

Curriculum Vitae
Chien-Min Kao, Ph.D.

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Personal Data

Date of Birth: August 11, 1966
Place of Birth: Taipei, Taiwan
Citizenship: Taiwan
Marital status: Married – Wife: Hui-Hua Wen, Daughter: Patrice J. Kao

Education

08/1984-06/1988 B.S. in Electrical Engineering, National Taiwan University, Taipei, Taiwan
09/1990-11/1991 Ph.D. Graduate Program in Astronomy and Astrophysics, University of Pennsylvania, Philadelphia, Pennsylvania, USA
01/1992-03/1997 Ph.D. in Medical Physics, University of Chicago, Chicago, Illinois, USA
Thesis Title: Pre-reconstruction sinogram restoration for positron emission tomography

Professional Experience

09/1987-12/1987 Computer Laboratory Consultant, Department of Computer Science, National Taiwan University, Taipei, Taiwan
08/1988-06/1990 Mandatory Army Service
11/1989-06/1990 System Engineer, Electronic Research & Service Organization, Hsinchu, Taiwan (elected by Army to form a 12-member research team to develop a prototype mobile network system for digital devices)
09/1990-11/1991 Teaching Assistant, Department of Astronomy and Astrophysics, University of Pennsylvania, Philadelphia, Pennsylvania
06/1993-08/1993 Summer Intern, Siemens Corporate Research, Inc., Princeton, New Jersey
11/1991-03/1997 Research Assistant, Department of Radiology, The University of Chicago, Chicago, Illinois
05/1997-02/2000 Research Associate, Department of Radiology, The University of Chicago, Chicago, Illinois

- 02/2000-10/2000 Research Associate (Instructor), Department of Radiology, The University of Chicago, Chicago, Illinois
- 11/2000-08/2002 Research Associate (Assistant Professor), Department of Radiology, The University of Chicago, Chicago, Illinois
- 08/2002-06/2009 Assistant Professor, Department of Radiology, The University of Chicago, Chicago, Illinois
- 08/2002-06/2009 Assistant Professor, Committee on Medical Physics, The University of Chicago, Chicago, Illinois
- 2004-present Member, Brain Research Institute, The University of Chicago, Chicago, Illinois
- 2005-2007 Faculty Co-Director, BSD PET and SPECT Core Facilities for Animal Imaging, The University of Chicago, Chicago, Illinois
- 2005-2007 Interim Technical Director, BSD PET Core Facility for Animal Imaging, The University of Chicago, Chicago, Illinois
- 2006-present Member, Cancer Research Center, The University of Chicago, Chicago, Illinois
- 2007-present Faculty Co-Director, PET and SPECT Imaging Research Laboratories, The University of Chicago, Chicago, Illinois
- 07/2009-present Associate Professor, Department of Radiology, The University of Chicago, Chicago, Illinois
- 07/2009-present Associate Professor, Committee on Medical Physics, The University of Chicago, Chicago, Illinois

Professional Association

- Senior Member, Institute of Electrical and Electronic Engineers (IEEE)
- Member, American Association of Physicists in Medicine (AAPM)
- Member, The Optical Society (OSA)
- Member, Society of Nuclear Medicine and Molecular Imaging (SNMMI)

Professional Activities

Conference Paper Reviewer

- 1997, 2008 Annual International Conference of the IEEE Engineering in Medicine and Biology
- 1998, 1999 IEEE Signal Processing Society International Conference on Image Processing
- 1998, 1999 Annual Meeting of the American Association of Physicists in Medicine
- 1998-present IEEE Nuclear Science Symposium and Medical Imaging Conference
- 1999 SPIE International Symposium on Medical Imaging
- 2008-present IEEE Engineering in Medicine and Biology
- 2012 Society of Nuclear Medicine

2012 Technology and Instrumentation in Particle Physics
2013-present Society of Nuclear Medicine and Molecular Imaging

Journal Paper Reviewer

1997 Annals of Statistics
1997-present Physics in Medicine and Biology
1998-present Medical Physics
1998-present IEEE Transactions on Nuclear Science
1999-present Applied Optics
1999-present International Journal of Imaging Systems & Technology
2001-present IEEE Transactions on Medical Imaging
2007-present European Journal of Nuclear Medicine and Molecular Imaging
2007-present Journal of Nuclear Medicine
2007-present IEEE Transaction on Biomedical Engineering
2008-present Optical Engineering
2008-present Inverse Problem
2009-present IEEE Transactions on Image Processing
2013-present Journal of Electronic Imaging

Editorship

2006 Guest Associate Editor, Medical Physics
2010 Associate Editor, Medical Physics
2008-present Associate Editor, Conference Editorial Board, the IEEE Engineering in Medicine and Biology
2013-present Senior Editor, American Journal of Nuclear Medicine and Molecular Imaging

