

# Ming-Hung (Jason) Kao

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EDUCATION	<b>Ph.D. in Statistics</b> 2004 – 2009 <b>University of Georgia</b> , Athens, GA <u>Dissertation</u> : Optimal Experimental Designs for Event-Related Functional Magnetic Resonance Imaging ( <u>Advisors</u> : John Stufken & Abhyuday Mandal)
	<b>M.S. in Statistics</b> 1997 – 1999 <b>National Central University</b> , Taiwan <u>Thesis</u> : Bayesian Analysis for Multiple Changes of the Long Memory Parameter ( <u>Advisor</u> : Shu-Ing Liu)
	<b>B.S. in Mathematics</b> 1993 – 1997 <b>National Central University</b> , Taiwan
PROFESSIONAL EXPERIENCE	<b>Associate Professor</b> 2015 – present School of Mathematical & Statistical Sciences Arizona State University
	<b>Assistant Professor</b> 2009 – 2015 School of Mathematical & Statistical Sciences Arizona State University
	<b>Lecturer</b> spring 2009 Department of Statistics University of Georgia
	<b>Statistical Consultant</b> 2006 – 2008 Biostatistics Consulting Center, College of Public Health University of Georgia
	<b>Teaching Assistant</b> 2004 – 2006 Department of Statistics University of Georgia
	<b>Assistant Manager</b> 2002 – 2004 Virginia Contract Research Organization, Taiwan
	<b>Statistician</b> 2001 – 2002 Virginia Contract Research Organization, Taiwan
AWARDS AND HONORS	<b>National Science Foundation (NSF) CAREER Award</b> (\$400,000, 2014–2019): the NSF’s most prestigious award in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research.
	<b>Institute of Mathematical Statistics (IMS) Travel Award</b> (\$1,130, 2014): a travel award from the IMS for giving an invited talk at the 3rd IMS Asia Pacific Rim Meeting
	<b>James L. Carmon Scholarship</b> (\$4,000, 2009): awarded to a graduate student whose research reflects state-of-the-art utilization of computer and/or networking technology in the sciences or creative arts by Office of the Vice President for Research, University of Georgia
	<b>Student Paper Award</b> (with \$1,000 travel support, 2008): awarded by the Statistical Computing Section and the Statistical Graphics Section of the American Statistical Association (ASA)

**The Best Senior Student** (\$250, 2008): awarded by the Department of Statistics, University of Georgia

**R. L. Anderson Award** (with \$500 travel support, 2007): awarded jointly by the Southern Regional Council on Statistics and the ASA

**The Best Beginning Theoretical Student** (2005): awarded by the Department of Statistics, University of Georgia

**University-Wide Graduate School Assistantship** (2004–2006): a competitive assistantship awarded by the Graduate School of the University of Georgia

**Scholarship of Cathay Life Charity Foundation** (NT\$10,000, 1997): a scholarship awarded to the most outstanding students at each university in Taiwan

**Honorary Member of the Phi Tau Phi Scholastic Honor Society of the Republic of China** (1997 – present): elected by the National Central University, Taiwan

REFEREED  
PUBLICATIONS

**Kao, M.-H.**, Mandal, A., and Stufken, J. (2008). Optimal Design for Event-related Functional Magnetic Resonance Imaging Considering Both Individual Stimulus Effects and Pairwise Contrasts. *Statistics and Applications*, 6, p.235-256

**Kao, M.-H.**, Mandal, A., Lazar, N., and Stufken, J. (2009). Multi-Objective Optimal Experimental Designs for Event-Related fMRI Studies. *NeuroImage*, 44, p.849-856 (*student paper award*)

**Kao, M.-H.** (2009). Multi-objective Optimal Experimental Designs for ER-fMRI Using Matlab. *Journal of Statistical Software*, 30, p.1-13

**Kao, M.-H.**, Mandal, A., and Stufken, J. (2009). Efficient Designs for Event-Related Functional Magnetic Resonance Imaging with Multiple Scanning Sessions. *Communications in Statistics – Theory and Methods*, 38, p.3170-3182

