

## CURRICULUM VITAE

**Liansheng Larry Tang, Ph.D.**

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### EDUCATION

B.S. in Finance, Department of Statistics & Finance, University of Science and Technology of China, Hefei, Anhui, China (2000)

M.S. in Statistics, Southern Methodist University, Dallas, TX (2003)

Ph.D. in Statistics, Southern Methodist University, Dallas, TX (2005)

Postdoctoral Fellow in Biostatistics, Department of Biostatistics, University of Washington, Seattle, WA (2005-2007)

### EXPERIENCE

- 2013–present Associate Professor, Department of Statistics, George Mason University, Fairfax, VA
- 2007–2013 Assistant Professor, Department of Statistics, George Mason University, Fairfax, VA
- 2014– present Guest Researcher, NIH Clinical Center, Rehabilitation Medicine Department, Rockville, MD
- 2011 – present Faculty Affiliate, Center for Advancing Correctional Excellence, George Mason University, Fairfax, VA

### RESEARCH INTERESTS

Statistical methods in diagnostic medicine, forensic statistics, clinical trial design, statistics in criminology, nonparametric methodology in high dimensional settings

### RESEARCH GRANTS

#### *External Grants:*

- Principal Investigator, MITRE & Department of Treasury, “IRS Stratified Sampling Methods”, 2018, \$30,432.00.
- Principal Investigator, IPA from National Institute of Health, 2014-2019.
- Co-Principal Investigator (with Loerch as PI), Mantech/DOD, “Support to USMC Gender Experimentation”, 2014-2015.
- Co-Principal Investigator (with Taxman as PI), Virginia Department of Health, “Medical Monitoring Project”, Summer 2012.
- Principal Investigator, National Security Agency Young Investigator Grant, “Statistical Methods in Complex ROC, LROC and FROC”, 2011-2013. \$29,997.
- Co-Principal Investigator (with Rosenberger as PI and Diao as Co-PI), National Cancer Institute (1R15CA150698), “Statistical Methods in Cancer Research”, 2010-2013. \$409,190. *Equal indirect allocation for all three PIs.*

#### *GMU Internal Grants*

- Co-PI (with Drs. Naoru Koizumi, Emily Ihara) George Mason University Multidisciplinary Seed Grant, “Impacts of the 2011 MIPPA Bundled Payment System on ESRD Care Provision: A Patient Outcome Comparison between Hemodialysis and Peritoneal Dialysis Modalities”, 2015-2016.
- Co-PI (with Drs. Naoru Koizumi, Duminda Wijesekera, Emily Ihara), George Mason University Multidisciplinary Seed Grant, 2015-2016.
- Principal Investigator, Center for Advancing Correctional Excellence at George Mason University, “Review of Reviews in AMTAP project”, Spring 2012.
- George Mason University Junior Faculty Summer Research Funding, “A Family of Generalized Receiver Operating Characteristic Summary Statistics”, Summer 2010.
- Volgenau School of Engineering Bioengineering Seed Grant (Joint with Nathalia Peixoto and Rajesh Ganesan), “Inflammatory Response in Deep Brain Implants”, 2009, \$9000.
- George Mason University Seed Grant, “Sequential and Optimal Methods in Diagnostic Medicine”, 2008-2009, \$5500.

#### SUBMITTED PAPERS

1. Q, Yuan, Tang, L. (submitted). “An exploration of SSAs disability determination process with multi-stage DEA method.” *Journal of Modeling in Management*
2. Zhang, Wei; Liu, Aiyi; Tang, Larry; Li, Qizhai. (submitted). “Order-Restricted Inference On ROC Curves with Correlated and Clustered Data.” *Biometrics*.

