


Tze Leung Lai

Ray Lyman Wilbur Professor and Professor, by courtesy, of Biomedical Data Science
Statistics

 Curriculum Vitae available Online

CONTACT INFORMATION

- **Alternate Contact**

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Bio

BIO

I am the Ray Lyman Wilbur Professor of Statistics and, by courtesy, of Biomedical Data Science and of the Institute of Computational and Mathematical Engineering (ICME) at Stanford University. I am also Co-director of the Center for Innovative Study Design (CISD) at the Stanford University School of Medicine. I have supervised 73 Ph.D. theses and seven postdoctoral trainees. I have published over 300 papers, many of which are in clinical trial design and analysis, population pharmacokinetics and pharmacodynamics, survival analysis, longitudinal data analysis, multiple endpoints, biomarkers, adaptive methods, sequential analysis and time series.

ACADEMIC APPOINTMENTS

- Professor, Statistics
- Professor (By courtesy), Biomedical Data Science
- Member, Stanford Cancer Institute
- Member, Wu Tsai Neurosciences Institute

ADMINISTRATIVE APPOINTMENTS

- Core Member, Center for Precision Mental Health and Wellness, Stanford University, (2018- present)
- Faculty Fellow, Center for Innovations in Global Health, Stanford University, (2018- present)
- Ray Lyman Wilbur Professor, Stanford University, (2017- present)
- Professor, by courtesy, of Biomedical Data Science (formerly Health Research and Policy), Stanford School of Medicine, (2015- present)
- Co-chair, Program in Mathematical and Computational Finance, Stanford University, (2014- present)
- Director, Financial and Risk Modeling Institute., Stanford University, (2012- present)
- International Advisory Committee Member, Mathematical Sciences Center, Tsinghua University, (2012- present)
- Advisory Committee Member, Institute of Mathematical Research, University of Hong Kong, (2011- present)
- Chair, Pao-Lu Hsu Distinguished Lecture Series in Statistics and Probability, Center for Mathematical Sciences, Tsinghua University, (2011- present)
- International Advisory Committee Member, Center for Statistical Sciences, Peking University, (2010- present)

- Co-director, Center for Innovative Study Design, Stanford School of Medicine, (2009- present)
- Professor, by courtesy, of the Institute of Computational and Mathematical Engineering, Stanford School of Engineering, (2009- present)
- Professor, by courtesy, of Health Research and Policy, Stanford School of Medicine, (2007-2015)
- Steering Committee, Methods of Analysis Program in the Social Sciences, Stanford University, (2005- present)
- Co-director, Biostatistics Core, Stanford Cancer Center, (2005-2016)
- Director, Interdisciplinary Program in Financial Mathematics, Stanford University, (2005-2014)
- Chair, School of Statistics, Chinese Academy of Sciences, (2003- present)

PROFESSIONAL EDUCATION

- B.A. with First Class Honors, University of Hong Kong , Mathematics (1967)
- M.A., Columbia University , Mathematical Statistics (1970)
- Ph.D., Columbia University , Mathematical Statistics (1971)

LINKS

- Statistics Department Faculty Page: <https://statistics.stanford.edu/people/tze-leung-lai>
- Financial and Risk Modeling Institute: <https://sites.stanford.edu/farm/>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Lai is widely recognized as a prolific leader in the field of sequential statistical analysis. Among his principal achievements is the development of a comprehensive theory of sequential tests of composite hypotheses, unifying previous approaches and providing far-reaching extensions to cope with the practical complexities that arise in the applications to group sequential clinical trials. In particular, this theory paved the way for his ground-breaking work with Shih on flexible and nearly-optimal group sequential tests that can "self-tune" to the unknown parameters during the course of the trial, under pre-specified constraints on the maximum sample size and significance level.

Other major breakthroughs include (a) accurate confidence intervals following sequential tests by using an innovative resampling approach, (b) a definitive solution to the long-standing "multi-armed bandit problem", and (c) the development of statistically and computationally efficient sequential change-point detection procedures in multivariate time series and stochastic systems, for applications to industrial quality control, fault detection in engineering systems and segmentation in computational biology.

Besides sequential analysis, Lai has also made ground-breaking contributions to (i) stochastic approximation and recursive estimation, (ii) adaptive control of linear stochastic systems and Markov decision processes, (iii) saddlepoint approximations and boundary-crossing probabilities in Markov random walks and random fields, and (iv) survival analysis, in particular, rand- and M-estimators in regression models when the response variable is subject to censoring and truncation, and interim analysis of clinical trials with failure-time endpoints.

Teaching

COURSES

2022-23

- Literature of Statistics: STATS 319 (Spr)
- Risk Analytics and Management in Finance and Insurance: CME 243, STATS 243 (Win)
- Risk Analytics and Management in Finance and Insurance: STATS 243P (Win)

2021-22

- Neuroscience-inspired Optimization in Artificial Intelligence, with Multifaceted Applications: STATS 246 (Win)
- Risk Analytics and Management in Finance and Insurance: STATS 243 (Win)
- Statistical Methods in Finance: STATS 240 (Aut)

2020-21

- Advanced Statistical Theory: STATS 314A (Spr)
- Data-driven Financial Econometrics: STATS 241 (Spr)
- Data-driven Financial Econometrics: STATS 241P (Spr)
- Statistical Methods in Finance: STATS 240 (Win)
- Statistical Methods in Finance: STATS 240P (Win)

2019-20

- Advanced Statistical Theory: STATS 314A (Aut)
- Statistical Methods in Finance: STATS 240 (Aut)
- Statistical Methods in Finance: STATS 240P (Aut)

