

CURRICULUM VITAE

Aiyi Liu, PhD

WORK ADDRESS

Biostatistics and Bioinformatics Branch
Division of Intramural Population Health Research
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EDUCATION AND TRAINING

B.S. in Mathematics (Statistics Major), 1986; M.S. in Statistics, 1988; Department of Mathematics, University of Science and Technology of China, Hefei, Anhui, China

Ph.D. in Statistics, 1997, Department of Statistics, University of Rochester, Rochester, NY, U.S.A.

Postdoctoral Research Fellow, 1997-1999, Department of Biostatistics and Epidemiology, St. Jude Children's Research Hospital, Memphis, TN, U.S.A.

CURRENT POSITION

2007-Present

Senior Investigator (with Tenure)
Biostatistics and Bioinformatics Branch
Division of Intramural Population Health Research
Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD), National Institutes of Health

PAST ACADEMIC/RESEARCH APPOINTMENT

Investigator (Tenure Track), 2002-2007, Biostatistics and Bioinformatics Branch, Division of Intramural Population Health Research, *Eunice Kennedy Shriver* National Institute of Child Health and Human Development, National Institutes of Health

Assistant Professor of Biostatistics (Tenure Track), 1999-2002, Department of Biostatistics, Bioinformatics and Biomathematics, Georgetown University; Faculty member, 1988-1993, Department of Mathematics, University of Science and Technology of China

MEMBERSHIP IN PROFESSIONAL SOCIETIES

American Statistical Association, International Biometric Society (ENAR), International Chinese Statistical Association, International Indian Statistical Association, International Statistical Institute, Institute of Mathematical Statistics, and Korean International Statistical Society

HONORS AND AWARDS

Jiuzhang Mathematical Prize, University of Science and Technology of China, 1991

Graduate Fellowships, University of Rochester, 1993-1997

Time-Off Award in Recognition and Appreciation of Special Act or Service, NICHD, NIH, 2002

Elected member, International Statistical Institute, 2006

National Institutes of Health Merit Award, 2007, 2009

Fellow, American Statistical Association, 2011 (For major contributions to sequential methods, especially in the area of statistical inference following sequential tests, for contributions to statistical research in diagnostic medicine, and for innovative applications of statistics to biomedical research)

National Institutes of Health Director's Award, 2013, 2015

PROFESSIONAL SERVICE

Associate Editor, *Clinical Trials: Journal of the Society for Clinical Trials*, 2014-Present

Member, Committee on Award of an Outstanding Statistical Application, the American Statistical Association (ASA), 2011-Present

Chair, Program Committee and Executive Committee, International Chinese Statistical Association 2013 Applied Statistics Symposium

Member, Program Committee, International Chinese Statistical Association 2011 Applied Statistics Symposium

Associate Editor, *Journal of Statistical Planning and Inference*, 2009-2012.

Member, Program Committee, International Chinese Statistical Association 2005 Applied Statistics Symposium

Member, Board of Directors, International Chinese Statistical Association, 2007-2009

Short course instructor on “Sequential Statistical Methods in the Design and Analysis of Clinical Trials”, at The 15th International Conference on Interdisciplinary Mathematical and Statistical Techniques, Shanghai, China, June 2007

Guest Editor for “Mathematical and Statistical Methods for Diagnoses and Therapies”.
Philosophical Transaction of the Royal Society A, Number 1874, Volume 366, July 2008

Short course instructor on “Evaluation of the Performance of Diagnostic Tests and Biomarkers Using ROC Analysis”, Society for Clinical Trials (SCT) 35th Annual Meeting, Philadelphia, PA, May 2014.

Member, Program Committee, International Chinese Statistical Association 2015 Applied Statistics Symposium

Peer referee for American Journal of Epidemiology, Biometrics, Biometrika, Biostatistics, Cancer Research, Communications in Statistics, Controlled Clinical Trials, Computational Statistics & Data Analysis, Epidemiology, Journal of Biopharmaceutical Statistics, Journal of Statistical Planning and Inference, Journal of the American Statistical Association, Journal of Multivariate Analysis, Medical and Pediatric Oncology, Pharmacotherapy, Statistics in Biosciences, Statistics in Biopharmaceutical Research, Statistics in Medicine, Statistics and Probability Letters, Statistical Science, Statistica Sinica