#### REFEREED JOURNAL PAPERS (\* DENOTES STUDENT CO-AUTHORS)

1. Zhang, W., Liu, A., Tang, L., Li, Q. (provisionally accepted). “A Cluster-Adjusted Rank-Based Test for a Clinical Trial Concerning Multiple Endpoints with Application to Dietary Intervention Assessment.” *Biometrics*.
2. Tolkacz, M, Friedman, J.M., Koizumi, N., Tang, L., Ortiz, J. (2018) “UNOS Rule Changes and their Effects on Kidney and Liver Transplantation Outcomes”. *Experimental and Clinical Transplantation*.
3. Lu, D., Zhou, C., Tang, L., Tan, M., Yuan, A., Chan, L. (2018) “Evaluating accuracy of diagnostic tests without conditional independence assumption.” *Statistics in Medicine*. 37, 2809-2821.
4. Vikas, K., Salha R., Wang, D. 2, Wood, E., Salvetti, M., Ristori, G., Tang, L., Bagnato, F., and N. Ikonomidou, V. (2018). “Validating non-linear registration to improve subtraction images for lesion detection and quantification in multiple sclerosis”, *Journal of Neuroimaging*, 28(1), 70-78.
5. Zhang, W., Yang, L., Tang, L.L., Liu, A., Mills, J.L., Sun, Y. and Li, Q. (2017). “GATE: an efficient procedure in study of pleiotropic genetic associations”, *BMC genomics*, 18(1), p.552.
6. Lerch, J., Walters, S., Tang, L., Taxman, F.S. (2017) “Effectiveness of a computerized motivational intervention on treatment initiation and substance use: Results from a randomized trial”, *Journal of Substance Abuse Treatment*, 80, 59-66.
7. Wang, S., Yuan, A., Tang, L., Fang, H, Tan, M., Chan, L. (2017). ”ROC analysis for phase II group sequential basket clinical trial.” *International Journal of Statistics in Medical Research*. 6, 22-33.
8. Tang, L., Yuan, A., Collins, J., Che. X., Chan, L. (2017). ”Unified Least Squares Methods for the Evaluation of Diagnostic Tests With the Gold Standard.” *Cancer Informatics*. 16, 1-12.