STANFORD ADVISEES

Doctoral Dissertation Advisor (AC)

Huanzhong Xu

Master's Program Advisor

Matheus Dias, Shannon Meyer, Disa Alda Naomi, Pablo Noyola, Rotimi Ojo, Michael Salerno, Armaun Sanayei, Sunwook Sim, Samita Sridhar Kamath

Publications

PUBLICATIONS

- **Power of an Adaptive Trial Design for Endovascular Stroke Studies Simulations Using IMS (Interventional Management of Stroke) III Data** *STROKE*
Lansberg, M. G., Bhat, N. S., Yeatts, S. D., Palesch, Y. Y., Broderick, J. P., Albers, G. W., Lai, T. L., Lavori, P. W.
2016; 47 (12): 2931-2937
- **MULTIVARIATE STOCHASTIC REGRESSION IN TIME SERIES MODELING** *STATISTICA SINICA*
Lai, T. L., Tsang, K. W.
2016; 26 (4): 1411-1426
- **Discussion on "Sequential detection/isolation of abrupt changes" by Igor V. Nikiforov** *SEQUENTIAL ANALYSIS-DESIGN METHODS AND APPLICATIONS*
Lai, T. L., Tsang, K. W.
2016; 35 (3): 305-310
- **Innovative designs of point-of-care comparative effectiveness trials** *CONTEMPORARY CLINICAL TRIALS*
Shih, M., Turakhia, M., Lai, T. L.
2015; 45: 61-68
- **Adaptive design of confirmatory trials: Advances and challenges** *CONTEMPORARY CLINICAL TRIALS*
Lai, T. L., Lavori, P. W., Tsang, K. W.
2015; 45: 93-102
- **ABO Mismatch Is Associated with Increased Nonrelapse Mortality after Allogeneic Hematopoietic Cell Transplantation** *BIOLOGY OF BLOOD AND MARROW TRANSPLANTATION*
Logan, A. C., Wang, Z., Alimoghaddam, K., Wong, R. M., Lai, T., Negrin, R. S., Grumet, C., Logan, B. R., Zhang, M., Spellman, S. R., Lee, S. J., Miklos, D. B.
2015; 21 (4): 746-754

- **ASYMPTOTICALLY EFFICIENT PARAMETER ESTIMATION IN HIDDEN MARKOV SPATIO-TEMPORAL RANDOM FIELDS** *STATISTICA SINICA*
Lai, T. L., Lim, J.
2015; 25 (1): 403-421
- **DYNAMIC EMPIRICAL BAYES MODELS AND THEIR APPLICATIONS TO LONGITUDINAL DATA ANALYSIS AND PREDICTION** *STATISTICA SINICA*
Lai, T. L., Su, Y., Sun, K. H.
2014; 24 (4): 1505-1528
- **Discussion on "Sequential Estimation for Time Series Models" by T. N. Sriram and Ross Iaci** *SEQUENTIAL ANALYSIS-DESIGN METHODS AND APPLICATIONS*
Lai, T. L.
2014; 33 (2): 169-173
- **A GENERAL THEORY OF PARTICLE FILTERS IN HIDDEN MARKOV MODELS AND SOME APPLICATIONS** *ANNALS OF STATISTICS*
Chan, H. P., Lai, T. L.
2013; 41 (6): 2877-2904
- **Group sequential designs for developing and testing biomarker-guided personalized therapies in comparative effectiveness research.** *Contemporary clinical trials*
Lai, T. L., Liao, O. Y., Kim, D. W.
2013; 36 (2): 651-663
- **Group sequential designs for developing and testing biomarker-guided personalized therapies in comparative effectiveness research.** *Contemporary clinical trials*
Lai, T. L., Liao, O. Y., Kim, D. W.
2013; 36 (2): 651-663
- **STOCHASTIC CHANGE-POINT ARX-GARCH MODELS AND THEIR APPLICATIONS TO ECONOMETRIC TIME SERIES** *STATISTICA SINICA*
Lai, T. L., Xing, H.
2013; 23 (4): 1573-1594
- **RARE-EVENT SIMULATION OF HEAVY-TAILED RANDOM WALKS BY SEQUENTIAL IMPORTANCE SAMPLING AND RESAMPLING** *ADVANCES IN APPLIED PROBABILITY*
Chan, H. P., Deng, S., Lai, T.
2012; 44 (4): 1173-1196
- **Sequential design of phase II-III cancer trials** *STATISTICS IN MEDICINE*
Lai, T. L., Lavori, P. W., Shih, M.
2012; 31 (18): 1944-1960
- **Clinical trial designs for testing biomarker-based personalized therapies** *CLINICAL TRIALS*
Lai, T. L., Lavori, P. W., Shih, M. I., Sikic, B. I.
2012; 9 (2): 141-154
- **Adaptive Trial Designs** *ANNUAL REVIEW OF PHARMACOLOGY AND TOXICOLOGY, VOL 52*
Lai, T. L., Lavori, P. W., Shih, M.
2012; 52: 101-110
- **Adaptation in clinical development plans and adaptive clinical trial designs** *STATISTICS AND ITS INTERFACE*
Lai, T. L., Liao, O. Y., Zhu, R. G.
2012; 5 (4): 431-442
- **Sequential Importance Sampling and Resampling for Dynamic Portfolio Credit Risk** *OPERATIONS RESEARCH*
Deng, S., Giesecke, K., Lai, T. L.
2012; 60 (1): 78-91
- **Futility stopping in clinical trials** *STATISTICS AND ITS INTERFACE*
He, P., Lai, T. L., Liao, O. Y.