RESEARCH INTEREST

General statistical theory and methods

Sequential and adaptive methods in clinical trials and biomedical research

Multivariate data analysis and related topics

Statistical methodology for diagnostic biomarkers (ROC curve analysis; methods for pooled biospecimens; evaluation of measurement errors; limit of detection and left truncation)

Semiparametric and nonparametric methods for multidimensional data

Genome-wide association studies

Group testing methodology

TEACHING, TRAINING AND MENTORING

Teaching various undergraduate and graduate statistics courses, including Statistics for Biological Sciences, Linear Models and its Applications, Regression Analysis. Department of Mathematics, University of Science and Technology of China, August 1988-July 1993

Teaching Assistant in various undergraduate statistics courses. University of Rochester, Department of Statistics, September 1993-August 1997

Teaching in the MS program of biostatistics in the Department of Biostatistics and Epidemiology of Georgetown University Medical Center, participating lecture series for staff and postdoctoral

fellows in the Department of Oncology and Lombardi Cancer Center, March 1999-February 2002.
Teaching Applied Biostatistics (19 students, 4 classes), January –February 2002

Teaching “Applied Multivariate Statistical Analysis” (Stat6215, graduate level), Fall 2011, Spring 2015, Department of Statistics, George Washington University

Teaching “Clinical Trials” (STAT6289-13, graduate level), Spring 2012, Fall 2015, Spring 2016, Department of Statistics, George Washington University

Teaching “Regression Analysis” (STAT2118, graduate level), Spring 2013, Fall 2013, Department of Statistics, George Washington University

Co-Mentor (with Enrique Schisterman) to summer students at NICHD: Eric Teoh (University of Alabama), 2002; Howard Bondell (Rutgers University), Neil Perkins (American University), 2003

Mentor to summer interns at NICHD: Yan Zhu (University of Virginia), 2003; Helen Guo (Thomas Jefferson High School for Science and Technology), 2004; Elizabeth Schofield Dahlquist (University of South Florida), 2005; Ekaterina Eliseeva (University of Chicago), 2006; Helen Guo (University of Virginia), 2007; Xiaoshu Feng (University of Maryland), 2008, Angel Davalos (University of Texas-El Paso), 2009; Robert Ashmead (The Ohio State University), 2011; Le Chen (Gallaudet University) 2013; Gregory Haber (University of Maryland Baltimore County), 2014;

Mentor to postdoctoral fellows at NICHD: Chengqing Wu (University of Science and Technology of China), October 2003-October 2007; Albert Vexler (Hebrew University), June 2004-June 2007; Catherine Chunling Liu (University of Hong Kong), October 2008-July 2010; Jared Foster (University of Michigan), August 2013-August 2015; Wondwosen Kassahun Yimer (Hasselt University, Belgium), August 2015-August 2017.

Ph.D. thesis advisor (with Professor Zhaohai Li) to Yu Shu, Department of Statistics, George Washington University.

Ph.D. thesis advisor (with Professor Zhaohai Li) to Mei Jin, Department of Statistics, George Washington University

Ph.D. thesis advisor (with Professor Zhaohai Li) to Xian Sun, Department of Statistics, George Washington University

Ph.D. thesis advisor (with Professor Zhaohai Li) to Xiaoyu Cai, Department of Statistics, George Washington University

Ph.D. thesis advisor (with Professor Daniel Q. Naiman) to Jiang Hu, Department of Applied Mathematics and Statistics, the Johns Hopkins University.

SERVICES AT NIH

Committee on Division of Intramural Population Health Research Retreat, 2002

Search Committee for Staff Scientist, Division of Intramural Population Health Research, 2003

Ph.D. Thesis Committee for Jiaquan Fan, Department of Statistics, George Washington University, March 2004

Ph.D. Thesis Committee for Dennis Buckman, Department of Statistics, George Washington University, June 2005

Judge for the Fellows Award for Research Excellence (FARE) 2005, Gene Expression Section

Search Committee for Statistician Staff Scientist – Facility Head Recruitment, Laboratory of Epidemiology, Demography and Biometry, National Institute on Aging, 2005, 2006

Search Committee member for tenure-track/tenured investigator, Epidemiology Branch, Division of Intramural Population Health Research, 2006

Data Safety and Monitoring Board (DSMB) for “S.japonicum and Pregnancy Outcomes: A Randomized, Double Blind, Placebo Controlled Trial”, National Institute of Allergy and Infectious Diseases (NIAID), 2006-Present

