Humza Nusrat, PhD, MCCPM

Medical Physicist, Henry Ford Health, Detroit · Assistant Professor, Michigan State University

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Positions

2025 – **Assistant Professor, Michigan State University**
Department of Radiology, College of Human Medicine

2024 – **Senior Staff Physicist, Henry Ford Cancer, Detroit**
MR-guided adaptive therapy and radiosurgery.

2021 – 2024 **Staff Medical Physicist, Sunnybrook Health Sciences Centre, Toronto**
IMRT QA and reference dosimetry lead.

Education and training

2019 – 2021 **Medical Physics Residency (CAMPEP-accredited)**, University of Toronto

2014 – 2019 **PhD, Biomedical Physics**, Ryerson University (now Toronto Metropolitan University)
Dissertation: Quantifying Radiobiological Variation in Cancer Radiotherapy Using Monte Carlo Simulation and Doped Plastic Scintillators

2013 **B.Sc. (Hons)**, University of Ontario Institute of Technology, Oshawa

Certification

Board certified in medical physics, Canadian College of Physicists in Medicine (MCCPM)

Research

OpenGray (preprint, 2026)

SAGE (two papers, 2026)

FLASH dosimetry (ongoing)

Virtual reality training (ongoing)

Dosimetry in the MR-linac (published 2020)

An LET detector (PhD) (2019)

Selected publications

[1] **H. Nusrat** and K. Thind, "OpenGray: a benchmark for evaluating the decisions of radiotherapy planning agents," arXiv:2610.37081 (2026).

[2] **H. Nusrat**, L. Francisco, B. Luo, H. Bagher-Ebadian, J. Kim, K. Chin-Snyder, S. Siddiqui, M. Shah, E. Mellon, M. Ghassemi, A. Doemer, B. Movsas, and K. Thind, "Stereotactic radiosurgery plan optimization with a human-in-the-loop reasoning large language model agent," Sci. Rep. (2026). doi:10.1038/s41598-026-73885-x

[3] **H. Nusrat**, B. Luo, H. Bagher-Ebadian, R. Hall, J. Kim, A. Doemer, K. Adil, M. Elsheikh, A. Feldman, B. Movsas, and K. Thind, "Local large language model-guided optimization for prostate radiotherapy planning," Med. Phys. **53**, e70654 (2026). doi:10.1002/mp.70654

[4] A. Varlukhin, M. Smith, F. Alam, A. Tagger, G. Morton, M. Paudel, A. Loblaw, L. C. Mendez, D. Hoover, R. Karshafian, and **H. Nusrat**, "Development and pilot evaluation of a virtual reality simulator for HDR prostate brachytherapy," Brachytherapy **25**, 728 (2026). doi:10.1016/j.brachy.2026.05.006

[5] V. Vanreusel, S. Brown, S. Ali, T. De Kerf, A. J. Doemer, P. Leblans, B. Movsas, **H. Nusrat**, B. Shirmard, K. Thind, S. Vanlanduit, D. Verellen, A. Gasparini, and L. F. Nascimento, "Characterization and ex vivo application of flexible 2D scintillating coatings in ultra-high dose rate electron beams for FLASH radiotherapy," arXiv:2504.15824 (2025).

[6] M. D'Souza, **H. Nusrat**, V. Iakovenko, B. Keller, A. Sahgal, J. Renaud, and A. Sarfehnia, "Water calorimetry in MR-linac: direct measurement of absorbed dose and determination of chamber $k_{\mathrm{Q,B}}$," Med. Phys. **47**, 6458 (2020). doi:10.1002/mp.14468

[7] **H. Nusrat**, S. Karim-Picco, G. Pang, M. Paudel, and A. Sarfehnia, "Maximum RBE change in ^{192}Ir, ^{125}I, and ^{169}Yb brachytherapy and the corresponding effect on treatment planning," Biomed. Phys. Eng. Express **6**, 015021 (2020). doi:10.1088/2057-1976/ab638e

[8] **H. Nusrat**, G. Pang, S. B. Ahmad, B. Keller, and A. Sarfehnia, "Quantifying the impact of lead doping on plastic scintillator response to radiation," Med. Phys. **46**, 4215 (2019). doi:10.1002/mp.13691

[9] **H. Nusrat**, J. Renaud, A. Sarfehnia, et al., "Innovations in Calorimetry," in *Recent Advancements and Applications in Dosimetry*, edited by M. F. Chan (Nova Science Publishers, 2018), Chap. 7.

Full list: Google Scholar (scholar.google.com/citations?user=yMey5EQAAAAJ).

Awards

2026	**Dr. Margot C. LaPointe Early Career Investigator Award**. Henry Ford Health, for the SAGE radiosurgery research.
2023	**Global Rising Star in Medical Physics**. American Association of Physicists in Medicine, for virtual and augmented reality research.
2021	**Sylvia Fedoruk Prize**. Best paper in Canadian medical physics, for MR-linac water calorimetry.
2018	**Anthony J. MacKay Award**. Best student paper, Canadian Radiation Protection Association.
2014, 2017	**TA of the Year**. Toronto Metropolitan University.
2009	**TD Canada Trust Scholarship**. Awarded to 20 of more than 7,000 applicants across Canada.

Software and tools

2026	**OpenGray**. Open benchmark for radiotherapy planning agents (Apache 2.0). github.com/hnusrat1/opengray
	Dose Oracle. Normal-tissue dose limits from QUANTEC, HyTEC, PENTEC and UK SABR, with BED and EQD2.
	Protocol Compass. An SBRT and SRS protocol reference.
	RadOnc.AI. Lessons for clinicians on using language models safely.

The Walled Web. A daily tracker of how websites treat AI crawlers, search bots and assistants.

Updated 3 November 2026.