2012; 5 (4): 415-423

- **Efficient Adaptive Randomization and Stopping Rules in Multi-arm Clinical Trials for Testing a New Treatment** *3rd International Workshop on Sequential Methodologies (IWSM)*
Lai, T. L., Liao, O. Y.
TAYLOR & FRANCIS INC.2012: 441-57
- **A SEQUENTIAL MONTE CARLO APPROACH TO COMPUTING TAIL PROBABILITIES IN STOCHASTIC MODELS** *ANNALS OF APPLIED PROBABILITY*
Chan, H. P., Lai, T. L.
2011; 21 (6): 2315-2342
- **EVALUATING PROBABILITY FORECASTS** *ANNALS OF STATISTICS*
Lai, T. L., Gross, S. T., Shen, D. B.
2011; 39 (5): 2356-2382
- **A STEPWISE REGRESSION METHOD AND CONSISTENT MODEL SELECTION FOR HIGH-DIMENSIONAL SPARSE LINEAR MODELS** *STATISTICA SINICA*
Ing, C., Lai, T. L.
2011; 21 (4): 1473-1513
- **MEAN-VARIANCE PORTFOLIO OPTIMIZATION WHEN MEANS AND COVARIANCES ARE UNKNOWN** *ANNALS OF APPLIED STATISTICS*
Lai, T. L., Xing, H., Chen, Z.
2011; 5 (2A): 798-823
- **Incorporating Individual and Collective Ethics into Phase I Cancer Trial Designs** *BIOMETRICS*
Bartroff, J., Lai, T. L.
2011; 67 (2): 596-603
- **A SIMPLE BAYESIAN APPROACH TO MULTIPLE CHANGE-POINTS** *STATISTICA SINICA*
Lai, T. L., Xing, H.
2011; 21 (2): 539-569
- **CRAMER TYPE MODERATE DEVIATIONS FOR STUDENTIZED U-STATISTICS** *ESAIM-PROBABILITY AND STATISTICS*
Lai, T. L., Shao, Q., Wang, Q.
2011; 15: 168-179
- **Discussion on "Two-Stage Procedures for High-Dimensional Data" by Makoto Aoshima and Kazuyoshi Yata** *SEQUENTIAL ANALYSIS-DESIGN METHODS AND APPLICATIONS*
Ing, C., Lai, T. L.
2011; 30 (4): 404-411
- **Sequential generalized likelihood ratio tests for vaccine safety evaluation** *STATISTICS IN MEDICINE*
Shih, M., Lai, T. L., Heyse, J. F., Chen, J.
2010; 29 (26): 2698-2708
- **Approximate Dynamic Programming and Its Applications to the Design of Phase I Cancer Trials** *STATISTICAL SCIENCE*
Bartroff, J., Lai, T. L.
2010; 25 (2): 245-257
- **Multistage Tests of Multiple Hypotheses** *COMMUNICATIONS IN STATISTICS-THEORY AND METHODS*
Bartroff, J., Lai, T. L.
2010; 39 (8-9): 1597-1607
- **Theory and applications of multivariate self-normalized processes** *STOCHASTIC PROCESSES AND THEIR APPLICATIONS*
de la Pena, V. H., Klass, M. J., Lai, T. L.
2009; 119 (12): 4210-4227
- **Option hedging theory under transaction costs** *JOURNAL OF ECONOMIC DYNAMICS & CONTROL*
Lai, T. L., Lim, T. W.
2009; 33 (12): 1945-1961

- **Tests and confidence intervals for secondary endpoints in sequential clinical trials** *BIOMETRIKA*
Lai, T. L., Shih, M., Su, Z.
2009; 96 (4): 903-915
- **A Bayesian Approach to Sequential Surveillance in Exponential Families** *COMMUNICATIONS IN STATISTICS-THEORY AND METHODS*
Lai, T. L., Liu, T., Xing, H.
2009; 38 (16-17): 2958-2968
- **Modern sequential analysis and its applications to computerized adaptive testing** *PSYCHOMETRIKA*
Bartroff, J., Finkelman, M., Lai, T. L.
2008; 73 (3): 473-486
- **Statistical inference in dynamic panel data models** *JOURNAL OF STATISTICAL PLANNING AND INFERENCE*
Lai, T. L., Small, D. S., Liu, J.
2008; 138 (9): 2763-2776
- **Stochastic segmentation models for array-based comparative genomic hybridization data analysis** *BIOSTATISTICS*
Lai, T. L., Xing, H., Zhang, N.
2008; 9 (2): 290-307
- **A Hidden Markov Filtering Approach to Multiple Change-point Models** *47th IEEE Conference on Decision and Control*
Lai, T. L., Xing, H.
IEEE.2008: 1914-1919
- **Statistical models for the Basel II internal ratings-based approach to measuring credit risk of retail products** *STATISTICS AND ITS INTERFACE*
Lai, T. L., Wong, S. P.
2008; 1 (2): 229-241
- **Corrected random walk approximations to free boundary problems in optimal stopping** *ADVANCES IN APPLIED PROBABILITY*
Lai, T. L., Yao, Y., Aitsahlia, F.
2007; 39 (3): 753-775
- **Efficient importance sampling for Monte Carlo evaluation of exceedance probabilities** *ANNALS OF APPLIED PROBABILITY*
Chan, H. P., Lai, T. L.
2007; 17 (2): 440-473
- **A combined superiority and non-inferiority approach to multiple endpoints in clinical trials** *STATISTICS IN MEDICINE*
Bloch, D. A., Lai, T. L., Su, Z., Tubert-Bitter, P.
2007; 26 (6): 1193-1207
- **Nonparametric functionals of spectral distributions and their applications to time series analysis** *JOURNAL OF STATISTICAL PLANNING AND INFERENCE*
Lai, T. L., Xing, H.
2007; 137 (3): 1066-1075
- **Identification and adaptive control of change-point ARX models via Rao-Blackwellized particle filters** *IEEE TRANSACTIONS ON AUTOMATIC CONTROL*
Chen, Y., Lai, T. L.
2007; 52 (1): 67-72
- **Marginal regression analysis of longitudinal data with time-dependent covariates: a generalized method-of-moments approach** *JOURNAL OF THE ROYAL STATISTICAL SOCIETY SERIES B-STATISTICAL METHODOLOGY*
Lai, T. L., Small, D.
2007; 69: 79-99
- **Confidence intervals for survival quantiles in the Cox regression model** *LIFETIME DATA ANALYSIS*
Lai, T. L., Su, Z.
2006; 12 (4): 407-419
- **Confidence intervals in group sequential trials with random group sizes and applications to survival analysis** *BIOMETRIKA*
Lai, T. L., Li, W.

