



Xuejun Gu

Associate Professor of Radiation Oncology (Medical Physics)

Radiation Oncology - Radiation Physics

Bio

BIO

Dr. Gu is Associate Professor and Director of Translational Research of Radiation Oncology Department at Stanford University. Dr. Gu's research has been focused on artificial intelligence in medicine, medical imaging and image analysis, and treatment planning. With the research emphasizing on clinical application, she has made unique and significant contributions to translating home-developed software platforms into the clinic and pre-clinic. Dr. Gu is an author on more than 100 peer reviewed publications, a co-inventor on many issued and pending patents, and a co- investigator or principal investigator on NIH and corporate grants. She is on the editorial boards of a number of journals in medical physics and medical imaging.

ACADEMIC APPOINTMENTS

- Associate Professor - University Medical Line, Radiation Oncology - Radiation Physics
- Member, Bio-X
- Member, Stanford Cancer Institute

ADMINISTRATIVE APPOINTMENTS

- Director of Translational Research, Department of Radiation Oncology, Stanford University, (2021- present)

HONORS AND AWARDS

- BEST IN PHYSICS (THERAPY), AAPM (2023)
- BEST IN PHYSICS (THERAPY), AAPM (2019)
- Science Council, AAPM (2017)
- BEST IN PHYSICS (JOINT IMAGING THERAPY), AAPM (2016)
- BEST IN PHYSICS (THERAPY), AAPM (2015)
- Norm Baily Postdoctoral/Resident Research Award, AAPM, Southern California Chapter (2011)
- NCI Ruth L. Kirschstein National Research Service Award, NIH/NCI (2010)
- Norm Baily Postdoctoral/Resident Research Award, AAPM, Southern California Chapter (2010)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Associate Editor, Medical Physics (2021 - present)
- Associate Editor, British Journal of Radiology (2021 - present)
- International Advisory Board, Physics in Medicine & Biology (2021 - present)
- Standing Member, NIH-Emerging Imaging Technologies and Applications (EITA) Study Section (2021 - present)

- Grant Reviewer, NIH-NIDCR (2019 - 2020)
- Research Scholar Grant Reviewer, Radiological Society of North America (RSNA) (2015 - 2015)

PROFESSIONAL EDUCATION

- Postdoc, University of California-San Diego , Radiation Physics
- PhD, Columbia University , Biomedical Engineering
- MS, Clemson University , Physics
- BA, Tianjin University , Biomedical Engineering

LINKS

- Gu Lab: <https://med.stanford.edu/gulab>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Artificial intelligence in medicine

Medical imaging and image analysis

Treatment planning and clinical decision-making

FLASH radiobiology study ;

CLINICAL TRIALS

- Neurocognitive Decline in Patients With Brain Metastases, Recruiting

Teaching

COURSES

2023-24

- Medical Physics and Dosimetry: BMP 251, RADO 251 (Aut)
- Physics of Radiation Therapy: BMP 252, RADO 252 (Win)

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Kangning Zhang

Publications

PUBLICATIONS

- **Stereotactic Radiosurgery for Ependymoma in Pediatric and Adult Patients: A Single-Institution Experience.** *Neurosurgery*
Yoo, K. H., Marianayagam, N. J., Park, D. J., Persad, A., Zamarud, A., Shaghaghian, E., Tayag, A., Ustrzynski, L., Emrich, S. C., Gu, X., Ho, Q. A., Soltys, S. G., Meola, et al
2024
- **Where Does Auto-Segmentation for Brain Metastases Radiosurgery Stand Today?** *Bioengineering (Basel, Switzerland)*
Kim, M., Wang, J. Y., Lu, W., Jiang, H., Stojadinovic, S., Wardak, Z., Dan, T., Timmerman, R., Wang, L., Chuang, C., Szalkowski, G., Liu, L., Pollom, et al
2024; 11 (5)
- **Exploring deep learning for estimating the isoeffective dose of FLASH irradiation from mouse intestinal histology images.** *International journal of radiation oncology, biology, physics*
Fu, J., Yang, Z., Melemenidis, S., Viswanathan, V., Dutt, S., Manjappa, R., Lau, B., Soto, L. A., Ashraf, R., Skinner, L., Yu, S. J., Surucu, M., Casey, et al

