UNIVERSITY of MARYLAND
RADIATION ONCOLOGY

University of Maryland Department of Radiation Oncology

Report for FY 2026 (July 1, 2025 – June 30, 2026)

Proton, FLASH, and Hyperthermia Publications & Scientific Presentations

Topic	Count
Proton- & FLASH-related **publications**	16
Hyperthermia-related **publications**	3
Proton- and FLASH-related **presentations**	29
Hyperthermia-related **presentations**	6
Local & other proton- FLASH- and hyperthermia-related presentations *(not at scientific meetings or UMD)*	8

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Proton- and FLASH-related publications (16 total)

FY 2026: July 2025-June 2026

1. Almohtasib J, Indelicato DJ, Paulino AC, Mihalcik S, Lee J, Ermoian R, Chang JH, **Kwok Y,** Perentesis J, Perkins SM, Hill-Kayser C, Zeina W, Laack NN, Yock TI, Gargollo PC. Assessing acute and long-term toxicities of proton radiation therapy in pediatric pelvic tumors: Findings from the Pediatric Proton Consortium Registry. *Pediatr Blood Cancer.* 2025 Jul 14:e31811. Online ahead of print.
2. **Biswal NC, Cherng HR, Parchur AK, Zhang B, Alicia D, Manuel E, Sun K, Yi B, Ferris MJ, Rana Z.** Predictive dosimetric parameters for adaptive replanning in proton beam therapy for thoracic cancer. *Med Dosim.* 2026 Jul 4:S0958-3947(26)00050-6. Online ahead of print.
3. **Biswal NC, Zakhary MJ, Parchur AK**, Mogilnay R, **Ferris MJ, Nichols EM,** Witek ME, **Yi B.** Optimizing quality assurance CT schedules during adaptive proton therapy for enhanced patient care. *J Appl Clin Med Phys.* 2025 Jul;26(7):e70142.
4. **Brown MH**, Pollock AE, **Sun K**, **Marter K, Alicia D,** Li E, Risher H, Rao GG, Roque DM, Mohindra P, **Bentzen SM, Vyfhuis MAL, McAvoy SA, Nichols EM**. Comparing acute toxicity of proton and photon radiotherapy in newly diagnosed gynecologic primaries. *Int J Radiat Oncol Biol Phys.* 2025 Nov 2:S0360-3016(25)06421-1. Online.
5. Charyyev S, Maradia V, Chang CW, Lin L, Dong L, Li H, Schuemann J, Shen J, Kang M, Taylor P, Zhang Y, Tang S, Wang P, Freund D, Zhang H, Zhao T, Chang C, Chen CC, Pankuch M, Gao M, Yu F, Lin H, Li Z, Wong T, Regmi R, Poels K, Depuydt T, Liu H, Broekhoven BL, **Mossahebi S, Yi B,** Paxton AB, Matsuura T, Wang Z, Vilches-Freixas G, Lin Y, Kurucz S, Ding X. Multiinstitutional survey of source modeling parameters for proton pencil beam scanning treatment planning system commissioning. Med Phys. 2025 Dec;52(12):e70199.
6. Darafsheh A, Hao Y, Bey A, Kim MM, Diffenderfer ES, Yin L, Chen CC, Xiao Z, Goddu SM, Zorloni G, Grignani P, Parodi K, Davidson K, Zhang T, Perkins S, Sobotka LG, **Mossahebi S**. First multi-institutional systematic comparison of the neutron ambient dose equivalent produced by proton therapy systems. *Phys Med Biol.* 2025 Nov 26;70(23).
7. Díaz-Comeche A, Oliver S, Juste B, Jardin D, **Zakhary M, Mossahebi S,** Mille MM, Lee C, Miró R, Verdú G, Morató S. Monte Carlo simulation and unfolding of an extended Bonner sphere system for secondary neutron spectrometry in proton therapy facilities using conventional BSS experimental data. *Front Oncol.* 2026 Apr 13;16:1789835.
8. Doig M, Lee J, **Kwok Y,** MacEwan I, Wolden S, Allison K, Dennehy S, Bajaj B, Short M, Gorayski P, Bezak E, Yock TI. Impact of substructure radiation dose on health-related quality of life in children with brain tumors: a Pediatric Proton/Photon Consortium Registry (PPCR) study. *J Neurooncol.* 2025 Sep 9. Online ahead of print.
9. Frank SJ, Busse PM, Lee JJ, Rosenthal DI, Hernandez M, Swanson DM, Garden AS, Gunn GB, Patel SH, Snider JW, Ma DJ, **Molitoris JK,** Lee NY, Parvathaneni U, McDonald MW, Kalman NS, Lin A, Mohammed N, Henson C, Hyde C, Bajaj GK, Katz SR, Dagan R, Morrison WH, Reddy JP, Fuller CD, Shah SJ, Phan J, Chronowski GM, Mayo L, Sturgis EM, Ferrarotto R, Zhu XR, Zhang X, Wang L, Hutcheson KA, El-Naggar AK, Moreno AC, Lee A, Spiotto MT, Gross ND, Lai SY, Liao JJ, Paly J, Liao Z, Foote RL; University of Texas MD Anderson Cancer Center Clinical Trial Consortium. Proton versus photon radiotherapy for patients with