Grant Reviewer

1999-2005 Imaging Grants for the Susan G. Komen Breast Cancer Foundation
2005 American Cancer Society
2009 UC Imaging Research Institute seed grants
2009 UC Cancer Research Center seed grants
2009-present National Institutes of Health
2011 UC CTSA pilot grant
2013 Austrian Science Fund
2014 University of Virginia Cancer Center

Professional Committee

2001-present Member, Technical Program Committee, IEEE Medical Imaging Conference
2009 Organizing Committee, VIIth Fast Timing Workshop, Chicago

2013-2016 RSNA Scientific Program Committee

Conference Chair

- 2005 The 27th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Imaging Processing session chair
- 2005 The 91st Scientific Assembly and Annual Meeting of the Radiological Society of North American, PET/CT Imaging session chair
- 2007 The 93st Scientific Assembly and Annual Meeting of the Radiological Society of North American, Nuclear Imaging session chair
- 2008 Pico-Second Timing Workshop, Application in Medical Imaging session chair
- 2008 The 30th Annual International Conference of IEEE Engineering in Medicine and Biology Society, Molecular Imaging and Image Processing Track Chair
- 2008 The 2008 Chicago Nuclear Medicine Forum, The Donald Charleston & Robert N. Beck Symposium, On Physics, Instrumentation, and Image Reconstruction & Analysis, session chair
- 2011 Technology and Instrumentation in Particle Physics '11 session chair
- 2011 RSNA Physics (PET, SPECT, and Molecular Imaging) session chair
- 2012 Beijing-Chicago Workshop on Detector R&D, session chair

Honors and Awards

- 1984 Book Coupon Award (Dean's list, top 5%, twice), National Taiwan University
- 1987, 1988 Championship, National Artificial-Intelligent Mouse Competition, Taiwan
- 1999 Young Investigator Award in the symposium *Future Directions in Nuclear Medicine Physics and Engineering*, Chicago, Illinois
- 2000 Conference Award in *the 2000 IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC)*, Lyon, France

Research Funding History

Current Funding

1. NIH R21, **Principal Investigator** (subaward), "*In-vivo Rat Brain PET Study of Task Specific Motor Recovery After Stroke*," 7/01/2012-6/30/2014, Total Budget: \$173,666.
2. NSF China International Collaborative Research, **Co-PI** (China PI: Dr. Qingguo Xie), "Panel Positron Emission Tomography Imaging," 01/01/2013-12/31/2017. Total budget: 2.8M RMB (approximately 0.47M USD).
3. NIH R01 Grant, **Principal Investigator**, "Flexible, High-Performance Electronics for Nuclear Medical Imaging," 10/1/2013-5/31/2017, Total budget: \$611,640.
4. NIH R01 Grant, **Co-Investigator**, "Targeted Imaging in Helical Cone-Beam CT," 2/7/2011-1/31/2015 (PI: Xiaochuan Pan).

Grants Submitted, Pending and In-Preparation

1. NIH R21 Grant, **Principal Investigator**, “Development of a miniature, briefcase PET imager for rodents,” 4/1/2015-3/31/2017. Total budget: \$434,500 (submitted June, 2014).
2. DOD Prostate Cancer Research Program Exploration – Hypothesis Development Award, **Principal Investigator**, “Investigation of a prostate PET camera for image-guided treatments,” 9/30/2014-8/31/2015. Total budget: \$112,932 (submitted June, 2014).
3. NIH R21 Grant, **Co-investigator**, “Investigation of a SiPM-based TOF-PET detector using a transmission-line readout,” 12/1/2013-11/30/2015. Total budget: \$410,372. (PI: Heejong Kim) (pending resubmission)
4. NIH R01 Grant, **Principal Investigator**, “A mobile brain TOFPET system for imaging neurological disorders” (in preparation).

