Ming-Chih Kao, PhD, MD

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Education			
	4/2009 — Present	**Stanford Hospital & Clinics**	Palo Alto, CA
		Clinical Assistant Professor *Pain Medicine, PM&R*	
		Chief Fellow & Fellow *Pain Medicine*	
		Chief Resident & Resident *PM&R*	
	7/2007 — 6/2008	**Yale-New Haven Hospital**	New Haven, CT
		Intern *Internal Medicine*	
	6/2003 — 5/2007	**Univ. of Michigan Medical School**	Ann Arbor, MI
		MD *Dean's Scholar*	
	8/1999 — 6/2005	**Harvard University**	Cambridge, MA
		PhD Biostatistics	
		"Computational and Statistical Approaches to the Study of the Genetic Bases of Human Diseases"	
		Wing Wong, Nan Laird, & *Christoph Lange*	
		HHMI Fellow *Computational Biology*	
		Howard Hughes Medical Institute	
		NIMH Trainee *Research Scientist Training Program*	
		National Institutes of Mental Health	
	9/1994 — 8/1999	**Univ. of California, Berkeley**	Berkeley, CA
		BA *Molecular & Cell Biology Psychology*	

Employment			
	4/2012 — 6/2012	**Palo Alto VA**	Palo Alto, CA
		Staff Physician *Polytrauma Network Site PM&R*	
	7/2009 — 3/2012	**ClinSolver**	Cupertino, CA
		Co-Founder *Medical Officer HIPAA Compliance Officer*	
	7/2008 — 6/2009	**Infollution Zero**	Palo Alto, CA
		Co-Founder *Chief Technology Officer*	
	11/2008 — 2/2009	**North East Medical Services**	San Francisco, CA
		Staff Physician *Adult Medicine*	
	8/2000 — 7/2003	**Wong Computational Biology Laboratory**	Boston, MA
		Root *Beowulf Cluster*	

Honors & Awards		
	June 2013	Spine Journal & North American Spine Society (NASS)
		2013 Outstanding Paper Award for Medical/Interventional Science
	Aug 2012	Center for Disease Control, Center for Health Statistics Conference 2012
		Best Poster Finalist
	June 2012	International Society for Study of the Lumbar Spine (ISSLS)
		Best Poster Award, SpineWeek
	June	Stanford PM&R
		Peter Singleton Award
	April	Stanford PM&R
		Best Research Presentation *Functional Measurement of Pain*
	Nov 2011	American Association of PM&R
		Best Musculoskeletal Research Presentation
		Accelerometry Measurement of Musculoskeletal Pain
	April	Stanford PM&R
		SAE Award
	April	Santa Clara Valley Medical Center
		Customer Service Award
	March	National Health 2.0 Developer Challenge
		Second Place *Project freeHealth*

	June 2010	Stanford PM&R
		Team Player Award
	October	Health 2.0 Developer Challenge Code-a-thon
		First Place *Project OskiHealth*
	2003 — 2007	University of Michigan Medical School
		Dean's Scholarship
	2000 — 2003	Howard Hughes Medical Institute (HHMI)
		HHMI Fellowship
		Computational Biology
	1999 — 2000	National Institute of Mental Health (NIMH)
		NIMH Research Scientist Training Program

Teaching Experiences

2011 — 2012	Stanford Internal Medicine Residency Program
	Lecturer *Selected Primary Care Topics in PM&R and Pain*
2011 — 2012	Stanford PM&R
	Lecturer *Evidence-Based Medicine & Practice-Based Evidence Series*
Spring 2005	Univ. of Michigan School of Public Health
	Guest Lecturer *Computational Biology*
Spring 2002	Harvard School of Public Health
	Teaching Assistant *Computational Biology*
Spring 2001	Harvard School of Public Health
	Teaching Assistant *Regression Analysis*