Ad hoc Reviewer, National Institute on Aging Board of Scientific Counselors’ (BSC) Meeting, May, 2008

Member, Search Committee for Tenure-Track Investigators, Division of Intramural Population Health Research, 2009

Member, Search Committee for Tenure-Track/Tenure-Eligible Investigators, Division of Intramural Population Health Research, 2010

Member, Professional Development Committee, Division of Intramural Population Health Research, 2010

Member, Institutional Review Board (IRB), National Institute of Child Health and Human Development, 2011-Present

Member, Search Committee for Tenure-Track/Tenure-Eligible Investigators, Division of Intramural Population Health Research, 2012

Ad hoc Reviewer, National Institute on Aging Board of Scientific Counselors’ (BSC) Meeting, May, 2012

Member, Search Committee for Staff Scientist, Division of Intramural Population Health Research, 2013

Member, Mentoring Committee, Division of Intramural Population Health Research, 2013

INVITED PRESENTATIONS

“Secondary analysis following sequential clinical trials”. Western Tennessee Chapter of ASA, Memphis, TN, April 1998

“Sequential tests and estimates after overrunning”. Statistical Research Symposium in Honor of W. Jackson Hall’s 70th Birthday. University of Rochester, Rochester, NY, September 1999

“Molecular classification of stage I breast cancer using gene microarray technology”. International Chinese Statistical Association Applied Statistics Symposium, Piscataway, NJ, June 1999

“Sample size calculation for planning group sequential longitudinal trials”. CDER, Food and Drug Administration (FDA), Rockville, MD, March 2000

“Analyzing data from a sequential clinical trial”. Workshop on Current Advances in Interim Analysis and Design Modifications, CDER, Food and Drug Administration (FDA), Rockville, MD, September 2000

“Block principal component analysis with application to gene microarray data classification”. Office of Biostatistics Research, National Heart Lung and Blood Institute, April 2003

“Unbiased estimation following a group sequential test for distributions in the exponential family”. Department of Mathematics and Statistics, York University, Canada, November 2003

“Estimation following a multivariate group sequential test”. International Chinese Statistical Association Applied Statistics Symposium, San Diego, CA, June 2004

“On linear combinations of biomarkers to improve diagnostic accuracy”. Department of Epidemiology and Biostatistics, Medical University of South Carolina, September 2004

“On linear combinations of biomarkers to improve diagnostic accuracy”. Division of Cancer Epidemiology and Genetics, National Cancer Institute, January 2005

“Estimation following a group sequential test for distributions in the one-parameter exponential family”. Department of Mathematics, University of Maryland, February 2005

“Local maximization of linear combination of biomarkers to improve diagnostic accuracy”. International Chinese Statistical Association Applied Statistics Symposium, Washington, DC, June 2005

“Sequential evaluation of time varying, non-transient treatment effects in clinical trials”. International Biometric Society –WNAR/IMS Meeting, Fairbanks, Alaska, June 2005

“Estimation following a group sequential test for distributions in the one-parameter exponential family”. Department of Statistics, George Washington University, September 2005

“Estimating rates at the termination of a group sequential phase II trial”. Department of Statistics, University of Virginia, October 2005

“Estimation following a group sequential test for distributions in the one-parameter exponential family”. Department of Mathematics and Statistics, McMaster University, Canada, February 2006

“Non-parametric sequential testing of the area under the ROC curves”. International Biometric Society (ENAR) Spring Meeting, Tampa, FL, March 2006

“Multistage evaluation of measurement error in a reliability study”. International Chinese Statistical Association Applied Statistics Symposium, University of Connecticut, June 2006

“Multistage evaluation of measurement error in a reliability study”. Department of Applied Mathematics, Beijing University of Technology, China, July 2006

“Multistage evaluation of measurement error in a reliability study”. Department of Statistics, George Mason University, October 2006

“Multistage evaluation of measurement error in a reliability study”. Department of Biostatistics, Columbia University, February 2007

“An adaptive approach for bivariate phase II clinical trial designs”. The 15th International Conference on Interdisciplinary Mathematical and Statistical Techniques, Shanghai, China, June 2007

“Sequential methods for evaluation of medical tests” (Invited Plenary Speech). The 15th International Conference on Interdisciplinary Mathematical and Statistical Techniques, Shanghai, China, June 2007

“Sample Size for a logistic regression with a covariate subject to detection limit”. International Chinese Statistical Association Applied Statistics Symposium, Raleigh, NC, June 2007