oropharyngeal cancer in the USA: A multicentre, randomised, open-label, non-inferiority phase 3 trial. *Lancet.* 2025 Dec 11:S0140-6736(25)01962-2. Online ahead of print.

10. **Hamad GM, Poirier Y, Mossahebi S, Sawant A**. Combining proton FLASH and spatially fractionated radiotherapy: experimental and simulation-based dosimetric characterization. *Phys Med Biol.* 2026 Feb 19. Online ahead of print.
11. Jiang C, **Hoover T,** Baron J, Han X, Li B, Gao Y, Kim M, Hubbeling H, Chong EA, Carter J, Svoboda J, Schuster SJ, Landsburg DJ, Nasta SD, Plastaras J, LaRiviere M. Long term results of proton therapy in adult infradiaphragmatic lymphoma. *Int J Part Ther.* 2026 Feb 7;19:101304. eCollection 2026 Mar.
12. Tong JY, Bzhilyanskaya V, **Molitoris JK, Ferris MJ,** Hatten KM. Disparities in proton radiation utilization for HPV-associated oropharyngeal cancer following TORS. *Head Neck.* 2025 Dec 4. Online ahead of print.
13. Wakisaka Y, Tominaga Y, Li X, Bamberger C, Castro J, Chen KL, D'Souza M, **Rahimi R.** Enhancing proton therapy for superficial lesions using patient-specific bolus and multi-leaf collimator. *Radiol Phys Technol.* 2026 Feb 18. Ahead of print.
14. Wakisaka Y, Tominaga Y, Miyasaka Y, **Rahimi R,** Furutani KM, Nakata M, Iwai T, Nishio T. Enhancing dose conformity in head and neck intensity-modulated proton therapy using a novel dynamic multi-leaf collimator strategy. *Med Phys.* 2026 Feb;53(2):e70355.
15. Wakisaka Y, Tominaga Y, Nakata M, **Rahimi R**, Miyasaka Y, Higashikawa T, Nishio T, Yamamoto M. Defining clinically relevant residual motion for respiratory-gated scanning proton therapy of liver cancer: A patient-derived 4D dynamic dose analysis. *Phys Med.* 2026 Mar 30;145:105800.
16. **Zakhary MJ, Redell D, Alicia D, Jatczak J, Biswal NC, Mossahebi S, Sun K, Bark R, Molitoris JK, Yi B.** Nominal plan robustness may predict plan degradation in proton therapy for oropharyngeal head-and-neck cancer. *J Appl Clin Med Phys.* 2026 May;27(5):e70585.

