Curriculum Vitae

Yang Shi, Ph.D.

January 1, 2020

Position and Contact Information

Assistant Professor Division of Biostatistics and Data Science Department of Population Health Sciences (Primary Appointment) Department of Neuroscience and Regenerative Medicine (Joint Appointment) Medical College of Georgia, Augusta University Mailing Address: 1120 15th Street, AE-1035, Augusta, GA 30912 Phone: (706) 721-5712 (office) | Fax: (706) 721-6294 (department) Email: yshi@augusta.edu Webpage: <u>https://www.augusta.edu/mcg/dphs/bds/people/yang_shi.php</u>

Education

- Ph.D. in Biostatistics, University of Michigan, Ann Arbor, Michigan, 2013 2016.
- M.S. in Biostatistics, University of Michigan, Ann Arbor, Michigan, 2011 2013.
- Attended Johns Hopkins University, Baltimore, Maryland, 2009 2011.
- B.S. in Biological Science, Peking University, Beijing, P. R. China, 2005 2009.

Employment and Appointments

• Full-time Employment

Assistant Professor, 08/2018 – Present

Division of Biostatistics and Data Science, Department of Population Health Sciences (Primary Appointment),

Department of Neuroscience and Regenerative Medicine (Joint Appointment),

Medical College of Georgia, Augusta University, Augusta, Georgia

Special-term Associate Professor (non-tenured), 09/2017 - 07/2018

Department of Epidemiology and Biostatistics, West China School of Public Health, Sichuan University, Chengdu, Sichuan, P. R. China

Biostatistics Research Scientist, 02/2015 – 05/2017

University of New Mexico Comprehensive Cancer Center, Albuquerque, New Mexico

• Part-time Appointments and Internships

Graduate Research Assistant, 01/2013 - 12/2014 Department of Biostatistics, University of Michigan, Ann Arbor, Michigan

Graduate Teaching Assistant, 09/2012 - 12/2012 and 09/2014 - 12/2014 Department of Biostatistics, University of Michigan, Ann Arbor, Michigan

Summer Research Internship, 05/2012 - 09/2012 Department of Biostatistics, University of Michigan, Ann Arbor, Michigan

Research Trainee, 01/2010 - 07/2011

Johns Hopkins University School of Medicine, Baltimore, Maryland

Undergraduate Research Assistant, 02/2007 - 06/2008 and 10/2008 - 12/2009 The Ministry of Education Key Laboratory of Cell Proliferation and Differentiation, Peking University, Beijing, P. R. China

Summer Research Internship (sponsored by the Howard Hughes Medical Institute International Summer Exchange Student Fellowship), 06/2008 - 09/2008 Johns Hopkins University School of Medicine, Baltimore, Maryland

Research Interests

• Methodology

Monte Carlo Methods and Simulations, The Cross-Entropy Method, Resampling Methods, Mixed-effects Models, Generalized Linear Models, Statistical Computing and Numerical Methods.

• Application

Genomics, Bioinformatics, Computational Biology, Neuroscience and Neurological Disorders, Cancer Research.

Publications

• Published or accepted peer-reviewed journal articles

(*indicates I am the corresponding author or one of the joint corresponding authors; #indicates I am one of the co-first authors)

-Before Year 2018:

1. Xuelong Lu, **Yang Shi**, Quanlong Lu, Yan Ma, Jia Luo, Qingsong Wang, Jianguo Ji, Qing Jiang, Chuanmao Zhang (2010). Requirement for lamin B receptor and its regulation by importin beta and phosphorylation in nuclear envelope assembly during mitotic exit. *Journal of Biological Chemistry* 285 (43): 33281-33293.

2. **Yang Shi** and Hui Jiang (2013). rSeqDiff: Detecting Differential Isoform Expression from RNA-Seq Data Using Hierarchical Likelihood Ratio Test. *PLOS ONE*, 8 (11): e79448.

3. Rohit Malik, Lalit Patel, John R Prensner, **Yang Shi**, Matthew K Iyer, Shruthi Subramaniyan, Alexander Carley, Yashar S Niknafs, Anirban Sahu, Sumin Han, Teng Ma, Meilan Liu, Irfan A Asangani, Xiaojun Jing, Xuhong Cao, Saravana M Dhanasekaran, Dan R Robinson, Felix Y Feng, Arul M Chinnaiyan (2014). The lncRNA PCAT29 inhibits oncogenic phenotypes in prostate cancer. *Molecular Cancer Research*, 12 (8): 1081-1087.

