.2217/epi-2016-0145.
33. 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; PMCID: PMC5379146; DOI: 10.1038/bjc.2017.34.
34. 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; PMCID: PMC5656174; DOI: 10.1093/hmg/ddx290.
35. 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; PMCID: PMC4930391; DOI: 10.1002/cncr.30045.
36. 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; PMCID: PMC5024414; DOI: 10.1186/s13148-016-0260-z.
37. 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 $\beta$ 1 and Nuclear ER $\beta$ 2 are Associated with Poor Outcomes Following Radical Prostatectomy. *Journal of Urology*, 195: 1760-1766. PMID: 26804755; PMCID: PMC4871721; DOI: 10.1016/j.juro.2015.12.101.

38. **Zhao S.**, Zheng Y., Prentice R.L., Feng, Z. (2015). Two-Stage Biomarker Panel Study and Estimation Allowing Early Termination for Futility. *Biostatistics*: 16: 799-812. PMID: 25964662; PMCID: PMC4570581; DOI: 10.1093/biostatistics/kxv017.
39. Rubicz R., **Zhao S.\***, April C., Wright J.L., Kolb S., Coleman I., Lin D.W., Nelson P.S., Ostrander E.A., Feng Z., Fan J.B., Stanford J.L. (2015). Expression of Cell Cycle-Regulated Genes and Prostate Cancer Prognosis in a Population-Based Cohort. *The Prostate*, 75: 1354-1362. PMID: 25990700; PMCID: PMC4992473; DOI: 10.1002/pros.23016. (\*co-first authors)
40. Karyadi, D. M., **Zhao S.\***, He Q., McIntosh, L., Wright, J.L., Ostrander, E.A., Feng, Z., Stanford J.L. (2015). Confirmation of Genetic Variants Associated with Lethal Prostate Cancer in a Cohort of Men from Hereditary Prostate Cancer Families. *International Journal of Cancer*, 136: 2166-2171. PMID: 25273821; PMCID: PMC4331209; DOI: 10.1002/ijc.29241. (\*co-first authors)
41. Geybels M.S., **Zhao S.**, Wong C.J., Bibikova M., Klotzle, B., Wu, M., Ostrander E.A., Fan J.B., Feng Z., Stanford J.L. (2015). Epigenomic Profiling of DNA Methylation in Paired Prostate Cancer versus Adjacent Benign Tissue. *The Prostate*, 75: 1941-1950. PMID: 26383847; PMCID: PMC4928710; DOI: 10.1002/pros.23093.
42. Geybels M.S., Alumkal J.J., Luedeke M., Rinckleb A., **Zhao S.**, Shui I.M., Bibikova M., Klotzle B., van den Brandt P.A., Ostrander E.A., Fan J.B., Feng Z., Maier C., Stanford J.L. (2015). Epigenomic Profiling of Prostate Cancer Identifies Differentially Methylated Genes in TMPRSS2:ERG Fusion-Positive Versus Fusion-Negative Tumors. *Clinical Epigenetics*. PMID: 26692910; PMCID: PMC4676897; DOI: 10.1186/s13148-015-0161-6.
43. Nelson J.C., Cook A.J., Yu O., **Zhao S.**, Jackson L.A., Psaty B.M.(2015). Methods for Observational Post-licensure Medical Product Safety Surveillance. *Statistical Methods in Medical Research*, 24: 177-193. PMID: 22138688; DOI: 10.1177/0962280211413452.
44. **Zhao S.**, Prentice R.L. (2014). Covariate Measurement Error Correction Methods in Mediation Analysis with Failure Time Data. *Biometrics*, 70: 835-844. PMID: 25139469; PMCID: PMC4276494; DOI: 10.1111/biom.12205.
45. **Zhao S.**, Chlebowski R.T., Anderson G., Kuller L.H., Manson J.E., Gass M., Patterson R., Rohan T.E., Lane D.S., Beresford S.A.A, Lavasani, S., Rossouw, J.E., Prentice R.L. (2014). Sex Hormone Associations with Breast Cancer Risk and the Mediation of Randomized Trial Postmenopausal Hormone Therapy Effects. *Breast Cancer Research*. 16: R30. PMID: 24670297; PMCID: PMC4053241; DOI: 10.1186/bcr3632.
46. Stott-Miller, M., **Zhao S.\***, Wright, J.L., Kobl S., Bibikova, M., Klotzle, B., Ostrander, E.A., Fan, J.B., Feng, Z., Stanford, J.L. (2014). Validation Study of Genes with Hypermethylated Promoter Regions Associated with Prostate Cancer Recurrence. *Cancer Epidemiology, Biomarkers & Prevention*, 23: 1331-1339. PMID: 24718283 PMCID: PMC4082437 DOI: 10.1158/1055-9965.EPI-13-1000. (\*co-first authors)
47. Prentice, R.L., **Zhao S.**, Johnson, M., Aragaki, A., Hsia, J., Jackson, R.D., Rossouw, J.E., Manson, J.E., Hanash, S.M. (2013). Proteomic Risk Markers for Coronary Heart Disease and Stroke: Validation and Mediation of Randomized Trial Hormone Therapy



