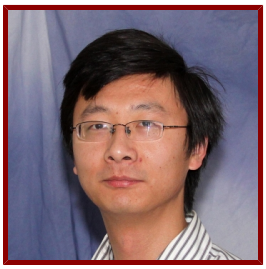
Stanford



Ruijiang Li

Associate Professor of Radiation Oncology (Radiation Physics)

Radiation Oncology - Radiation Physics

CONTACT INFORMATION

- **Alternate Contact**

  Andrew Heider - Assistant Clinical Research Coordinator

  Email aheider@stanford.edu

Bio

ACADEMIC APPOINTMENTS

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

HONORS AND AWARDS

- Graduate Alumni Fellowship, University of Florida (2004-2008)
- Resident Poster Recognition Award, ASTRO (2009)
- Resident Clinical/Basic Science Research Award, ASTRO (2010)
- Annual Meeting Science Council Research Award, AAPM (2010, 2014)
- Annual Meeting Scientific Abstract Award, ASTRO (2011)
- Pathway to Independence Award (K99/R00), NIH/NCI (2012)
- Resident Clinical/Basic Science Research Award (senior author), ASTRO (2014)
- Basic/Translational Science Abstract Award (senior author), ASTRO (2015)
- iDEA-iTECH Award, Sanofi (2023)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Member, Board of Associated Editors, AAPM (2019 - 2024)
- Member, Research Grants Evaluation Subcommittee, Science Council, ASTRO (2019 - 2021)
- Member, Scientific Review Panel, Science Council, ASTRO (2021 - present)

PROFESSIONAL EDUCATION

- Board Certification, American Board of Radiology , Therapeutic Medical Physics (2013)
- Ph.D., University of Florida , Electrical and Computer Engineering (2008)
- B.Sc., Zhejiang University , Electrical Engineering (2004)

LINKS

- My Lab Website: http://med.stanford.edu/lilab.html

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Our lab is focused on the development and application of novel machine learning and deep learning approaches for medical imaging analysis and precision oncology. This can lead to discovery of imaging-based biomarkers for several clinical applications including cancer detection and diagnosis, treatment response and prognosis prediction, which have the potential to transform cancer care.

Our work spans across multiple imaging domains and modalities including radiology as well as histopathology image data. These data sets are linked with clinical outcomes to address a specific unmet clinical need. Further, we integrate imaging with matched genomic/molecular data to gain more insight into cancer biology.

Artificial intelligence (AI) including machine learning and deep learning plays a critical role in these endeavors. We are developing new methods to make these sophisticated models more robust, reproducible, and interpretable; all are which key elements of successful AI applications in medicine.

Our research is multidisciplinary by nature. We work closely with a team of expert clinicians including oncologists, surgeons, radiologists, and pathologists at Stanford and beyond. Our goal is to translate new technology and imaging biomarkers to clinical practice, which can guide personalized management and therapy selection, ultimately improving outcomes for cancer patients.

Teaching

COURSES

2026-27

- Medical Physics and Dosimetry: BMP 251, RADO 251 (Aut)

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Yuchen Li, Zhongxiao Li, Ce Luo, Xiangde Luo, Fangliangzi Meng, Jinxi Xiang

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Biomedical Data Science (PhD Program)
- Biomedical Data Science (Masters Program)

Publications

PUBLICATIONS

- **Ensemble learning of pathology foundation models for precision oncology.** *Cancer cell*
  Luo, X., Wang, X., Eweje, F., Zhang, X., Gomez Marti, J. L., Cascarino, S., Yang, S., Li, Y., Quinton, R., Xiang, J., Ji, Y., Li, Z., Chen, et al
  2026
- **nnMIL: a generalizable multiple instance learning framework for computational pathology.** *Nature biomedical engineering*
  Luo, X., Xiang, J., Ji, Y., Li, R.
  2026