4. Aaron M Udager#, **Yang Shi**#, Scott A Tomlins, Ajjai Alva, Javed Siddiqui, Xuhong Cao, Kenneth J Pienta, Hui Jiang, Arul M Chinnaiyan, Rohit Mehra (2014). Frequent discordance between ERG gene rearrangement and ERG protein expression in a rapid autopsy cohort of patients with lethal, metastatic, castration-resistant prostate cancer. *The Prostate*, 74 (12): 1199-1208. #Co-first authors.

5. Rohit Mehra, **Yang Shi**, Aaron M Udager, John R Prensner, Anirban Sahu, Matthew K Iyer, Javed Siddiqui, Xuhong Cao, John Wei, Hui Jiang, Felix Y Feng, Arul M Chinnaiyan (2014). A Novel RNA In Situ Hybridization Assay for the Long Noncoding RNA SChLAP1 Predicts Poor Clinical Outcome After Radical Prostatectomy in Clinically Localized Prostate Cancer. *Neoplasia*, 16 (12): 1121–1127.

6. Iris H Wei, **Yang Shi**, Hui Jiang, Chandan Kumar-Sinha, Arul M Chinnaiyan (2014). RNA-Seq Accurately Identifies Cancer Biomarker Signatures to Distinguish Tissue of Origin. *Neoplasia*, 16 (11): 918-927.

7. **Yang Shi**, Arul M Chinnaiyan, Hui Jiang (2015). rSeqNP: A non-parametric approach for detecting differential expression and splicing from RNA-Seq data. *Bioinformatics*, 31 (13): 2222-2224.

8. Kathryn M Frietze, Richard BS Roden, Ji-Hyun Lee, **Yang Shi**, David S Peabody, Bryce Chackerian (2016). Identification of anti-CA125 antibody responses in ovarian cancer patients by a novel deep sequence-coupled biopanning platform. *Cancer Immunology Research*, 4 (2): 1-8.

9. Aaron M Udager, Angelo M. DeMarzo, **Yang Shi**, Jessica L Hicks, Xuhong Cao, Javed Siddiqui, Hui Jiang, Arul M Chinnaiyan, Rohit Mehra (2016). Concurrent nuclear ERG and MYC protein overexpression defines a subset of locally advanced prostate cancer: Potential opportunities for synergistic targeted therapeutics. *The Prostate*, 76 (9): 845-853.

10. Mei-Fang Xiao, Desheng Xu, Michael T Craig, Kenneth A Pelkey, Chun-Che Chien, **Yang Shi**, Juhong Zhang, Susan Resnick, Olga Pletnikova, David Salmon, James Brewer, Steven Edland, Jerzy Wegiel, Benjamin Tycko, Alena Savonenko, Roger H Reeves, Juan C Troncoso, Chris J McBain, Douglas Galasko, Paul F Worley (2017). NPTX2 and Cognitive Dysfunction in Alzheimer's disease. *eLife*, 6: e23798.

11. Jack Cuzick, Orrin Myers, Ji-Hyun Lee, **Yang Shi**, Julia C Gage, William C Hunt, Michael Robertson, Cosette M Wheeler (2017). Outcomes in women with cytology showing atypical squamous cells of undetermined significance with vs without human papillomavirus testing. *JAMA Oncology*, 3 (10): 1327-1334.

- Year 2018:

12. Yang Shi* and Ji-Hyun Lee (2018). Sample size calculations for group randomized trials with unequal group sizes through Monte Carlo simulations. *Statistical Methods in Medical Research*, 27 (9): 2569-2580 (published online in advance in December 2016). *Corresponding author.

13. Irene Orlow, **Yang Shi**, Peter A Kanetsky, Nancy Thomas, Li Luo, Sergio Corrales-Guerrero, Anne E Cust, Lidia Sacchetto, Roberto Zanetti, Stefano Rosso, Bruce K Armstrong, Terence Dwyer, Alison Venn, Richard P Gallagher, Stephen B Gruber, Loraine D Marrett, Hoda Anton-Culver, Klaus Busam, Colin B Begg, Marianne Berwick (2018). The interaction between vitamin D receptor polymorphisms and sun exposure around time of diagnosis influences melanoma survival. *Pigment Cell & Melanoma Research*, 31 (2): 287-296.