Professional Experiences

2013	International Spine Intervention Society (ISIS)
	Research Committee
2011 — 2012	AAPM&R, AMIA
	Reviewer
2010 — 2012	Santa Clara Valley Medical Center
	Statistical Consultant *Rehabilitation Research Center (RRC)*
2010	Department of Health, Republic of China
	Panel Member *Classification and Management of Controlled Drugs*
2007 — 2008	National Institutes of Health
	Statistical Consultant *ClinicalTrials.Gov*
2005 — 2006	Univ. of Michigan Health System
	Statistical Consultant *The OMP Project*
2004 — 2007	University of Southern California
	Statistical Consultant *Zhou Computational Biology Laboratory*
2003	Brigham and Women's Hospital
	Research Assistant *Department of Emergency Medicine*
2000 — 2003	Harvard School of Public Health
	Research Assistant *Wong Computational Biology Laboratory*
1996 — 1997	UC Berkeley
	Research Assistant *Jacobs Biological Psychology Laboratory*

Examinations

Medical Board Examinations		*In-Service Examinations*		
USMLE	**Step 1** *260 / 99*	**Internal Medicine PGY-1** *99*		
	Step 2 *256 / 99*	**PM&R**	**PGY-2** *95*	
	Step 3 *241 / 99*		**PGY-3** *93*	
Specialty Board Examinations			**PGY-4** *94*	
PM&R	**Step 1** *96*	**Pain**	**PGY-5** *93*	
	Step 2 *Pass*			

Medical Licensure

Medical Board of California	*exp. 9/2014*
Drug Enforcement Administration	*exp. 12/2014*
Physical Medicine & Rehabilitation	*exp. 12/31/2023*

Foreign Languages	Mandarin, Taiwanese, Cantonese			

Knowledge Management Websites	**Reddit**	*Founder & Moderator*	/r/statistics, /r/medicine	
	StackExchange	*Contributor*	Statistics	
	Wikipedia	*Contributor*	Topics in randomized clinical trials, pain management	

Academic Software Packages	**Quantile NCS**	*Android, iOS*	*Java, Titanium*	*2011*
	Local Markov Model	*Linux, Windows*	*Perl, C*	*2004*
	Exact FBAT	*Linux, Windows*	*C++, STL*	*2003*

Publications

Kao MCJ, Zheng P, Smuck S. *Response to "Worsening trends in the management and treatment of back pain".* JAMA Internal Medicine (in press).

Smuck M, Kao MCJ, Choi YW, Brar N, Thomkins-Lane. *Does Physical Activity Influence the Relationship Between Low Back Pain and Obesity?* Spine Journal (in press).

Kao MCJ, Jarosz R, Goldin M, Patel A, Smuck M. *Determinants of Physical Activity in America: A First Characterization of Physical Activity Profile using National Health and Nutrition Examination Survey (NHANES).* PM&R (in press).

Smuck M, Zheng P, Chong T, Kao MCJ, Geisser ME. *Duration of Fluoroscopic-Guided Spine Interventions and Radiation Exposure Is Increased in Overweight Patients.* PM&R, 13 (S1934-1482), 2013.

Shem KL, Castillo K, Wong SL, Chang J, Kao MCJ, Kolakowsky-Hayner S. *Diagnostic Accuracy of Bedside Swallow Evaluation Versus Videofluoroscopy to Assess Dysphagia in Individuals With Tetraplegia.* PM&R, 4 (283-9), 2012.

Xu M, Kao MCJ, Nunez-Iglesias J, Nevins JR, West M, Zhou XJ. *An integrative approach to characterize disease-specific pathways and their coordination: a case study in cancer.* BMC Genomics, 9 (Suppl 1:S12), 2008.

Leykin I, Kao MCJ, Wong WH. *HumanUpstream and MouseUpstream, Databases of Promoter Sequences in the Human and Mouse Genomes.* OMICS 9(3), 2005.

Zhou XH, Kao MCJ, Huang H, Wong A, Nunez-Iglesias J, Primig M, Aparicio OM, Finch CE, Morgan TE, Wong WH. *Functional Annotation and Network Reconstruction Through Cross-Platform Integration of Microarray Data.* Nature Biotechnology 23(2), 2005, 238-243.

Zhong S, Storch FK, Lipan O, Kao MCJ, Weitz C, Wong WH. *GoSurfer: A Graphical Interactive Tool for Comparative Analysis of Large Gene Sets in GeneOntology Space.* Applied Bioinformatics 3(4), 2004, 261-4.