2024

● **STEREOTACTIC RADIOSURGERY FOR RESIDUAL, RECURRENT, AND METASTATIC HEMANGIOPERICYTOMAS: A SINGLE INSTITUTION EXPERIENCE**

Yoo, K., Park, D., Veeravagu, A., Lee, M., Marianayagam, N., Zamarud, A., Gu, X., Pollom, E., Soltys, S., Chang, S., Meola, A.
OXFORD UNIV PRESS INC.2023

● **Considerations for intensity modulated total body or total marrow and lymphoid irradiation.** *Clinical and translational radiation oncology*

Parsons, D., Lim, T. Y., Teruel, J. R., Galavis, P., Agostinelli, S., Liang, J., Mancosu, P., Cherpak, A., Stanley, D. N., Ahn, K., Guo, B., Gonzalez, Y., Burmeister, et al
2023; 43: 100674

● **Stereotactic Radiosurgery for Cranial and Spinal Hemangioblastomas: A Single-Institution Retrospective Series.** *Neurosurgery*

Yoo, K. H., Park, D. J., Marianayagam, N. J., Gu, X., Pollom, E. L., Soltys, S. G., Chang, S. D., Meola, A.
2023

● **Leveraging global binary masks for structure segmentation in medical images.** *Physics in medicine and biology*

Kazemimoghadam, M., Yang, Z., Chen, M., Ma, L., Lu, W., Gu, X.
2023

● **Angular correction methodology and characterization of a high-resolution CMOS array for patient specific quality assurance on a robotic arm linac.** *Journal of applied clinical medical physics*

Ashraf, M. R., Krimmer, J., Zalavri, L., Gu, X., Wang, L., Chuang, C. F.
2023: e14110

● **An Integrated 3D Printed Enclosure for a Radioluminescent-Based Phantom for Quality Assurance on a Robotic-Arm Linac.** *Physics in medicine and biology*

Ashraf, M. R., Gibson, C., Skinner, L. B., Gu, X., Xing, L., Wang, L.
2023

● **A deep learning approach for automatic delineation of clinical target volume in stereotactic partial breast irradiation (S-PBI).** *Physics in medicine and biology*

Kazemimoghadam, M., Yang, Z., Chen, M., Rahimi, A., Kim, N., Alluri, P., Nwachukwu, C., Lu, W., Gu, X.
2023

● **Stability and reproducibility comparisons between deep inspiration breath-hold techniques for left-sided breast cancer patients: A prospective study.** *Journal of applied clinical medical physics*

Parsons, D., Joo, M., Iqbal, Z., Godley, A., Kim, N., Spangler, A., Albuquerque, K., Sawant, A., Zhao, B., Gu, X., Rahimi, A.
2023: e13906

● **Feasibility and efficacy of active breathing coordinator assisted deep inspiration breath hold technique for treatment of locally advanced breast cancer.** *Journal of applied clinical medical physics*

All, S., Zhao, B., Montalvo, S., Maxwell, C., Johns, C., Gu, X., Rahimi, A., Alluri, P., Parsons, D., Chiu, T., Schroeder, S., Kim, D. N.
2022: e13893

● **Ensemble learning for glioma patients overall survival prediction using pre-operative MRIs.** *Physics in medicine and biology*

Yang, Z., Chen, M., Kazemimoghadam, M., Ma, L., Stojadinovic, S., Wardak, Z., Timmerman, R. D., Dan, T., Lu, W., Gu, X.
2022

● **Global optimization for spot-based treatment planning.** *Medical physics*

Chen, M., Gu, X., Lu, W.
2022

● **In Reply to Hannoun-Levi et al.** *International journal of radiation oncology, biology, physics*

Rahimi, A., Simmons, A., Kim, D. N., Leitch, M., Haas, J., Gu, X., Ahn, C., Gao, A., Spangler, A., Morgan, H. E., Goudreau, S., Seiler, S., Farr, et al
2022; 113 (2): 475-477