14. Kang Wang, Qiu-Juan Wang, Yong-Fu Xiong, **Yang Shi**, Wen-Jing Yang, Xiang Zhang, Hong-Yuan Li (2018). Survival comparisons between early male and female breast cancer patients: a population-based, propensity score matched, longitudinal cohort study. *Scientific Reports*, 8 (1): 8900.

15. Kang Wang, Xiang Zhang, Ke Zheng, Xue-Dong Yin, Lei Xing, Ai-Jie Zhang, **Yang Shi**, Ling-Quan Kong, Fan Li, Bin-Lin Ma, Hui Li, Jin-Ping Liu, Jun Jiang, Guo-Sheng Ren, Hong-Yuan Li (2018). Predictors of Internal Mammary Lymph Nodes (IMLN) Metastasis and Disease-free Survival Comparison between IMLN-Positive and IMLN-Negative Breast Cancer Patients: Results from Western China Clinical Cooperation Group (WCCCG) database. *Medicine*, 97 (28): e11296.

16. Dali Ding, Weiping Shi*, **Yang Shi*** (2018). Numerical simulation of embryo transfer: how the viscosity of transferred medium affects the transport of embryos. *Theoretical Biology and Medical Modelling*, 15 (1): 20. *Joint corresponding authors.

17. Kang Wang, Hai-Lin Li, Yong-Fu Xiong, Zhuyue Li, **Yang Shi**, Jie Li, Xiang Zhang, Hong-yuan Li (2018). Development and validation of nomograms integrating immunerelated genomic signatures with clinicopathologic features to improve prognosis prediction of triple negative breast cancer: a gene-expression-based retrospective study. *Cancer Medicine*, 8: 686–700

18. Kang Wang, Gui-Qi Zhu, **Yang Shi**, Zhu-Yue Li, Xiang Zhang, Hong-Yuan Li (2018). Long-term Survival Differences Between T1-T2 Invasive Lobular Breast Cancer and Corresponding Ductal Carcinoma After Breast-conserving Surgery: A Propensity Scored Matched, Longitudinal Cohort Study. *Clinical Breast Cancer*, 19 (1): e101-e115.

-Year 2019:

19. Yang Shi*, Mengqiao Wang, Weiping Shi, Ji-Hyun Lee, Huining Kang*, Hui Jiang* (2019). Accurate and efficient estimation of small *p*-values with the cross-entropy method: applications in genomic data analysis. *Bioinformatics*, 35 (14): 2441-2448. *Joint corresponding authors.

20. Kang Wang#, **Yang Shi**#, Zhu-Yue Li, Ye-Lei Xiao, Jie Li, Xiang Zhang, Hong-Yuan Li (2019). Metastatic Pattern Discriminates Survival Benefit of Primary Surgery for De Novo Stage IV Breast Cancer: A Real-World Observational Study. *European Journal of Surgical Oncology*, 45(8):1364-1372. #Co-first authors.

21. Mengqiao Wang, Xinghan Sun, **Yang Shi**, Xiaojun Song, Hao Mi (2019). A genomewide association study on photic sneeze reflex in the Chinese population. *Scientific Reports*, in press. Published online in advance in March 2019:

https://www.nature.com/articles/s41598-019-41551-0.

22. Zhuyue Li, Kang Wang, **Yang Shi**, Xuemei Zhang, Jin Wen (2019). Incidence of second primary malignancy after breast cancer and related risk factors - is breast conserving surgery safe? A nested case-control study. *International Journal of Cancer*, in press. Published online in advance in March 2019: <u>https://doi.org/10.1002/ijc.32259</u>.

23. Kang Wang, Yutuan Wu, Xiang Zhang, Li Chen, Wenming Zhu, Ke Zheng, Xuedong Yin, Aijie Zhang, Lin-Jie Lu, Fan Li, Binlin Ma, Hui Li, Jinping Liu, Jun Jiang, Zhuyue Li, **Yang Shi**, Hong-Yuan Li, Guosheng Ren (2019). Clinicopathologic and prognostic significance of body mass index (BMI) among breast cancer patients in western China: a retrospective multi-center cohort based on Western China Clinical Cooperation Group (WCCCG). *BioMed Research International*, in press. Published online in advance in April 2019: https://doi.org/10.1155/2019/3692093.