Kao MCJ*, Huang H*, Zhou XH, Liu JS, Wong WH. *Determination of Local Statistical Significance of Patterns in Markov Sequences with Application to Promoter Element Identification.* Journal of Computational Biology 11(1), 2004, 1-14. (*co-first-authors)

Koeller KM, Haggarty SJ, Perkins B, Leykin I, Wong JC, Kao MCJ, Schreiber SL. *Chemical Genetic Modifier Screens: Small Molecule Trichostatin Suppressors as Probes of Intracellular Histone and Tubulin Acetylation.* Chemistry and Biology 10(5), 2003, 397-410.

Zhou XH, Krueger JG, Kao MCJ et al. *Novel Mechanisms of T-Cell and Dendritic Cell Activation Revealed by Profiling of Psoriasis on the 63,100-Element Oligonucleotide Array.* Physiological Genomics 13(1), 2003, 69-78.

Zhou XH, Kao MCJ, Wong WH. *Transitive Functional Annotation by Shortest Path Analysis of Gene Expression Data.* Proceedings of the National Academy of Science 99(20), 2002, 12783-12788.

Selected Presentations

Kao MCJ, Yang L, Smuck M. *Health Research Economics of Clinical Trials: Dynamic Model-Based Risk Management.* 2013 AMIA Joint Summits on Translational Science, Mar 2013, San Francisco.

Kao MCJ, Jarosz R, Tomkins-Lane C, Mackey S, Smuck M. *Physical Activity Intensity Signatures*

(PAIS) of Pain: Large-Scale Study Reveals Novel Cut-Points for Accelerometry Analysis in Regional Body Pain. AAPMR Annual Assembly, Nov 2012, Atlanta, GA.

Kao MCJ, Burns M, Tomkins-Lane C, Mackey S, Smuck M. Population Reference Chart for Accelerometry: The Pain-Free Physical Activity Reference Chart (PARC). AAPMR Annual Assembly, Nov 2012, Atlanta, GA.

Kao MCJ*, Cao Minh L*, Huang GY, Teraoka JK, Smuck M. Rising Incidence and Rates of Opioid Medication Prescription for Regional Body Pain in the Emergency Department. AAPMR Annual Assembly, Nov 2012, Atlanta, GA.

Kao MCJ*, Cao Minh L*, Huang GY, Deldar S, Teraoka JK, Smuck M. Gender and Racial Disparities in Opioid Medication Prescription for Regional Body Pain in the Emergency Department. AAPMR Annual Assembly, Nov 2012, Atlanta, GA.

Kao MCJ, Cao-Minh L, Huang GY, Smuck M. Rising Incidence and Rates of Opioid Medication Prescription for Regional Body Pain in the Emergency Department. 2012 National Conference on Health Statistics, Aug 2012, Washington, DC.

Kao MCJ, Cao-Minh L, Huang GY, Deldar S, Teraoka J, Smuck M. Gender and Racial Disparities in Opioid Medication Prescription for Regional Body Pain in the Emergency Department. 2012 National Conference on Health Statistics, Aug 2012, Washington, DC.

Kao MCJ, Yang L, Smuck M. Health Research Economics of Clinical Trials: Dynamic Model-Based Risk Management. 2012 Annual HIMSS Conference & Exhibition, Feb 2012, Las Vegas.

Kao MCJ, Chen C, Yu S, Tam A, Ng K, Brodeur A. Probabilistic Model-Based Dynamic Elicitation and Personalized Recommendation of Preventive Health Services. AMIA Annual Symposium, Nov 2011, Washington, DC.

Chen C, Kao MCJ, Yu S, Tam A, Ng K, Brodeur A. Apomediation and the Affordable Care Act. Stanford Medicine 2.0, Sept 2011, Palo Alto, CA.

Kao MCJ*, Yang L*, Shem K, Koo, C. Health Research Economics of Patient Recruitment: Probabilistic Modeling of Multi-Center Clinical Trial Recruitment for Cost Forecasting. AMIA Annual Symposium, Nov 2011, Washington, DC.

Kao MCJ*, Yang L*, Wright J, Shem K. (Best Poster Finalist Award) Health Research Economics of Patient Recruitment: Probabilistic Modeling of Multi-Center Clinical Trial Recruitment for Cost Forecasting. SoCRA Annual Conference, Sept 2011, San Diego, CA.