● **Registration-guided deep learning image segmentation for cone beam CT-based online adaptive radiotherapy.** *Medical physics*

Ma, L., Chi, W., Morgan, H. E., Lin, M. H., Chen, M., Sher, D., Moon, D., Vo, D. T., Avkshol, V., Lu, W., Gu, X.
2022

- **Volumetric dose extension for isodose tuning.** *Medical physics*
Ma, L., Chen, M., Gu, X., Lu, W.
2022
- **A How-To Compendium for GammaPod Treatments, Clinical Workflow, and Clinical Program at an Early Adopting Institution.** *Practical radiation oncology*
Zhang-Velten, E., Zhang, Y., Radpour, S., Gu, X., Kim, D. N., Alluri, P., Nwachukwu, C., Chiu, T., Lu, W., Parsons, D., Tan, J., Gillespie, J., Stevenson, et al
2022
- **Deep-learning and radiomics ensemble classifier for false positive reduction in brain metastases segmentation.** *Physics in medicine and biology*
Yang, Z., Chen, M., Kazemimoghadam, M., Ma, L., Stojadinovic, S., Timmerman, R. D., Dan, T., Wardak, Z., Lu, W., Gu, X.
1800
- **Dose kernel decomposition for spot-based radiotherapy treatment planning.** *Medical physics*
Chen, M., Yang, Z., Wardak, Z., Stojadinovic, S., Gu, X., Lu, W.
1800
- **Saliency-guided deep learning network for automatic tumor bed volume delineation in post-operative breast irradiation.** *Physics in medicine and biology*
Kazemimoghadam, M., Chi, W., Rahimi, A., Kim, N., Alluri, P., Nwachukwu, C., Lu, W., Gu, X.
2021
- **A general algorithm for distributed treatments of multiple brain metastases** *MEDICAL PHYSICS*
Chen, M., Wardak, Z., Stojadinovic, S., Gu, X., Lu, W.
2021: 1832–38
- **Cosmetic Outcomes of a Phase 1 Dose Escalation Study of 5-Fraction Stereotactic Partial Breast Irradiation for Early Stage Breast Cancer.** *International journal of radiation oncology, biology, physics*
Rahimi, A., Morgan, H. E., Kim, D. W., Zhang, Y., Leitch, M., Wooldridge, R., Goudreau, S., Haley, B., Rao, R., Rivers, A., Spangler, A. E., Jones, R. T., Stevenson, et al
2021
- **Preliminary Results of Multi-Institutional Phase I Dose Escalation Trial Using Single Fraction Stereotactic Partial Breast Irradiation for Early Stage Breast Cancer: Dose Escalated Single Fraction Stereotactic PBI.** *International journal of radiation oncology, biology, physics*
Rahimi, A., Simmons, A., Kim, D. N., Leitch, M., Haas, J., Gu, X., Ahn, C., Gao, A., Spangler, A., Morgan, H. E., Goudreau, S., Seiler, S., Farr, et al
2021
- **Volumetric Modulated Arc Therapy Enabled Total Body Irradiation (VMAT-TBI): Six-year Clinical Experience and Treatment Outcomes.** *Transplantation and cellular therapy*
Zhang-Velten, E. R., Parsons, D., Lee, P., Chambers, E., Abdulrahman, R., Desai, N. B., Dan, T., Wardak, Z., Timmerman, R., Vusirikala, M., Patel, P., Simms-Waldrup, T., Aquino, et al
2021
- **Deep learning-based medical image segmentation with limited labels** *PHYSICS IN MEDICINE AND BIOLOGY*
Chi, W., Ma, L., Wu, J., Chen, M., Lu, W., Gu, X.
2020; 65 (23)
- **Deep learning-based inverse mapping for fluence map prediction** *PHYSICS IN MEDICINE AND BIOLOGY*
Ma, L., Chen, M., Gu, X., Lu, W.
2020; 65 (23)
- **Risk Factors for Fat Necrosis After Stereotactic Partial Breast Irradiation for Early-Stage Breast Cancer in a Phase 1 Clinical Trial** *INTERNATIONAL JOURNAL OF RADIATION ONCOLOGY BIOLOGY PHYSICS*
Rahimi, A., Zhang, Y., Kim, D. W., Morgan, H., Hossain, F., Leitch, M., Wooldridge, R., Seiler, S., Goudreau, S., Haley, B., Rao, R., Rivers, A., Spangler, et al
2020; 108 (3): 697–706
- **Robustness study of noisy annotation in deep learning based medical image segmentation** *PHYSICS IN MEDICINE AND BIOLOGY*
Yu, S., Chen, M., Zhang, E., Wu, J., Yu, H., Yang, Z., Ma, L., Gu, X., Lu, W.
2020; 65 (17): 175007
- **BIRADS features-oriented semi-supervised deep learning for breast ultrasound computer-aided diagnosis** *PHYSICS IN MEDICINE AND BIOLOGY*
Zhang, E., Seiler, S., Chen, M., Lu, W., Gu, X.