24. AE Cust, C Badcock, J Smith, NE Thomas, LE Haydu, BK Armstrong, MH Law, JF Thompson, PA Kanetsky, CB Begg, **Y Shi**, A Kricker, I Orlow, A Sharma, S Yoo, SF Leong, M Berwick, DW Ollila, S Lo (2019). A risk prediction model for development of subsequent primary melanoma in a population-based cohort. *British Journal of Dermatology*, in press. Published online in advance in September 2019:

https://doi.org/10.1111/bjd.18524.

• Peer-reviewed conference abstracts published in journal supplemental issues

1. Kang Wang, Yang Shi, Xiang Zhang, Guo-Sheng Ren, Hong-Yuan Li (2019). Metastatic pattern discriminates survival benefit of primary surgery for de novo stage IV breast cancer patients: A longitudinal cohort study. *Cancer Research*,79 (4 Supplement): P2-14-10-P2-14-10.

2. Felix YC Feng, Shuang Zhao, John Prensner, Nicholas Erho, Matthew J Schipper, **Yang Shi**, Cristina Magi-Galluzzi, Javed Siddiqui, Elai Davicioni, Robert B Den, Adam Dicker, R Jeffrey Karnes, John T Wei, Eric A Klein, Robert B Jenkins, Arul M Chinnaiyan, Rohit Mehra (2015). Investigating the long noncoding RNA SChLAP1 as a prognostic tissue and urine biomarker in prostate cancer. *Journal of Clinical Oncology*, 33 (7 Supplement): 7. 3. Rohit Malik, Amjad P Khan, John R Prensner, Matthew K Iyer, Dmitry Borkin, Xiaoju Wang, Xia Jiang, Shruthi Subramaniam, **Yang Shi**, Rachell Stender, Yi-Mi Wu, Xuhong Cao, Jolanta Grembecka, Tomasz Cierpicki, Arul Chinnaiyan (2014). Targeting novel co-activators of androgen receptor in castration resistant prostate cancer. *Cancer Research*, 74 (19 Supplement): 1398.

• Manuscripts submitted or in revision

1. **Yang Shi**, Huining Kang, Ji-Hyun Lee, Hui Jiang (2019+). Fast permutation test using adaptive cross-entropy method for differential gene expression analysis. Submitted. arXiv preprint available at: <u>https://arxiv.org/abs/1608.00053</u>.

2. Sarah Friend, Yara Abdou, Christine Gan, Yehuda Patt, Ian Rabinowitz, **Yang Shi**, Ji-Hyun Lee, Kasra Mojtahed, Glenroy Heywood, Gulshan Parasher, Richard Lauer, Dulcinea Candelaria, Fa-Chyi Lee (2019+). Phase II Clinical Trial of Combination Oxaliplatin, Irinotecan, and Cetuximab for Patients with Locally Advanced or Metastatic Pancreatic Cancer. Submitted.

• Other scholarly products

Ph.D. dissertation at the University of Michigan. Title: Statistical and Computational Methods for Differential Expression Analysis in High-throughput Gene Expression Data. Available at the University of Michigan Library website:

https://deepblue.lib.umich.edu/handle/2027.42/135864

rSeqDiff: An R package for detecting differential isoform expression from RNA-Seq data using hierarchical likelihood ratio test.

Available at: <u>http://www-personal.umich.edu/~jianghui/rseqdiff/index.html</u>

rSeqNP: An R package using a permutation-based test approach for detecting differential gene expression and alternative splicing from RNA-Seq data. <u>Available at: http://www-personal.umich.edu/~jianghui/rseqnp/</u>

Research Grants and Funding

• Current Grant and Contract Funding

Title: Startup Research Grant

Funding: Medical College of Georgia, Augusta University

Budget: \$140,000 (\$20,000 for research-related expenses and \$120,000 for the support of a post-doctoral trainee)

Role: PI (08/2018 – Present)

• Past Grant and Contract Funding

 Title: Statistical and Computational Methods for High-throughput Genomic Data Analysis with Application in Public Health
 Funding: National Natural Science Foundation of China and Sichuan University Startup Research Grant for Junior Investigators (Grant Number: 20822041B4009)
 Budget: RMB 300,000 (Real cost was RMB 190,000. The rest of funds was turned in after I resigned from Sichuan University in 07/2018)
 Role: PI (09/2017 – 07/2018)

