

# Yixiang Liao

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1415 W. Harrison Street, Chicago, IL 60607 · (217) 840-1981 · E-mail: yixiangl@gmail.com

## **EDUCATION**

**M.S., Medical Physics**, School of Medicine, Wayne State University, Detroit, MI, 2007

**Ph.D., Atmospheric Science**, Division of the Physical Sciences, University of Chicago, Chicago, IL, 2004

**B.S., Atmospheric Physics**, School of Physics, Peking University, Beijing, P. R. China, 1997

## **EMPLOYMENT HISTORY**

**Medical Physicist/Associate Professor**, 2022 – present, Rush University Medical Center, Chicago, IL

**Director**, 2021 – present, Medical Physics Residency Program, Rush University medical Center, Chicago, IL

**Associate Director**, 2016 – 2021, Medical Physics Residency Program, Rush University Medical Center, Chicago, IL

**Medical Physicist/Assistant Professor**, 2012 – 2022, Rush University Medical Center, Chicago, IL

**Medical Physicist/Instructor**, 6/2007 – 2012, Rush University Medical Center, Chicago, IL

## **CERTIFICATION**

Diplomate of American Board of Radiology in Therapeutic Medical Physics, 2011.

## **CLINICAL EXPERIENCE**

Treatment planning:

- HDR, IORT, and prostate seed implant
- Treatment planning for 3D-CRT, IMRT, Tomotherapy, and SRS/SBRT on Pinnacle, Eclipse, TomoTherapy, Nucletron Oncentra, Varian BrachyVision, iPlan and Variseed
- Perform calculations for TBI and eye plaque treatments

Quality assurance

- Monthly/annual QA of Varian linear accelerators (TrueBeam, Trilogy, 21EX, etc.), Tomotherapy, Nucletron HDR unit, and Philips Brilliance Big-Bore CT using Profiler, PTW water phantom, and Gafchromic film
- Plan delivery QA using MapCheck and ArcCheck
- Initial patient data validation and weekly chart checking in paperless department using Aria and Mosaik as Record and Verify systems

Commissioning/Calibration

- Lead linear accelerator commission (Varian 21iX)

## **RESEARCH EXPERIENCE**

- 3D printing in radiation oncology
- PET-guided HDR radiobiological optimization
- Image guided brachytherapy
- Computed Tomography of ultrasound in breast imaging
- Real-time EPID imaging in radiation therapy
- Radiobiological modeling

## **CERTIFIED TRAINING**

Image-guided Adaptive Brachytherapy for Gynaecology using the Combined Intracavitary-Interstitial Technique, Vienna, Austria, 2012

Electronic brachytherapy using Xofig, San Jose, CA, 2013

Integrated Course in the Biology and Physics of Radiation Oncology (IBPRO), Detroit, MI, 2014

## HONORS AND AWARDS

Awarded Presentation, AAPM Midwest Chapter Young Investigator Symposium, 2008  
Graduate Professional Scholarship, Wayne State University, 2006

## REFEREED PUBLICATIONS

**Liao, Y.**, Dorafshar, A., Bernard, D., Kim, T., Camden, N., Wang, D., High-dose-rate interstitial brachytherapy vs external beam radiation for the treatment of complex keloids, *Medical Dosimetry*, In Press.

**Liao, Y.**, Tatebe, K., Barry, P., Wang, D., Turian, J., A Novel Use of 3D-printed Template in Vaginal HDR Brachytherapy, *Brachytherapy*, 2022, 21, pp. 238-243.

Ansari, S., **Liao, Y.**, Dewdney, S., Wang, D. Barry, P., Vaginal oligometastatic disease of colorectal primary: a novel therapeutic approach, *Rare Tumor*, 2021

Paul, J., Grelewicz, Z., Chowdhary, M., **Liao, Y.**, Bernard, D., Patel, K., & Turian, J. (2021). Quantitative medical physics national job data distribution analysis. *Practical Radiation Oncology*, doi:10.1016/j.prro.2021.02.009

Green, M., Van Nest, S. J., Soisson, E., Huber, K., **Liao, Y.**, McBride, W., ... Joiner, M. C. (2020). Three discipline collaborative radiation therapy (3DCRT) special debate: We should treat all cancer patients with hypofractionation. *Journal of Applied Clinical Medical Physics*, 21(6), 7-14. doi:10.1002/acm2.12954

Carrier F, **Liao Y**, Mendenhall N, Guerrieri P, Todor D, Ahmad A, Dominello M, Joiner MC, Burmeister J. “Three Discipline Collaborative Radiation Therapy (3DCRT) Special Debate: I would treat prostate cancer with proton therapy”, *J Appl Clin Med Phys*. 2019 Jul;20(7):7-14

Redler, G., Templeton, A., Zhen, H., Turian, J., Bernard, D., Chu, J.C.H., Griem, K.L., **Liao, Y.** “Dosimetric effects of saline- versus water-filled balloon applicators for IORT using the model S700 electronic brachytherapy source”. *Brachytherapy*, 2018, 17 (2), pp. 500-505.