- **Cellular architecture and neighborhood-informed virtual spatial tumor profiling from histopathology.** *Cell*
  Li, Y., Li, Z., Quinton, R., Ji, Y., Zhang, X., Xiang, J., Wang, X., Yang, S., Eweje, F., Chen, Y., Luo, X., Li, Y., Mulholland, et al
  2026
- **AI-enabled virtual spatial proteomics from histopathology for interpretable biomarker discovery in lung cancer.** *Nature medicine*
  Li, Z., Li, Y., Xiang, J., Wang, X., Yang, S., Zhang, X., Eweje, F., Chen, Y., Luo, X., Li, Y., Mulholland, J., Bergstrom, C., Kim, et al
  2026
- **Automated cell annotation and classification on histopathology for spatial biomarker discovery.** *Nature communications*
  Li, Z., Mirjahanmardi, S. H., Sali, R., Eweje, F., Gopaulchan, M., Kloker, L., Zhang, X., Li, G., Jiang, Y., Li, R.
  2025; 16 (1): 6240
- **Integrating ctDNA Analysis and Radiomics for Dynamic Risk Assessment in Localized Lung Cancer.** *Cancer discovery*
  Moding, E. J., Shahrokh Esfahani, M., Jin, C., Hui, A. B., Nabet, B. Y., Liu, Y., Chabon, J. J., Binkley, M. S., Kurtz, D. M., Hamilton, E. G., Chaudhuri, A. A., Liu, C. L., Li, et al
  2025: OF1-OF21
- **Foundation Model for Predicting Prognosis and Adjuvant Therapy Benefit From Digital Pathology in GI Cancers.** *Journal of clinical oncology : official journal of the American Society of Clinical Oncology*
  Wang, X., Jiang, Y., Yang, S., Wang, F., Zhang, X., Wang, W., Chen, Y., Wu, X., Xiang, J., Li, Y., Jiang, X., Yuan, W., Zhang, et al
  2025: JCO2401501
- **A vision-language foundation model for precision oncology.** *Nature*
  Xiang, J., Wang, X., Zhang, X., Xi, Y., Eweje, F., Chen, Y., Li, Y., Bergstrom, C., Gopaulchan, M., Kim, T., Yu, K. H., Willens, S., Olguin, et al
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- **Morphological diversity of cancer cells predicts prognosis across tumor types.** *Journal of the National Cancer Institute*
  Sali, R., Jiang, Y., Attaranzadeh, A., Holmes, B., Li, R.
  2023
- **Biology-guided deep learning predicts prognosis and cancer immunotherapy response.** *Nature communications*
  Jiang, Y., Zhang, Z., Wang, W., Huang, W., Chen, C., Xi, S., Ahmad, M. U., Ren, Y., Sang, S., Xie, J., Wang, J. Y., Xiong, W., Li, et al
  2023; 14 (1): 5135
- **Non-invasive tumor microenvironment evaluation and treatment response prediction in gastric cancer using deep learning radiomics.** *Cell reports. Medicine*
  Jiang, Y., Zhou, K., Sun, Z., Wang, H., Xie, J., Zhang, T., Sang, S., Islam, M. T., Wang, J. Y., Chen, C., Yuan, Q., Xi, S., Li, et al
  2023: 101146
- **Predicting peritoneal recurrence and disease-free survival from CT images in gastric cancer with multitask deep learning: a retrospective study.** *The Lancet. Digital health*
  Jiang, Y., Zhang, Z., Yuan, Q., Wang, W., Wang, H., Li, T., Huang, W., Xie, J., Chen, C., Sun, Z., Yu, J., Xu, Y., Poultsides, et al
  2022; 4 (5): e340-e350
- **Radiological tumour classification across imaging modality and histology** *NATURE MACHINE INTELLIGENCE*
  Wu, J., Li, C., Gensheimer, M., Padda, S., Kato, F., Shirato, H., Wei, Y., Schonlieb, C., Price, S., Jaffray, D., Heymach, J., Neal, J. W., Loo, et al
  2021
- **Radiographical assessment of tumour stroma and treatment outcomes using deep learning: a retrospective, multicohort study** *LANCET DIGITAL HEALTH*
  Jiang, Y., Liang, X., Han, Z., Wang, W., Xi, S., Li, T., Chen, C., Yuan, Q., Li, N., Yu, J., Xie, Y., Xu, Y., Zhou, et al
  2021; 3 (6): E371-E382
- **Predicting treatment response from longitudinal images using multi-task deep learning.** *Nature communications*
  Jin, C., Yu, H., Ke, J., Ding, P., Yi, Y., Jiang, X., Duan, X., Tang, J., Chang, D. T., Wu, X., Gao, F., Li, R.
  2021; 12 (1): 1851
- **Natural killer cell and stroma abundance are independently prognostic and predict gastric cancer chemotherapy benefit.** *JCI insight*
  Li, B., Jiang, Y., Li, G., Fisher, G. A., Li, R.
  2020

