

SHANSHAN ZHAO, PH.D.

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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: 919-316-4869
Email: shanshan.zhao@nih.gov

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
Affiliated Assistant Professor

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

Fred Hutchinson Cancer Research Center, September 2009 – September 2012
Graduate Research Assistant

Group Health Research Institute, September 2007 – March 2010
Graduate Research Assistant/Intern

Holden Comprehensive Cancer Center, University of Iowa, June 2006 – May 2007
Graduate Research Assistant

HONORS AND AWARDS

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

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

Tuition Scholarship, University of Iowa, 2005 – 2007

PROFESSIONAL ACITIVITIES

Membership

American Statistical Association, 2008 – present

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

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

International Chinese Statistical Association, 2015 – present

Editorial Appointments

Academic Editor, PLOS One, 2017 – present

Journal Review

Biometrics

Methodology & Computing in Applied Probability

Statistical Methods in Medical Research

Statistics in Medicine

American Journal of Epidemiology

BMC Geriatrics

Genetics in Medicine

Journal of Urology

PLOS One

Paediatric and Perinatal Epidemiology

Service

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

Reviewer, NIH Fellow Award of Research Excellence, 2017

Member, Search Committee for Chief of Biostatistics and Computational Biology Branch, NIEHS/NIH, 2017

MENTORING

Rachel Carroll, NIH Research Fellow, 2016 – present

Jung In Kim, NIH IRTA Fellow, 2017 – present

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

Kevin Day, NIH Summer Intern, 2017

PUBLICATIONS

Published

1. Carroll R., Lawson A.B., **Zhao S.** (2017). Spatial accelerated failure time model for mortality following breast cancer diagnosis. In Press. ***Social Science & Medicine***.
2. **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: 311-319. PMID: 27358489; PMCID: PMC5199634; DOI: 10.1158/1078-0432.CCR-16-0549.
3. Rubicz R., **Zhao S.***, Wright J.L., Coleman I., Grasso C., Geybels M., Leonardson, A., Kolb S., April C., Bibikova M., Troyer D., Lance R., Lin D.W., Ostrander E.A., Nelson P.S., Fan J., Feng Z., Stanford J.L. (2017). Gene Expression Panel Predicts Metastatic-Lethal Prostate Cancer Outcomes in Men Diagnosed with Clinically Localized Prostate Cancer. ***Molecular Oncology***, 11: 140-150. PMID: 28145099; PMCID: PMC5510189; DOI: 10.1002/1878-0261.12014. (*co-first authors)
4. Reese S.E., **Zhao S.**, Wu M.C., Joubert B.R., Parr C.L., Håberg S.E., Ueland P.M., Nilsen R.M., Midttun 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***. PMID: 27323799; PMCID: PMC5391987. DOI: 10.1289/EHP333.
5. Stanford J.L., 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.. Germline Variants in IL4 and MGMT are Associated with Prostate Cancer Mortality: A Meta-analysis of 12,082 Patients from Seven International Cohorts. In Press. ***Prostate Cancer and Prostatic Diseases***.
6. 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 an Increased Risk of Breast Cancer. ***British Journal of Cancer***, 116: 960-960. PMID: 28208154; PMCID: PMC5379146; DOI: 10.1038/bjc.2017.34.
7. 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. (2017). Maternal Alcohol Consumption and Offspring DNA Methylation: Findings from Six General Population-Based Birth Cohorts. In Press. ***Epigenomics***.
8. 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. (2017). Cohort Profile: Pregnancy And Childhood Epigenetics (PACE) Consortium. ***International Journal of Epidemiology***, 1-23. DOI: 10.1093/ije/dyx190.

9. Prentice R.L., **Zhao S.** (2016). Nonparametric Estimation of the Multivariate Survivor Function: the Multivariate Kaplan-Meier Estimator. *Lifetime Data Analysis*. PMID: 27677472; PMCID: PMC5373162; DOI: 10.1007/s10985-016-93830y.
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. (2016). DNA Methylation Profiles in African American Prostate Cancer Patients in Relation to Disease Progression. *Genomics*. doi: 10.1016.j.ygeno.2016.02.004. PMID: 26902887; PMCID: PMC4992660.
11. 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: 2168-2177. PMID: 27142338; PMCID: PMC4930391; DOI: 10.1002/cncr.30045.
12. Valeri L., Reese S.L., **Zhao S.**, Page C.M., Nystad W., Coull B.A., London S.J. (2016). Misclassified Exposure in Epigenetic Mediation Analyses. Does DNA Methylation Mediate Effects of Smoking on Birthweight? *Epigenomics*, 9: 253-265. PMID: 28234025 PMCID: PMC5331915; DOI: 10.2217/epi-2016-0145.
13. 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.
14. 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; PMCID: PMC4871721; DOI: 10.1016/j.juro.2015.12.101.
15. **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.
16. 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. *Prostate*, 75: 1354-1362. PMID: 25990700; PMCID: PMC4992473; DOI: 10.1002/pros.23016. (*co-first authors)
17. 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)
18. 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. *Prostate*, 75: 1941-1950. PMID: 26383847; PMCID: PMC4928710; DOI: 10.1002/pros.23093.