**Kao, M.-H.**, Mandal, A., and Stufken, J. (2012). Constrained Multi-objective Designs for Functional MRI Experiments via A Modified Nondominated Sorting Genetic Algorithm. *Journal of the Royal Statistical Society: Series C (Applied Statistics)*, 61, p.515-534

**Kao, M.-H.** (2013). On the Optimality of Extended Maximal Length Linear Feedback Shift Register Sequences. *Statistics & Probability Letters*, 83, p.1479-1483

**Kao, M.-H.**, Majumdar, D., Mandal, A. and Stufken, J. (2013). Maximin And Maximin Efficient Event-Related fMRI Designs under A Nonlinear Model. *Annals of Applied Statistics*, 7, p.1940-1959

**Kao, M.-H.**, and Mittelmann, D. H. (2014). A Fast Algorithm For Constructing Efficient Event-Related fMRI Designs. *Journal of Statistical Computation and Simulation*, 84, p.2391-2407

**Kao, M.-H.** (2014). A New Type of Experimental Designs for Event-Related fMRI via Hadamard Matrices. *Statistics & Probability Letters*, 84, p.108-112

**Kao, M.-H.**, Tamkit, M., and Wong, W. K. (2014). Recent Developments in Optimal Experimental Designs for Functional MRI. *World Journal of Radiology*, 6, p.437-445 (*invited paper for the 6th anniversary special issue*)

**Kao, M.-H.** (2015). Universally Optimal fMRI Designs for Comparing Hemodynamic Response Functions. *Statistica Sinica*, 25, p.499-506

**Kao, M.-H.**, and Stufken, J. (2015). Optimal design for event-related fMRI studies. To appear in the *Handbook of Design and Analysis of Experiments*, Chapman & Hall/CRC

Cheng, C.-S., and **Kao, M.-H.** (2015) Optimal experimental designs for fMRI via circulant biased weighing designs *Annals of Statistics*, to appear.

OTHER  
MANUSCRIPTS

Lin, Y.-L., Phoa, F. K. H., and **Kao, M.-H.** “Partial Hadamard matrices: construction via general difference sets and application to fMRI designs,” *under review*

Saleh M., **Kao, M.-H.**, and Pan, R. “Fast algorithms for designing D-optimal event-related fMRI experiments,” *revised*

Jangid, K., **Kao, M.-H.**, Williams, M. A., Rathbun, S. L., Whitman, W. B. “K-Shuff: a sensitive new algorithm for comparing structural and compositional diversity in gene libraries and comparison of soil bacterial communities across geographical boundaries,” *under revision*

Zhou, L., and **Kao, M.-H.** “Robust fMRI experimental designs with uncertain design matrix,” *running title*

**Kao, M.-H.** “Optimal experimental designs for event-related functional magnetic resonance imaging,” *Ph.D. dissertation*, University of Georgia.

**Kao, M.-H.** “Bayesian analysis for multiple changes of the long memory parameter,” *M.S. thesis*, National Central University, Taiwan

GRANT  
PROPOSALS

“CAREER: New Developments on Experimental Designs for Pioneering Functional Brain Imaging Technologies.” Sole PI, *National Science Foundation (DMS)*, funded (2014 – 2019, \$400,000)

“Optimal Design of Experiments for Functional Magnetic Resonance Imaging.” Sole PI, Research Enhancement Support awarded by Arizona State University with a course load reduction in spring 2014

“RTG: Data-Oriented Mathematical and Statistical Sciences.” Co-PI with Anne Gelb (PI), Rodrigo Platte (co-PI), and John Stufken (co-PI), *National Science Foundation (DMS)*, funded (2015 – 2019, \$1,099,995).

“QuBBD: New Structural Equation Models for Precision Medicine of Traumatic Brain Injury.” Co-PI with Jing Li (PI), and Teresa Wu (co-PI) *National Science Foundation (DMS)*, pending (2015 – 2019, \$100,000).

