



Sen Wang

Instructor, Radiology

Bio

BIO

Dr. Wang is an instructor in the Wang group. He previously completed his postdoctoral fellowship in the Wang group and his BS and PhD in the Department of Engineering Physics at Tsinghua University. Sen's research interests focus on technologies and methods for image processing, reconstruction, and recognition, especially in the medical field. His PhD work investigated reconstruction algorithms and applications of x-ray spectral imaging, including photon counting detector modeling and correction, as well as quantitative imaging and computer vision with deep learning on x-ray images and other medical images.

At Stanford, Dr. Wang works on advanced CT detector designs and imaging algorithms.

ACADEMIC APPOINTMENTS

- Instructor, Radiology

PROFESSIONAL EDUCATION

- PhD, Tsinghua University (2019)
- Bachelor, Tsinghua University (2014)

Publications

PUBLICATIONS

- **Deep-learning-based multiple organ segmentation for CT scout images: applications to automatic CT planning.** *Journal of medical imaging (Bellingham, Wash.)*
Fang, K. W., Wang, S., Medrano, M. J., Sun, L., Stevens, G. M., Tse, J. R., Wang, A. S.
2026; 13 (3): 033501
- **Implicitly Defined Material Decomposition Estimator and Learned Physics-Informed Neural Proxy for Photon Counting CT.** *IEEE transactions on medical imaging*
Wang, S., Yang, Y., Gronberg, F., Stevens, G. M., Wang, A. S.
2026; PP
- **End-to-End Differentiable Photon Counting X-ray Imaging with Cross-Domain Learning: A Demonstration for Scatter Correction**
Wang, S., Lee, J., Stevens, G. M., Wang, A. S.
edited by Li, K., Abbaszadeh, S., Ganguly, A.
SPIE-INT SOC OPTICAL ENGINEERING.2026
- **Scout-Dose-TCM: direct and prospective scout-based estimation of personalized organ and effective doses from tube current modulated CT exams.** *Physics in medicine and biology*

-
- Medrano, M. J., Wang, S., Sun, L., Imran, A. A., Cao, J., Stevens, G., Tse, J. R., Wang, A. S.
2025
- **Automated estimation of individualized organ-specific dose and noise from clinical CT scans.** *Physics in medicine and biology*
Wang, S., Medrano, M. J., Imran, A. A., Lee, W., Cao, J., Stevens, G., Tse, J. R., Wang, A. S.
2025
 - **Unsupervised Training of a Dynamic Context-Aware Deep Denoising Framework for Low-Dose Fluoroscopic Imaging** *IEEE TRANSACTIONS ON INSTRUMENTATION AND MEASUREMENT*
Jeon, S., Wang, S., Wang, A. S., Gold, G. E., Choi, J.
2025; 74
 - **Increasing Spatial Resolution in Photon Counting CT by Exploiting the Non-Linear Partial Volume Effect**
Li, B., Yang, Y., Wang, S., Darwin, E., Stevens, G., Levenston, M., Wang, A. S.
edited by Sabol, J. M., Li, K., Abbaszadeh, S.
SPIE-INT SOC OPTICAL ENGINEERING.2025
 - **Multiple Organ Segmentation for CT Scout Images**
Fang, K., Wang, S., Medrano, M., Stevens, G., Tse, J., Wang, A.
edited by Sabol, J. M., Li, K., Abbaszadeh, S.
SPIE-INT SOC OPTICAL ENGINEERING.2025
 - **Implicitly Defined PCCT Material Decomposition Estimator and Learned Physics-Informed Neural Proxy**
Wang, S., Yang, Y., Gronberg, F., Stevens, G. M., Wang, A. S.
edited by Sabol, J. M., Li, K., Abbaszadeh, S.
SPIE-INT SOC OPTICAL ENGINEERING.2025
 - **Spectral optimization using fast kV switching and filtration for photon counting CT with realistic detector responses: a simulation study.** *Journal of medical imaging (Bellingham, Wash.)*
Wang, S., Yang, Y., Pal, D., Yin, Z., Maltz, J. S., Pelc, N. J., Wang, A. S.
2024; 11 (Suppl 1): S12805
 - **Optimal weighting strategies for maximizing contrast-to-noise ratio in photon counting CT images.** *Medical physics*
Yang, Y., Wang, S., Stevens, G. M., Fan, J., Wang, A. S.
2024
 - **Emulating Low-Dose PCCT Image Pairs with Independent Noise for Self-Supervised Spectral Image Denoising.** *IEEE transactions on medical imaging*
Wang, S., Yang, Y., Stevens, G. M., Yin, Z., Wang, A. S.
2024; PP
 - **Retrospective Tube Current Modulation Optimization of Individualized Organ-Level CT Dose and Image Quality**
Wang, S., Medrano, M., Imran, A., Stevens, G., Tse, J., Wang, A. S.
edited by Fahrig, R., Sabol, J. M., Li, K.
SPIE-INT SOC OPTICAL ENGINEERING.2024
 - **Denoising X-Ray Images with Deep Learning: Impact of Spatially Correlated Noise**
Ku, A., Wang, S., Wang, A.
edited by Fahrig, R., Sabol, J. M., Li, K.
SPIE-INT SOC OPTICAL ENGINEERING.2024
 - **Optimal Weighting Strategies for Maximizing Contrast-to-Noise Ratio in Photon Counting CT Images**
Yang, Y., Wang, S., Stevens, G., Fan, J., Wang, A. S.
edited by Fahrig, R., Sabol, J. M., Li, K.
SPIE-INT SOC OPTICAL ENGINEERING.2024
 - **Personalized, Scout-Based Dose Estimation for Prospective Optimization of CT Tube Current Modulation**
Medrano, M., Wang, S., Imran, A., Stevens, G., Tse, J., Wang, A.
edited by Fahrig, R., Sabol, J. M., Li, K.
SPIE-INT SOC OPTICAL ENGINEERING.2024

