Fangyuan Zhang

Department of Mathematics & Statistics, Texas Tech University

Education

May 2015 **Ph.D Biostatistics**, *The Ohio State University, Ohio*.

2012 **M.S. Statistics**, *The Ohio State University, Ohio*.

2010 **B.S. Statistics**, *Beijing Normal University, Beijing, China*.

Ph.D thesis

Title **Detecting genomic imprinting and maternal effects in family-based association studies**

Advisor **Prof. Shili Lin**

Research Interest

- **Developing parametric and nonparametric statistical methods to detect genomic imprinting and maternal effects under different study designs.**
- **Testing for association in a heterogeneous sample and its application on tumor clustering based on gene signatures**
- **Chromatin Interaction Analysis by Paired-End Tag Sequencing Data**
- **Constructing 3D structure of Chromosomes based on Hi-C data**
- **Multiple comparisons**

Professional Experience

2015–present **Assistant Professor of Statistics**, Texas Tech University.

2012–2015 **Research Associate**, *with Prof. Shili Lin*, The Ohio State University.

Jun–Aug 2012 **Research Associate**, *with Prof. H.N. Nagaraja*, The Ohio State University.

2011–2012 **Teaching Associate**, The Ohio State University.

2009–2010 **Intern**, *with Prof. Chen Yao*, Peking University Clinical Research Institute.

Publications

- H. MANSOURI & **F. ZHANG**, Simultaneous rank tests in analysis of covariance based on pairwise ranking. Submitted.
- **F. ZHANG** & S. LIN. (2020) Imprinting and maternal effect detection using partial likelihood incorporating nearby loci. *Eur J Hum Gene*. doi: 10.1038/s41431-020-0590-3. [Epub ahead of print]

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- D. Wang*, T. WANG, A. Gill, T. HILLIARD, F. CHEN, A.L. KARAMYSHEV, & **F. Zhang***. (2020) Uncovering the cellular capacity for intensive and specific feedback self-control of the argonautes and MicroRNA targeting activity. *Nucleic Acids Research*. gkaa20. (* co-corresponding authors)

- D.P. Chen, **F. ZHANG** & S. LIN. (2019) AIJ: Joint Test for Simultaneous Detection of Imprinting and Allelic Expression Imbalance. *Math Biosci Eng*. 17(1):366-386

- **F. ZHANG**, A. Khalili & S. LIN. (2019) Imprinting and maternal effect detection using partial likelihood based on discordant sibship data. *Statistica Sinica*. 29:1915-1937.

- W. JIANG, Z. GUO, N. LAGES, W. ZHENG, D. FELIERS, **F. ZHANG** & D. WANG. (2018) Multi-parameter analysis of cellular coordination of multiple transcriptome regulation mechanisms. *Scientific Reports*. 8(1): 5742

- M. TODA, **F. ZHANG** & B. ATHUKORALLAGE. (2017) Mathematical models of beta barrels. *PROTEINS: Structure, Function, and Bioinformatics*. 86(1): 35-42

- **F. ZHANG** & D. WANG. (2017) The pattern of microRNA binding site distribution. *Genes*. 8(11): 296

- **F. ZHANG** , J. DING & S. LIN. (2017) Testing for associations of opposite directionality in a heterogeneous population. *Statistics in BioSciences*. 9(1): 137-159

- Z. QIN, B. LI, K. CONNEELY, H. WU, M. HU, D. AYYALA, Y. PARK, V. JIN, **F. ZHANG**, H. ZHANG, L. LI & S. LIN. (2016) Statistical challenges in analyzing methylation and long-range chromosomal interaction data. *Statistics in BioSciences*. 8(2): 284-309

- **F. ZHANG***, A. KHALILI* & S. LIN. (2015) Optimum study design for detecting imprinting and maternal effects based on partial likelihood. *Biometrics*. 72(1): 95-105.(* co-first authors)

- H. N. NAGARAJA, K. BHARATH & **F. ZHANG**. (2015) Spacings around an order statistic. *Annals of the Institute of Statistical Mathematics*. 67: 515-540.

- **F. ZHANG** & S. LIN. (2014) Nonparametric method for detecting imprinting effect using all members of general pedigrees with missing data. *Journal of Human Genetics*. 59: 541-548.