- **Development and Validation of a Deep Learning CT Signature to Predict Survival and Chemotherapy Benefit in Gastric Cancer: A Multicenter, Retrospective Study.** *Annals of surgery*
  Jiang, Y. n., Jin, C. n., Yu, H. n., Wu, J. n., Chen, C. n., Yuan, Q. n., Huang, W. n., Hu, Y. n., Xu, Y. n., Zhou, Z. n., Fisher, G. A., Li, G. n., Li, et al
  2020
- **Noninvasive imaging evaluation of tumor immune microenvironment to predict outcomes in gastric cancer.** *Annals of oncology : official journal of the European Society for Medical Oncology*
  Jiang, Y. n., Wang, H. n., Wu, J. n., Chen, C. n., Yuan, Q. n., Huang, W. n., Li, T. n., Xi, S. n., Hu, Y. n., Zhou, Z. n., Xu, Y. n., Li, G. n., Li, et al
  2020
- **Tumor Subregion Evolution-based Imaging Features to Assess Early Response and Predict Prognosis in Oropharyngeal Cancer.** *Journal of nuclear medicine : official publication, Society of Nuclear Medicine*
  Wu, J., Gensheimer, M., Zhang, N., Guo, M., Liang, R., Zhang, C., Fischbein, N., Pollom, E., Beadle, B., Le, Q., Li, R.
  2019
- **The immune subtypes and landscape of squamous cell carcinoma.** *Clinical cancer research : an official journal of the American Association for Cancer Research*
  Li, B., Cui, Y., Nambiar, D. K., Sunwoo, J. B., Li, R.
  2019
- **Integrating Radiosensitivity and Immune Gene Signatures for Predicting Benefit of Radiotherapy in Breast Cancer.** *Clinical cancer research : an official journal of the American Association for Cancer Research*
  Cui, Y., Li, B., Pollom, E. L., Horst, K., Li, R.
  2018
- **Intratumoral Spatial Heterogeneity at Perfusion MR Imaging Predicts Recurrence-free Survival in Locally Advanced Breast Cancer Treated with Neoadjuvant Chemotherapy.** *Radiology*
  Wu, J. n., Cao, G. n., Sun, X. n., Lee, J. n., Rubin, D. L., Napel, S. n., Kurian, A. W., Daniel, B. L., Li, R. n.
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- **Unsupervised clustering of quantitative image phenotypes reveals breast cancer subtypes with distinct prognoses and molecular pathways.** *Clinical cancer research : an official journal of the American Association for Cancer Research*
  Wu, J., Cui, Y., Sun, X., Cao, G., Li, B., Ikeda, D. M., Kurian, A. W., Li, R.
  2017
- **Heterogeneous Enhancement Patterns of Tumor-adjacent Parenchyma at MR Imaging Are Associated with Dysregulated Signaling Pathways and Poor Survival in Breast Cancer.** *Radiology*
  Wu, J. n., Li, B. n., Sun, X. n., Cao, G. n., Rubin, D. L., Napel, S. n., Ikeda, D. M., Kurian, A. W., Li, R. n.
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- **Development and Validation of an Individualized Immune Prognostic Signature in Early-Stage Nonsquamous Non-Small Cell Lung Cancer.** *JAMA oncology*
  Li, B. n., Cui, Y. n., Diehn, M. n., Li, R. n.
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- **Early-Stage Non-Small Cell Lung Cancer: Quantitative Imaging Characteristics of (18)F Fluorodeoxyglucose PET/CT Allow Prediction of Distant Metastasis.** *Radiology*
  Wu, J., Aguilera, T., Shultz, D., Gudur, M., Rubin, D. L., Loo, B. W., Diehn, M., Li, R.
  2016; 281 (1): 270-278
- **Prognostic Imaging Biomarkers in Glioblastoma: Development and Independent Validation on the Basis of Multiregion and Quantitative Analysis of MR Images** *RADIOLOGY*
  Cui, Y., Tha, K. K., Terasaka, S., Yamaguchi, S., Wang, J., Kudo, K., Xing, L., Shirato, H., Li, R.
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- **Ensemble learning of foundation models for precision oncology** *Cancer Cell*
  Luo, X., Wang, X., Eweje, F., Zhang, X., Yang, S., Quinton, R., Xiang, J., Li, Y., Ji, Y., Li, Z., Chen, Y., Bergstrom, C., Kim, et al
  2026; 44: 1-16
- **Multimodal analysis of whole slide images in colorectal cancer.** *NPJ digital medicine*
  Jonnagaddala, J., Shulajkovska, M., Gradišek, A., Jue, T. R., Zhou, Q., Guo, Y., Chayeb, J. M., Li, R., Lipkova, J., Kather, J. N., Huang, J.