2006; 93 (3): 641-654

- **Efficient recursive estimation and adaptive control in stochastic regression and ARMAX models** *STATISTICA SINICA*
Lai, T. L., Ying, Z.
2006; 16 (3): 741-772
- **Modified Haybittle-Peto group sequential designs for testing superiority and non-inferiority hypotheses in clinical trials** *STATISTICS IN MEDICINE*
Lai, T. L., Shih, M. C., Zhu, G. R.
2006; 25 (7): 1149-1167
- **Flexible modeling via a hybrid estimation scheme in generalized mixed models for longitudinal data** *BIOMETRICS*
Lai, T. L., Shih, M. C., Wong, S. P.
2006; 62 (1): 159-167
- **A new approach to modeling covariate effects and individualization in population pharmacokinetics-pharmacodynamics** *JOURNAL OF PHARMACOKINETICS AND PHARMACODYNAMICS*
Lai, T. L., Shih, M. C., Wong, S. P.
2006; 33 (1): 49-74
- **Maxima of asymptotically Gaussian random fields and moderate deviation approximations to boundary crossing probabilities of sums of random variables with multidimensional indices** *ANNALS OF PROBABILITY*
Chan, H. P., Lai, T. L.
2006; 34 (1): 80-121
- **The optimal stopping problem for S-n/n and its ramifications** *Festschrift in Honor of Yuan Shih Chow on Random Walk, Sequential Analysis and Related Topics*
Lai, T. L., Yao, Y.
WORLD SCIENTIFIC PUBL CO PTE LTD.2006: 131-149
- **Autoregressive models with piecewise constant volatility and regression parameters** *NBER/NSF Time Series Conference*
Lai, T. L., Liu, H. Y., King, H. P.
STATISTICA SINICA.2005: 279-301
- **Optimal stopping for Brownian motion with applications to sequential analysis and option pricing** *JOURNAL OF STATISTICAL PLANNING AND INFERENCE*
Lai, T. L., Lim, T. W.
2005; 130 (1-2): 21-47
- **Power, sample size and adaptation considerations in the design of group sequential clinical trials** *BIOMETRIKA*
Lai, T. L., Shih, M. C.
2004; 91 (3): 507-528
- **Self-normalized processes: Exponential inequalities, moment bounds and iterated logarithm laws** *ANNALS OF PROBABILITY*
De La Pena, V. H., Klass, M. J., Lai, T. L.
2004; 32 (3A): 1902-1933
- **Exercise regions and efficient valuation of American lookback options** *5th ICSA International Statistical Conference*
Lai, T. L., Lim, T. W.
WILEY-BLACKWELL.2004: 249-69
- **Valuation of American options via basis functions** *IEEE TRANSACTIONS ON AUTOMATIC CONTROL*
Lai, T. L., Wong, S. P.
2004; 49 (3): 374-385
- **Limit theorems for moving averages** *Workshop on Probability with Applications to Finance and Insurance*
Lai, T. L.
WORLD SCIENTIFIC PUBL CO PTE LTD.2004: 1-14
- **A hybrid estimator in nonlinear and generalised linear mixed effects models** *BIOMETRIKA*
Lai, T. L., Shih, M. C.
2003; 90 (4): 859-879