Past Funding

1. NIH R21 Grant, **Principal Investigator**, “Economic and compact PET systems (ezPET),” 9/1/2000-8/31/2003, Total budget: \$267,395.
2. Siemens Equipment Grant, **Principal Investigator**, Amount \$250,000, 2002-2006 (estimated cost for a pair of high-performance, large-area detectors and their associated electronics).
3. American Cancer Society-IL Grant, **Principal Investigator**, "A study of physical factors affecting PET/CT in lung cancer diagnosis," 5/1/2005-3/31/2007, Total budget: \$99,999.
4. American Cancer Society-IRG Grant, **Principal Investigator**, “Development and evaluation of an IGRT technology for prostate cancer,” 12/01/2006-11/30/2007, Total budget: \$20,000.
5. NIH R29 Grant, **Co-Investigator**, “Non-iterative methods for 3D SPECT image reconstruction,” 4/1/1996-3/31/2001, \$497,079. (PI: Xiaochuan Pan)
6. UCCRC Cancer Center Support Grant, **Co-Investigator**, “Innovative Cancer CAM Initiative in Cancer Centers,” 4/1/2000-3/31/03. Total budget: \$135,016. (PI: Chin-Tu Chen)
7. NIH/NCI P30 UCCRC Cancer Center Support Grant: Pilot Development Grants, **Co-Investigator**, “Collaborative Pilot Studies of Animal Imaging,” 04/01/2004-03/31/2005. (PI: Chin-Tu Chen)
8. UCCRC/ANL Collaborative Pilot Project Grant, **Co-Investigator**, “Novel Technology for Hybrid PET/MRI & PET/EPRI in Cancer Imaging,” 07/01/2006-06/30/2008. (PI: Howard Halpern)
9. NIH/NCRR U54 RR 023560, **Co-Investigator** in Animal Imaging Cores, “Re-engineering Translational Research at the University of Chicago,” 09/17/2007-05/31/2008. (PI: Julian Solway)
10. Brain Research Foundation, **Principal Investigator**, “In vivo PET study of sensorimotor recovery in rat’s brain after stroke,” 5/17/2007-6/30/2009, Total budget: \$25,000.
11. NIH/NCI P30 UCCRC Cancer Center Support Grant: Development of New Core Facilities, **Co-Investigator**, “Functional and Molecular Imaging Core Facilities,” 07/01/2003-06/30/2009. Annual direct cost: \$30,000 to \$120,000. (PI : Chin-Tu Chen)
12. NIH/NCI P30 UCCRC Cancer Center Support Grant, **Co-Investigator**, “Pilot Seed Grant for Functional and Molecular Imaging Projects,” 12/1/2006-12/31/2008, Total direct cost: \$30,000. (PI: Chin-Tu Chen)

13. NIH/NCRR S10 RR022520, **Co-Investigator**, “Hybrid MicroSPECT/MicroCT for Quantitative Imaging,” 03/01/2008-02/28/2009. (PI: Chin-Tu Chen)
14. NIH/NCI P30 UCCRC Cancer Center Support Grant: Programmatic Pilot Seed Grant, **Co-Investigator**, “Quantitative Imaging Evaluation of Radio-Inducible Gene Therapy,” 07/15/2008-06/30/2009, Total direct cost: \$35,000. (PI : Chin-Tu Chen)
15. NIH R01 Grant, **Co-Investigator**, “Target imaging in helical cone-beam CT,” 9/1/2005-8/31/2009, Total budget: \$1,396,609. (PI: Xiaochuan Pan)
16. University of Chicago Women’s Board Grant, **Co-Principle Investigator** (with Professor Yau W. Wah in the Department of Physics), “New technique for time measurement,” 1/2/2009-1/1/2010, Total budget: \$69,744.
17. Associacao Fundo de Incentivo A Psicofarmacologia (AFIP, Brazil), **Co-Investigator**, “Collaborative Research in Brain Imaging,” 05/02/07-05/01/11. (PI: Chin-Tu Chen)
18. Sociedade Beneficente Israelita Brasileira Albert Einstein (SBIBAE, Brazil), **Co-Investigator**, “Research Projects Collaboration for Animal SPECT Development,” 09/01/2008-08/31/2010. (PI: Chin-Tu Chen)
19. University of Chicago Women’s Board Seed Grant, **Principal Investigator**, “Development of next-generation PET system,” 01/01/2011-12/31/2011, Total Budget: \$58,000.
20. UC-ANL Strategic Collaboration Seed Grant, **Principal Investigator**, “A novel integrative PET system for molecular imaging of cancer biology at the APS,” 10/01/2010-09/30/2011, Total Budget: \$75,000.
21. NIH R21 Grant, **Principal Investigator**, “Maximal information utilization in TOF-PET for reducing scatter and randoms,” 04/01/2009–03/31/2012, Total Budget: \$389,372.
22. UC-Fermi Strategic Collaboration Seed Grant, **Investigator**, “A New Photodetection System for PET Imaging Using Silicon Photomultipliers,” 08/01/2011-07/31/2012, Total Budget: \$75,000 (PIs: Chin-Tu Chen and Eric Ramberg).
23. UC-Fermi Strategic Collaboration Seed Grant, **Investigator**, “A New Photodetection System for PET Imaging Using Silicon Photomultipliers,” 08/01/2012-07/31/2013, Total Budget: \$75,000 (PIs: Chin-Tu Chen and Eric Ramberg).
24. UC Institute for Translational Medicine Pilot Awards, **Principal Investigator**, “PET technology for high-resolution PET/MRI imaging of the mouse brain,” 5/7/2013-5/6/2014, Total Budget: \$50,000.