Hyperthermia-related publications (3 total)

FY 2026: July 2025- June 2026

1. De Lazzari M, Dobsicek Trefna H, Carrapiço-Seabra C, Granton PV, Curto S, **Rodrigues D.** Quality assurance phantoms for deep hyperthermia devices: design principles informed by computational modeling. *Phys Med Biol.* 2026 Apr 30. Online ahead of print.
2. **Lang Y, Rodrigues DB, Ren L.** Automatic specific absorption rate (SAR) prediction for hyperthermia treatment planning using deep learning method. *Int J Hyperthermia.* 2025 Dec;42(1):2554860. Epub 2025 Sep 9.
3. Taleei R, **Rodrigues D**, Oei A, Krishnan S, Koushki K, Abolfath R, Weinfeld M: Innovative Strategies to Enhance Radiosensitivity: Hyperthermia, Nanoparticles, and DNA Repair Inhibition (Chapter 4), in Ashique S, Behnam B, Taghizadeh-Hesary F, Mishra N (Eds.) *From Radiobiology to Radiation Oncology*, Springer International Publishing, 2025, pp:55-7.

Proton- and FLASH-related scientific presentations

FY 2026: July 2025-June 2026 (29 total)

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1. **Allen A,** Simone CB**, Sun K, Bajaj G**, Chang J, Choung M, Gray J, Grover R, Hyde C, McDonald M, Mihalcik S, Perkins S, Rose L, Rotondo R, Sinesi C, Tsai H, Urbanic J, Vargas C, Zeng J, **Ferris M**. Hypofractionated and Stereotactic Body Proton Radiotherapy for a High-Risk Lung Cancer Cohort: A Multi-Institutional Experience from the Proton Collaborative Group Prospective Registry. Oral presentation at:11th Annual Meeting of the Particle Therapy Cooperative Group – North America (PTGOC-NA); November 7-9, 2025; Shreveport, LA.
2. **Allen A, Sun K, Olabumuyi AA, Keepers Z, Valluri SS, Cherng HRR, Bentzen SM, Kim M, Kunaprayoon D, Regine WF**. Clinical toxicity profiles of neoadjuvant volumetric modulated arc radiotherapy and proton beam radiotherapy for soft tissue sarcoma: a single-institution retrospective analysis. Poster at: ASTRO Annual Meeting; September 30, 2025; San Francisco, CA.
3. **Banskota A**, Gonzalez R, Olis S, Yi B, **Mossahebi S**. Effect of Energy Layer Spacing on Plan Quality and Treatment Delivery Time of Intensity Modulated Proton Therapy of Breast Patients. Presentation at: American Association of Medical Dosimetrists (AAMD) Annual Fall Meeting; September 5-6 2025; Fairfax, VA.
4. **Biswal, NC**, Zhang B**, Zhou J, Kunaprayoon D, Regine W, Yi B**. Verification CT prediction from the daily setup CBCT images during adaptive proton therapy of soft tissue sarcoma patients. Presentation at: PTCOG 64; June 8 - 13, 2026; Deauville, Normandy, France.
5. Calingo A, Gautam B, Jin PL, Pathak S, Zhao M, Fateen H, Lewis H, Gobbert MK, Sharma VR, Ren L, **Chalise A**, Peterson SW, Polf JC. Large-Scale Optimizations in Proton Beam Radiotherapy by Neural Network Denoising of Robust Simulated Patient Data. Presentation at: IEEE International Conference on Data Mining Workshops (ICDMW); 2025; Washington, DC.
6. Cha E, Mihalcik SA, Indelicato DJ, Laack NN, Ermoian RP, Mangona VS, Perkins SM, Wolden SL, Lee JY, Perentesis JP, Palmer JD, Tsang DSC, Hill-Kayser CE, **Kwok Y**, MacEwan I, Eaton BR, Le HV, Paulino AC, Yock TI. Outcomes of patients with intracranial germinoma enrolled on the Pediatric Proton Photon Consortium Registry. Poster at: ASTRO Annual Meeting; September 30, 2025; San Francisco, CA.
7. Chen KL, **Rahimi R**, Fan J, Khan R. Radiological assessment of Radiochromic film models EBT3 and EBT4 in proton beams. Online poster at: AAPM 66th Annual Meeting & Exhibition; July 27–30, 2025; Washington, D.C.
8. Flanigan K, **Mossahebi S**, Yi B, Biswal NC. Improving Clinical Efficiency from Simulation to Treatment: Impact of a Calculation-Based Patient-Specific QA Program at a Proton Therapy Center. Presentation at: American Association of Medical Dosimetrists (AAMD) Annual Fall Meeting; September 5-6 2025; Fairfax, VA.
9. **Hoover T, Sun K**, Lee N, Chang J, Thukral A, Tsai H, Shepherd A, Katz S, Vargas C, Patel S, Grover R, Perkins R, Medek S, McDonald M, **Ferris M**. Proton Therapy for Laryngeal and Hypopharyngeal Cancer: A Report from the Proton Collaborative Group. Poster presentation at: PTCOG 64; June 8 - 13, 2026; Deauville, Normandy, France.
10. **Lang Y,** Jiang Z, Sun L, Xu Y, Buller J, **Tran P**, Xiang L, **Ren L**. 3D Segment Anything Model (SAM) for 3D protoacoustic imaging enhancement and in vivo dose verification in proton therapy**.** Poster at: ASTRO Annual Meeting; September 30, 2025; San Francisco, CA.