9. Tang, L., Zhang, W., Li, Q., \*Ye., X., Chan, L. (2016). "Least squares regression methods for clustered ROC data with discrete covariates." *Biometrical Journal*. 58, 747-765.
10. \*Dong, T., Tang, L., Petricoin, E. F. (2014) "Combining Proteomic Biomarkers with and without the Limit of Detection." *Statistics in Medicine*. 33, 1307-1320.
11. \*Dong, T., Tang, L., Rosenberger, W. R. (2014) "Optimal Sampling Ratios in Comparative Diagnostic Trials." *Journal of the Royal Statistical Society: Series C*. 63, 49917514.
12. Wooditch, A., Tang, L., Taxman, F. (2014) "Which Criminogenic Need Changes Affect Criminal Offending and Drug Use among Probationers?" *Criminal Justice and Behavior*. 41, 276-299. (Top 10 Most-Read Article of 2014 from Criminal Justice and Behavior).
13. Caudy, M., Tang, L., Taxman, F., Wooditch, A. (2014) "Short-term Trajectories of Substance Use in A Sample of Drug-involved Probationers." *Journal of Substance Abuse Treatment*. 46(2):202-13.
14. Tang, L., Caudy, M., Taxman, F. (2013) "Methods for Synthesizing Meta-Analyses." *Computational and Mathematical Methods in Medicine*.
15. Tang, L., Kang, L., Liu, C., Schisterman, E., and Liu, A. (2013) "An Additive Selection of Markers to Improve Diagnostic Accuracy Based on a Discriminatory Measure." *Academic Radiology*. 20, 854-862.
16. Tang, L., Liu, A., Chen, C., Schisterman, E., Zhang, B., \*Miao, Z. (2013). "Nonparametric ROC Summary Statistics for Correlated Diagnostic Marker Data." *Statistics in Medicine*. 32, 2209-2220.
17. Tang, L., Zhou, X. H. (2013). "A General Framework of Marker Validation Designs with Optimal Allocation to Assess Clinical Utility." *Statistics in Medicine*. 32(4), 620-30.
18. Tang, L., Liu, A., Schisterman, E., Zhou, X. H., Liu, C. (2012). "Homogeneity Tests of Clustered Diagnostic Markers with Applications to the BioCycle Study." *Statistics in Medicine*. 31, 3638-3648.
19. Tang, L. and Zhou, X. H. (2012). "A Semiparametric Separation Curve Approach for Comparing Correlated ROC Data from Multiple Markers." *Journal of Computational and Graphical Statistics*. 21 (3) , 662-676.
20. Palsbo, S., Diao, G., Palsbo G., Tang, L., Rosenberger W. F., Mastal, M. (2011). "Case-Mix Adjustment and Enabled Reporting of the Health Care Experiences of Adults with Disabilities." *Archives of Physical Medicine and Rehabilitation*. 91(9), 1339-1346.
21. Tang, L., Ming, T. and Zhou, X. H. (2011). "A Sequential Conditional Probability Ratio Test Procedure for Comparing Diagnostic Tests." *Journal of Applied Statistics*. 38 (8), 1623-1632.
22. Tang, L. and N. Balakrishnan. (2011). "A Random-Sum Wilcoxon Statistic and Its Application to Analysis of ROC and LROC Data." *Journal of Statistical Planning and Inference*. 141 (1), 335-344.
23. \*Dong, T., Tang, L. (2011). "Sequential Diagnostic Trial Designs." *Wiley Interdisciplinary Reviews: Computational Statistics*. 3, 79-83.
24. Tang, L., Du, P., Wu, CQ. (2010). "Compare Diagnostic Tests Using Transformation-invariant Smoothed ROC Curves." *Journal of Statistical Planning and Inference*. 140 (11), 3540-3551.
25. Tang, L. and Liu, A. (2010). "Sample Size Recalculation in Sequential Diagnostic Trials." *Biostatistics*. 11(1), 151-163.
26. Tang, L. and Zhou, X. H. (2009). "Semiparametric Inferential Procedures for Comparing Multivariate ROC Curves with Interaction Terms." *Statistica Sinica*. 19, 1203-1221.

27. Du, P. and Tang, L. (2009). "Transformation-invariant and Nonparametric Monotone Smooth Estimation of ROC Curves." *Statistics in Medicine*. 28, 349-359.
28. Tang, L., Emerson, S. and Zhou, X.H. (2008). "Nonparametric and Semiparametric Group Sequential Methods for Comparing Accuracy of Diagnostic Tests." *Biometrics*. 64, 1137-1145.
29. Tang, L., Schucany, W. and Woodward, W. (2008). "Undercoverage of Wavelet-Based Resampling Confidence Intervals." *Communications in Statistics*. 37, 1307-1315.

#### REFEREED CONFERENCE PAPERS

30. Marasco, E., Cando, S., Tang, L., Marcialis, G.L. (2018) "A Look At Non-Cooperative Presentation Attacks in Fingerprint Systems", *IEEE International Conference on Image Processing Theory, Tools and Applications (IPTA) 2018*, pp.1-6.
31. Zhu, X., Tang, L., Tabassi, E. (2017, October). "Repeatability and Reproducibility of Forensic Likelihood Ratio Methods when Sample Size Ratio Varies". In *The International Joint Conference on Biometrics*.
32. Tang, L. (2008). "A Family of Nonparametric Statistics for LROC Curves." *2008 International Conference on BioMedical Engineering and Informatics*, 758-762.