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- **Automated Deep Learning-Based Detection and Segmentation of Lung Tumors at CT.** *Radiology*
  Kashyap, M., Wang, X., Panjwani, N., Hasan, M., Zhang, Q., Huang, C., Bush, K., Chin, A., Vitzthum, L. K., Dong, P., Zaky, S., Loo, B. W., Diehn, et al
  2025; 314 (1): e233029
- **A pathology foundation model for cancer diagnosis and prognosis prediction.** *Nature*
  Wang, X., Zhao, J., Marostica, E., Yuan, W., Jin, J., Zhang, J., Li, R., Tang, H., Wang, K., Li, Y., Wang, F., Peng, Y., Zhu, et al
  2024
- **Virtual multiplexed immunofluorescence staining from non-antibody-stained fluorescence imaging for gastric cancer prognosis.** *EBioMedicine*
  Zhou, Z., Jiang, Y., Sun, Z., Zhang, T., Feng, W., Li, G., Li, R., Xing, L.
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- **A Longitudinal MRI-Based Artificial intelligence System to Predict Pathological Complete Response after Neoadjuvant Therapy in Rectal Cancer: a Multicenter Validation Study.** *Diseases of the colon and rectum*
  Ke, J., Jin, C., Tang, J., Cao, H., He, S., Ding, P., Jiang, X., Zhao, H., Cao, W., Meng, X., Gao, F., Lan, P., Li, et al
  2023
- **Cancer immunotherapy response prediction from multi-modal clinical and image data using semi-supervised deep learning.** *Radiotherapy and oncology : journal of the European Society for Therapeutic Radiology and Oncology*
  Wang, X., Jiang, Y., Chen, H., Zhang, T., Han, Z., Chen, C., Yuan, Q., Xiong, W., Wang, W., Li, G., Heng, P. A., Li, R.
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- **Survival Prediction via Hierarchical Multimodal Co-Attention Transformer: A Computational Histology-Radiology Solution.** *IEEE transactions on medical imaging*
  Li, Z., Jiang, Y., Lu, M., Li, R., Xia, Y.
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- **Artificial intelligence for clinical oncology: current status and future outlook.** *Science bulletin*
  Jiang, Y., Li, R., Li, G.
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- **Development and Validation of a Machine Learning Model for Detection and Classification of Tertiary Lymphoid Structures in Gastrointestinal Cancers.** *JAMA network open*
  Li, Z., Jiang, Y., Li, B., Han, Z., Shen, J., Xia, Y., Li, R.
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- **Improving the diagnosis of acute ischemic stroke on non-contrast CT using deep learning: a multicenter study.** *Insights into imaging*
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- **B cell-related gene signature and cancer immunotherapy response.** *British journal of cancer*
  Lundberg, A., Li, B., Li, R.
  1800
- **Noninvasive Prediction of Occult Peritoneal Metastasis in Gastric Cancer Using Deep Learning.** *JAMA network open*
  Jiang, Y., Liang, X., Wang, W., Chen, C., Yuan, Q., Zhang, X., Li, N., Chen, H., Yu, J., Xie, Y., Xu, Y., Zhou, Z., Li, et al
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- **Single-Cell Spatial Analysis of Tumor and Immune Microenvironment on Whole-Slide Image Reveals Hepatocellular Carcinoma Subtypes.** *Cancers*
  Wang, H., Jiang, Y., Li, B., Cui, Y., Li, D., Li, R.
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- **Deep learning analysis of the primary tumour and the prediction of lymph node metastases in gastric cancer.** *The British journal of surgery*
  Jin, C., Jiang, Y., Yu, H., Wang, W., Li, B., Chen, C., Yuan, Q., Hu, Y., Xu, Y., Zhou, Z., Li, G., Li, R.
  2020