19. 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.
20. 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.
21. **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.
22. **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.
23. 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)
24. 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.
25. **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.
26. 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.
27. 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.
28. Nelson J.C., Bittner R.C., Bounds L., **Zhao S.**, Baggs J., Donahue J.G., Hambridge 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.

Under Revision/ Submitted

1. Carroll R., **Zhao S.** Spatial Heterogeneity: Gaining relevance from the random. Under revision for ***Spatial and Spatial Temporal Epidemiology***.
2. Nethery R.C., Sandler D.P., **Zhao S.**, Engal L.S., Kwok, R.K.. A Joint Spatial Factor Analysis Model to Accommodate Data from Misaligned, Nested Areal Units with Application to Louisiana Social Vulnerability. Under revision for ***Biostatistics***.
3. Dong J., Buas M.F., Gharahkhani P., Kendall B.J., **Zhao S.**, Whiteman D.C., Vaughan T.L., Thrift A.P.. Risk Prediction for Barretts Esophagus and Esophageal Adenocarcinoma: Incorporation of epidemiologic risk factors and 23 confirmed genetic loci. Under revision for ***Gastroenterology***.
4. Carroll R., Lawson A.B., **Zhao S.** Spatio-temporal accelerated failure time model for time to event data in disease mapping. Submitted.
5. Carroll R., Lawson A.B., **Zhao S.** A data-driven approach for estimating the change-points and impact of major events on disease risk. Submitted.
6. **Zhao S.**, McDaniel A., Leonardson A., Yu M., Geybels M., Jhun M., Kolb S., Zong H., Carter K., Bibikova M., Wright J.L., Morrissey C., Pritchard C.C., Lance R., Troyer D., Fan J., Dai J., Ostrander E.A., Siddiqui J., Feng Z., Tomlins S., Stanford J.L.. A Five-CpG DNA Methylation Score has Prognostic Value for Metastatic Progression in Men Treated for Localized Prostate Cancer. Submitted.

BOOKS

Prentice R.L., **Zhao S.** The Statistical Analysis of Multivariate Failure Time Data. Under contract with Chapman & Hall/CRC Press. Manuscript to be delivered 2018.

PRESENTATIONS

1. Disease Risk Assessment and Prediction. NIEHS Epigenetic & Stem Cell Biology Laboratory Seminar. (November 2017, invited)
2. Analyzing Mortality Following Breast Cancer Diagnosis in Louisiana SEER Data via a Spatial Accelerated Failure Time Model. Joint Statistical Meetings, Baltimore, MD. (August 2017)
3. Statistical Methods for Multivariate Failure Time Data Analysis. International Chinese Statistical Association Symposium, Chicago, IL. (June 2017, invited)
4. Statistical Methods for Multivariate Failure Time Data Analysis. ENAR Spring Meeting, Washington D.C.. (March 2017)
5. Better Use of Family History Data to Predict Breast Cancer Risk. Joint Statistical Meetings, Chicago, IL. (August 2016)
6. Better Use of Family History Data to Predict Breast Cancer Risk. International Chinese Statistical Association Symposium, Atlanta, GA. (June 2016, invited)

7. Statistical Methods for Risk Assessment and Prediction. NIEHS Retreat, Raleigh, North Carolina. (April 2016, invited)
8. Regression Methods for Bivariate Failure Time Data. NIEHS Biostatistics and Computational Biology Branch Seminar. (March 2016, invited)
9. Regression Methods for Bivariate Failure Time Data. Joint Statistical Meetings, Seattle, WA. (August 2015)
10. Measurement Error Correction Methods in Mediation Analysis with Failure Time Data. NIEHS, Research Triangle Park, North Carolina. (April 2014, invited)
11. Measurement Error Correction Methods in Mediation Analysis with Failure Time Data. University of Nevada, Reno. (January 2014, invited)
12. Estimation from a Two-Stage Biomarker Study Allowing Early Termination for Futility. Joint Statistical Meetings, Montreal, Canada. (August 2013)
13. Measurement Error Correction Methods in Mediation Analysis with Failure Time Data. Department of Biostatistics, University of Texas MD Anderson Cancer Center. (June 2013, invited)
14. Measurement Error Correction Methods in Mediation Analysis with Failure Time Data. Joint Statistical Meetings, San Diego, CA. (August 2012)
15. Measurement Error Correction Methods in Mediation Analysis with Failure Time Data. Department of Biostatistics, University of Washington, Seattle, WA. (September 2011)
16. 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).
17. 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).
18. Statistical Performance of Group Sequential Methods for Evaluating Post-Marketing Vaccine and Drug Safety: A Simulation Study. Joint Statistical Meetings, Denver, CO (August 2008).