CONFERENCE  
PRESENTATIONS  
(\*: INVITED)

1. \*Optimal Experimental Designs for fMRI via Circulant Biased Weighing Designs, Mar. 2015, Design and Analysis of Experiments Conference, Cary, NC
2. \*Recent Developments in Optimal Experimental Designs for Functional MRI, Dec. 2014, the 7th International Conference of the ERCIM WG on Computational and Methodological Statistics, Pisa, Italy
3. Universally Optimal fMRI Designs for Comparing Hemodynamic Response Functions, Aug. 2014, Joint Statistical Meetings, Boston, MA
4. \*Recent Developments in Optimal Experimental Designs for Functional MRI, Jul. 2014, the Conference on Experimental Design and Analysis 2014, Taipei, Taiwan
5. \*Optimal fMRI Experimental Designs for Contrasts between Hemodynamic Response Functions, Jul. 2014, the 3rd Institute of Mathematical Statistics Asia Pacific Rim Meeting, Taipei, Taiwan (topic contributed session)

6. \*On the Statistical Optimality of Some Designs for fMRI Experiments, Jun. 2014, the 23rd South Taiwan Statistics Conference and 2014 Chinese Institute of Probability and Statistics Annual Meeting, Hualian, Taiwan
7. On the Optimality of Extended Maximal Length Linear Feedback Shift Register Sequences, Aug. 2013, the Joint Statistical Meetings, Montral, Quebec, Canada
8. \*A New Type of Experimental Designs for Event-Related fMRI Via Hadamard Matrices, Jun. 2013, the 2013 WNAR/IMS Annual Meeting, Los Angeles, CA
9. \*Constrained Multi-Objective Designs for Functional MRI Experiments Via A Modified Nondominated Sorting Genetic Algorithm, Jun. 2013, the 20th ASA/IMS Spring Research Conference on Statistics in Industry and Technology, Los Angeles, CA
10. \*Maximin and Maximin Efficient Designs for fMRI Experiments, Jun. 2013, the 2nd International Conference and Exhibition on Biometrics & Biostatistics, Northbrook, IL
11. Maximin and Maximin Efficient Designs for fMRI Experiments, Oct. 2012, Design and Analysis of Experiments Conference, Athens, GA
12. \*Experimental Designs for Functional MRI with Compound Stimulus, Jul. 2012, the Joint Statistical Meetings, San Diego, CA (topic contributed session)
13. \*Robust Event-Related fMRI Designs under A Nonlinear Model, Jun. 2012, the 6th World Congress of Nonlinear Analysts, Athens, Greece
14. \*Experimental Designs for Functional MRI with Compound Stimulus, May 2011, International Conference on Design of Experiments, Memphis, TN
15. \*Constrained Multi-objective Designs for Functional MRI via A Modified NSGA-II, Dec. 2010, the 2010 Annual Meeting of Chinese Statistical Society and International Statistical Conference, Jhongli, Taiwan
16. Multi-Objective fMRI Designs with Unequal Epoch Length via NSGA-II, May. 2010, Joint Research Conference on Statistics in Quality, Industry and Technology, Gaithersburg, MD
17. Multi-Objective fMRI Designs with Unequal Epoch Length via NSGA-II, May 2010, the Fifth International Workshop: Statistical Analysis of Neuronal Data, Pittsburgh, PA
18. \*Multi-Objective fMRI Designs with Unequal Epoch Length via NSGA-II, Apr. 2010, New England Statistics Symposium, Cambridge, MA
19. \*Efficient Experimental Designs under a Nonlinear Model for Event-Related fMRI, Oct. 2009, Design and Analysis of Experiments Conference, Columbia, MO
20. Efficient Experimental Designs under a Nonlinear Model for Event-Related fMRI, Aug. 2009, the Joint Statistical Meetings, Washington, DC
21. Multi-Objective Optimal Experimental Designs for Event-Related fMRI Studies, Oct. 2008, Network of Greater Georgia Institutions of Neuroimaging and Statistics, Athens, GA
22. \*Multi-Objective Optimal Experimental Designs for Event-Related fMRI Studies, Aug. 2008, the Joint Statistical Meetings, Denver, CO (student paper award)
23. Multi-Objective Optimal Experimental Designs for Event-Related fMRI Studies, May 2008, International Indian Statistical Association, Storrs, CT
24. Multi-Objective Optimal Experimental Designs for Event-Related fMRI Studies, May 2008, Spring Research Conference on Statistics in Industry and Technology, Atlanta, GA
25. Multi-Objective Optimal Experimental Designs for Event-Related fMRI Studies, Nov. 2007, Design and Analysis of Experiments Conference, Memphis, TN