Patents and Inventions

1. X. Pan, **C.-M. Kao**, and C.E. Metz: New methods for data acquisition and image reconstruction in single-photon emission computed tomography (UCHI#899). Elected by the ARCH Development Corporation of The University of Chicago for consideration for commercialization, May 14, 2001.
2. X. Pan and **C.-M. Kao**: Novel approaches for increasing the FOV, for increasing the rotation speed, and for reducing cost in CT. The Special Project Office of The University of Chicago for consideration for commercialization, 2001.
3. **C.-M. Kao**, X. Pan, and C.-T. Chen: ezPET: A new design approach for economic and compact Positron Emission Tomography. U.S. Patent No. 6,528,793.

4. X. Pan, L. Yu, and **C.-M. Kao**: Algorithm for image reconstruction and image noise analysis in computed tomography. US Patent No. 7,245,755.
5. X. Pan, Y. Zou, L. Yu, **C.-M. Kao**, M. King, M. Giger, D. Xia, H. Halpern, C. Pelizzari, E.Y. Sidky and S. Cho: Imaging system performing substantially exact reconstruction and using non-traditional trajectories. U.S. Patent No. 7,444,011.
6. Q. Xie, **C.-M. Kao**, Z. Hsiau, and C.-T. Chen: A device and method for digitizing gamma ray energy and characterizing peak time and decay time constant without the use of ADC. U.S. Patent No. 7,199,370; German, Japan and Taiwan patents pending.
7. Q. Xie, **C.-M. Kao**, Z. Hsiau, and C.-T. Chen: A device and method for digitizing radiation events. U.S. Patent No. 7,342,232; Taiwan Patent No. I272934; German and Japan patents pending.
8. H. Frisch, J.-F. Genat, H. Grabas, **C.-M. Kao**, C.-T. Chen, H. Kim, and F. Tang: Use of flat panel microchannel photomultipliers in sampling calorimeters with timing, US Patent no. 8604440..

Oral Presentations at International Conferences

1. “Accurate edge extraction and its application in automatic segmentation of ultrasound images of blood vessels and the heart,” RSNA (Radiological Society of North American) Annual Meeting, November, 1997.
2. “Accurate image reconstruction for DOI-PET systems,” IEEE (Institute of Electrical and Electronics Engineers) Nuclear Science Symposium and Medical Imaging Conference, October, 1999.
3. “Dual isotope (In-111/Tc-99m) SPECT: noise reduction with an analytic attenuation correction method,” IEEE Nuclear Science Symposium and Medical Imaging Conference, October, 2000.
4. “A statistical spatial-temporal analysis of image sequences for functional imaging,” World Congress on Medical Physics and Biomedical Engineering, July, 2000.
5. “An integrated design concept for compact PET systems,” World Congress on Medical Physics and Biomedical Engineering, July, 2000.
6. “Statistical analysis of dynamic sequences for functional imaging,” SPIE Medical Imaging, March, 2000.
7. “A dual-head PET system for high-throughput small-animal imaging,” AMI (Academy of Molecular Imaging) Annual Meeting, September, 2003.
8. “An energy-dependent scatter reduction method for PET,” AMI Annual Meeting, September, 2003.
9. “Animal CT with ultra-resolution,” AMI Annual Meeting, September, 2003.
10. “An evaluation of SPECT imaging for quantitative assessment of Parkinson's disease,” IEEE Nuclear Science Symposium and Medical Imaging Conference, October, 2003.
11. “Precise imaging of small animals using a dual-head microPET scanner,” SPIE Medical Imaging Conference, March, 2006.

12. "Performance characterization of a high-sensitivity small-animal PET scanner," IEEE Nuclear Science Symposium and Medical Imaging Conference, October, 2007.
13. "Performance comparison of multi-pixel photon counters with different pixel numbers for PET imaging," IEEE Nuclear Science Symposium and Medical Imaging Conference, October, 2007.
14. "Windowed image reconstruction for TOF-PET," IEEE Nuclear Science Symposium and Medical Imaging Conference, October, 2007.
15. "On an information-theoretical assessment of PET system," IEEE Nuclear Science Symposium and Medical Imaging Conference, October, 2009.
16. "PET development at UChicago, Argonne and Fermi," Beijing-Chicago Workshop on Detector R&D, June, 2012.
17. "A continuous-coordinate image reconstruction method for list-mode TOF PET," IEEE Nuclear Science Symposium and Medical Imaging Conference, November, 2013.

