Stanford

Bin Han

Clinical Professor, Radiation Oncology - Radiation Physics

Bio

BIO

Dr. Bin Han serves as a Clinical Professor in the Department of Radiation Oncology at Stanford University. After completing a CAMPEP-accredited Therapeutic Medical Physics residency at Stanford, he attained certification as a Medical Physicist from the American Board of Radiology. Immediately following his residency, Dr. Han joined the faculty at Stanford's Department of Radiation Oncology and was promoted to the position of Clinical Professor.

Dr. Han's responsibilities encompass providing top-tier clinical medical physics services, innovating radiation therapy treatment devices, and creating new treatment protocols to enhance patient care. He spearheaded the commissioning of the world's first PET-Linac-based, biology-guided radiation therapy device.

He also manages several research projects funded by industry and the National Institutes of Health (NIH). These projects involve the development of an advanced EPID-based dosimetric solution, an ultrasound system for image-guided prostate cancer treatment, depth-sensing and 3D-printing techniques for total body irradiation, and leveraging AI/deep learning to predict treatment effectiveness and cancer recurrence.

In addition to his clinical and research duties, Dr. Han contributes to the educational mission of Stanford University by mentoring graduate students, postdocs, and residents, providing research guidance and clinical education.

ACADEMIC APPOINTMENTS

- Clinical Professor, Radiation Oncology - Radiation Physics

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Development of an advanced EPID-based dosimetric solution

Ultrasound system for image guided prostate cancer treatment,

Depth sensing and 3D-printing techniques for total body irradiation

AI applications in predicting treatment effectiveness and cancer recurrence

Publications

PUBLICATIONS

- **Inference-specific learning for improved medical image segmentation.** *Medical physics*
  Chen, Y., Liu, S., Li, M., Han, B., Xing, L.
  2025
- **Auto-delineation of treatment target volume for radiation therapy using large language model-aided multimodal learning.** *International journal of radiation oncology, biology, physics*

Rajendran, P., Chen, Y., Qiu, L., Niedermayr, T., Liu, W., Buyyounouski, M., Bagshaw, H., Han, B., Yang, Y., Kovalchuk, N., Gu, X., Hancock, S., Xing, et al
2024

- **Commissioning of a novel PET-Linac for biology-guided radiotherapy (BgRT).** *Medical physics*
  Surucu, M., Ashraf, M. R., Romero, I. O., Zalavari, L. T., Pham, D., Vitzthum, L. K., Gensheimer, M. F., Yang, Y., Xing, L., Kovalchuk, N., Han, B.
  2024

- **First-in-Human Experience with Biology-guided Radiotherapy (BgRT) Using the RefleXion X1 System**
  Surucu, M., Kotha, N. V., Pham, D., Kovalchuk, N., Han, B., Loo, B. W., Vitzthum, L. K.
  ELSEVIER IRELAND LTD.2024: S1807-S1810

- **Monitoring of PET-Avid OAR Moving in the Treatment Area During Biology-guided Radiotherapy Delivery**
  Surucu, M., Han, B., Bal, H., Shi, L., Xu, S., Voronenko, Y., Bal, G., Schmall, J., Kovalchuk, N.
  ELSEVIER IRELAND LTD.2024: S4408-S4409

- **Construction of clinically meaningful loss function for improved medical image auto-segmentation**
  Chen, Y., Gensheimer, M., Quynh-Thu Le, Han, B., Xing, L.
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- **A time- and space-saving Monte Carlo simulation method using post-collimation generative adversarial network for dose calculation of an O-ring gantry Linac.** *Physica medica : PM : an international journal devoted to the applications of physics to medicine and biology : official journal of the Italian Association of Biomedical Physics (AIFB)*
  Shi, M., Cui, S., Chuang, C., Oderinde, O., Kovalchuk, N., Surucu, M., Xing, L., Han, B.
  2024; 119: 103318