“A two-stage procedure for selecting the best diagnostic biomarker with dichotomous outcomes”. The First International Workshop in Sequential Methodologies, Auburn, Alabama, July 2007

“An adaptive approach for testing two correlated proportions with application to bivariate phase II clinical trial designs”. Department of Biostatistics, State University of New York at Buffalo, September 2007

“Sequential evaluation of measurement error in a reliability study”. Department of Biostatistics and Computational Biology, University of Rochester, NY, November, 2007

“A threshold sample-enrichment approach in a clinical trial with heterogeneous subpopulations”. Division of Biostatistics, University of Maryland School of Medicine, Baltimore, MD, May 2008

“Sequential evaluation of measurement error in a reliability study”. International Chinese Statistical Association Applied Statistics Symposium, Piscataway, NJ, June 2008

“Two-stage procedures in statistical experiments and analysis”. Department of Mathematics and Statistics, University of South Alabama, Mobile, October 2008

“A threshold sample-enrichment approach in a clinical trial with heterogeneous subpopulations”. Symposium in Honor of Dr. Edmund Gehan, Georgetown University Medical Center, Washington, DC, April 27, 2009

“Threshold sample enrichment approach with heterogeneous populations in a clinical trial for preeclampsia”. University of Pennsylvania Conference on Statistical Issues in Clinical Trials: From Bench to Bedside to Community, Philadelphia, PA, April 29, 2009

“An efficient rank-based test for comparison of multidimensional outcomes”. International Chinese Statistical Association Applied Statistics Symposium, San Francisco, CA, June 2009

“A threshold sample-enrichment approach in a clinical trial with heterogeneous subpopulations”. International Biometric Society (ENAR) Spring Meeting, New Orleans, LA, March, 2010

“A rank-based test for comparison of multidimensional outcomes”. Department of Biostatistics and Bioinformatics, Duke University. April 2010

“A min-max combination of biomarkers to improve diagnostic accuracy”. First Joint Biostatistics symposium, Beijing, China, July 2010

“Optimality of group testing in the presence of misclassification”. International Workshop on the Frontier of Statistics, Beijing, China, July 2010

“Using group testing to evaluate gene-environment interaction”. International Chinese Statistical Association Applied Statistics Symposium, New York City, NY, June 2011

“Optimality of group testing in the presence of misclassification”. Department of Statistics, Pennsylvania State University, September 2011

“A nonparametric procedure to compare clustered multiple endpoints”. Department of Mathematics and Statistics, University of Maryland at Baltimore County, Baltimore, MD, October 2011

“Combining biomarkers to improve diagnostic accuracy”. International Biometric Society (ENAR) Spring Meeting, Washington, DC, April 2012

“Adjusting for misclassification in stratified biomarker clinical trials”. Department of Biostatistics and Bioinformatics, Duke University, May 2012

“Optimality of group testing in the presence of misclassification”. International Chinese Statistical Association Applied Statistics Symposium, Boston, MA, June 2012

“From diagnostic biomarkers to innovative clinical trials-A statistician’s perspective”. Division of Biostatistics, UMD Marlene and Stewart Greenebaum Cancer Center, April 2013

“Some statistical challenges in the design and analysis of gestational diabetes studies”. Joint Statistical Meetings, Montreal, Canada, August 2013

“A nonparametric procedure to compare clustered multiple endpoints”. Department of Biostatistics-SLAM Working Group, Johns Hopkins University, September 2013

“Group testing in the presence of misclassification”. Department of Mathematical Sciences, New Jersey Institute of Technology, November 2015

“On design and analysis of a stratified biomarker time-to-event clinical trial in the presence of measurement Error”. International Chinese Statistical Association Applied Statistics Symposium, Fort Collins, CO, June 2015

CONTRIBUTED PRESENTATIONS

“Uniformly minimum variance unbiased estimation of the drift of Brownian motion with parallel or triangular stopping boundaries.” International Chinese Statistical Association Applied Statistics Symposium, Baltimore, MD, June 1996

“Uniformly minimum variance unbiased estimation of the drift of Brownian motion with parallel or triangular stopping boundaries.” Joint Statistical Meetings, Chicago, IL, August 1996

“Unbiased estimation following sequential tests”. International Biometric Society (ENAR) Spring Meeting, Memphis, TN, March 1997

“Two simple estimates following a sequential test”. International Biometric Society (ENAR) Spring Meeting, Pittsburgh, PA, March 1998