- **Saddlepoint approximations and nonlinear boundary crossing probabilities of Markov random walks** *ANNALS OF APPLIED PROBABILITY*
Chan, H. P., Lai, T. L.
2003; 13 (2): 395-429
- **Nonparametric estimation in nonlinear mixed effects models** *BIOMETRIKA*
Lai, T. L., Shih, M. C.
2003; 90 (1): 1-13
- **Optimal learning and experimentation in bandit problems** *JOURNAL OF ECONOMIC DYNAMICS & CONTROL*
Brezzi, M., Lai, T. L.
2002; 27 (1): 87-108
- **Detection and estimation in stochastic systems with time-varying parameters** *Workshop on Stochastic Theory and Control*
Lai, T. L.
SPRINGER-VERLAG BERLIN.2002: 251–265
- **One-sided tests in clinical trials with multiple endpoints** *BIOMETRICS*
Bloch, D. A., Lai, T. L., Tubert-Bitter, P.
2001; 57 (4): 1039-1047
- **Asymptotic expansions in multidimensional Markov renewal theory and first passage times for Markov random walks** *ADVANCES IN APPLIED PROBABILITY*
Fuh, C. D., Lai, T. L.
2001; 33 (3): 652-673
- **Stochastic neural networks with applications to nonlinear time series** *JOURNAL OF THE AMERICAN STATISTICAL ASSOCIATION*
Lai, T. L., Wong, S. P.
2001; 96 (455): 968-981
- **Sequential analysis: Some classical problems and new challenges** *STATISTICA SINICA*
Lai, T. L.
2001; 11 (2): 303-351
- **Asymptotic approximations for error probabilities of sequential or fixed sample size tests in exponential families** *ANNALS OF STATISTICS*
Chan, H. P., Lai, T. L.
2000; 28 (6): 1638-1669
- **Incomplete learning from endogenous data in dynamic allocation** *ECONOMETRICA*
Brezzi, M., Lai, T. L.
2000; 68 (6): 1511-1516
- **Efficient score estimation and adaptive M-estimators in censored and truncated regression models** *STATISTICA SINICA*
Kim, C. K., Lai, T. L.
2000; 10 (3): 731-749
- **Sequential multiple hypothesis testing and efficient fault detection-isolation in stochastic systems** *IEEE TRANSACTIONS ON INFORMATION THEORY*
Lai, T. L.
2000; 46 (2): 595-608
- **Hybrid resampling methods for confidence intervals** *STATISTICA SINICA*
Chuang, C. S., Lai, T. L.
2000; 10 (1): 1-33
- **Moment bounds for self-normalized martingales** *2nd International Conference on High Dimensional Probability*
de la Pena, V. H., Klass, M. J., Lai, T. L.
BIRKHAUSER BOSTON.2000: 3–11
- **Determination of power and sample size in the design of clinical trials with failure-time endpoints and interim analyses** *CONTROLLED CLINICAL TRIALS*
Gu, M. G., Lai, T. L.
1999; 20 (5): 423-438

- **Efficient recursive algorithms for detection of abrupt changes in signals and control systems** *IEEE TRANSACTIONS ON AUTOMATIC CONTROL*
Lai, T. L., Shan, J. Z.
1999; 44 (5): 952-966
- **Regression smoothers and additive models for censored and truncated data** *COMMUNICATIONS IN STATISTICS-THEORY AND METHODS*
Kim, C. K., Lai, T. L.
1999; 28 (11): 2717-2747
- **Information bounds and quick detection of parameter changes in stochastic systems** *IEEE TRANSACTIONS ON INFORMATION THEORY*
Lai, T. L.
1998; 44 (7): 2917-2929
- **Wald's equations, first passage times and moments of ladder variables in Markov random walks** *JOURNAL OF APPLIED PROBABILITY*
Fuh, C. D., Lai, T. L.
1998; 35 (3): 566-580
- **Resampling methods for confidence intervals in group sequential trials** *BIOMETRIKA*
Chuang, C. S., Lai, T. L.
1998; 85 (2): 317-332
- **Repeated significance testing with censored rank statistics in interim analysis of clinical trials** *STATISTICA SINICA*
Gu, M. G., Lai, T. L.
1998; 8 (2): 411-428
- **Stochastic adaptive control of linear time-varying systems using auxiliary variables** *37th IEEE Conference on Decision and Control*
Lai, T. L., Li, Z.
IEEE.1998: 3445-3450
- **Moments of randomly stopped U-STATISTICS** *ANNALS OF PROBABILITY*
de la Pena, V. H., Lai, T. L.
1997; 25 (4): 2055-2081
- **Information and prediction criteria for model selection in stochastic regression and ARMA models** *STATISTICA SINICA*
Lai, T. L., Lee, C. P.
1997; 7 (2): 285-309
- **Wald's equation and asymptotic bias of randomly stopped U-statistics** *PROCEEDINGS OF THE AMERICAN MATHEMATICAL SOCIETY*
DELAPENA, V. H., Lai, T. L.
1997; 125 (3): 917-925
- **On optimal stopping problems in sequential hypothesis testing** *STATISTICA SINICA*
Lai, T. L.
1997; 7 (1): 33-51
- **Nonparametric estimation and regression analysis with left-truncated and right-censored data** *JOURNAL OF THE AMERICAN STATISTICAL ASSOCIATION*
Gross, S. T., Lai, T. L.
1996; 91 (435): 1166-1180
- **Bootstrap methods for truncated and censored data** *STATISTICA SINICA*
Gross, S. T., Lai, T. L.
1996; 6 (3): 509-530
- **Convergence rate in the strong law of large numbers for Markov chains** *Conference on Convergence in Ergodic Theory and Probability*
Fuh, C. D., Lai, T. L.
WALTER DE GRUYTER & CO.1996: 185-192
- **Computer-based screening of patients with HIV/AIDS for clinical-trial eligibility.** *The Online journal of current clinical trials*
Carlson, R. W., Tu, S. W., Lane, N. M., Lai, T. L., Kemper, C. A., Musen, M. A., Shortliffe, E. H.
1995; Doc No 179: [3347 words, 32 paragraphs]