#### REFEREED BOOK CHAPTERS

33. Xuan, Ye, Tang, L.. (2015). "Group Sequential Methods for Comparing Correlated Receiver Operating Characteristic Curves". *Applied Statistics in Biomedicine and Clinical Trials Design*. Ed. by Z. Chen et al.
34. Caudy, M., Tang, L., Taxman, F. S., Watson, C. (2014). "A Standardized Method for Reviewing Systematic Reviews: An Overview of the Evidence Mapping to Advance Justice Practice (EMTAP) Project." *Systematic Reviews in Criminology: What Have We Learned?* Ed. by D. F. Farrington and D. Weisburd.
35. Caudy, M., Tang, L., Lerch, J., Ainsworth, S. A., Taxman, F. S. "Reducing Recidivism Through Correctional Programming: Using Meta-Analyses to Inform the RNR Simulation Tool." (2014). *Risk Need Responsivity (RNR): Simulation Strategies to Respond to the Call for a Correctional System that Reduces Recidivism*. Ed. by F. S. Taxman and A. Pattavina.

#### EDITED BOOK

1. Chen, Z., Aiyi, L., Qu, Y., Tang, L., Ting, N. and Tsong, Y. eds. (2015). *Applied Statistics in Biomedicine and Clinical Trials Design: Selected Papers from 2013 ICSA/ISBS Joint Statistical Meetings*, Springer.

#### BOOK REVIEWS

1. Tang, L. (2010). Review of "Statistics Using SPSS: An Integrative Approach" by Sharon Lawner Weinberg and Sarah Knapp Abramowitz. *The American Statistician*. 64, 361.
2. Tang, L. (2008). Review of "Analyzing Receiver Operating Characteristic Curves with SAS" by Gönen, M. *Biometrics*. 64, 659.

#### HONORS AND AWARDS

- 2011 National Security Agency Young Investigator Award
- 2005 Institute of Mathematical Statistics Laha Travel Award for Joint Statistical Meetings

## PROFESSIONAL ACTIVITIES

### Professional Committee

- Committee member of Fire Debris and Explosives Subcommittee, the Organization of Scientific Area Committees for Forensic Science, 2017-present.

### Scientific Review Panel

- Standing member of NIJ Scientific Review Panel, 2014-present.

### Data Safety and Monitoring Boards

- DSMB of Project HOPE: Hospital Visit as Opportunity for Prevention and Engagement for HIV-Infected Drug Users, National Institute on Drug Abuse, 2012-2016.

### Conference committee

- 2018 ASA/AdvaMed Conference Organizing Committee
- 2013 10th International Conference on Health Policy Statistics Scientific Organizing Committee
- 2012 Eastern North American Region of the International Biometric Society Meeting Organizing Committee
- Invited session organizer, 2011 International Chinese Statistical Association Applied Statistics Symposium, New York, NY.
- Invited session organizer, 2010 Eastern North American Region of the International Biometric Society Meeting, New Orleans, LA.
- Invited session organizer, 2010 International Conference on Statistical Analysis of Complex Data, Yunnan, China.
- Invited session organizer/chair, 2009 Western North American Region of the International Biometric Society Meeting, Portland, OR.
- Invited session organizer, 2008 Eastern North American Region of the International Biometric Society Meeting, Arlington, VA.
- Invited session organizer, 2008 IEEE International Conference on BioMedical Engineering and Informatics, Hainan, China.

### Short Courses

- 2011 Fourth Annual International Symposium on the Evaluation of Clinical Trials Methodologies and Applications, Beijing, China. “Statistical Methods in Single Patient Trials.”

## STUDENT ADVISING

- Doctoral Student
  - Xuan Ye, graduated in 2015, now at FDA
  - Zhuang Miao, graduated in 2014, now at FDA
  - Ting Dong, graduated in 2011, now at Microstrategy

## INVITED PRESENTATIONS

- 2018 Forensics at NIST Conference, MD. “The Confidence Interval for the Likelihood Ratio with Application to Biometrics.”
- 2018 11th Annual FDA/AdvaMed Medical Devices & Diagnostics Statistical Issues Conference, DC. “Evaluating Rater Difference using the ROC Curve”.
- 2018 International Chinese Statistical Association Applied Statistics Symposium, NJ. “Evaluating accuracy of diagnostic tests without conditional independence assumption.”