“Sequential tests and estimates after overrunning”. Joint Statistical Meetings, Baltimore, MD, August 1999

“Analysis of secondary endpoints following sequential clinical trials”. International Biometric Society (ENAR) Spring Meeting, Atlanta, GA, March 1999

“Analysis of secondary endpoints following sequential clinical trials”. International Chinese Statistical Association Applied Statistics Symposium, Washington, DC, June 1999

“Sample size and power determination for clustered repeated measurements”. International Biometric Society (ENAR) Spring Meeting, Chicago, IL, March 2000

“Visualization of gene microarray data using block principal component analysis”. International Biometric Society (ENAR) Spring Meeting, Charlotte, NC, March 2001

“Visualization of gene microarray data using block principal component analysis”. National Cancer Institute SPORE Microarray Workshop on Informatics, San Francisco, CA, June 2001

“Nonparametric inference on the partial area under receiver operating characteristic curves”. Mid-Atlantic Probability and Statistics Day, George Washington University, Washington, DC, November 2002

“Conditional receiver operating characteristic curves for evaluation of diagnostic accuracy in matched case-control studies”. The 2nd International Biometric Society Conference of the Eastern Mediterranean Region (EMR), Antalya, Turkey, January 2003

“Design and analysis of comparative diagnostic accuracy studies with multiple correlated test results”. International Biometric Society (ENAR) Spring Meeting, Tampa, FL, March 2003

“Conditional receiver operating characteristic curves for evaluation of diagnostic accuracy with clustered data”. Joint Statistical Meetings, San Francisco, CA, August 2003

“Unbiased estimation following a group sequential test for distributions in the exponential family”. Joint Statistical Meetings, Toronto, Canada, August 2004

“Estimating rates in a multistage phase II trial” (poster presentation). National Institutes of Health Research Festival, September 2004

“Supplementary analysis of probabilities at the termination of a group sequential phase II trial”. International Biometric Society (ENAR) Spring Meeting, Austin, TX, March 2005

“Multistage evaluation of measurement error in a reliability study” (poster presentation). National Institutes of Health Research Festival, October 2005

“Multistage evaluation of measurement error in a reliability study”. International Conference on Design and Experiments, Tianjin, China, July 2006

“Nonparametric procedures for comparing correlated multiple endpoints with applications to oxidative stress biomarkers”. International Biometric Society (ENAR) Spring Meeting, San Antonio, TX, March 2009

“Two-stage procedures for selecting the best diagnostic biomarkers” (Topic Contributed). Joint Statistical Meetings, Washington, DC, August 2009

“A Nonparametric Procedure to Compare Clustered Multiple Endpoints”. 7th International Conference on Multiple Comparison Procedures (MCP), Washington, DC, August 2011

“Adjusting for misclassification in stratified biomarker clinical trials”. (Topic-Contributed) Joint Statistical Meeting, San Diego, CA, August 2012

“Nonparametric Comparison of Longitudinal Profiles of Healthy Eating Index Scores”.) Joint Statistical Meeting, Seattle, WA, August 2015

PAST COLLABORATIVE RESEARCH PRIOR TO NIH

University of Rochester Medical Center (September 1993-July 1997)

Research Associate (June 1997-July 1998) and Consultant (August 1998-June 2000) on “Secondary inference in cardiovascular clinical trials” (NIH/R01 HL58751), NHLBI (July 1, 1997 to June 30, 2000). Principal Investigator: W. Jack Hall, Department of Biostatistics

St. Jude Children’s Research Hospital (August 1997-March 1999):

Co-Investigator on “Nutrient intakes of hospitalized pediatric patients on oncology services: A comparison of patients dining with caregivers versus patients dining independently”. Principal Investigator: Ruth Williams, Department of Clinical Nutrition

Co-Investigator on “Nutritional, clinical and biological effects of glutamine supplementation in children with sickle cell disease”. Principal Investigator: Ruth Williams, Department of Clinical Nutrition

Georgetown University Lombardi Cancer Center (March 1999-February 2002):

Biostatistics Core Grant (30%) on “Cancer center support grant” (NIH/5P30 CA51008, \$1,653,617), NCI (May 1, 1997-April 30, 2002). Principal Investigator: Marc Lippman

Co-Investigator (5%) on “Breast cancer center grant” (CC950002, \$1,200,038), DOD (July 1, 1996-June 30, 2000). Principal Investigator: Marc Lippman