- **Integrated imaging and molecular analysis to decipher tumor microenvironment in the era of immunotherapy.** *Seminars in cancer biology*
  Wu, J. n., Mayer, A. T., Li, R. n.
  2020
- **Peritumoral Radiomics and Predicting Treatment Response.** *JAMA network open*
  Li, R. n.
  2020; 3 (9): e2016125
- **Triple attention learning for classification of 14 thoracic diseases using chest radiography.** *Medical image analysis*
  Wang, H. n., Wang, S. n., Qin, Z. n., Zhang, Y. n., Li, R. n., Xia, Y. n.
  2020; 67: 101846
- **Early response evaluation using primary tumor and nodal imaging features to predict progression-free survival of locally advanced non-small cell lung cancer.** *Theranostics*
  Zhang, N., Liang, R., Gensheimer, M. F., Guo, M., Zhu, H., Yu, J., Diehn, M., Loo, B. W., Li, R., Wu, J.
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- **Integrating Imaging, Histologic, and Genetic Features to Predict Tumor Mutation Burden of Non-Small-Cell Lung Cancer.** *Clinical lung cancer*
  Zhang, N., Wu, J., Yu, J., Zhu, H., Yang, M., Li, R.
  2019
- **Predicting metastasis in clinically negative axillary lymph nodes with minimum apparent diffusion coefficient value in luminal A-like breast cancer** *BREAST CANCER*
  Kato, F., Kudo, K., Yamashita, H., Baba, M., Shimizu, A., Oyama-Manabe, N., Kinoshita, R., Li, R., Shirato, H.
  2019; 26 (5): 628–36
- **Predicting metastasis in clinically negative axillary lymph nodes with minimum apparent diffusion coefficient value in luminal A-like breast cancer.** *Breast cancer (Tokyo, Japan)*
  Kato, F., Kudo, K., Yamashita, H., Baba, M., Shimizu, A., Oyama-Manabe, N., Kinoshita, R., Li, R., Shirato, H.
  2019
- **Integrating tumor and nodal imaging characteristics at baseline and mid-treatment CT scans to predict distant metastasis in oropharyngeal cancer treated with concurrent chemoradiotherapy.** *International journal of radiation oncology, biology, physics*
  Wu, J., Gensheimer, M. F., Zhang, N., Han, F., Liang, R., Qian, Y., Zhang, C., Fischbein, N., Pollom, E. L., Beadle, B., Le, Q., Li, R.
  2019
- **The utility of MRI histogram and texture analysis for the prediction of histological diagnosis in head and neck malignancies.** *Cancer imaging : the official publication of the International Cancer Imaging Society*
  Fujima, N., Homma, A., Harada, T., Shimizu, Y., Tha, K. K., Kano, S., Mizumachi, T., Li, R., Kudo, K., Shirato, H.
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  Fujima, N., Hirata, K., Shiga, T., Li, R., Yasuda, K., Onimaru, R., Tsuchiya, K., Kano, S., Mizumachi, T., Homma, A., Kudo, K., Shirato, H.
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- **Magnetic resonance imaging and molecular features associated with tumor-infiltrating lymphocytes in breast cancer.** *Breast cancer research : BCR*
  Wu, J., Li, X., Teng, X., Rubin, D. L., Napel, S., Daniel, B. L., Li, R.
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  Wu, J., Tha, K., Xing, L., Li, R.
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- **A Quantitative CT Imaging Signature Predicts Survival and Complements Established Prognosticators in Stage I Non-Small Cell Lung Cancer.** *International journal of radiation oncology, biology, physics*