- **First-Year Experience of Stereotactic Body Radiation Therapy/Intensity Modulated Radiation Therapy Treatment Using a Novel Biology-Guided Radiation Therapy Machine.** *Advances in radiation oncology*
  Shi, M., Simiele, E., Han, B., Pham, D., Palomares, P., Aguirre, M., Gensheimer, M., Vitzthum, L., Le, Q., Surucu, M., Kovalchuk, N.
  2024; 9 (1): 101300

- **BIOGUIDE-X: A First-in-Human Study of the Performance of Positron Emission Tomography-Guided Radiotherapy.** *International journal of radiation oncology, biology, physics*
  Vitzthum, L. K., Surucu, M., Gensheimer, M. F., Kovalchuk, N., Han, B., Pham, D., Chang, D., Shirvani, S. M., Aksoy, D., Maniyedath, A., Narayanan, M., Da Silva, A. J., Mazin, et al
  2023

- **Adaptive Region-Specific Loss for Improved Medical Image Segmentation.** *IEEE transactions on pattern analysis and machine intelligence*
  Chen, Y., Yu, L., Wang, J., Panjwani, N., Obeid, J., Liu, W., Liu, L., Kovalchuk, N., Gensheimer, M. F., Vitzthum, L. K., Beadle, B. M., Chang, D. T., Le, et al
  2023; PP

- **Patient-specific Auto-segmentation on Daily kVCT Images for Adaptive Radiotherapy.** *International journal of radiation oncology, biology, physics*
  Chen, Y., Gensheimer, M. F., Bagshaw, H. P., Butler, S., Yu, L., Zhou, Y., Shen, L., Kovalchuk, N., Surucu, M., Chang, D. T., Xing, L., Han, B.
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- **Mitigation of IMRT/SBRT treatment planning errors on the RefleXion X1 system using FMEA within Six Sigma framework** *Advances in Radiation Oncology*
  Simiele, E., Han, B., Skinner, L., Pham, D., Lewis, J., Gensheimer, M., Vitzthum, L., Chang, D., Surucu, M., Kovalchuk, N.
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- **Image-mode performance characterization of a positron emission tomography subsystem designed for Biology-guided radiotherapy (BgRT).** *The British journal of radiology*
  Hu, Z., Bieniosek, M., Ferri, V., Iagaru, A., Kovalchuk, N., Han, B., Xing, L., Vitzthum, L., Olcott, P., Narayanan, M., Laurence, T., Ren, Y., Oderinde, et al
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- **Treatment planning system commissioning of the first clinical biology-guided radiotherapy machine.** *Journal of applied clinical medical physics*
  Simiele, E., Capaldi, D., Breitkreutz, D., Han, B., Yeung, T., White, J., Zaks, D., Owens, M., Maganti, S., Xing, L., Surucu, M., Kovalchuk, N.