2. Title: University of New Mexico Cancer Center Support Grant (Sub-project: Biostatistics Shared Resource)
Funding: NIH/NCI (Grant Number: 5P30CA118100-13; Sub-project ID: 8404)
PI: Cheryl Willman (Sub-project PI and Resource Director: Ji-Hyun Lee)
Effort: 100% from 02/2015 to 05/2015, then 45% from 05/2015 to 05/2017
Role: Co-I / Biostatistician (02/2015 - 05/2017)

3. Title: Personalized Genomic Testing for Melanoma: Maximizing Personal Utility and Reach
Funding: NIH/NCI (Grant Number: 1R01 CA181241)
PI: Marianne Berwick
Effort: 10%
Role: Co-I / Biostatistician (05/2015 - 05/2017)

4. Title: Epidemiology and Prevention Interdisciplinary Center (EPIC) for Sexually Transmitted Infections (EPIC-STI)
Funding: NIH/NIAID (Grant Number: U19 AI113187-01)
PI: Cosette Wheeler
Effort: 25%
Role: Co-I / Biostatistician (05/2015 - 05/2017)

5. Title: New Mexico HPV Outcomes, Practice Effectiveness and Surveillance (NM-HOPES)

Funding: NIH/NCI (Grant Number: U54CA164336)

PI: Cosette Wheeler Effort: 20% Role: Co-I / Biostatistician (05/2015 - 05/2017)

Computational Skills

- R, SAS, MATLAB, Python, C/C++, Unix/Linux system
- Statistical packages for specific methods: ADMB and TMB (non-linear statistical modeling and optimization problems using automatic differentiation), BUGS (Bayesian computation), Stan (Bayesian computation)

Selective Talks and Presentations

Accurate and Efficient Estimation of Small P-values with the Cross-Entropy Method: Applications in Genomic Data Analysis. Presented at ENAR 2019 Spring Meeting, Philadelphia, Pennsylvania on March 26, 2019.

Statistical and computational methods for high-throughput gene expression data analysis. Presented at Sichuan University West China School of Public Health, Chengdu, Sichuan, P. R. China on July 7, 2017.

An adaptive importance sampling approach for efficiently estimating small p-values in *permutation tests*. Presented at 2016 Joint Statistical Meetings, Chicago, Illinois on August 1, 2016.

Statistical methods for detecting gene differential expression and splicing from RNA-Seq data. Presented at University of New Mexico Cancer Center, Albuquerque, New Mexico on April 10, 2015.

A nonparametric approach for detecting differential alternative splicing in RNA-Seq data. Presented at 2014 Joint Statistical Meetings, Boston, Massachusetts on August 5, 2014.

A permutation approach for detecting differential alternative splicing in RNA-Seq data. Presented at 2014 Michigan Symposium for Interdisciplinary Statistical Sciences, University of Michigan, Ann Arbor, Michigan on March 21, 2014. Detecting differential isoform expressions from RNA-Seq data using hierarchical likelihood ratio test. Presented at 2013 Michigan Symposium for Interdisciplinary Statistical Sciences, University of Michigan, Ann Arbor, Michigan on March 22, 2013.

Teaching Experience

• At Augusta University

- 2020 Spring, *Statistical Theory II* (STAT 7620), core course for biostatistics graduates, 3 credits.
- 2019 Fall, *Statistical Theory I* (STAT 7520), core course for biostatistics graduates, 3 credits.
- 2019 Spring, *Statistical and Machine Learning for Big Data* (STAT 7860), elective course for biostatistics graduates, 3 credits.

• At Sichuan University

- 2017 Fall and 2018 Spring, *Medical Statistics III* (in Chinese), core course for medical students, 3 credits.
- 2017 Fall and 2018 Spring, *Medical Statistics* (in Chinese, I was an instructor in a teaching team), core course for MPH and graduate medical students, 4 credits.

• At University of Michigan (as Graduate Teaching Assistant)

- 2014 Fall, Applied Linear Regression, core course for M.S. in Biostatistics, 4 credits.
- 2014 Fall, Applied Stochastic Process, core course for Ph.D. in Biostatistics, 3 credits.
- 2012 Fall, Applied Biostatistics with SPSS Lab, core course for MPH, 5 credits.