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  2018
- **Imaging CF3I conical intersection and photodissociation dynamics with ultrafast electron diffraction** *Science*
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  Wang, J., Kato, F., Yamashita, H., Baba, M., Cui, Y., Li, R., Oyama-Manabe, N., Shirato, H.
  2017; 30 (2): 215-227
- **Robust Estimation of Electron Density From Anatomic Magnetic Resonance Imaging of the Brain Using a Unifying Multi-Atlas Approach.** *International journal of radiation oncology, biology, physics*
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- **Incorporating prior biological knowledge for network-based differential gene expression analysis using differentially weighted graphical LASSO** *BMC BIOINFORMATICS*
  Zuo, Y., Cui, Y., Yu, G., Li, R., Ressom, H. W.
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- **Identifying relations between imaging phenotypes and molecular subtypes of breast cancer: Model discovery and external validation.** *Journal of magnetic resonance imaging : JMRI*
  Wu, J., Sun, X., Wang, J., Cui, Y., Kato, F., Shirato, H., Ikeda, D. M., Li, R.
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- **Volume of high-risk intratumoral subregions at multi-parametric MR imaging predicts overall survival and complements molecular analysis of glioblastoma.** *European radiology*
  Cui, Y., Ren, S., Tha, K. K., Wu, J., Shirato, H., Li, R.
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- **Prognostic value and molecular correlates of a CT image-based quantitative pleural contact index in early stage NSCLC.** *European radiology*
  Lee, J. n., Cui, Y. n., Sun, X. n., Li, B. n., Wu, J. n., Li, D. n., Gensheimer, M. F., Loo, B. W., Diehn, M. n., Li, R. n.
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- **Decentralized Learning Framework of Meta-Survival Analysis for Developing Robust Prognostic Signatures.** *JCO clinical cancer informatics*
  Cui, Y. n., Li, B. n., Li, R. n.
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- **Comprehensive Analysis of the Unfolded Protein Response in Breast Cancer Subtypes.** *JCO precision oncology*
  Jiang, D., Turner, B., Song, J., Li, R., Diehn, M., Le, Q., Khatri, P., Koong, A. C.
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  Wu, J., Gong, G., Cui, Y., Li, R.
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- **Automatic multiorgan segmentation in CT images of the male pelvis using region-specific hierarchical appearance cluster models** *MEDICAL PHYSICS*
  Li, D., Zang, P., Chai, X., Cui, Y., Li, R., Xing, L.
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- **Optimization approaches to volumetric modulated arc therapy planning** *MEDICAL PHYSICS*
  Unkelbach, J., Bortfeld, T., Craft, D., Alber, M., Bangert, M., Bokrantz, R., Chen, D., Li, R., Xing, L., Men, C., Nill, S., Papp, D., Romeijn, et al
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- **Simultaneous beam sampling and aperture shape optimization for SPORT.** *Medical physics*
  Zarepisheh, M., Li, R., Ye, Y., Xing, L.
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