2020; 65 (12): 125005

- **POD-DOSI: A dedicated dosimetry system for GammaPod commissioning and quality assurance** *MEDICAL PHYSICS*
Parsons, D., Zhang, Y., Gu, X., Lu, W.
2020; 47 (8): 3647–57
- **A web-based brain metastases segmentation and labeling platform for stereotactic radiosurgery** *MEDICAL PHYSICS*
Yang, Z., Liu, H., Liu, Y., Stojadinovic, S., Timmerman, R., Nedzi, L., Dan, T., Wardak, Z., Lu, W., Gu, X.
2020; 47 (8): 3263–76
- **Radiation Therapy for Pediatric Brain Tumors using Robotic Radiation Delivery System and Intensity Modulated Proton Therapy** *PRACTICAL RADIATION ONCOLOGY*
Lin, M., Yang, M., Dougherty, J., Tasson, A., Zhang, Y., Mohamad, O., Dan, T., Yan, Y., Gu, X., Timmerman, R., Laack, N., Beltran, C.
2020; 10 (3): E173–E182
- **Electron modulated arc therapy (EMAT) using photon MLC for postmastectomy chest wall treatment I: Monte Carlo-based dosimetric characterizations** *PHYSICA MEDICA-EUROPEAN JOURNAL OF MEDICAL PHYSICS*
Ma, C., Parsons, D., Chen, M., Jiang, S., Hou, Q., Gu, X., Lu, W.
2019; 67: 1–8
- **Generating synthesized computed tomography (CT) from cone-beam computed tomography (CBCT) using CycleGAN for adaptive radiation therapy** *PHYSICS IN MEDICINE AND BIOLOGY*
Liang, X., Chen, L., Dan Nguyen, Zhou, Z., Gu, X., Yang, M., Wang, J., Jiang, S.
2019; 64 (12): 125002
- **A feasibility study for predicting optimal radiation therapy dose distributions of prostate cancer patients from patient anatomy using deep learning** *SCIENTIFIC REPORTS*
Dan Nguyen, Long, T., Jia, X., Lu, W., Gu, X., Iqbal, Z., Jiang, S.
2019; 9: 1076
- **A recursive ensemble organ segmentation (REOS) framework: application in brain radiotherapy** *PHYSICS IN MEDICINE AND BIOLOGY*
Chen, H., Lu, W., Chen, M., Zhou, L., Timmerman, R., Tu, D., Nedzi, L., Wardak, Z., Jiang, S., Zhen, X., Gu, X.
2019; 64 (2): 025015
- **Flattening filter free in intensity-modulated radiotherapy (IMRT) - Theoretical modeling with delivery efficiency analysis** *MEDICAL PHYSICS*
Ma, C., Chen, M., Long, T., Parsons, D., Gu, X., Jiang, S., Hou, Q., Lu, W.
2019; 46 (1): 34–44
- **Deep-learning based surface region selection for deep inspiration breath hold (DIBH) monitoring in left breast cancer radiotherapy** *PHYSICS IN MEDICINE AND BIOLOGY*
Chen, H., Chen, M., Lu, W., Zhao, B., Jiang, S., Zhou, L., Kim, N., Spangler, A., Rahimi, A., Zhen, X., Gu, X.
2018; 63 (24): 245013
- **Investigating rectal toxicity associated dosimetric features with deformable accumulated rectal surface dose maps for cervical cancer radiotherapy** *RADIATION ONCOLOGY*
Chen, J., Chen, H., Zhong, Z., Wang, Z., Hrycushko, B., Zhou, L., Jiang, S., Albuquerque, K., Gu, X., Zhen, X.
2018; 13: 125
- **Use of 5-alpha-reductase inhibitors as alternatives to luteinizing-hormone releasing hormone (LHRH) analogs or anti-androgens for prostate downsizing before brachytherapy** *PRACTICAL RADIATION ONCOLOGY*
Chiu, T., Tan, J., Brenner, M., Gu, X., Yang, M., Westover, K., Strom, T., Sher, D., Jiang, S., Zhao, B.
2018; 8 (3): E167–E174
- **Prototype volumetric ultrasound tomography image guidance system for prone stereotactic partial breast irradiation: proof-of-concept** *PHYSICS IN MEDICINE AND BIOLOGY*
Chiu, T. D., Parsons, D., Zhang, Y., Hrycushko, B., Zhao, B., Chopra, R., Kim, N., Spangler, A., Rahimi, A., Timmerman, R., Jiang, S. B., Lu, W., Gu, et al
2018; 63 (5): 055004
- **Internal Motion Estimation by Internal-external Motion Modeling for Lung Cancer Radiotherapy** *SCIENTIFIC REPORTS*
Chen, H., Zhong, Z., Yang, Y., Chen, J., Zhou, L., Zhen, X., Gu, X.
2018; 8: 3677