Invited Presentations

1. "Pre-reconstruction sinogram restoration for positron emission tomography," Diagnostic Radiology Department, National Institutes of Health, Bethesda, Maryland, January, 1997. (Talk)
2. "Image reconstruction in PET and SPECT," Workshop on Tomographic Image Reconstruction organized by the National Health Research Institutes, Taipei, Taiwan, August, 2001. (Talk)
3. "Nuclear medicine imaging and instrumentation," Institute of Radiological Sciences, School of Medical Technology and Engineering, National Yang-Ming University, Taipei, Taiwan, August, 2001. (Short Course)
4. "Multi-modality image registration," Computer Graphics Laboratory, Department of Electrical and Computer Engineering, Evanston, Illinois, March, 2002. (Workshop)
5. "Principles of PET and recent advances," Biomedical Engineering Division, National Health Research Institutes, Taipei, Taiwan, December, 2002. (Talk)
6. "Topics on advanced PET instrumentation and image reconstruction," Biomedical Engineering Division, National Health Research Institute, Taipei, Taiwan, December, 2002. (Short Course)
7. "Registration of dissimilar 2D images," Small Animal Imaging Forum, Department of Radiology, University of Chicago, Illinois, June, 2004. (Talk)
8. "Small-animal PET imaging," Department of Nuclear Medicine, Chang Gung Memorial Hospital, Taipei, Taiwan, July, 2004. (Short Course)
9. "Imaging science in biomedical applications and recent developments at the UofC," Biomedical Engineering Department, National Health Research Institutes, Zhunan Town, Taiwan, August, 2005. (Talk)
10. "A multi-threshold digitizing scheme for PET," Pico-Second Hardware Workshop, Chicago, Illinois, USA, November, 2005. (Workshop)

11. "Recent developments in PET technology," Molecular Imaging: The New and Very New Technology, organized by the Universidade Federal de São Paulo and the Albert Einstein Hospital, sponsored by the International Centre for Genetic Engineering and Biotechnology (ICGEB), São Paulo, Brazil, June, 2006. (Talk)
12. "Home-brew solution – PET," Pico-Second Timing Simulation Workshop, Chicago, Illinois, USA, December, 2006. (Talk)
13. "Selected topics in PET Imaging," Detector R&D Program, High Energy Physics Division, Argonne National Laboratory, Argonne, Illinois, USA, March, 2007. (Workshop)
14. "UChicago TOFPET project," Pico-Second Timing Workshop, Chicago, Illinois, USA, March, 2008. (Talk)
15. "An introduction to positron emission tomography," Friday Physics Lectures, Physics Department, University of Chicago, Chicago, Illinois, USA, May, 2008. (Talk)
16. "Challenges and methods in PET image reconstruction," SIAM (Society of Industrial and Applied Mathematics) Conference on Imaging Science, San Diego, California, USA, July, 2008. (Talk)
17. "A high-sensitivity small-animal PET scanner and PET imaging in biomedical research," Neuroscience Institute, Department of Veterans Affairs, Edward Hines, Jr. Hospital, Hines, Illinois, USA, August, 2008. (Talk)
18. "A synergistic design concept for developing high-sensitivity small-animal PET scanner," The 2008 Chicago Nuclear Medicine Forum, Chicago, Illinois, USA, September 2008. (Talk)
19. "Experience in Using Large-Area Detector Panels for Building a High-Sensitivity Small-Animal PET Scanner," Pico-Second Workshop VII, Chicago, Illinois, USA, 2009. (Talk)
20. "Some New Perspectives of Utilizing TOF Information for Improving PET Imaging," Pico-Second Workshop VII, Chicago, Illinois, USA, 2009. (Talk)
21. "Instrumentation and System Design for Positron Emission Tomography," Graduate Institute of Biomedical Electronics and Bioinformatics, National Taiwan University, Taipei, Taiwan, June 08, 2009. (Talk)
22. "A Novel PET System for Molecular Imaging at the APS," 9th Argonne-UChicago-Fermilab Collaboration Meeting, Chicago, June 2011. (Talk)
23. "TOF PET development at UChicago, Argonne and Fermi," GE Global Research, Niskayuna, New York, USA, April 2012. (Talk)

Bibliography

Refereed Journal Articles

- J1. **C.-M. Kao**, J.T. Yap, J. Mukherjee and M.N. Wernick, "Image reconstruction for dynamic PET based on low-order approximation and restoration of the sinograms," *IEEE Transactions on Medical Imaging*, **16**, pp. 738-749, 1997.