- 2017 10th International Conference on Forensic Inference and Statistics. “Likelihood ratios in forensics and their confidence intervals”.
- 2016 Department of Statistics, University of Virginia. “ROC Curve and Likelihood Ratio in Diagnostic Medicine and Forensics” .
- 2016 Forensic Science Brown Bag Seminar, National Institute of Standards and Technology. “Likelihood ratios in forensics: what they are and what they are not” .
- 2016 Department of Mathematical Sciences, NJIT, “ROC Curve and Likelihood Ratio in Diagnostic Medicine and Forensics”.
- 2016 Department of Statistics, GMU, “ROC Curve and Likelihood Ratio in Diagnostic Medicine and Forensics” .
- 2016 International Chinese Statistical Association Applied Statistics Symposium, Atlanta, GA. “Least squares regression methods for clustered ROC data”.
- 2016 Social Security Administration, Woodlawn, MD. “Analyzing ODAR’s Hearing Offices Performance: Multi-stage Data Envelopment Analysis”.
- 2016 Academy of Mathematics and Systems Science, Chinese Academy of Sciences, Beijing, China. “Semiparametric separation curve approaches for comparing correlated ROC data”.
- 2014 NIH Clinical Center, “Design Issues in Diagnostic Trials” .
- 2013 University of Maryland. “Within-cluster resampling methods for clustered ROC data.”
- 2013 FDA workshop. “Incorporating Interim Analysis in Diagnostic Trials.”
- 2013 International Chinese Statistical Association Applied Statistics Symposium, Bethesda, MD. “Optimal Sampling Ratios in Comparative Diagnostic Trials.”
- 2013 Department of Biostatistics, Columbia University, New York, New York. “Sampling Ratios in Diagnostic Trials.”
- 2013 Department of Biostatistics, University at Buffalo, Buffalo, New York. “Sampling Ratios in Diagnostic Trials.”
- 2013 Department of Department of Applied Mathematics, The Hong Kong Polytechnic University, Hong Kong, China. “Optimal Sampling Ratios in Diagnostic Trials.”
- 2012 International Chinese Statistical Association Applied Statistics Symposium, Boston, MA. “Homogeneity Tests for Correlated Diagnostic Markers in High Dimensional Settings.”
- 2012 Joint Seminar by Department of Statistics & Division of Biostatistics, Oregon State University, Corvallis, OR. “Homogeneity Tests for Correlated Diagnostic Markers in High Dimensional Settings.”
- 2011 International Conference on Advances in Probability and Statistics - Theory and Applications, Hong Kong, China. “A Random-Sum Wilcoxon Statistic and Its Application to Analysis of ROC and LROC Data.”
- 2011 International Chinese Statistical Association Applied Statistics Symposium, New York, NY. “A Class of Generalized Nonparametric ROC Summary Statistics for Clustered Diagnostic Marker Data.”
- 2011 Fourth Annual International Symposium on the Evaluation of Clinical Trials Methodologies and Applications, Beijing, China. “A General Framework of Marker Validation Designs with Optimal Allocation.”
- 2011 Biostatistics & Bioinformatics Branch, Eunice Kennedy Shriver National Institute of Child Health and Human Development. “A Class of Generalized Nonparametric ROC Summary Statistics for Clustered Diagnostic Marker Data.”
- 2010 Seminar Celebrating Bill Schucany’s 40 Years in Statistical Science at SMU. “Sample Size Recalculation in Sequential Diagnostic Trials.”
- 2010 Division of Biostatistics, University of Maryland Greenebaum Cancer Center, Baltimore, MD. “Semiparametric Least Squares Procedure for Correlated ROC Data.”