Effects on These Diseases. *Genome Medicine*. 5: 112. PMID: 24373343; PMCID: PMC3971342; DOI: 10.1186/gm517.

48. **Zhao S.**, Cook A.J., Jackson L.A., Nelson J.C. (2012). Statistical Performance of Group Sequential Methods for Post-Licensure Medical Product Safety Surveillance: A Simulation Study. *Statistics and Its Interface*. 5: 381-390. doi: 10.4310/SII.2012.v5.n4.a1.
49. Prentice R.L., **Zhao S.** (2012). On the Use of Biomarkers to Elucidate Clinical Trial Results: Examples from the Women's Health Initiative. *Proceedings of the Fourth Seattle Symposium in Biostatistics: Clinical Trials*, Springer.
50. Nelson J.C., Cook A.J., Yu O., Dominguez C., **Zhao S.**, Greene S., Fireman B., Jacobsen S.J., Weintraub E., Jackson L.A. (2012). Challenges in the Design and Analysis of Sequentially Monitored Postmarket Safety Surveillance Evaluations using Electronic Observational Health Care Data. *Pharmacoepidemiology and Drug Safety*. 21 Suppl 1: 62-71. PMID: 22262594; DOI: 10.1002/pds.2324.
51. Nelson J.C., Bittner R.C., Bounds L., **Zhao S.**, Baggs J., Donahue J.G., Hambidge S.J., Jacobsen S.J., Klein N.P., Naleway A.L., Zangwill K.M., Jackson L.A. (2009). Compliance with Multiple-Dose Vaccine Schedules Among Older Children, Adolescents, 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.

#### Submitted / Under Revision

1. Kim J., Fine J.P., Sandler D.P., Weinberg C.R., **Zhao S.** Accommodating Precancerous Conditions in the Analysis of Cancer Risk: With Application to Breast Cancer and the Sister Study. Under revision for *Epidemiology*.
2. Jiang Y., **Zhao S.**, Fine J.P. Explained Variance Decompositions for Mediation Effect Sizes with Multiple Exposures.
3. Chen L., Fine J., McElrath T., Cantonwine D., Meeker J., Ferguson K.K, **Zhao S.** Semiparametric Analysis of a Generalized Linear Model with Multiple Covariates Subject to Detection Limits.
4. Carroll R., White L., **Zhao S.** A Bayesian Approach to Weighted Quantile Sum Regression.
5. Carroll R., Sandler D.P., **Zhao S.** Understanding the Impact of Social and Physical Environment on Breast Cancer Risk in the NIEHS Sister Study.
6. Wogu A.F., **Zhao S.**, Nichols H.B, Cai J.. Proportional Subdistribution Hazards Model for Competing Risks in Case-Cohort Studies.

#### 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>

## PRESENTATIONS

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

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