• Workshops taught

- 2019 Summer, *Introduction to Machine Learning*, 18 hours, in a workshop for computer scientists and data analysts from the Department of Defense, organized by Augusta University and Fort Gordon.
- 2018 Spring, *Fundamentals of Biostatistics* (in Chinese), 12 hours, in a workshop for health professionals at Center for Disease Control and Prevention of Jianyang City.
- 2017 Fall, *Introduction to RNA-Seq data analysis* (in Chinese), 3 hours, in a biomedical data analysis training workshop at Sichuan University.
- 2017 Fall, *Fundamentals of Biostatistics* (in Chinese), 8 hours, in a workshop for health professionals at Center for Disease Control and Prevention of Sichuan Province.

<u>Student Advisement</u>

• Doctoral student mentoring

- Dissertation Committee Member / Reviewer of Dissertation:
 Henry Claussen, Ph.D. Candidate in Biostatistics, Augusta University, 2020 Present.
 Dali Ding, Ph.D. Candidate in Applied Mathematics, Jilin University, 2018 Present.
 Hao Xu, Ph.D. in Biostatistics, Sichuan University, 2017 2018.
 Zhengji Qin, Ph.D. in Biostatistics, Sichuan University, 2017 2018.
- Advisor for Reading and Research Course (STAT 8890) at Augusta University:
 Bich Na Choi, Ph.D. Student in Biostatistics, Augusta University, 2020 Present.
 Kathryn McDonald, Ph.D. Student in Biostatistics, Augusta University, 2020 Present.

Master student mentoring

- Thesis Committee Member:

Rafael Hellebuyck, M.S. in Biostatistics, Augusta University, 2018.

• Undergraduate student mentoring

- Undergraduate Thesis Advisor:

Ming Yuan, B.S. in Preventive Medicine, Sichuan University, 2017 – 2018. Yuxiao Zhou, B.S. in Preventive Medicine, Sichuan University, 2017 – 2018.

- Undergraduate Research Training Program Advisor:

Xinyi Lu, B.S. in Preventive Medicine, Sichuan University, 2017 – 2019.
Ying Xiao, B.S. in Preventive Medicine, Sichuan University, 2017 – 2019.
Muqi Xing, B.S. in Preventive Medicine, Sichuan University, 2017 – 2019.
Chenyu Yang, B.S. in Preventive Medicine, Sichuan University, 2017 – 2019.

Academic and Institutional Service

- Reviewer for academic journals
- Computational Statistics and Data Analysis

- Biostatistics
- Statistical Methods in Medical Research
- BMC Bioinformatics
- Molecular Genetics and Genomic Medicine
- Medical Problems of Performing Artists
- PLOS ONE
- Professional association memberships
- Member, American Statistical Association (2013 Present).
- Member, International Biometrics Society (2018 Present).
- Member, Chinese Health Information Association, Statistical Theory and Methodology Committee (2017 Present).
- Member, Chinese Applied Statistics Association, Biostatistics Committee (2017 Present).

• Institutional service

- Grader of Comprehensive Exams (2020 Spring) and Preliminary Exams (2019 Spring and Fall) for Ph.D. in Biostatistics, Augusta University.
- Organizer of seminars at Department of Epidemiology and Biostatistics, West China School of Public Health, Sichuan University (2017 2018).
- Member of Faculty Committee for Graduate Entrance Examinations (Master and Ph.D.), Department of Epidemiology and Biostatistics, West China School of Public Health, Sichuan (2018).
- Statistical reviewer of clinical trial protocols for the Protocol Review and Monitoring Committee of University of New Mexico Comprehensive Cancer Center (2015 - 2017).
- Search committee member for new junior research scientists and biostatisticians at University of New Mexico Comprehensive Cancer Center Biostatistics Shared Resource (2016, 2017).
- Guest lecturer of Biostatistics 101 (Principles of Biostatistics and Data Science for Cancer Researchers) and one workshop for researchers from non-quantitative backgrounds at University of New Mexico Comprehensive Cancer Center (2016).
- Organizer of seminars and journal clubs at University of New Mexico Comprehensive Cancer Center Biostatistics Shared Resource (2015 – 2017).