- **F. ZHANG** & S. LIN. (2014) Detection of imprinting effects for hypertension based on general pedigrees utilizing all affected and unaffected individuals. *BMC proceedings*. 8(Suppl 1):S52.

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Manuscripts in Progress

- **F. ZHANG**, A. KHALILI & S. LIN. Imprinting and maternal effect detection using penalized partial likelihood.

Presentations

2019 **Flash talk & Poster**, *"Detecting imprinting and maternal effects using Monte Carlo expectation maximization algorithm"*, 2019 New Researcher Conference, Colorado.

2019 **Poster**, *"Detect differentially methylated regions using non-homogeneous hidden Markov model"*, Scientific Computing meets Machine Learning and Life Sciences, the Department of Mathematics & Statistics at Texas Tech University.
Presented by Xue, S.

2019 **Poster**, *"Network clustering with entropy-based monte carlo method"*, Scientific Computing meets Machine Learning and Life Sciences, the Department of Mathematics& Statistics at Texas Tech University.
Presented by Zhai, Q.

2019 **Poster**, *"Testing for marginal independence between two categorical variables with multiple responses"*, Scientific Computing meets Machine Learning and Life Sciences, the Department of Mathematics & Statistics at Texas Tech University.
Presented by Nguyen, X. T.

2018 **Poster**, *"Detecting imprinting and maternal effects using Monte Carlo expectation maximization algorithm"*, 2018 Summer Research Conference, Virginia.
Presented by Aavani, P.

2018 **Presentation**, *"Irrigation Rates, Soil Physical Properties and Topography Effects on Cotton Yield in the Southern High Plains"*, International Aridlands Conference, Lubbock, TX.
Presented by Neupane, J.

2018 **Poster**, *"A custom microarray dataset for discovery of drought stress responses and breeding for water use efficiency in Sorghum bicolor"*, Southern Section American Society of Plant Biologists Annual Meeting, New Orleans LA.
Presented by Weligodage, H. D. S.

2018 **Presentation**, *"A custom microarray dataset for discovery of drought stress responses and breeding for water use efficiency in Sorghum bicolor"*, 9th Texas Tech Annual Biological Sciences Symposium, Texas Tech University, Lubbock TX.
Presented by Weligodage, H. D. S.

2018 **Presentation**, *"Incorporating Information from nearby loci for detection of imprinting and maternal effects based on partial likelihood"*, International Indian Statistical Association, University of Florida, Gainesville FL.

2017 **Presentation**, *"Beta Barrels as Elastic Surfaces (50 min lecture)"'*, AMS Conf Special Session Special Session on Differential Geometry of Smooth and Discrete Surfaces in Euclidean and Lorentz Spaces, Denton TX.
Presented by Dr. Magda Toda

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2017 **Presentation**, *"Simultaneous Rank Tests for Pairwise Comparisons in Analysis of Covariance"*, 10th International Conference on Multiple Comparison Procedures, University of California Riverside CA.
Presented by Dr. Hossein Mansouri

2017 **Presentation**, *"Testing for Associations of Opposite Directionality in a Heterogeneous Population"*, Conference of Texas Statisticians, Dallas TX.

2016 **Presentation**, *"TAD-Penalized 3D Modeling of Chromosomal Structure Reconstruction"*, the Joint Statistical Meetings, Chicago IL.

2016 **Presentation**, *"Detecting Association in a Heterogeneous Sample"*, Beijing Normal University, Beijing, China.

2016 **Presentation**, *"Robust Partial Likelihood Method for Detecting Imprinting and Maternal Effects"*, Nankai University, Tianjin, China.

2016 **Presentation**, *"Robust Partial Likelihood Method for Detecting Imprinting and Maternal Effects"*, ENAR, Austin TX.

2015 **Presentation**, *"Discordant Sibship Design for detecting Imprinting and Maternal Effects based on Partial Likelihood"*, the Joint Statistical Meetings, Washington State Convention Center, Seattle WA.

2015 **Presentation**, *"Detecting Genomic Imprinting and Maternal Effects in Family-based Association Studies "*, Whitney Research Award/Cooley Memorial Prize Seminar, The Ohio State University, Columbus OH.

