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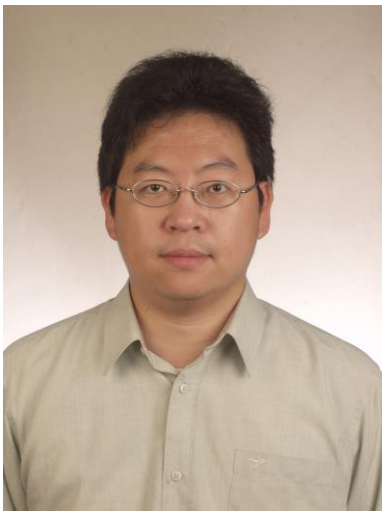
Tsi-Chain Chao (趙自強), Ph. D.



Associate Professor
Department of Medical imaging & Radiological Sciences,
Chang Gung University,
Kweishan, Tau-yuan
Taiwan
Tel: 886-3-2118800 ext.5385
E-mail: chaot@mail.cgu.edu.tw

Education：

2001 PhD, Nuclear Engineering, Rensselaer Polytechnic Institute, USA
1997 MSc, Nuclear Sciences, National Tsing Hua University, Taiwan
1994 BS, Physics, National Tsing Hua University, Taiwan

Professional Experiences

08/2011 ~	Associate Professor
02/2003 –07/2011	Assistant Professor
	Department of Medical Imaging and Radiological Sciences
	Chang Gung University, Taiwan
01/2002 - 12/2002	Postdoc Research Associate
	Nuclear Engineering, Rensselaer Polytechnic Institute, USA

Research Interest:

- Monte Carlo Simulation
- Digital Phantom Construction
- Photon/electron/proton radiation therapy

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Chao's research interests include Monte Carlo simulation and radiation dosimetry. Chao codirects the Radiation Therapy Laboratory (RTLab) at CGU, including responsibilities in quality assurance (QA) for radiation therapy, small field dosimetry, transmission dosimetry based on electronic portal imaging devices (EPID), proton therapy, microdosimetry, and nanodosimetry. In addition, RTLab, CGU is the pioneer group in Taiwan to study the dosimetry of proton therapy. We have published several preliminary results.

Early from 1997, Chao has been a key researcher to develop the state-of-the-art 3D/4D tomographic models, VIP-Man using Visible Human Project's (VHP) images. These efforts were finally published in a book chapter. Recently, Chao still used VIP-Man to study X-ray dosimetry and skeleton dosimetry. The significance of these jobs has been recognized by researchers and been referenced by International Commission on Radiological Protection (ICRP) and National Radiological Protection Board (NRPB) reports.

Small animals are frequently used in molecular imaging studies for the investigation of the dynamic of radiopharmaceuticals and the response of radiation therapy; and the results could be applied to human beings. On the other hand, compared with the invaluable applications in preclinical research using animal CT/PET/MRI, there is still a novel and unexplored research field for animal irradiators. The disadvantages of not having a precise irradiator for animal studies are clear. In a well-designed animal study using state-of-the-art animal imaging modalities, researchers can examine clear tomographic images in very high resolution to evaluate biological responses accurately and precisely. The dose uncertainty within the small animals, however, is still considerable and the evaluation of dose response (the weakest link) against different radiations could be biased accordingly. Our group in CGU and CGMH proposed a multi-modalities animal RT system (MultiART) which is composed of three different modes including MV photon mode, MeV electron mode, and kV photon mode.

Chao also involved in several other studies, such as in vivo dosimetry, brachytherapy dosimetry, and dual resolution dosimetry.

Recent Publications:

Journal (Peer reviewed):

1. Lo CJ, Yang PY, Chao TC, Tu SJ (2015). Effect of contrast agent administration on consequences of dosimetry and biology in radiotherapy planning. *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*. (online available).
2. Wu SW, Tung CJ, Lee CC, Fan KH, Huang HC, Chao TC (2015). Impact of the material composition on proton range variation – A Monte Carlo study. *Radiation Physics and*

Chemistry. (online available).