- **Empirical optimization of energy bin weights for compressing measurements with realistic photon counting x-ray detectors.** *Medical physics*
Yang, Y., Wang, S., Pal, D., Yin, Z., Pelc, N. J., Wang, A. S.
2023
- **Personalized CT organ noise estimation from scout images** *SPIE Medical Imaging: Physics of Medical Imaging*
Imran, A., Pal, D., Wang, S., Dutta, S., Zucker, E., Wang, A.
2022
- **Fast kV Switching for Improved Material Decomposition with Photon Counting X-ray Detectors**
Wang, S., Yang, Y., Pal, D., Pelc, N. J., Wang, A. S.
edited by Zhao, W., Yu, L.
SPIE-INT SOC OPTICAL ENGINEERING.2022
- **Empirical Optimization of Energy Bin Weights for Compressing Measurements with Photon Counting X-ray Detectors**
Yang, Y., Wang, S., Pal, D., Pelc, N. J., Wang, A. S.
edited by Zhao, W., Yu, L.
SPIE-INT SOC OPTICAL ENGINEERING.2022
- **Multimodal Contrastive Learning for Prospective Personalized Estimation of CT Organ Dose**
Imran, A., Wang, S., Pal, D., Dutta, S., Zucker, E., Wang, A.
edited by Wang, L., Dou, Q., Fletcher, P. T., Speidel, S., Li, S.
SPRINGER INTERNATIONAL PUBLISHING AG.2022: 634-643
- **Personalized CT Organ Dose Estimation from Scout Images** *International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)*
Imran, A., Wang, S., Pal, D., Dutta, S., Patel, B., Zucker, E., Wang, A.
2021
- **A systematic evaluation and optimization of automatic detection of ulcers in wireless capsule endoscopy on a large dataset using deep convolutional neural networks.** *Physics in medicine and biology*
Wang, S., Xing, Y., Zhang, L., Gao, H., Zhang, H.
2019; 64 (23): 235014
- **Deep Convolutional Neural Network for Ulcer Recognition in Wireless Capsule Endoscopy: Experimental Feasibility and Optimization** *COMPUTATIONAL AND MATHEMATICAL METHODS IN MEDICINE*
Wang, S., Xing, Y., Zhang, L., Gao, H., Zhang, H.
2019; 2019: 7546215
- **Second Glance framework (secG): Enhanced Ulcer Detection with Deep Learning on a Large Wireless Capsule Endoscopy Dataset**
Wang, S., Xing, Y., Zhang, L., Gao, H., Zhang, H.
edited by Jiang, Chen, Z., Chen, G.
SPIE-INT SOC OPTICAL ENGINEERING.2019
- **Systematic implementation of spectral CT with a photon counting detector for liquid security inspection** *NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION A-ACCELERATORS SPECTROMETERS DETECTORS AND ASSOCIATED EQUIPMENT*
Xu, X., Xing, Y., Wang, S., Zhang, L.
2018; 893: 99–108
- **Enhanced material separation with a quasi-monochromatic CT imaging method using a photon counting detector** *NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION A-ACCELERATORS SPECTROMETERS DETECTORS AND ASSOCIATED EQUIPMENT*
Wang, S., Xing, Y., Zhang, L., Xu, X.
2018; 881: 9–15
- **Quasi-monochromatic imaging in x-ray CT via spectral deconvolution using photon-counting detectors** *PHYSICS IN MEDICINE AND BIOLOGY*
Wang, S., Gao, H., Zhang, L., Wu, D., Xu, X.
2017; 62 (6): 2208–23

- **More Accurate and Less Noisy Spectral Deconvolution Strategy using Photon Counting Detectors**
Wang, S., Zhang, L., Xu, X., IEEE
IEEE.2017
- **A hybrid Monte Carlo model for the energy response functions of X-ray photon counting detectors** *NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION A-ACCELERATORS SPECTROMETERS DETECTORS AND ASSOCIATED EQUIPMENT*
Wu, D., Xu, X., Zhang, L., Wang, S.
2016; 830: 397-406
- **A weighted polynomial based material decomposition method for spectral x-ray CT imaging.** *Physics in medicine and biology*
Wu, D., Zhang, L., Zhu, X., Xu, X., Wang, S.
2016; 61 (10): 3749-83
- **Preliminary Study of Quantitative X-ray Spectral Imaging with Spectral Deconvolution**
Wang, S., Zhang, L., Xu, X., Wu, D., IEEE
IEEE.2016