Kao MCJ, Deldar, S, Huang GT, Mitra R. Race and Ethnicity in the Prescription of Opiate Pain Medications for Back Pain in Emergency Departments in the United States, 1997 to 2008. AAPMR Annual Assembly, Nov 2011, Orlando, FL.

Kao MCJ*, Patel A*, Goldin M, Smuck M. (Best Musculoskeletal Research Presentation Award) Determinants of Physical Activity: A First Characterization of the Nationally Representative Physical Activity Database in National Health and Nutrition Examination Survey (NHANES). AAPMR Annual Assembly, Nov 2011, Orlando, FL.

Kao MCJ*, Goldin M*, Patel A, Smuck M. Association of Regional Body Pain with Accelerometer-Based Physical Activity Measures in National Health And Nutrition Examination Survey (NHANES). AAPMR Annual Assembly, Nov 2011, Orlando, FL.

Smuck M, Kao MCJ, Goldin M, Patel A. The Association of Accelerometer-Based Activity Monitoring with Chronic Low Back Pain. NASS Annual Meeting, Nov 2011, Chicago, IL.

Kao MCJ, Cohen A, Teraoka J, Lawton M. Medical Resident Adoption of Clinical Informatics Tools: An adaptation and Validation of the Unified Theory of Acceptance and Use of Technology (UTAUT) Model. AMIA Annual Symposium, Nov 2010, Washington, DC.

Kao MCJ, Wang PW, Yang L, Shem K. Discrete-Event Simulation for Randomized Clinical Recruitment Modeling and Trial Planning: A Case Study with Back On Track (BOT). AAPMR 2010 Annual Assembly and Technical Exhibition, Oct 2010, Seattle, WA.

Kao MCJ, Huang G, Mitra R. Trends in the Management of Acute Lower Back Pain in Outpatient Clinics in the United States: 2002 to 2007. AAPMR 2010 Annual Assembly and Technical Exhibition, Oct 2010, Seattle, WA.

Kao MCJ, Cohen A, Teraoka J, Lawton M. Medical Resident Adoption of Clinical Informatics Tools:

An adaptation and Validation of the Unified Theory of Acceptance and Use of Technology (UTAUT) Model. <u>AAPMR 2010 Annual Assembly and Technical Exhibition</u>, Oct 2010, Seattle, WA.

Kao MCJ, Agarwal R, Shem K, Kiratli J. *Evidence Base in Spinal Cord Injury Rehabilitation: A Population Study of the Literature Using the Spinal Cord Injury Rehabilitation Evidence (SCIRE) Database*. (Oral presentation). <u>AAP 2010 Annual Meeting</u>, Bonita Springs, FL.

Kao MCJ, Huang G, Lee RS, Mitra R. *Trends in Opiate Prescription for Acute Management of Back Pain in Emergency Departments in the United States, 1996-2006*. <u>AAP 2010 Annual Meeting</u>, Bonita Springs, FL.

Kao MCJ, Zhou XH, Wong WH. *Shortest Path Analysis and 2nd-Order Analysis*. <u>38th Symposium on the Interface of Statistics, Computing science, and Applications</u>, May 2006, Pasadena, CA.

Zhou XH, Kao MCJ, Wong WH. *Predicting Gene Functions by Shortest Path Analysis of Gene Expression Data.* The 6th International Conference on Computational Molecular Biology (RECOMB 2002).

Leykin I, Kao MCJ, Lipan O *et al*. *Identification of cis-Regulatory Elements and Their Combination in Mammalian Promoter Sequences.* The 6th International Conference on Computational Molecular Biology (RECOMB 2002).

Zhong R, Lipan O, Storch KF, Kao MCJ *et al*. *GoSurfer: A Visualization Tool for Comparative Gene Analysis.* The 10th International Conference on Intelligent Systems for Molecular Biology (ISMB 2002).

Professional Organizations	American Medical Association (AMA) American Association of PM&R (AAPMR) American Statistical Association (ASA) American Medical Informatics Association (AMIA) Healthcare Information and Management Systems Society (HIMSS) International Association for the Study of Pain (IASP) International Spine Intervention Society (ISIS)