3. Pan CY, Huang YW, Cheng KH, Chao TC, Tung CJ (2014, Dec). Microdosimetry spectra and relative biological effectiveness of 15 and 30 MeV proton beams. *Applied Radiation and Isotopes*, (online available)
4. C. Y. Yeh , C. J. Tung , T. C. Chao , M. H. Lin and C. C. Lee (2014, Nov). A dual resolution measurement based Monte Carlo simulation technique for detailed dose analysis of small volume organs in the skull base region. *Radiation Physics and Chemistry*, 104(2014):389–392
5. Lee, CC; Wu, JF; Chang, KP; Chu, CH; Wey, SP; Liu, HL; Tung, CJ; Wu, SW; Chao, TC; (2014, Nov). The use of normoxic polymer gel for measuring dose Distributions of 1, 4 and 30mm Cones. *Radiation Physics and Chemistry*, 104(2014): 221–224.
6. C.Y. Yeh, C.J. Tung, C.C. Lee, M.H. Lin, T.C. Chao (2014, Apr). Measurement-based Monte Carlo Simulation of High Definition Dose Evaluation for Nasopharyngeal Cancer Patients Treated by using Intensity Modulated Radiation Therapy. *Radiation Measurements*, 71:333-337.
7. C. Y. Yeh, C. C. Lee, T. C. Chao, M. H. Lin, P. A. Lai, F. H. Liu and C. J. Tung (2014, Feb). Application of Measurement-based Monte Carlo Method in Nasopharyngeal Cancer Patients for Intensity Modulated Radiation Therapy. *Radiation Physics and Chemistry*, 95, 240-242.
8. Lee CC, Lee YJ, Tung CJ, Cheng HW, Chao TC* (2014, Feb). MCNPX Simulation of Proton Dose Distribution in Homogeneous and CT Phantoms. *Radiation Physics and Chemsitry*, 95 (2014) 302–304.
9. Chao TC, Wang CC, Li JL, Li CY, Tung CJ (2012, Jan). Cellular- and micro-dosimetry of heterogeneously distributed tritium.. *Int J Radiat Biol.*, 88:151-7
10. Wang CC, Hsiao Y, Lee CC, Chao TC, Wang CC, Tung CJ (2012, Jan). Monte Carlo simulations of therapeutic proton beams for relative biological effectiveness of double-strand break. *Int J Radiat Biol.*, 88:158-63.
11. Chao TC, Kao YF, Lee CC, Tung CJ (2011, Dec). Dose assessment for chest X-ray examination based on a voxelised human model. *Radi. Meas.*, 46(12):2077-80.
12. Chao TC, Yu PC, Lee CC, Wu CJ, Tung CJ (2011, Dec). In vivo dosimetry with asymmetry and heterogeneity correction. *Radi. Meas.*, 46(12):1956-9
13. Cheng HW, Ho CJ, Lee CC, Tu SJ, Shih BY, Chao TC* (2011, Dec). Development of a novel optical CT employing a laser to create a collimated line-source with a flat-top intensity distribution. *Radi. Meas.*, 46(12):1932-5.
14. Chu, WH; Lan, JH; Chao, TC; Lee, CC; Tung, CJ; (2011, Dec). Neutron spectrometry and dosimetry around 15 MV linac. *Radiation Measurements*, 46(12):1741–1744.
15. Lee CC, Chen AM, Tung CJ, Chao TC* (2011, Dec). Monte Carlo simulation of small field electron beams for small animal irradiation. *Radi. Meas.*, 46(12):2003-5
16. Wu, SW; Chao, TC; Tung, CJ; Lin, MH; Lee, CC; (2011, Dec). MLC mediated beam hardening effects in IMRT. *Radiation Measurements*, 46(12):1989–1992.
17. Yu, Pei-Chieh; Chao, Tsi-Chian; Tung, Chuan-Jong; Wu, Ching-Jung; Lee, Chung-Chi; (2011, Dec). Dose assessment for brachytherapy with Henschke applicator. *Radiation Measurements*, 46(12):2028–2030.

18. Chao TC, Huang YS, Hsu FY, Hsiao Y, Lee CC and Tung CJ (2011, Feb). Cellular Dosimetry and Microdosimetry for Internal Electron Emitters. *Radiat. Prot. Dosim.*, 143 (2-4): 248-252
19. Tung CJ, Yu PC, Chiu MC, Yeh CY, Lee CC, Chao TC* (2010, Dec). Midline Dose Verification with Diode in vivo Dosimetry for External Photon Therapy of Head and Neck and Pelvis Cancers during Initial Large-Field Treatments. *Med. Dos.*, 35(4): 304-311
20. Chen AE, Dai SJ, Chu ML, Lin CH, Teng PK, Wang CH, Chao TC, Lee CC, Tung CJ , Duh TS (2010, Nov). Beam profile monitoring system for proton therapy. *IEEE Nuclear Science Symposium Conference Record*, 440-2. .
21. Lin MH, Chao TC, Lee CC, Chang JTC, Tung CJ (2010, Jul). Tissue classifications in Monte Carlo simulations of patient dose for photon beam tumor treatments. *Nucl. Instr. and Meth. in Phys. Res. A*, 619(2010):393-6.
22. Yu PC, Chao TC, Lee CC, Wu CJ, Tung CJ (2010, Jul). A Monte Carlo dosimetry study using Henschke applicator for cervical brachytherapy.. *Nucl. Instr. and Meth. in Phys. Res. A*, 619(2010): 411–4..
23. Tu SJ, Hsieh HL, Chao TC (2010, Mar). Imaging properties of gold nanoparticles: CT number dependence study. *Progress in Biomedical Optics and Imaging*, v7622. .
24. Chao TC, Chen AM, Tu SJ, Tung CJ, Hong JH and Lee CC (2009, Sep). The Evaluation of 6 and 18 MeV Electron Beams for Small Animal Irradiation. *Phys. Med. Biol.*, 54(2009):5847-5860.
25. Caracappa PF, Chao TC, and Xu XG (2009, Jun). A Study of Predicted Bone Marrow Distribution on Calculated Marrow Dose from External Radiation Exposures Using Two Sets of Image Data for the Same Individual. *Health Phys.*, 96(6):661-74.
26. Liu CS, Tung CJ, Hu YH, Chou CM, Chao TC and Lee CC (2009, May). Calculations of Specific cellular doses for Low-Energy Electrons.. *Nucl. Instr. and Meth. in Phys. Res. B*, 267:1823-9.
27. Lin MH*, Chao TC*, Lee CC, Tung CJ, Yeh CY, Hong JH (2009, Apr). Measurement-Based Monte Carlo Dose Calculation System for IMRT Pre-treatment and In-vivo Dose Verifications.. *Med. Phys.*, 36(4):1168-75.
28. Tu SJ, Hsieh HL, Chao TC, and Lee CC (2009, Mar). Feasibility of using the micro CT imaging system as the conformal radiation therapy facility for small animals. *Progress in Biomedical Optics and Imaging*, v7258.

Book Chapter:

Xu XG, Chao TC, Bozkurt A, Shi CY, Zhang JY. *"Chapter 6: The 3D and 4D VIP-Man Computational Phantoms" in "Handbook of Anatomical Models for Radiation Dosimetry" TAYLOR & FRANCIS, 2009* (1) (ISBN: 978-1-4200-5979-3). New York: TAYLOR & FRANCIS. Dec, 2009.