- **Predicting severe hematologic toxicity from extended-field chemoradiation of para-aortic nodal metastases from cervical cancer** *PRACTICAL RADIATION ONCOLOGY*
Yan, K., Ramirez, E., Xie, X., Gu, X., Xi, Y., Albuquerque, K.
2018; 8 (1): 13–19
- **Deep convolutional neural network with transfer learning for rectum toxicity prediction in cervical cancer radiotherapy: a feasibility study** *PHYSICS IN MEDICINE AND BIOLOGY*
Zhen, X., Chen, J., Zhong, Z., Hrycushko, B., Zhou, L., Jiang, S., Albuquerque, K., Gu, X.
2017; 62 (21): 8246–63
- **A deep convolutional neural network-based automatic delineation strategy for multiple brain metastases stereotactic radiosurgery** *PLOS ONE*
Liu, Y., Stojadinovic, S., Hrycushko, B., Wardak, Z., Lau, S., Lu, W., Yan, Y., Jiang, S. B., Zhen, X., Timmerman, R., Nedzi, L., Gu, X.
2017; 12 (10): e0185844
- **Inversed-Planned Respiratory Phase Gating in Lung Conformal Radiation Therapy** *INTERNATIONAL JOURNAL OF RADIATION ONCOLOGY BIOLOGY PHYSICS*
Modiri, A., Sabouri, P., Gu, X., Timmerman, R., Sawant, A.
2017; 99 (2): 317–24
- **Comprehensive target geometric errors and margin assessment in stereotactic partial breast irradiation** *RADIATION ONCOLOGY*
Zhen, X., Zhao, B., Wang, Z., Timmerman, R., Spangler, A., Kim, N., Rahimi, A., Gu, X.
2017; 12: 151
- **An anthropomorphic abdominal phantom for deformable image registration accuracy validation in adaptive radiation therapy** *MEDICAL PHYSICS*
Liao, Y., Wang, L., Xu, X., Chen, H., Chen, J., Zhang, G., Lei, H., Wang, R., Zhang, S., Gu, X., Zhen, X., Zhou, L.
2017; 44 (6): 2369–78
- **A novel geometry-dosimetry label fusion method in multi-atlas segmentation for radiotherapy: a proof-of-concept study** *PHYSICS IN MEDICINE AND BIOLOGY*
Chang, J., Tian, Z., Lu, W., Gu, X., Chen, M., Jiang, S. B.
2017; 62 (9): 3656–67
- **Comprehensive evaluation of ten deformable image registration algorithms for contour propagation between CT and cone-beam CT images in adaptive head & neck radiotherapy** *PLOS ONE*
Li, X., Zhang, Y., Shi, Y., Wu, S., Xiao, Y., Gu, X., Zhen, X., Zhou, L.
2017; 12 (4): e0175906
- **Automatic metastatic brain tumor segmentation for stereotactic radiosurgery applications** *PHYSICS IN MEDICINE AND BIOLOGY*
Liu, Y., Stojadinovic, S., Hrycushko, B., Wardak, Z., Lu, W., Yan, Y., Jiang, S. B., Timmerman, R., Abdulrahman, R., Nedzi, L., Gu, X.
2016; 61 (24): 8440–61
- **Cardiac dosimetric evaluation of deep inspiration breath-hold level variances using computed tomography scans generated from deformable image registration displacement vectors** *MEDICAL DOSIMETRY*
Harry, T., Rahn, D., Semenov, D., Gu, X., Yashar, C., Einck, J., Jiang, S., Cervino, L.
2016; 41 (1): 22–27
- **4D cone-beam CT reconstruction using multi-organ meshes for sliding motion modeling** *PHYSICS IN MEDICINE AND BIOLOGY*
Zhong, Z., Gu, X., Mao, W., Wang, J.
2016; 61 (3): 996–1020
- **SCORE System for Online Adaptive Radiotherapy** *GRAPHICS PROCESSING UNIT-BASED HIGH PERFORMANCE COMPUTING IN RADIATION THERAPY*
Tian, Z., Gautier, Q., Gu, X., Men, C., Peng, F., Zarepisheh, M., Graves, Y., Uribe-Sanchez, A., Jia, X., Jiang, S. B., Jia, Jiang, S. B.
2016: 351–65
- **Patient-specific dosimetric endpoints based treatment plan quality control in radiotherapy** *PHYSICS IN MEDICINE AND BIOLOGY*
Song, T., Staub, D., Chen, M., Lu, W., Tian, Z., Jia, X., Li, Y., Zhou, L., Jiang, S. B., Gu, X.
2015; 60 (21): 8213–27
- **A Pilot Evaluation of a 4-Dimensional Cone-Beam Computed Tomographic Scheme Based on Simultaneous Motion Estimation and Image Reconstruction** *INTERNATIONAL JOURNAL OF RADIATION ONCOLOGY BIOLOGY PHYSICS*