Millunchick, C.H., Zhen, H., Redler, G., **Liao, Y.**, Turian, J.V. “A model for predicting the dose to the parotid glands based on their relative overlapping with planning target volumes during helical radiotherapy”, *J Appl Clin Med Phys*. 2018 Mar;19(2):48-53.

**Liao, Y.** Dandekar V, Chu J, Turian J, Bernard D, Kiel K, “Reporting small bowel dose in cervix cancer high-dose-rate brachytherapy”, *Med Dosim*. 2016 Spring; 41(1):28-33.

Yao R, Templeton AK, **Liao Y**, Turian JV, Kiel KD, Chu JC. “Optimization for high-dose-rate brachytherapy of cervical cancer with adaptive simulated annealing and gradient descent”. *Brachytherapy*. 2014 Jul-Aug;13(4):352-60.

Coon AB, Dickler A, Kirk MC, **Liao Y**, Shah AP, Strauss JB, Chen S, Turian J, Griem KL, “Tomotherapy and Multifield Intensity-Modulated Radiotherapy Planning Reduce Cardiac Doses in Left-Sided Breast Cancer Patients with Unfavorable Cardiac Anatomy.”, *International Journal of Radiation Oncology, Biology, Physics*, 2010 Sep 1; 78(1):104-10.

Huang Y, Joiner M, Zhao B, **Liao Y**, Burmeister J “Dose convolution filter: incorporating spatial dose information into tissue response modeling”, *Med Phys*. 2010 Mar; 37(3):1068-74.

**Liao, Y.**, M. Joiner, Y. Huang, and J. Burmeister, “Hypofractionation: What Does It Mean For Prostate Cancer Treatment?”, *International Journal of Radiation Oncology, Biology, Physics*, 2010 Jan 1; 76(1):260-8.

**Liao, Y.**, Burmeister J., and Joiner M., “Modeling normal tissue complications in hypofractionated prostate cancer radiotherapy”, *Radiotherapy and Oncology*, 2009, 90 Suppl 1, S22

## SELECTED CONFERENCE PRESENTATIONS

J McCorkindale, **Y Liao**, K Jones, J Sun, A Templeton, J Chu, J Turian, “Tomographic Thermal Imaging as a Predictor of Skin Reactions in Radiation Therapy”, *Med. Phys.*, (2019)

K Jones, **Y Liao**, Z Grelewicz, D Bernard, J Turian, “Time-Resolved Gamma Imaging of High Dose Rate (HDR) Brachytherapy Source Positions”, *Med. Phys.*, (2019)

**Y Liao**, A Templeton, A Osmanuddin, Z Grelewicz, J Turian, C Hogue, P Barry, Study of the TraceIT as a Hydrogel Spacer for Rectal Sparing in Recurrent Endometrial Cancer”, *Med. Phys.*, (2018)

G Redler, A Templeton, J Turian, J Chu, D Bernard, H Zhen, **Y Liao\***, “Dosimetric Effects of Saline Filled Balloons During IORT Using Xofigo Electronic Brachytherapy”, *Med. Phys.*, **43**, (2016)

G Redler, G Cifter, A Templeton, C Lee, D Bernard, **Y Liao**, H Zhen, J Turian, J Chu, "Simulated Real-Time Image Guidance for Lung SBRT Patients Using Scatter Imaging", *Med. Phys.*, **43**, (2016)

G Cifter, G Redler, C Lee, A Templeton, D Bernard, J Turian, J Chu, **Y Liao**, **Best in Physics (Joint Imaging-Therapy): A Real-Time Tumor Tracking Using Novel Scatter Imaging Modality During Lung SBRT**", *Med. Phys.* **43**, (2016)

A Templeton, **Y Liao**, A Diaz, J Turian, "Nomogram for Prediction, Comparison, and Evaluation of Dose to Normal Tissue in SRS Planning", *Med. Phys.*, **43**, (2016)

A Templeton, **Y Liao**, G Redler, H Zhen, "Do Task Group External Beam QA Recommendations Guarantee Accurate Treatment Plan Dose Delivery?", *Med. Phys.*, **42**, (2015)

**Y Liao**, J Turian, A Templeton, G Redler, J Chu, "Using CBCT as the Alternative Method of Assessing ITV Volume", *Med. Phys.*, **42**, (2015)

Sen N, **Liao Y**, Kiel K. "Vaginal contrast improves CT based delineation of the vaginal cuff and proximal vaginal mucosa". Oral presentation: 2014 ABS Gyn School, Chicago, IL July 12-14, 2014.