11. MacDonald SM, Pugh S, Paulus R, Chauhan C, Braunstein LZ, Freedman GM, Jimenez RB, Kim JN, Thukral AD, **Mishra MV**, Mutter RW, Wright JL, Urbanic JJ, Ohri N, Boggs H, Chawla AK, Ellenberg S, Lin A, Ky B, Bekelman JE. Phase III randomized trial of proton vs. photon therapy for patients with non-metastatic breast cancer receiving comprehensive nodal radiation: A Radiotherapy Comparative Effectiveness (RadComp) Consortium trial: Health-related quality of life outcomes. Oral late-breaking abstract at: ASTRO Annual Meeting; September 30, 2025; San Francisco, CA.
12. **MacFarlane MJ, Biswal NC,** Zakhary MJ, **Ferris MJ, Molitoris JK, Yi BY**. Could synthetic CTs simulating patient anatomical changes help improve the robustness of head-and-neck proton plans? Poster at: AAPM 66th Annual Meeting & Exhibition; July 27–30, 2025; Washington, D.C.
13. **Mathai M, Thompson A, Escobal LH**, Singh G, **Alicia D, Ruff S,** Koduri S, Kidorf M, **Ferris M, Cheston S, Citron W, Patel A**, Rao M, **McAvoy S, Nichols E, Dudley S, Vyfhuis M**. Proton vs. photon: predictors of cardiac and pulmonary toxicities in locally advanced breast cancer patients. Poster at: ASTRO Annual Meeting; September 30, 2025; San Francisco, CA.
14. **Molitoris J.** Proton Therapy for Oropharyngeal Cancer. Oral presentation at: Radiation Oncology Summit: ACRO 2026; February 4-7, 2026; Lake Buena Vista, FL.
15. **Mossahebi S.** Direct Proton Measurement Validation of Dual Energy CT-Derived SPR Across a Wide Range of Ex-Vivo Biological Tissues. Poster at: 11th Annual Meeting of the Particle Therapy Cooperative Group – North America (PTGOC-NA); November 7-9, 2025; Shreveport, LA.
16. **Mossahebi S**. Direct Proton-Measurement Validation of Dual Energy CT-Derived SPR Across a Wide Range of Ex-Vivo Biological Tissues. Short oral e-poster at: PTCOG 64; June 8 - 13, 2026; Deauville, Normandy, France.
17. Qiao Z, **Yao W**, Zhang Z, **Zhang B**, Beltran C, **Yi BY,** Paulson ES, **Ren L**, Fang R, Huang M. Improving proton dose calculation accuracy using ROI-focused AI deep learning network for CBCT based adaptive proton therapy. Poster at: ASTRO Annual Meeting; September 30, 2025; San Francisco, CA.
18. **Rahimi R.** Enhancing proton therapy for superficial lesions using patient-specific bolus and multi-leaf collimator. Oral presentation at: 12th World Congress on Cancer Research and Therapy (WCCRT-2026); June 29-30, 2026; Rome, Italy.
19. Sabouri P, Koroulakis A, Wohlfahrt P, Shah J, **Molitoris J, Mishra M, Mossahebi S**. Enhancing proton range estimation: A comparative study of DECT and optimized SECT SPR calibration. Presentation at: 11th Annual Meeting of the Particle Therapy Cooperative Group – North America (PTGOC-NA); November 7-9, 2025; Shreveport, LA.
20. Sarath KS, Shree C, Tamil Selvan S, Kumar HS, **Shukla HD**, Agarwalla SK, Nayak JK, Prema P, **Biswal NC**. Analytical approach to calculate normal tissue complication probability and tumor control probability for ultra-high dose rate radiation (FLASH) Based on Linear-Quadratic Model. Snap oral presentation at: AAPM 66th Annual Meeting & Exhibition; July 27–30, 2025; Washington, D.C.
21. Snider JW, **Mossahebi S,** Ramirez S, **Molitoris JK**, Chhabra AM, **Mundis M,** Soike M, Butkus M, Vai A, Lebhertz D, Hartl B, Navratil M, Hedrick SG, Hoene T, Anand A, Yusuf MB, Zhang X, Frank SJ. A multicenter, blinded, intensity modulated proton therapy competitive planning study for head and neck cancers: The urgency for guidelines and