Co-Investigator (5%) on “PKC modulation in patients with advanced cancer” (NIH/R01 CA71856, \$123,000), NCI (July 1, 1996-June 30, 2000). Principal Investigator: John Marshall

Co-Investigator (5%) on “Health promotion for women at risk for breast cancer” (NIH/R01 CA74869, \$74,307), NCI (August 1, 1998-May 5, 2003). Principal Investigator: Janet Audrain

Co-Investigator (5% in years 1-2 and 10% in years 3-5) on “Transdisciplinary Tobacco Use Research Center (TTURC)” (NIH/1p50 CA84718-01, \$2,207,020), NCI (September 30, 1999-September 29, 2004). Principal Investigator: Caryn Lerman

Co-Investigator (5%) on “Genetic counseling for breast cancer susceptibility in African American women”, DOD (July 2000-June 2005). Principal Investigator: Chanita Hughes

Co-Investigator (5%) on “Anticancer therapeutic potential of VEGI, an antiangiogenic cytokine”, DOD (March 2001-February 2004). Principal Investigator: Luyuan Li

Co-Investigator (5%) on “Polymorphic polyglutamine of A1B1 and its relationship to breast cancer”, DOD (March 2001-February 2004). Principal Investigator: Lee-Jun Wong

Co-Investigator (5%) on “Mitochondrial DNA mutations in breast cancer”, DOD (March 2001-February 2004). Principal Investigator: Lee-Jun Wong

Co-investigator (20% in year three) on “Mutagen sensitivity, apoptosis, and polymorphism in DNA repair as measures of prostate cancer risk”, DOD (November 2001-October 2004). Principal Investigator: Radoslav Goldman

MAJOR COLLABORATIVE STUDIES AT NICHD

Family Management of Diabetes Multisite Main Trial (FMOD), PI: Tonja Nansel, HBB

Cultivating Healthy Environments in Families with Type 1 Diabetes (CHEF), PI: Tonja Nansel, HBB

Trinity Students Study (TSS), PI: Jim Mills, EB

Genetic Factors in Birth Defects, PI: Jim Mills, EB

Diabetes & Women’s Health: A Study of Long-Term Health Implications of Glucose Intolerance in Pregnancy (DWH), PI: Cuilin Zhang, EB

Transgenerational Study of GDM and Obesity, PI: Cuilin Zhang, EB.

Pregnancy Eating Attributes Study (PEAS), PI: Tonja Nansel, HBB

2-hydroxypropyl- β -cyclodextrin in Patients with Niemann-Pick Disease Type C1, PI: Forbes Porter, DIR

PEER-REVIEWED RESEARCH ARTICLES

1. **Liu A.** On the best estimation of variance in linear models. *Mathematical Statistics and Applied Probability* 1988; 3: 232-236.
2. Wang S, **Liu A.** Relative efficiency of two-stage estimators. *Acta Mathematica Sinica* 1989; 32: 42-54.
3. **Liu A,** Wang S. A new relative efficiency of least squares estimates in linear models. *Chinese Journal of Applied Probability and Statistics* 1989; 5: 97-104.
4. **Liu A,** Wang, S. Biased estimators for the parameters of a class of related regression system. *Chinese Journal of Applied Probability and Statistics* 1991; 7: 266-274.