J Anderson, D Bernard, **Y Liao**, *et al.*, "Helical Cranial\_Spinal Treatments with a Linear Accelerator", *Med. Phys.* **41**, (2014)

**Y Liao**, T Kadir, J Turian, A Templeton, K Kiel, J Chu, "Evaluation of Deformable Registration of PET/CT Images for Cervical Cancer Brachytherapy", *Med. Phys.*, **41**, (2014)

**Liao, Y**, *et al.*, "The Role of Small Bowel in Cervical Cancer Brachytherapy", *Med. Phys.* **40**, (2013)

J Anderson, K Kiel, R Yao, **Y Liao**, D Bernard, N Biswal, J Turian, J Chu, "PET Image-Guided Dose Escalation Study for Cervical Cancer Patients Receiving HDR Brachytherapy", *Med. Phys.* **40**, (2013)

**Liao Y**, Dandekar V, Chu J, Turian J, Kiel K, "Evaluation of Inverse Optimization in Brachytherapy for Locally Advance Cervix Cancer", *Med. Phys.* **39**, 3803 (2012)

**Liao Y**, Tolekids G, Yao R, Templeton A, Sensakovic W, Chu J, "Evaluation of the Effectiveness of Compression Methods in SBRT for Lung", *Med. Phys.* **39**, 3656 (2012)

Yao R, **Liao Y**, Kiel K, *et al.*, "Comparison of HDR Brachytherapy for Cervix Cancer using an Adaptive Simulated Annealing Program and Oncentra for Simultaneously Integrated Boost", *Med. Phys.* **39**, 3802 (2012)

J Turian, **Y Liao**, D Bernard, and J Chu, "Are We Ready for Biological Planning? A Dosimetric Study", *Med. Phys.* **38**, 3641 (2011)

R Yao, A Templeton, J Chu, **Y Liao**, *et al.*, "HDR Brachytherapy for Cervical Cancer Using an Adaptive Simulated Annealing Optimization Algorithm with Physical Dose and GEUD Cost Functions", *Med. Phys.* **38**, 3637 (2011)

**Liao Y**, Turian J, Chu J, "EPID Assisted Dosimetric Evaluation of Treatment Planning Using Helical or 4D CT in Stereotactic Radiotherapy of Lung Cancer", *Med. Phys.* **38**, 3620 (2011)

R Yao, A Templeton, J Chu, **Y Liao**, J Turian, B Giolda, and T Zusag, "PET/CT Guided Dose Redistribution for HDR Interstitial Brachytherapy of Cervical Cancer", *Med. Phys.* **37**, 3390 (2010)

**Liao Y**, Turian J, Zhou J, *et al.*, "The Optimal Frame Rate for Cine EPID Images", *Med. Phys.* **37**, 3159 (2010)

J Zhou, J Turian, E Lee, A Templeton, **Y Liao**, and J Chu, "A Novel Approach to Tracking Intrafraction Prostate Motion during Volumetric Modulated Arc Therapy with Tomosynthesis", *Med. Phys.* **37**, 3386 (2010)

Yao R, Templeton A, Chu J, **Liao Y**, *et al.*, "Comparison of Optimized Interstitial HDR Brachytherapy Plans Using Adaptive Simulated Annealing Algorithm and Physical, Biological and Hybrid Cost Functions", *Med. Phys.* **36** 2534 (2009).

**Liao Y**, Joiner M, Huang Y, and Burmeister J, "Hypofractionation: What Does It Mean For Prostate Cancer Treatment?", *Med. Phys.* **35** 2911 (2008)

Zhao B, Joiner M, Huang Y, **Liao Y**, and Burmeister J, "Incorporating Biological and Spatial Dose Information Can Change the Predicted Outcome of Radiotherapy Treatment Plans", *Med. Phys.* **35** 2823 (2008)

**Liao Y**, *et al.*, "Comparison of Rush University In-House Dose Optimizer and Nucletron IPSA", *Med. Phys.* **35** 2836 (2008)

Yao R, Chu J, **Liao Y**, *et al.*, "Optimal Dose Grid and Sampling Resolution for HDR Interstitial Brachytherapy Planning", *Med. Phys.* **35** 2730 (2008)

Huang Y, Joiner M, **Liao Y**, and Burmeister J, "Dose Convolution Filter: Incorporating Spatial Dose Information Into Tissue Response Modeling", *Med. Phys.* **34** 2506 (2007)

## INVITED PEER REVIEW

- AAPM Annual Meeting Abstract
- International Journal of Radiation Oncology, Biology, Physics
- Contemporary Brachytherapy
- Open Access Surgery,

- Clinical Medicine Insights: Oncology
- Clinical Medicine Reviews in Oncology
- Cancer Informatics

## **PROFICIENT COMPUTER SKILLS**

Languages: Python, C, Matlab, Unix/Linux shell scripting,  
Software: MIM@, ImageJ

## **PROFESSIONAL AFFILIATIONS**

Member, Brachytherapy Subcommittee, AAPM, 2022-2024  
Associate Editor, Medical Physics Journal  
Associate Editor, Technology in Cancer Research & Treatment  
APEX Surveyor, ASTRO  
Consultant, Brachytherapy Subcommittee, AAPM, 2021  
Member, Board of Directors, AAPM, 2016-2018  
Member, AAPM Strategic Planning Committee, 2017-2019  
Member, Board of Directors, AAPM Midwest Chapter, 2016-2018  
Member, Board of Directors, AAPM Midwest Chapter, 2020-2022  
Member, Medical Physics Leadership Academy Progress Assessment Subcommittee, 2019-2022  
Member, American Society for Radiation Oncology (ASTRO)  
Member, American Association of Physicists in Medicine (AAPM)  
Member, American Brachytherapy Society (ABS)  
Member, AAPM Midwest Chapter