COLLOQUIA/  
SEMINARS

26. Multi-Objective Optimal Experimental Designs for Event-Related fMRI Studies, Jun. 2007, the SRCOS/ASA Summer Research Conference on Statistics, Richmond, VA
27. Recent Developments in Optimal Experimental Designs for Functional MRI, Apr. 2014, Department of Mathematics, Statistics, and Computer Science, University of Illinois at Chicago, IL
28. Recent Developments in Optimal Experimental Designs for Functional MRI, Feb. 2014, Department of Mathematical Sciences, Indiana University-Purdue University Indianapolis, Indianapolis, IN
29. Optimal Experimental Designs for Functional MRI: An Overview, Feb. 2014, Design and Analysis of Experiments Research Group Meeting, Academia Sinica, Taipei, Taiwan
30. Recent Developments in Optimal Experimental Designs for Functional MRI, Jan. 2014, Department of Statistics, University of Georgia, Athens, GA
31. On the Statistical Optimality of Some Designs for fMRI Experiments and A New Type of fMRI Designs Via Hadamard Matrices, Apr. 2013, School of Mathematical & Statistical Sciences (Statistics Seminar), Arizona State University, Tempe, AZ
32. Maximin and Maximin Efficient Designs for Functional MRI Experiments, Jan. 2013, Department of Statistics, National Cheng Kung University, Taiwan
33. Experimental Designs for Event-Related fMRI Studies, Feb. 2012, School of Mathematical & Statistical Sciences (Computational/Applied Mathematics Seminar), Arizona State University, Tempe, AZ
34. Experimental Designs for Functional MRI, Mar. 2011, fMRI Data Analysis Group, University of Georgia, Athens, GA
35. Two Experimental Design Issues for Functional MRI, Nov. 2010, School of Mathematical & Statistical Sciences (Statistics Seminar), Arizona State University, Tempe, AZ
36. Efficient Experimental Designs under a Nonlinear Model for Event-Related fMRI, Dec. 2009, Department of Applied Mathematics, National Sun Yat-Sen University, Taiwan
37. Efficient Experimental Designs under a Nonlinear Model for Event-Related fMRI, Dec. 2009, Institute of Statistics, National Central University, Taiwan
38. Efficient Experimental Designs for Event-Related Functional Magnetic Resonance Imaging, Nov. 2009, School of Mathematical & Statistical Sciences (Mathematical Methods of Imaging Seminar), Arizona State University, Tempe, AZ
39. Efficient Experimental Designs under a Nonlinear Model for Event-Related fMRI, Oct. 2009, School of Mathematical & Statistical Sciences (Statistics Seminar), Arizona State University, Tempe, AZ
40. Multi-Objective Optimal Experimental Designs for Event-Related fMRI Studies, Mar. 2009, Department of Mathematics, California State University at Fullerton, Fullerton, CA
41. Multi-Objective Optimal Experimental Designs for Event-Related fMRI Studies, Feb. 2009, School of Mathematical & Statistical Sciences, Arizona State University, Tempe, AZ
42. Multi-Objective Optimal Experimental Designs for Event-Related fMRI Studies, Jan. 2009, Department of Statistics, Iowa State University, Ames, IA
43. Multi-Objective Optimal Experimental Designs for Event-Related fMRI Studies, Apr. 2008, Franklin Foundation Neuroimaging Training Program, University of Georgia, Athens, GA