2022: e13638

- **Beam commissioning of the first clinical biology-guided radiotherapy system.** *Journal of applied clinical medical physics*
  Han, B., Capaldi, D., Kovalchuk, N., Simiele, E., White, J., Zaks, D., Xing, L., Surucu, M.
  2022: e13607
- **Dose Prediction for Cervical Cancer Brachytherapy Using 3-D Deep Convolutional Neural Network** *IEEE TRANSACTIONS ON RADIATION AND PLASMA MEDICAL SCIENCES*
  Ma, M., Kidd, E., Fahimian, B. P., Han, B., Niedermayr, T. R., Hristov, D., Xing, L., Yang, Y.
  2022; 6 (2): 214-221
- **IMRT and SBRT Treatment Planning Study for the First Clinical Biology-Guided Radiotherapy System.** *Technology in cancer research & treatment*
  Pham, D., Simiele, E., Breitkreutz, D., Capaldi, D., Han, B., Surucu, M., Oderinde, S., Vitzthum, L., Gensheimer, M., Bagshaw, H., Chin, A., Xing, L., Chang, et al
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- **Small field measurement and monte carlo model validation of a novel image-guided radiotherapy system.** *Medical physics*
  Shi, M., Chuang, C. F., Kovalchuk, N., Bush, K. K., Zaks, D., Xing, L., Surucu, M., Han, B.
  2021
- **Deep learning-enabled EPID-based 3D dosimetry for dose verification of step-and-shoot radiotherapy.** *Medical physics*
  Jia, M., Wu, Y., Yang, Y., Wang, L., Chuang, C., Han, B., Xing, L.
  2021
- **MR to Ultrasound Image Registration with Segmentation-Based Learning for HDR Prostate Brachytherapy**
  Chen, Y., Xing, L., Yu, L., Liu, W., Fahimian, B., Niedermayr, T., Bagshaw, H., Buyyounouski, M., Han, B.
  WILEY.2021
- **MR to ultrasound image registration with segmentation-based learning for HDR prostate brachytherapy.** *Medical physics*
  Chen, Y. n., Xing, L. n., Yu, L. n., Liu, W. n., Fahimian, B. P., Niedermayr, T. n., Bagshaw, H. P., Buyyounouski, M. n., Han, B. n.
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- **Deep learning applications in automatic needle segmentation in ultrasound-guided prostate brachytherapy.** *Medical physics*
  Wang, F., Xing, L., Bagshaw, H., Buyyounouski, M., Han, B.
  2020
- **Densely Connected Neural Network With Unbalanced Discriminant and Category Sensitive Constraints for Polyp Recognition** *IEEE TRANSACTIONS ON AUTOMATION SCIENCE AND ENGINEERING*
  Yuan, Y., Qin, W., Ibragimov, B., Zhang, G., Han, B., Meng, M., Xing, L.
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- **Automatic intraprostatic lesion segmentation in multiparametric magnetic resonance images with proposed multiple branch Unet.** *Medical physics*
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- **Beam data modeling of linear accelerators (linacs) through machine learning and its potential applications in fast and robust linac commissioning and quality assurance.** *Radiotherapy and oncology : journal of the European Society for Therapeutic Radiology and Oncology*
  Zhao, W. n., Patil, I. n., Han, B. n., Yang, Y. n., Xing, L. n., Schüler, E. n.
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- **Incorporating imaging information from deep neural network layers into image guided radiation therapy (IGRT).** *Radiotherapy and oncology : journal of the European Society for Therapeutic Radiology and Oncology*
  Zhao, W., Han, B., Yang, Y., Buyyounouski, M., Hancock, S. L., Bagshaw, H., Xing, L.
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- **Prostate cancer classification with multiparametric MRI transfer learning model** *MEDICAL PHYSICS*
  Yuan, Y., Qin, W., Buyyounouski, M., Ibragimov, B., Hancock, S., Han, B., Xing, L.
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- **Feasibility of Image Registration for Ultrasound-Guided Prostate Radiotherapy Based on Similarity Measurement by a Convolutional Neural Network** *TECHNOLOGY IN CANCER RESEARCH & TREATMENT*
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- **Markerless pancreatic tumor target localization enabled by deep learning.** *International journal of radiation oncology, biology, physics*
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  Zhu, N., Najafi, M., Han, B., Hancock, S., Hristov, D.
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- **Prostate Cancer Classification with Multi-parametric MRI Transfer Learning Model.** *Medical physics*
  Yuan, Y., Qin, W., Buyyounouski, M., Ibragimov, B., Hancock, S., Han, B., Xing, L.
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- **Evaluation of transperineal ultrasound imaging as a potential solution for target tracking during hypofractionated radiotherapy for prostate cancer.** *Radiation oncology (London, England)*
  Han, B., Najafi, M., Cooper, D. T., Lachaine, M., von Eyben, R., Hancock, S., Hristov, D.
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- **A unified material decomposition framework for quantitative dual- and triple-energy CT imaging.** *Medical physics*
  Zhao, W., Vernekohl, D., Han, F., Han, B., Peng, H., Yang, Y., Xing, L., Min, J. K.
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- **RIIS-DenseNet: Rotation-Invariant and Image Similarity Constrained Densely Connected Convolutional Network for Polyp Detection**
  Yuan, Y., Qin, W., Ibragimov, B., Han, B., Xing, L.
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- **Pixel response-based EPID dosimetry for patient specific QA.** *Journal of applied clinical medical physics*
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  Lee, M., Han, B., Jenkins, C., Xing, L., Suh, T.
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