5. **Liu A.** An improvement of principal components estimator for seemingly unrelated regression equations. *Mathematical Statistics and Applied Probability* 1993; 8: 70-75.
6. **Liu A.** An efficient estimation of seemingly unrelated multivariate regression models with application to growth curves analysis. *Statistica Sinica* 1993; 3: 421-434.
7. **Liu A.** Selection of covariates and estimation of parameters in growth curve models. *Acta Mathematica Sinica* 1994; 37: 362-372.
8. **Liu A.** Estimation of the parameters in two linear models with only some of the parameter vectors identical. *Statistics and Probability Letters* 1996; 29: 369-375.
9. **Liu A.** On the maximum likelihood estimate for the drift of Brownian motion following a symmetric sequential probability ratio test. *Communications in Statistics---Theory and Methods* 1997; 26: 977-989.
10. **Liu A.** Detecting influential covariates in a growth curve model. *Computational Statistics and Data Analysis* 1998; 28: 105-113.
11. **Liu A, Hall WJ.** Minimum variance unbiased estimation of the drift of Brownian motion with linear stopping boundaries. *Sequential Analysis* 1998; 17: 91-107.
12. **Liu A, Hall WJ.** Unbiased estimation following a group sequential test. *Biometrika* 1999; 86: 71-78.
13. Gajjar A, Fouladi M, Walter A, Thompson S, Reardon D, Merchant T, Jenkins J, **Liu A**, Boyett J, Kun L, Heideman R. Comparison of lumbar and shunt cerebrospinal fluid specimens for cytologic detection of leptomeningeal disease in pediatric patients with brain tumors. *Journal of Clinical Oncology* 1999; 17: 1825-1828.
14. Fouladi M, Gajjar A, Boyett J, Walter W, Thompson S, Merchant T, Jenkins J, Langston J, **Liu A**, Kun L, Heideman R. Comparison of CSF cytology and spinal magnetic resonance imaging in the detection of leptomeningeal disease in pediatric medullblastoma or primitive neuroectodermal tumor. *Journal of Clinical Oncology* 1999; 17: 3234-3237.
15. **Liu A, Boyett J, Xiong XP.** Sample size calculation for planning group sequential longitudinal trials. *Statistics in Medicine* 2000; 19: 205-220.
16. **Liu A, Tan M, Boyett J, Xiong XP.** Testing secondary hypotheses following sequential clinical trials. *Biometrics* 2000; 56: 640-644.
17. **Liu A.** Maximum likelihood estimate following sequential probability ratio tests. *Sequential Analysis* 2000; 19: 63-75.

18. Smith K, Hale GM, Williams R, Ludwig M, Thompson A, Bowman L, Shochat S, **Liu A**, Barkley C. Comparison of two different low profile gastrostomy enteral feeding devices in pediatric oncology patients. *Nutrition and Clinical Practice* 2000; 15: 189-192.
19. Hayes AJ, Huang W, Yu J, Maisonpierre PC, **Liu A**, Kern FG, Lippman ME, McLeskey SW, Li L. Expression and function of angiopoietin-1 breast cancer. *British Journal of Cancer* 2000; 83: 1154-1160.
20. Pedrosa F, Bonilla M, **Liu A**, Smith K, Davis D, Ribeiro RC, Wilimas JA.. Effect of malnutrition at the time of diagnosis on the survival of children treated for cancer in El Salvador and northern Brazil. *Journal of Pediatric Hematology/Oncology* 2000; 22: 502-505.
21. **Liu A**, Hall WJ. Unbiased estimation of secondary parameters following a sequential test. *Biometrika* 2000; 88: 895-900.
22. **Liu A**, Shih WJ, Gehan E. Sample size and power determination for clustered repeated measurements. *Statistics in Medicine* 2002; 21: 1787-1801.
23. **Liu A**. Efficient estimation of two seemingly unrelated regression equations. *Journal of Multivariate Analysis* 2002; 82: 445-456.
24. **Liu A**, Zhang Y, Gehan E, Clarke R. Block principal component analysis with application to gene microarray data classification. *Statistics in Medicine* 2002; 21: 3465-3474.
25. Hall WJ, **Liu A**. Sequential tests and estimates after overrunning based on maximum-likelihood ordering. *Biometrika* 2002; 89: 699-70.
26. Poola I, Abraham J, **Liu A**. Estrogen receptor beta splice variant mRNAs are differentially altered during breast carcinogenesis. *Journal of Steroid Biochemistry and Molecular Biology* 2002; 82: 169-179.
27. Lerman C, Roth D, Kaufmann V, Audrain J, Hawk L, **Liu A**, Niaura R, Epstein L. Mediating mechanisms for the impact of bupropion in smoking cessation treatment. *Drug and Alcohol Dependence* 2002; 67: 219-223.
28. Gu Z, Lee RY, Skaar TC, Bouker KB, Welch JN, Lu J, **Liu A**, Zhu Y, Davis N, Leonessa F, Brunner N, Wang Y, Clarke R. Association of interferon regulatory Factor-1, Nucleophosmin, nuclear Factor-kB, and cyclic AMP response element binding with acquired resistance to Faslodex (ICI 182,780). *Cancer Research* 2002; 62: 3428-3437.
29. Ellis M, Davis N, Coop A, Liu M, Schumaker L, Lee RY, Srikanchana R, Russell CG, Singh B, Miller WR, Stearns V, Pennanen M, Tsangaris T, Gallagher A, **Liu A**, Zwart A, Hayes DF, Lippman ME, Wang Y, Clarke R. Development and validation of a method for using breast core needle biopsies for gene expression microarray analyses. *Clinical Cancer Research* 2000; 8: 1155-1166.