- 2010 First Biostatistics Symposium, Beijing, China. “A Two-stage Procedure to Choose the Optimal Ratio of Cases to Controls in Diagnostic Trials.”
- 2010 Eastern North American Region of the International Biometric Society Meeting, New Orleans, LA. “Adaptive Designs to Validate Cancer Biomarkers.”
- 2009 EMMES, Rockville, MD. “Semiparametric Least Squares Procedure for Correlated ROC Data.”
- 2009 Design and Analysis of Experiments Conference, Columbia, MO. “A Two-Stage Allocation Procedure for Monitoring Comparative Diagnostic Trials.”
- 2009 Western North American Region of the International Biometric Society Meeting, Portland, OR. “A Random-Sum Wilcoxon Statistic with Applications to LROC Data.”
- 2008 Institute of Statistics, National University of Kaohsiung, Taiwan. “A Sequential Procedure for Recalculating Sample Sizes and Monitoring Comparative Diagnostic Trials.”
- 2008 2008 IEEE International Conference on BioMedical Engineering and Informatics, Hainan, China. “A Family of Nonparametric Statistics for LROC Curves.”
- 2008 Eastern North American Region Meeting of the International Biometric Society Meeting, Arlington, VA. “Semiparametric Least Squares Procedure for Correlated ROC Data.”
- 2007 Center for Devices and Radiological Health, U.S. Food and Drug Administration, Rockville, MD. “Nonparametric Group Sequential Methods for Comparing Accuracy of Diagnostic Tests.”
- 2007 “Least Squares Receiver Operating Characteristic Estimation for Correlated Biomarker Data.”
- Department of Statistics, George Mason University, Fairfax, VA.
  - Department of Medicine, Division of Biostatistics, Indiana University, Indianapolis, IN.
  - Children’s Hospital Boston, Harvard Medical School, Boston, MA.
  - Department of Quantitative Health Sciences, Cleveland Clinic, Cleveland, OH.
  - Jiann-Ping Hsu College of Public Health, Georgia Southern University, Statesboro, GA.
- 2006 International Chinese Statistical Association Applied Statistics Symposium, Storrs, CT. “Parametric Least Squares Procedure for Correlated ROC Data.”
- 2005 Department of Biostatistics, University of Washington, Seattle, WA. “Undercoverage of Wavelet-Based Resampling Confidence Intervals and A Parametric Spatial Bootstrap.”

#### MANUSCRIPT REVIEW

- Book reviewer for CRC Press, Oxford University Press, Pearson Hall
- Referee for Journal of the American Statistical Association, Biometrics, Statistica Sinica, Statistics in Medicine, Journal of Environmental and Ecological Statistics, Journal of Statistical Planning and Inference, Computational Statistics and Data Analysis, Communications in Statistics, Health Services and Outcomes Research Methodology, the Philosophical Transactions of the Royal Society A, Clinical Trials, Statistics and Its Interface

#### UNIVERSITY SERVICE

- 
- Founding Member of the Study Group on Interventions in Behavioral and Health Sciences at George Mason University

#### DEPARTMENTAL AND SCHOOL SERVICE

- Volgenau School of Engineering (VSE) Research Council, 2017 - present
- VSE Entrepreneurship Faculty Advisory Group, 2017 - present
- APR Peer Review Committee, 2017-2019
- Graduate Program Coordinator, M.S. in Biostatistics, 2013–
- Lead Faculty in the Development of M.S. Program in Biostatistics, 2012
- Member, VSE Graduate Studies Committee, 2011–2012
- Applied Statistics Qualifying Exam Committee, 2010-present
- Member, Chair Renewal Evaluation Committee, 2009
- Member, Statistics Master Program Review Committee, 2009–
- Applied Probability Qualifying Exam Committee, 2008-2009
- Chair, Statistics Seminar Series, 2007–2010

#### PROFESSIONAL AFFILIATIONS

- American Statistical Association
- Institute of Mathematical Statistics, permanent member
- International Chinese Statistical Association, permanent member