Dang, J., Gu, X., Pan, T., Wang, J.
2015; 91 (2): 410–18

● **Automated landmark-guided deformable image registration** *PHYSICS IN MEDICINE AND BIOLOGY*

Kearney, V., Chen, S., Gu, X., Chiu, T., Liu, H., Jiang, L., Wang, J., Yordy, J., Nedzi, L., Mao, W.
2015; 60 (1): 101–16

● **Breaking bad IMRT QA practice** *JOURNAL OF APPLIED CLINICAL MEDICAL PHYSICS*

Stojadinovic, S., Ouyang, L., Gu, X., Pompos, A., Bao, Q., Solberg, T. D.
2015; 16 (3): 154–65

● **Deformation vector fields (DVF)-driven image reconstruction for 4D-CBCT** *JOURNAL OF X-RAY SCIENCE AND TECHNOLOGY*

Dang, J., Luo, O., Gu, X., Wang, J.
2015; 23 (1): 11–23

● **Simultaneous motion estimation and image reconstruction (SMEIR) for 4D cone-beam CT** *MEDICAL PHYSICS*

Wang, J., Gu, X.
2013; 40 (10): 101912

● **High-quality four-dimensional cone-beam CT by deforming prior images** *PHYSICS IN MEDICINE AND BIOLOGY*

Wang, J., Gu, X.
2013; 58 (2): 231–46