44. Multi-Objective Optimal Experimental Designs for Event-Related fMRI Studies, Oct. 2007, Department of Statistics, University of Georgia, Athens, GA

SELECTED  
CONSULTING  
PROJECTS

- K-shuff: a robust new tool to quantitatively compare gene sequence libraries
  - a poster presented by Jangid, K. at the 13th International Symposium on Microbial Ecology, Seattle, WA
  - a manuscript submitted to *Applied and Environmental Microbiology*
- Alcohol-related elevations in blood pressure among young adults on a college campus
  - a poster presented by Godette, D. at the APHA 136th Annual Meeting and Expo, San Diego, CA
- Hurt at work in America: an examination of workplace injury through the 2002 general social survey and NIOSH quality of worklife module
  - a poster presented by Smith, T. at the 2008 National Occupational Injury Research Symposium, Pittsburgh, PA
- Semantic specific and semantic - syntactic integration regions engaged by verbal memory processes and the semantic encoding advantage
  - a manuscript submitted to *Brain and Language*

TEACHING  
EXPERIENCE

**Arizona State University**

\*: new course; [x]: course evaluation (avg. rating of the course; 5 is best)

- STP 231: Statistics for Biosciences, 2009, 2010 [4.33–4.68]
- STP 420: Introductory Applied Statistics, 2011 [4.4]
- STP 427: Mathematical Statistics, 2011 [4.67]
- STP 526: Theory of Statistical Linear Models, 2010–2015 [4.8–5]
- STP 531: Applied Analysis of Variance, 2010–2013 [4.77–4.93]
- STP 598\*: Advanced Design of Experiments, 2012 [5]
- STP 598\*: Clinical Trials, 2015 [5]

**University of Georgia:**

- STAT 4220: Applied Experimental Designs, 2009
- STAT 2000 (lab instructor): Elementary Statistics, 2004

SERVICES

**Referee for:** Annals of Statistics (2); American Statistician (1); Communications in Statistics (3); Journal of Biomedical Graphics and Computing (2); Journal of Computational and Graphical Statistics (1); Journal of Medical Imaging and Health Informatics (1); Journal of American Statistical Association (1); Journal of Neuroscience Methods (1); Journal of Statistical Planning and inference (2); Journal of Statistical Software (1); Journal of Statistical Theory and Practice (1); Journal of the Royal Statistical Society: Series B (1); NeuroImage (7); Statistical Analysis and Data Mining (1); Statistics in Medicine (1); Statistics and Probability Letters (3); Statistica Sinica (3); Technometrics (1); World Journal of Radiology (3)

**Book proposal review:** Elsevier Science/Academic Press

**National Science Foundation (NSF) panelist,** 2015

**National Security Agency (NSA) proposal reviewer for the Mathematical Sciences Program, 2015**

**Session Chair:** the 20th ASA/IMS Spring Research Conference on Statistics in Industry and Technology, Los Angeles, CA

**Service at Arizona State University:**

- Statistics seminars, chair, 2015–present
- Advisors for statistics graduate students, 2015–present
- Graduate admissions committee in statistics, 2014–present
- Examinations committee in statistics, 2014–present
- School colloquium/distinguished lecture series, co-chair, 2011–2013
- University committee on Statistics, 2009–2013
- Tenure-track faculty hiring committee, 2012–2013
- Visiting faculty hiring committee, 2009
- Ph.D. comprehensive and qualifying examination committees:
  - Theory of Statistical Linear Models & Large Sample Theory (co-char), 2010
  - Theory of Statistical Linear Models & Mixed Models (co-char), 2011, 2014
  - Theory of Statistical Linear Models & Computational statistics (co-char), 2012
  - Theory of Statistical Linear Models & Multivariate data analysis (co-char), 2013
  - Theory of Statistical Linear Models (chair), Mar. 2014
  - Theory of Statistical Linear Models & Bayesian analysis (co-char), 2015
  - Mathematical Statistics (member), 2009, 2010, 2011, 2012, 2013
  - Probability (member), 2010