- **ASYMPTOTIC NORMALITY OF A CLASS OF ADAPTIVE STATISTICS WITH APPLICATIONS TO SYNTHETIC DATA METHODS FOR CENSORED REGRESSION** *JOURNAL OF MULTIVARIATE ANALYSIS*
Lai, T. L., Ying, Z. L., Zheng, Z. K.
1995; 52 (2): 259-279
- **SEQUENTIAL CHANGEPOINT DETECTION IN QUALITY-CONTROL AND DYNAMICAL-SYSTEMS** *JOURNAL OF THE ROYAL STATISTICAL SOCIETY SERIES B-METHODOLOGICAL*
Lai, T. L.
1995; 57 (4): 613-658
- **ASYMPTOTIC PROPERTIES OF NONLINEAR LEAST-SQUARES ESTIMATES IN STOCHASTIC REGRESSION-MODELS** *ANNALS OF STATISTICS*
Lai, T. L.
1994; 22 (4): 1917-1930
- **STATISTICAL-ANALYSIS OF LIGAND-BINDING EXPERIMENTS** *BIOMETRICS*
Lai, T. L., Zhang, L. M.
1994; 50 (3): 782-797
- **A MISSING INFORMATION PRINCIPLE AND M-ESTIMATORS IN REGRESSION-ANALYSIS WITH CENSORED AND TRUNCATED DATA** *ANNALS OF STATISTICS*
Lai, T. L., Ying, Z. L.
1994; 22 (3): 1222-1255
- **Nearly optimal generalized sequential likelihood ratio tests in multivariate exponential families** *International Symposium on Multivariate Analysis and Its Applications*
Lai, T. L., Zhang, L. M.
INST MATHEMATICAL STATISTICS.1994: 331-346
- **EDGEWORTH EXPANSIONS FOR SYMMETRICAL STATISTICS WITH APPLICATIONS TO BOOTSTRAP METHODS** *STATISTICA SINICA*
Lai, T. L., WANG, J. Q.
1993; 3 (2): 517-542
- **ASYMPTOTIC THEORY OF A BIAS-CORRECTED LEAST-SQUARES ESTIMATOR IN TRUNCATED REGRESSION** *STATISTICA SINICA*
Lai, T. L., Ying, Z.
1992; 2 (2): 519-539
- **BOOTSTRAP CONFIDENCE BANDS FOR SPECTRA AND CROSS-SPECTRA** *IEEE TRANSACTIONS ON SIGNAL PROCESSING*
Politis, D. N., Romano, J. P., Lai, T. L.
1992; 40 (5): 1206-1215
- **ASYMPTOTICALLY EFFICIENT ESTIMATION IN CENSORED AND TRUNCATED REGRESSION-MODELS** *STATISTICA SINICA*
Lai, T. L., Ying, Z. L.
1992; 2 (1): 17-46
- **CERTAINTY EQUIVALENCE WITH UNCERTAINTY ADJUSTMENTS IN STOCHASTIC ADAPTIVE-CONTROL** *WORKSHOP ON STOCHASTIC THEORY AND ADAPTIVE CONTROL*
Lai, T. L.
SPRINGER VERLAG.1992: 270-284
- **RECURSIVE-IDENTIFICATION AND ADAPTIVE PREDICTION IN LINEAR STOCHASTIC-SYSTEMS** *SIAM JOURNAL ON CONTROL AND OPTIMIZATION*
Lai, T. L., Ying, Z. L.
1991; 29 (5): 1061-1090
- **LARGE SAMPLE THEORY OF A MODIFIED BUCKLEY-JAMES ESTIMATOR FOR REGRESSION-ANALYSIS WITH CENSORED-DATA** *ANNALS OF STATISTICS*
Lai, T. L., Ying, Z. L.
1991; 19 (3): 1370-1402

- **PARALLEL RECURSIVE ALGORITHMS IN ASYMPTOTICALLY EFFICIENT ADAPTIVE-CONTROL OF LINEAR STOCHASTIC-SYSTEMS** *SIAM JOURNAL ON CONTROL AND OPTIMIZATION*
Lai, T. L., Ying, Z. L.
1991; 29 (5): 1091-1127
- **ADAPTIVE PREDICTION IN NONLINEAR AUTOREGRESSIVE MODELS AND CONTROL-SYSTEMS** *STATISTICA SINICA*
Lai, T. L., Zhu, G. G.
1991; 1 (2): 309-334
- **RANK REGRESSION METHODS FOR LEFT-TRUNCATED AND RIGHT-CENSORED DATA** *ANNALS OF STATISTICS*
Lai, T. L., Ying, Z. L.
1991; 19 (2): 531-556
- **ESTIMATING A DISTRIBUTION FUNCTION WITH TRUNCATED AND CENSORED-DATA** *ANNALS OF STATISTICS*
Lai, T. L., Ying, Z. L.
1991; 19 (1): 417-442
- **INFORMATION BOUNDS, CERTAINTY EQUIVALENCE AND LEARNING IN ASYMPTOTICALLY EFFICIENT ADAPTIVE-CONTROL OF TIME-INVARIANT STOCHASTIC-SYSTEMS** *LECTURE NOTES IN CONTROL AND INFORMATION SCIENCES*
Lai, T. L.
1991; 161: 335-368
- **FUNCTIONAL LAWS OF THE ITERATED LOGARITHM FOR THE PRODUCT-LIMIT ESTIMATOR OF A DISTRIBUTION FUNCTION UNDER RANDOM CENSORSHIP OR TRUNCATION** *ANNALS OF PROBABILITY*
Gu, M. G., Lai, T. L.
1990; 18 (1): 160-189
- **STOCHASTIC INTEGRALS OF EMPIRICAL-TYPE PROCESSES WITH APPLICATIONS TO CENSORED REGRESSION** *JOURNAL OF MULTIVARIATE ANALYSIS*
Lai, T. L., Ying, Z. L.
1988; 27 (2): 334-358
- **OPEN BANDIT PROCESSES AND OPTIMAL SCHEDULING OF QUEUEING-NETWORKS** *ADVANCES IN APPLIED PROBABILITY*
Lai, T. L., Ying, Z. L.
1988; 20 (2): 447-472
- **NEARLY OPTIMAL SEQUENTIAL-TESTS OF COMPOSITE HYPOTHESES** *ANNALS OF STATISTICS*
Lai, T. L.
1988; 16 (2): 856-886
- **BOUNDARY CROSSING PROBLEMS FOR SAMPLE MEANS** *ANNALS OF PROBABILITY*
Lai, T. L.
1988; 16 (1): 375-396
- **HEART-RATE-VARIABILITY DURING RESPIRATORY PAUSES IN PUPPIES AND DOGS** *PEDIATRIC RESEARCH*
Haddad, G. G., Jeng, H. J., Lai, T. L.
1987; 22 (3): 306-311
- **DETERMINATION OF SLEEP STATE IN INFANTS USING RESPIRATORY VARIABILITY** *PEDIATRIC RESEARCH*
Haddad, G. G., Jeng, H. J., Lai, T. L., Mellins, R. B.
1987; 21 (6): 556-562
- **ASYMPTOTICALLY EFFICIENT SELF-TUNING REGULATORS** *SIAM JOURNAL ON CONTROL AND OPTIMIZATION*
Lai, T. L., Wei, C. Z.
1987; 25 (2): 466-481
- **EXTENDED LEAST-SQUARES AND THEIR APPLICATIONS TO ADAPTIVE-CONTROL AND PREDICTION IN LINEAR-SYSTEMS** *IEEE TRANSACTIONS ON AUTOMATIC CONTROL*
Lai, T. L., Wei, C. Z.
1986; 31 (10): 898-906