30. Wong LJ, Wong IH, **Liu A**. Intergenerational transmission of pathogenic heteroplasmic mitochondrial DNA. *Genetics in Medicine* 2002; 4: 78-83.
31. **Liu A**. A simple low-bias estimate following a sequential test with linear boundaries. In: *Crossing Boundaries: Statistical Essays in Honor of Jack Hall*, IMS Monograph Series, Kolassa J and Oakes D, Editors, 2003; p 47-58.
32. Mazumdar M, **Liu A**. Group sequential design for comparative diagnostic accuracy studies. *Statistics in Medicine* 2003; 22: 727-739.
33. **Liu A**, Schisterman EF. Comparison of diagnostic accuracy of biomarkers with pooled assessments. *Biometrical Journal* 2003; 45: 631-644.
34. **Liu A**, Troendle JF, Yu KF, Yuan V. Conditional maximum likelihood estimation following a group sequential test. *Biometrical Journal* 2004; 46: 760-768.
35. **Liu A**, Schisterman EF, Teoh E. Sample size and power calculation in comparing diagnostic accuracy of biomarkers with pooled assessments. *Journal of Applied Statistics* 2004; 31: 49-59.
36. Blancato J, Singh B, **Liu A**, Liao DJ, Dickson RB. Correlation of amplification and over-expression of the *c-myc* oncogene in high-grade breast cancer: FISH, *in situ* hybridisation, and immunohistochemical analyses. *British Journal of Cancer* 2004; 90:1612-1619.
37. Dimitrakakis C, Jones RA, **Liu A**, Bondy CA. Breast cancer incidence in menopausal women using testosterone in addition to usual hormone therapy. *Menopause* 2004; 11:531-535.
38. **Liu A**, Schisterman EF, Zhu Y. On linear combinations of biomarkers to improve diagnostic accuracy. *Statistics in Medicine* 2005; 24: 37-47.
39. **Liu A**, Wu CQ, Yu KF, Gehan E. Supplementary analysis of probabilities at the termination of a group sequential phase II trial. *Statistics in Medicine* 2005; 24: 1009-1027
40. Troendle, JF, **Liu A**, Wu CQ, Yu KF. Sequential testing for efficiency in clinical trials with non-transient effects. *Statistics in Medicine* 2005; 24: 3239-3250.
41. **Liu A**, Schisterman EF, Mazumdar M, Hu J. Power and sample size calculation of comparative diagnostic accuracy studies with multiple correlated test results. *Biometrical Journal* 2005; 47: 140-150.
42. **Liu A**, Schisterman EF, Wu CQ. Nonparametric estimation and hypothesis testing on the partial area under receiver operating characteristic curves. *Communications in Statistics---Theory and Methods* 2005; 34: 2077-2088.
43. Guo H, **Liu A**. A simple and efficient bias-reduced estimator of response probability following a group sequential phase II trial. *Journal of Biopharmaceutical Statistics* 2005; 15: 773-781.

44. Schisterman EF, Perkins N, **Liu A**, Bondell H. Optimal cut-point and its corresponding Youden index to discriminate individuals using pooled blood samples. *Epidemiology* 2005; 16: 73-81.
45. Wu CQ, **Liu A**, Yu KF. Estimation of secondary parameters after a multivariate group sequential test. In *Contemporary Multivariate Analysis and Experimental Designs-In Celebration of Professor Kai-Tai Fang's 65th Birthday*, 2005; pp. 337-350. Fan J, Li G, Editors. The World Scientific Publisher.
46. Poola I, Fuqua SAW, DeWitty RL, Abraham J, Marshallack JJ, **Liu A**. ER α - negative breast cancer tissues express significant level of ER β 1 and ER β 5: potential molecular targets(s) for chemo-prevention. *Clinical Cancer Research* 2005; 1, 7579-7585.
47. Zhu Y, Singh B, Hewitt S, **Liu A**, Gomez B, Wang A, Clarker R. Expression patterns among interferon regulatory factor-1, human X-box binding protein-1, nuclear factor kappa B, nucleophosmin, estrogen receptor-alpha and progesterone receptor proteins in breast cancer tissue microarrays. *International Journal of Oncology* 2006; 28: 67-76.
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