**Service at the University of Georgia:**

- Dean's Student Advisory Board, Franklin College, 2007–2008
- Vice President of Statistics Club, 2006–2007
- Officer of Taiwanese Student Association, 2005–2006

GRADUATE  
STUDENTS

**Completed Students:**

- M'Hamed Temkit, Ph.D. in Statistics, Dec. 2014  
Dissertation: Experimental Designs for Generalized Linear Models and Functional Magnetic Resonance Imaging  
Current position: Biostatistician, Mayo Clinic, Scottsdale, AZ
- Lin Zhou, M.S. in Statistics, Dec. 2014  
Thesis: Robust Experimental Designs for fMRI with an Uncertain Design Matrix  
*(Award: Summer 2013 Block Grant Support awarded by SoMSS, ASU)*  
Current position: Ph.D. student in applied mathematics at Arizona State University
- Yan Wu, M.S. in Statistics, Dec. 2014  
Applied project: The Analysis of a Saturated Design for Comparing Hadamard Sequences with Computer Generated fMRI Designs
- Xiao-Ying Kuang, M.S. in Statistics, Dec. 2013  
Applied project: Adaptive Experimental Designs for Functional MRI  
Current position: Bioinformatics Analyst, Banner Alzheimer's Institute, Phoenix, AZ

- Amani Alrumayh, M.S. in Statistics, Dec. 2013  
Applied project: The Use of Kriging Approximation in Design of fMRI Experiments  
Current position: Teacher Assistant (Instructor), Department of Mathematics, Northern Borders University, Saudi Arabia (spring 2014); & Ph.D. student in statistics at Arizona State University (since fall 2014)
- Adam Rosenthal, M.S. in Statistics, Aug. 2011  
Applied project: Experimental Designs for Functional MRI with Compound Stimulus  
Current position: Biostatistician, Cancer Research and Biostatistics (CRAB), Seattle, WA

**Current Students:**

- Lin Zhou, Ph.D. in Applied Mathematics (co-advising with Bruno Welfert), expected 2016
- Amani Alrumayh, Ph.D. in Statistics, expected 2018
- Soohyun Kim, Ph.D. in Statistics, expected 2018
- Yongzhao Peng, M.S. in Statistics, expected 2016

**Committee member for Ph.D. dissertation:** Jennifer Broatch (2009), Michael Manley (2011); Andrew Karl (2012); Jingjing Li (2012); Chester Ismay (2013); Arturo Validivia (2013); Jun Zhang (2013); Ehab Nasir (2014, Industrial Engineering); Wanchunzi Yu (current); Maduranga Dassanayake (current); Junfei Zhu (current); Moein Saleh (current; Industrial Engineering); Kyle Irimata (current); Katherine Cai (current); Zhongshen Wang (current)

**Committee member for M.S. thesis/applied project:** Hailong Cui (2010); Siyuan Huang (2010); Swetha Surabhi (2011); Na Zou (2012, Civil Engineering); Wanchunzi Yu (2012); Wenjun Ke (2012); Minyao Sun (2012); Jianqiong Yin (2012); Aaron Henrichsen (2012); Brett Efaw (2012); Lulu Wang (2013); Jiaomei Liu (2013); Mingchun Chen (2013); Jinhyun Gwak (2013); Hazar Khoger (2014); Anh Dang (2014); Andrew Gough (2014); Junfei Zhu (2014); Wei Xin (2014); Sujatha Rajagopal (2014); Liqiu Deng (current); Xiao Wang (current); Bei Wang (current); Chad Mehalechko (current); Jiaju Liu (current)