- **WITHIN-BREATH ELECTROMYOGRAPHIC CHANGES DURING LOADED BREATHING IN ADULT SHEEP** *JOURNAL OF APPLIED PHYSIOLOGY*
Haddad, G. G., Jeng, H. J., Bazzy, A. R., Lai, T. L.
1986; 61 (4): 1316-1321
- **EFFECT OF ENDORPHINS ON HEART-RATE AND BLOOD-PRESSURE IN ADULT DOGS** *AMERICAN JOURNAL OF PHYSIOLOGY*
Haddad, G. G., Jeng, H. J., Lai, T. L.
1986; 250 (5): H796-H805
- **ASYMPTOTICALLY EFFICIENT ADAPTIVE ALLOCATION RULES** *ADVANCES IN APPLIED MATHEMATICS*
Lai, T. L., Robbins, H.
1985; 6 (1): 4-22
- **ORTHONORMAL BANACH SYSTEMS WITH APPLICATIONS TO LINEAR-PROCESSES** *ZEITSCHRIFT FUR WAHRSCHEINLICHKEITSTHEORIE UND VERWANDTE GEBIETE*
Lai, T. L., Wei, C. Z.
1985; 70 (3): 381-393
- **OPTIMAL SEQUENTIAL SAMPLING FROM 2 POPULATIONS** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA-PHYSICAL SCIENCES*
Lai, T. L., Robbins, H.
1984; 81 (4): 1284-1286
- **RHYTHMIC VARIATIONS IN R-R INTERVAL DURING SLEEP AND WAKEFULNESS IN PUPPIES AND DOGS** *AMERICAN JOURNAL OF PHYSIOLOGY*
Haddad, G. G., Jeng, H. J., Lee, S. H., Lai, T. L.
1984; 247 (1): H67-H73
- **FIXED ACCURACY ESTIMATION OF AN AUTOREGRESSIVE PARAMETER** *ANNALS OF STATISTICS*
Lai, T. L., Siegmund, D.
1983; 11 (2): 478-485
- **HEART-RATE PATTERN DURING SLEEP IN AN INFANT WITH CONGENITAL PROLONGATION OF THE Q-T INTERVAL (ROMANO-WARD SYNDROME)** *CHEST*
LEISTNER, H. L., Haddad, G. G., Lai, T. L., Mellins, R. B.
1983; 84 (2): 191-194
- **CONVERGENCE SYSTEMS AND STRONG CONSISTENCY OF LEAST-SQUARES ESTIMATES IN REGRESSION-MODELS** *KEXUE TONGBAO*
Chen, G. J., Lai, T. L., Wei, C. Z.
1983; 28 (1): 16-20
- **ASYMPTOTIC PROPERTIES OF GENERAL AUTOREGRESSIVE MODELS AND STRONG CONSISTENCY OF LEAST-SQUARES ESTIMATES OF THEIR PARAMETERS** *JOURNAL OF MULTIVARIATE ANALYSIS*
Lai, T. L., Wei, C. Z.
1983; 13 (1): 1-23
- **ENKEPHALIN-INDUCED CHANGES IN VENTILATION AND VENTILATORY PATTERN IN ADULT DOGS** *JOURNAL OF APPLIED PHYSIOLOGY*
Haddad, G. G., Gandhi, M. R., Hochwald, G. M., Lai, T. L.
1983; 55 (4): 1311-1320
- **ADAPTIVE CHOICE OF MEAN OR MEDIAN IN ESTIMATING THE CENTER OF A SYMMETRIC DISTRIBUTION** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA-PHYSICAL SCIENCES*
Lai, T. L., Robbins, H., Yu, K. F.
1983; 80 (18): 5803-5806
- **LEAST-SQUARES ESTIMATES IN STOCHASTIC REGRESSION-MODELS WITH APPLICATIONS TO IDENTIFICATION AND CONTROL OF DYNAMIC-SYSTEMS** *ANNALS OF STATISTICS*
Lai, T. L., Wei, C. Z.
1982; 10 (1): 154-166
- **DETERMINATION OF VENTILATORY PATTERN IN REM-SLEEP IN NORMAL INFANTS** *JOURNAL OF APPLIED PHYSIOLOGY*