- J2. **C.-M. Kao**, X. Pan, C.-T. Chen and W.H. Wong, "Image restoration and reconstruction with a bayesian approach," *Medical Physics*, **25**, pp. 600-613, 1998.
- J3. **C.-M. Kao**, M.N. Wernick and C.-T. Chen, "Kalman sinogram restoration for fast and accurate PET image reconstruction," *IEEE Transactions on Nuclear Science*, **45**, pp. 3022-3029, 1998.
- J4. **C.-M. Kao**, X. Pan, E.M. Hiller and C.-T. Chen, "A bayesian approach for edge extraction in ultrasound image and its application to image segmentation," *IEEE Transactions on Nuclear Science*, **45**, pp. 3089-3096, 1998.
- J5. M.A. Anastasio, X. Pan and **C.-M. Kao**, "Multi-dimensional smoothing using orthogonal expansions," *IEEE Signal Processing Letters*, **6**, pp. 91-94, 1999.
- J6. X. Pan, M.A. Anastasio and **C.-M. Kao**, "A comparative studies of image reconstructions in SPECT and ultrasonic diffraction tomography," *IEEE Transactions on Nuclear Sciences*, **46**, pp. 527-534, 1999.
- J7. **C.-M. Kao** and X. Pan, "Fast implementation and quantitative evaluation of analytical methods with Wiener filters for image reconstruction in 3D SPECT," *IEEE Transactions on Nuclear Sciences*, **46**, pp. 1100-1109, 1999.
- J8. **C.-M. Kao**, X. Pan, P. La Rivière and M.A. Anastasio, "Fourier-based optimal recovery method for antialiasing interpolation," *Optical Engineering*, **38**, pp. 2041-2044, 1999.
- J9. **C.-M. Kao**, X. Pan and C.-T. Chen, "Accurate image reconstruction using DOI information and its implications for the development of compact PET systems," *IEEE Transactions on Nuclear Science*, **47**, pp. 1551-1560, 2000.
- J10. **C.-M. Kao** and X. Pan, "Non-iterative methods incorporating a priori source distribution and data information for suppression of image noise and artifacts in 3D SPECT," *Physics in Medicine and Biology*, **45**, pp. 2801-2819, 2000.
- J11. X. Pan, P. La Rivière, D. Gilland, **C.-M. Kao**, W. Chang and R. Jaszczak, "Transmission image reconstruction and redundant information in SPECT with asymmetric fan-beam collimation," *IEEE Transactions on Nuclear Sciences*, **48**, pp. 1357-1363, 2001.
- J12. **C.-M. Kao** and C.-T. Chen, "A direct sinogram-restoration method for fast image reconstruction in compact DOI-PET systems," *IEEE Transactions on Nuclear Science*, **49**, pp. 208-214, 2002.
- J13. X. Pan, **C.-M. Kao** and C.E. Metz, "A family of π -scheme exponential Radon transforms and the uniqueness of their inverses," *Inverse Problem*, **18**, pp. 825-826, 2002.
- J14. X. Pan, E.Y. Sidky, **C.-M. Kao**, Y. Zou and C.E. Metz, "Short-scan SPECT imaging with non-uniform attenuation and 3D distance-dependent spatial resolution," *Physics in Medicine and Biology*, **47**, pp. 2811-2833, 2002.
- J15. B.C. Penney, **C.-M. Kao**, X. Pan and N. Bidani, "Dual Isotope (In-111/Tc-99m) SPECT: Noise reduction with an analytic attenuation correction method," *IEEE Transactions on Nuclear Science*, **49**, pp. 733-739, 2002.
- J16. **C.-M. Kao**, X. Pan and B.C. Penney, "Toward optimal reduction of noise and errors in non-iterative reconstruction methods for 3D SPECT," *IEEE Transactions on Nuclear Science*, **49**, pp. 774-781, 2002.
- J17. X. Pan and **C.-M. Kao**, "Review on spatial statistics: methodological aspects and applications," *IEEE Transactions on Medical Imaging*, **21**, pp. 840-841, 2002.