standards. Oral presentation at: ASTRO Annual Meeting; September 30, 2025; San Francisco, CA.

22. Sun L, Bjegovic K, Xu Y, Pandey PK, **Lang Y**, Gonzalez G, Chen Y, **Ren L**, Xiang L. Physics-informed neural network for in vivo dosimetry during proton therapy using protoacoustic tomography. Oral presentation at: AAPM 66th Annual Meeting & Exhibition; July 27–30, 2025; Washington, D.C.
23. **Thompson A,** Koroulakis A, **Patel A, Molitoris JK, Regine WF, Vyfhuis MAL, Kanani SP, Kunaprayoon D, Kim M.** Outcomes of re-irradiation with pencil beam scanning proton therapy for rectal cancer following prior pelvic radiation: Toxicity, recurrence, and symptom improvement. Poster at: ASTRO Annual Meeting; September 30, 2025; San Francisco, CA.
24. Tominaga Y, **Rahimi R**, Wakisaka Y, Kato T, Oita M, Nishio T. Systematic proton planning study for enhanced lateral penumbra control using a multi-leaf collimator and 3D bolus. Oral Presentation at: 11th Annual Meeting of the Particle Therapy Cooperative Group – North America (PTGOC-NA); November 7-9, 2025; Shreveport, LA.
25. Tominaga Y, Wakisaka Y, Kato T, Oita M, **Rahimi R**, Nishio T. Improvements of lateral penumbra at various depth regions in scanned proton treatment system with a multi-leaf collimator: dose verifications and plan comparisons. Poster at: AAPM 66th Annual Meeting & Exhibition; July 27–30, 2025; Washington, D.C.
26. Wang P, Hu L, O'Grady F, Yeo IH, Liu J, Nie W, **Rahimi R**, Bamberger C, Fan J. Simple QA method for coincidence measurements between proton isocenter and CBCT and orthogonal kV imaging isocenters. Poster Presentation at: 11th Annual Meeting of the Particle Therapy Cooperative Group – North America (PTGOC-NA); November 7-9, 2025; Shreveport, LA.
27. **Yao W, Ferris MJ, Molitoris JK, Zhang B, Yi BY**. Automated determination of deteriorations in proton therapy plan quality using daily cone beam CT as a predictor of need for adaptive replans for head and neck cases. Online poster at: AAPM 66th Annual Meeting & Exhibition; July 27–30, 2025; Washington, D.C.
28. **Yao W, Yi BY**, Huang M, **Zhang B**. Proton range-based patient setup. Poster at: ASTRO Annual Meeting; September 30, 2025; San Francisco, CA.
29. **Yi BY, Jatczak J, Modiri A, McFarlane MJ.** Optimal proton energy layer space for arc therapy of brain with pencil beam scanning. Proton range-based patient setup. Poster at: ASTRO Annual Meeting; September 30, 2025; San Francisco, CA.