2015 **Presentation**, *"Imprinting and Maternal Effect Detection Using Partial Likelihood Based on Discordant Sibship Data"*, The 2015 Annual Joint Biostatistics Symposium, Case Western Reserve University, Cleveland OH.

2014 **Poster**, *"Imprinting and Maternal Effect Detection Using Partial Likelihood Based on Discordant Sibship Data"*, Statistics/Biostatistics poster session, The Ohio State University, Columbus OH.

2014 **Poster**, *"Detecting Association in a Heterogeneous Sample"*, Beyond Bioinformatics: Statistical and Mathematical Challenges (Bioinformatics), North Carolina Biotechnology Center, Raleigh NC.

2014 **Presentation**, *"Imprinting and Maternal Effect Detection Using Partial Likelihood Based on Discordant Sibship Data"*, the Joint Statistical Meetings, Boston Convention and Exhibition Center, Boston MA.

2014 **Poster**, *"Imprinting and Maternal Effect Detection Using Partial Likelihood Based on Discordant Sibship Data"*, Road to Collaboration: NCH and OSU Human Genetics Community, Nationwide Children's Hospital, Columbus OH.

2014 **Poster**, *"Imprinting and Maternal Effect Detection Using Partial Likelihood Based on Discordant Sibship Data"*, Ohio State - Cleveland Clinic Foundation - Case Western Reserve University Biostatistics Joint Symposium, The Ohio State University, Columbus OH.

2013 **Presentation**, *"Asymptotic Property and Study Design for Detecting Imprinting and Maternal Effects Based on Partial Likelihood"*, "Statistics at the Crossroads: Its Multifaceted Impact on the Society" symposium, the University of Akron, Akron OH.

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2013 **Poster**, *"Asymptotic Property and Study Design for Detecting Imprinting and Maternal Effects Based on Partial Likelihood"*, Statistics/Biostatistics poster session, The Ohio State University, Columbus OH.

2012 **Presentation**, *"Detection of Imprinting Effects for Hypertension Based on General Pedigrees Utilizing All Affected and Unaffected Individuals"*, Genetic Analysis Workshop 18, Stevenson WA.

Journal Referee

Annals of Applied Statistics.
Annals of Human Genetics.
Bioinformatics.
Biometrics.
BMC Bioinformatics.
Human Heredity.
Journal of Applied Statistics.
Journal of Biopharmaceutical Statistics.
Journal of Biomedical Science and Engineering.
Journal of Human Genetics.
PLOS One.
Statistical Applications in Genetics and Molecular Biology.

Software Packages

- contribute to R packages: MCPPATu part of MC-PDT; information and sample size calculation parts of LIME; LIME$_{DSP}$; CEMC$_{tp}$.

Grants

- Zhang, Yan (Principal), **Zhang, Fangyuan** (Co-Principal), Dennis, Jeff, Robertson, Brandy, Jenn ings, Carrie, Riggins, Mary Ellen, Sherry, Allen, (2017-2019) "Gender differences in 30-day mortality rates and unplanned readmission for patients treated for heart attack and stroke". LWBIWH/UMC Research Scholars & Seed Grant. Sponsored by LWBIWH and UMC, $\$20,000.00$.

Travel Grants

- Received Biometrics Section Student Travel Award for the 2015 JSM meeting in Seattle.
- Received funding for preparation to present a poster in Beyond Bioinformatics: Statistical and Mathematical Challenges (Bioinformatics) Workshop in Raleigh NC, October 2014.
- Received funding for preparation to present a paper in the Joint Statistical Meetings in Boston MA, funded by Gary G. Koch and Family Graduate Student Travel Award Endowment Fund, August 2014.

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- Received funding to participate in the Midwest Biopharmaceutical Statistics Workshop in Muncie, Indiana, May 2014.
- Received funding for preparation to present a paper in the Genetic Analysis Workshop 18 in Stevenson WA, October 2012.

Honors and Awards

2014-2015 **Biometrics Section Student Travel Award for the 2015 JSM in Seattle**.
2014–2015 **Whitney Research Award**.
2014–2015 **Presidential Fellowship**.
2013–2014 **Best Research Associate Award**.
2010–2011 **The Ohio State University Fellowship**.
2008–2009 **Beijing Normal University the professional Second Prize Scholarship**.
2007–2008 **Beijing Normal University the professional First Prize Scholarship**.
2006–2007 **Beijing Normal University the professional Second Prize Scholarship**.
2006–2010 **Selected into Beijing Normal University LiYun Talents Training Plan**.