- J18. X. Pan, **C.-M. Kao**, E. Sidky, Y. Zou and C.E. Metz, " π -scheme short-scan SPECT and image reconstruction," *IEEE Transactions on Nuclear Science*, **50**, pp. 87-96, 2003.
- J19. **C.-M. Kao**, X. Pan and C.-T. Chen, "An exact Fourier rebinning algorithm for 3D panel detector PET systems," *Physics in Medicine and Biology*, **49**, pp. 2407-2423, 2004.
- J20. X. Pan, L. Yu and **C.-M. Kao**, "Spatial-resolution enhancement in computed tomography," *IEEE Transactions on Medical Imaging*, **24**, pp. 246-253, 2005.
- J21. Q. Xie, **C.-M. Kao**, Z. Hsiao and C.-T. Chen, "A new approach for pulse processing in PET," *IEEE Transactions on Nuclear Science*, **52**, pp. 988-995, 2005.
- J22. E. Sidky, **C.-M. Kao** and X. Pan, "Accurate image reconstruction from few-views and limited-angle data in divergent-beam CT," *Journal of X-ray Science and Technology*, **14**, pp. 119-139, 2006.
- J23. **C.-M. Kao**, Y. Zou, S. Cho and X. Pan, "An exact analytic approach to 3D PET image reconstruction," *International Journal of Image and Graphics*, **7**, pp. 35-54, 2007.
- J24. **C.-M. Kao**, "Windowed image reconstruction for time-of-flight positron emission tomography," *Physics in Medical and Biology*, **53**, pp. 3431-3445, 2008 (Medicine & Biology Highlights of 2008).
- J25. H. Kim, **C.-M. Kao**, Q. Xie, C.-T. Chen, L. Zhou, F. Tang, H. Frisch, W.W. Moses and W.S. Choong, "A Multi-Threshold Sampling Method for TOF PET Signal Processing," *Nuclear Instrument and Methods in Physics Research, A*, **602**, pp. 618-621, 2009. PMC2727689
- J26. Q. Xie, **C.-M. Kao**, X. Wang, N. Guo, C. Zhu, H. Frisch, W.W. Moses and C.-T. Chen, "Potential advantages of digitally sampling scintillation pulses in timing determination in PET," *IEEE Transactions on Nuclear Science*, **56**, pp. 2607-2613, 2009. PMC2849149
- J27. **C.-M. Kao**, Q. Xie, Y. Dong, L. Wan and C.-T. Chen, "A high-sensitivity small-animal PET scanner: Development and initial performance measurements," *IEEE Transaction on Nuclear Science*, **56**, pp. 2678-2688, 2009.
- J28. H. Kim, H. Frisch, **C.-M. Kao**, C.-T. Chen, J.-F. Genat, F. Tang, W.W. Moses and W.S. Choong, "A Design of PET Detector Using Micro-Channel Plate PMT with Transmission-Line Readout," *Nuclear Instrument and Methods in Physics Research A*, **622**, pp. 628-636, 2010.
- J29. H. Kim, C.-T. Chen, H. Frisch and **C.-M. Kao**, "A prototype TOF PET detector module using micro-channel plate photomultiplier tube with waveform sampling," *Nuclear Instruments and Methods in Physics Research A*, **662**, pp. 26-32, 2012.
- J30. M. Niu, **C.-M. Kao**, J. Zhu, P. Xiao, A. Long, R.G. Wagner, G. Drake, C.-T. Chen and Q. Xie, "Evaluation of multi-pixel photon counters in energy determination for PET imaging," *Journal of Instrumentation*, **7**, 10.1088/1748-0221/7/04/T04001, 2012.
- J31. H. Kim, C.-T. Chen, H. Frisch, F. Tang and **C.-M. Kao**, "An application of micro-channel plate photomultiplier tube to positron emission tomography," *Physics Procedia*, **37**, pp. 1480-1487, 2012.
- J32. D. Xi, Q. Xie, J. Zhu, L. Lin, M. Niu, P. Xiao, C.-T. Chen and **C.-M. Kao**, "Optimization of the SiPM pixel size for a monolithic PET detector," *Physics Procedia*, **37**, pp. 1497-1503, 2012.

- J33. C.-Y. Chou, Y. Dong, Y. Hung, Y.-J. Kao, W. Wang, **C.-M. Kao** and C.-T. Chen, "Accelerating image reconstruction in dual-head PET system by GPU and symmetry properties," *PLoS ONE* **7**(12): e50540, 2012
- J34. A. Ronzhin, M. Albrow, S. Los, M. Martens, P. Murat, E. Ramberg, H. Kim, C.-T. Chen, **C.-M. Kao**, K. Niessen, A. Zatserklyaniy, M. Mazzillo, B. Carbone, G. Condorelli, G. Fallica, A. Piana, D. Sanfilippo, G. Valvo and S. Ritt, "A SiPM-based TOF-PET detector with high speed digital DRS4 readout," *Nuclear Instruments and Methods in Physics Research A*, **703**, pp 109-113, 2013.
- J35. Q. Xie, Y. Chen, J. Zhu, J. Liu, X. Wang, W. Liu, X. Chen, M. Niu, Z. Wu, D. Xi, L. Wang, P. Xiao, C.-T. Chen and **C.-M. Kao**, "Implementation of LYSO/PSPMT block detector with all digital DAQ system," *IEEE Trans Nucl Sci*, **60**, pp. 1487-1494, 2013.
- J36. D. Xi, **C.-M. Kao**, W. Liu, C. Zeng, X. Liu and Q. Xie, "FPGA-only MVT digitizer for TOF PET," *IEEE Trans Nucl Sci*, **60**, pp. 3253-3261, 2013.
- J37. J. Gong, Z. Wang, I. Polegaeva, R. Salgia, **C.-M. Kao**, C.-T. Chen, and L. Chen, "Activating the expression of human K-ras G12D stimulates oncogenic transformation in transgenic goat fetal fibroblast cells," *PLoS ONE*, **9**, e90059, 2014.
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Teaching Experience.