-
- Haddad, G. G., Lai, T. L., Mellins, R. B.
1982; 53 (1): 52-56
- **BREATH-TO-BREATH VARIATIONS IN RATE AND DEPTH OF VENTILATION IN SLEEPING INFANTS** *AMERICAN JOURNAL OF PHYSIOLOGY*
Haddad, G. G., Lai, T. L., EPSTEIN, M. A., EPSTEIN, R. A., Yu, K. F., LEISTNER, H. L., Mellins, R. B.
1982; 243 (1): R164-R169
 - **A LAW OF THE ITERATED LOGARITHM FOR DOUBLE ARRAYS OF INDEPENDENT RANDOM-VARIABLES WITH APPLICATIONS TO REGRESSION AND TIME-SERIES MODELS** *ANNALS OF PROBABILITY*
Lai, T. L., Wei, C. Z.
1982; 10 (2): 320-335
 - **ASYMPTOTIC PROPERTIES OF PROJECTIONS WITH APPLICATIONS TO STOCHASTIC REGRESSION PROBLEMS** *JOURNAL OF MULTIVARIATE ANALYSIS*
Lai, T. L., Wei, C. Z.
1982; 12 (3): 346-370
 - **CONSISTENCY AND ASYMPTOTIC EFFICIENCY OF SLOPE ESTIMATES IN STOCHASTIC-APPROXIMATION SCHEMES** *ZEITSCHRIFT FUR WAHRSCHEINLICHKEITSTHEORIE UND VERWANDTE GEBIETE*
Lai, T. L., Robbins, H.
1981; 56 (3): 329-360
 - **CONVERGENCE SYSTEMS AND STRONG CONSISTENCY OF LEAST-SQUARES ESTIMATES IN REGRESSION-MODELS** *JOURNAL OF MULTIVARIATE ANALYSIS*
GUIJING, C., Lai, T. L., Wei, C. Z.
1981; 11 (3): 319-333
 - **VENTILATION AND VENTILATORY PATTERN DURING SLEEP IN ABORTED SUDDEN INFANT DEATH SYNDROME** *PEDIATRIC RESEARCH*
Haddad, G. G., LEISTNER, H. L., Lai, T. L., Mellins, R. B.
1981; 15 (5): 879-883
 - **SEQUENTIAL MEDICAL TRIALS** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA-PHYSICAL SCIENCES*
Lai, T. L., Levin, B., Robbins, H., Siegmund, D.
1980; 77 (6): 3135-3138
 - **HEART-RATE AND HEART-RATE-VARIABILITY DURING SLEEP IN ABORTED SUDDEN INFANT DEATH SYNDROME** *JOURNAL OF PEDIATRICS*
LEISTNER, H. L., Haddad, G. G., EPSTEIN, R. A., Lai, T. L., EPSTEIN, M. A., Mellins, R. B.
1980; 97 (1): 51-55
 - **NON-LINEAR RENEWAL THEORY WITH APPLICATIONS TO SEQUENTIAL-ANALYSIS .2.** *ANNALS OF STATISTICS*
Lai, T. L., Siegmund, D.
1979; 7 (1): 60-76
 - **ADAPTIVE DESIGN AND STOCHASTIC-APPROXIMATION** *ANNALS OF STATISTICS*
Lai, T. L., Robbins, H.
1979; 7 (6): 1196-1221
 - **STRONG CONSISTENCY OF LEAST-SQUARES ESTIMATES IN MULTIPLE-REGRESSION .2.** *JOURNAL OF MULTIVARIATE ANALYSIS*
Lai, T. L., Robbins, H., Wei, C. Z.
1979; 9 (3): 343-361
 - **LOCAL CONVERGENCE THEOREMS FOR ADAPTIVE STOCHASTIC-APPROXIMATION SCHEMES** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Lai, T. L., Robbins, H.
1979; 76 (7): 3065-3067
 - **CLASS OF DEPENDENT RANDOM-VARIABLES AND THEIR MAXIMA** *ZEITSCHRIFT FUR WAHRSCHEINLICHKEITSTHEORIE UND VERWANDTE GEBIETE*
Lai, T. L., Robbins, H.
-

1978; 42 (2): 89-111

- **STRONG CONSISTENCY OF LEAST-SQUARES ESTIMATES IN MULTIPLE-REGRESSION** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Lai, T. L., Robbins, H., Wei, C. Z.
1978; 75 (7): 3034-3036
- **LIMIT-THEOREMS FOR WEIGHTED SUMS AND STOCHASTIC-APPROXIMATION PROCESSES** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Lai, T. L., Robbins, H.
1978; 75 (3): 1068-1070
- **ADAPTIVE DESIGN IN REGRESSION AND CONTROL** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Lai, T. L., Robbins, H.
1978; 75 (2): 586-587
- **NONLINEAR RENEWAL THEORY WITH APPLICATIONS TO SEQUENTIAL-ANALYSIS I** *ANNALS OF STATISTICS*
Lai, T. L., Siegmund, D.
1977; 5 (5): 946-954
- **STRONG CONSISTENCY OF LEAST-SQUARES ESTIMATES IN REGRESSION-MODELS** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Lai, T. L., Robbins, H.
1977; 74 (7): 2667-2669
- **MAXIMALLY DEPENDENT RANDOM-VARIABLES** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Lai, T. L., Robbins, H.
1976; 73 (2): 286-288