Teaching Experience

2020 Spring **Lecturer**, *Math3342: Mathematical Statistics for Scientists and Engineers, Texas Tech University*.
2020 Spring **Lecturer**, *Stat 5374: Theory of Linear Statistical Models, Texas Tech University*.
2019 Fall **Lecturer**, *Stat 5326: Biostatistics, Texas Tech University*.
2019 Fall **Lecturer**, *Stat 5373: Design of Experiments, Texas Tech University*.
2019 Spring **Lecturer**, *Math 4342: Mathematical Statistics I, Texas Tech University*.
2019 Spring **Lecturer**, *Stat 5373: Design of Experiments, Texas Tech University*.
2018 Fall **Lecturer**, *Stat 5326: Biostatistics, Texas Tech University*.
2018 Fall **Lecturer**, *Math 3342: Mathematical Statistics for Scientists and Engineers, Texas Tech University*.
2018 Spring **Lecturer**, *Stat 5373: Design of Experiments, Texas Tech University*.
2017 Fall **Lecturer**, *Math 3342: Mathematical Statistics for Scientists and Engineers, Texas Tech University*.
2017 Spring **Lecturer**, *Stat 5373: Design of Experiments, Texas Tech University*.
2016 Fall **Lecturer**, *Math 3342: Mathematical Statistics for Scientists and Engineers, Texas Tech University*.
2016 Spring **Lecturer**, *Math 3342: Mathematical Statistics for Scientists and Engineers, Texas Tech University*.
2015 Fall **Lecturer**, *Math 3342: Mathematical Statistics for Scientists and Engineers, Texas Tech University*.
2012 **Recitation Leader**, *STAT 135: Elementary Statistics, The Ohio State University*.
Grader, *STAT 529: Data Analysis 2, The Ohio State University*.

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2011 **Recitation Leader**, *STAT 133: Statistics Business Science, The Ohio State University*.

Thesis/Non-Thesis Committee/Chair

Ph.D. Candidacy Exam Committee Member

2016 **Bo Li**.

2017 **Purna Gamage**.

2019 **Mai Dao; Dong Xu**.

Ph.D. Dissertation Committee Member

2015 **Bo Li**.

2018 **Purna Gamage**.

2018 **Quan Hoang**.

2019 **Mengmeng Guo**.

Master Thesis Committee Chair

2019 **Pooya Aavani**.

Master Thesis Committee Member

2019 **Yazhou Sun**.

Master Report Committee Chair

2017 **Yujia Pan**.

2018 **Audrey Gill, Qiannan Zhai**.

2019 **Ying Teng, Nan Mi**.

Master Report Committee Member

2016 **Yang Cai, Qingmin Zeng**.

2017 **Danna Naser, Kallie Judge, Li Sun, Yumin Xie, Zhigang Yu**.

2018 **Yao Fu, Roham Agha, Jasmine Neupane**.

2019 **Lingjuan Qi**.

University/Community Service

2017-2020 May/Aug **Preliminary Exam Committee**, *Write and Grade DOE Exams*, Department of Mathematics and Statistics, Texas Tech University.

2019 **Dean's representative**, *Attend Pooya Aavani's PhD Dissertation Defense*, Texas Tech University.

2019 May **Exam Reviwer**, *for Math 1330*, Texas Tech University.

2018 Nov **Exam Reviwer**, *for Math 1330*, Texas Tech University.

2018 May **Exam Reviwer**, *for Math 2300*, Texas Tech University.

2017 Oct-Present **Undergraduate Committee**, *Department of Mathematics and Statistics*, Texas Tech University.

2017 Mar **Judge**, *Best Poster Award*, Conference of Texas Statisticians, Dallas. TX

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2016 **Dean's representative**, *Attend Qing Zhang's PhD Dissertation Defense*, Texas Tech University.

2016 Aug **Preliminary Exam Committee**, *Grade Exams*, Department of Mathematics and Statistics, Texas Tech University.

2016 **Search Committee**, *Department of Mathematics and Statistics*, Texas Tech University.

2015 **Search Committee**, *Department of Mathematics and Statistics*, Texas Tech University.

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