Courses

- 1997-1999 Practicum in Physics of Nuclear Medicine
- 1999 Physics in Nuclear Medicine
- 2000-present Physics in Medical Imaging II (Course Coordinator since 2006)
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- 2002-present Research Rotation Courses, Committee on Medical Physics

Invited Short Courses

- 2001 *Nuclear Medicine Imaging and Instrumentation*, Institute of Radiological Sciences, School of Medical Technology and Engineering, National Yang-Ming University, Taiwan
- 2002 *Topics on Advanced PET Instrumentation and Image Reconstruction*, Biomedical Engineering Division, National Health Research Institute, Taiwan
- 2004 *Small-Animal PET Imaging*, Department of Nuclear Medicine and Molecular Imaging Center, Chang Gung Memorial Hospital, Taiwan
- 2010 *Summer Course on Imaging Science – Theory and Methods of Tomographic Image Reconstruction in CT and PET*, Department of Mathematics and Mathematics Division of National Center for Theoretical Sciences, Taipei, Taiwan
- 2011,2012 *PET Fundamentals*, School of Life Science and Technology, Huazhong University of Science and Technology, Wuhan, China

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Teaching Assistant

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Ph.D. dissertation topic: Investigation of on-board PET with tomotherapy

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On objective evaluation of estimation tasks in medical imaging
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On development of PET data acquisition technology
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2003 Michalis Aristophanous
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(currently: Instructor, Department of Radiation Physics, Division of Radiation Oncology, The University of Texas MD Anderson Cancer Center, Houston)

2005 Kyle Denniston
Research topic: Performance evaluation and characterization of a dual-head small-animal PET system

2008 Federico Pineda
Research Topic: Characterization of the Performance Characteristics of Silicon Photomultipliers for PET Imaging
(currently: Graduate student in the Graduate Programs in Medical Physics, The University of Chicago)

2010 Dave Rigie
Research Topic: Time-of-flight PET image reconstruction
(currently: Graduate student in the Graduate Programs in Medical Physics, The University of Chicago)

2012 Buxin Chen
Research Topic: PET detector electronics
(currently: Graduate student in the Graduate Programs in Medical Physics, The University of Chicago)

2013 Neville Eclov
Research Topic: Embedded PET system for irradiator
(currently: Graduate student in the Graduate Programs in Medical Physics, The University of Chicago)

2014 Sean Rose
Research Topic: TOF PET imaging reconstruction
(currently: Graduate student in the Graduate Programs in Medical Physics. The University of Chicago)

2014 Bryan Quigley
Research Topic: PET imaging and image analysis of stroke in a rat brain
(currently: Graduate student in the Graduate Programs in Medical Physics. The University of Chicago)

Mentor for Research Associates, Fellows and Visiting Scholars

1998 Yu-Tai Jing, Visiting Scholar

- Department of Radiology, The University of Chicago
 Research topic: Computer graphics for PET image processing
 (currently: Professor, Department of Computer Science, National Chiao Tung University, Taiwan)
- 2001-2002 Jiang Feng, Research Associate
 Department of Radiology, The University of Chicago
 Research topic: SPECT/PET image reconstruction/processing
 (in conjunction with Dr. Xiaochuan Pan)
- 2001-2003 Emil Sidky, Research Associate
 Department of Radiology, The University of Chicago
 Research topic: SPECT/CT image reconstruction
 (in conjunction with Dr. Xiaochuan Pan)
 (currently: Research Associate Professor, Department of Radiology, The University of Chicago)
- 2002-2008 Quingguo Xie, Postdoc
 Medical Engineering Division, National Health Research Institutes, Taiwan
 Research topic: A new pulse processing technique for radiation detection in PET
 (Recipient of the 2006 and 2007 IEEE NSS/MIC meeting Trainee Award)
 (currently: Professor, Biomedical Engineering Department, Huazhong University of Science and Technology, Wuhan, China)
- 2004-2006 Jeffrey Souris
 Department of Radiology, The University of Chicago
 Research topic: Imaging in dual-head small-animal PET systems, and its performance evaluation and characterization
 (currently: Research Assistant Professor, Department of Radiology, The University of Chicago)
- 2008-2010 Heejong Kim, NIH Postdoc Fellow
 Department of Radiology, The University of Chicago
 Research topic: PET data-acquisition system, PET detector design and evaluation
 (currently: Research Assistant Professor, Department of Radiology, The University of Chicago)

Summer Intern/High-School Student Advisor

- 2005 Sean Tsai
 Summer Intern
 Implement control/acquisition interface for a dual-head small-animal PET system
- 2006 Xiao Han
 Summer Intern
 Performance characterization and simulation of a dual-head small-animal PET system

- 2009-2010 Justine Ly and Katie Shi
Illinois Mathematics and Science Academy (IMSA) Student Inquiry Research
Quantitative analysis of TRODAT SPECT-99m brain images for diagnosis of
Parkinson disease
- 2010-2011 Thomas Reith and Vijay Jayaram
Illinois Mathematics and Science Academy (IMSA) Student Inquiry Research
Calculating the detection efficiency of positron emission tomography systems
- 2010-2011 Eric Ordonez
Illinois Mathematics and Science Academy (IMSA) Student Inquiry Research
Measuring Time Calibrations in Waveform Digitizing for PET