Hyperthermia-related *presentations*: FY 2026

July 2025 – June 2026 (6 total)

1. **Lang Y**, **Rodrigues DB, Ren L**. Automatic specific absorption rate (SAR) prediction for hyperthermia treatment planning (HTP) using deep learning method. Poster at: AAPM 66th Annual Meeting & Exhibition; July 27–30, 2025; Washington, D.C.
2. **Rodrigues DB**, Turner P, Ellsworth J, **Molitoris JK, Mishra M**, Woodworth G, **Ren L**. Novel 915 MHz annular phased array applicator for hyperthermia treatment of brain lesions. Snap oral presentation at: AAPM 66th Annual Meeting & Exhibition; July 27–30, 2025; Washington, D.C.

3. Bustamante D, **Rodrigues DB,** Yan Y, Yuja Vaquiz Y, Parker K, **Kunaprayoon D**, Mehrmohammadi M. Feasibility of a ring-array ultrasound transducer for hyperthermia delivery and temperature monitoring in soft tissue sarcoma. Presentation at: 40th Annual Meeting of the STM; May 7-9, 2026; Savannah, GA. STM Proc 2026.
4. De Lazzari M, Seabra CC, Curto S, Dobsicek Trefna H, **Rodrigues DB**. Toward standardized quality assurance phantoms for deep hyperthermia therapy. Oral presentation at: 40th Annual Meeting of the STM; May 7-9, 2026; Savannah, GA. STM Proc 2026.
5. **Khamis Y, Olabumuyi A, Allen A, Hamza M, Zarinshenas R, Mossahebi S, Biswal N, McDonagh R, Rana Z, Kunaprayoon D, Regine W, Rodrigues DB, Molitoris JK.** Preoperative radiation therapy with concurrent external superficial hyperthermia for soft tissue sarcoma: long-term outcomes, toxicity, and surgical complications. Oral presentation at: 40th Annual Meeting of the STM; May 7-9, 2026; Savannah, GA. (Scholar-in-Training Award winner).
6. **Molitoris J, Rodrigues D, Eggleston C,** Maglo P, **Mossahebi S, Biswal NC,** Zakhary M, Ciner A. Early Report of a Pilot Study of Chemoimmunotherapy Combined with Hyperthermia and Spatially-fractionated Radiotherapy in Biliary Tract and Hepatocellular Cancers. Presentation at: International Congress of Hyperthermia Oncology (ICHO); September 10-13; 2025; Seoul, South Korea.

Other Proton- FLASH- and Hyperthermia- Related Presentations in FY 2026 (not at national conferences/ or scientific meetings) (8 total)

1. **Banskota A, Mossahebi S.** Impact of Energy Layer Spacing on Treatment Delivery Time and Plan Quality in Intensity-Modulated Proton Therapy for Breath-Hold Cancer Patients. Oral presentation at: MAC AAPM Joint Annual Meeting & DMV Proton Symposium; October 24-25, 2026; Washington, DC.
2. **Biswal N.** Comparison between proton LET-dependent RBE dose and photon physical dose for acute radiation dermatitis in Caucasian and African American breast cancer patients undergoing radiation therapy. Oral presentation at: MAC AAPM Joint Annual Meeting & DMV Proton Symposium; October 24-25, 2026; Washington, DC.
3. **Houser T (CMD)**. Do we need a single or multiple CT density curves to treat all anatomical sites with proton therapy: Cupping effect? Oral presentation at: MAC AAPM Joint Annual Meeting & DMV Proton Symposium; October 24-25, 2026; Washington, DC.
4. **Lang Y**, **Rodrigues DB, Ren L.** Automatic Specific Absorption Rate (SAR) Prediction for Hyperthermia Treatment Planning (HTP) Using Deep Learning Method. Oral presentation at: MAC AAPM Joint Annual Meeting & DMV Proton Symposium; October 24-25, 2026; Washington, DC.
5. **Molitoris JK.** Combining Deep Regional Hyperthermia and Proton Therapy for Soft Tissue Sarcomas. Invited Lecture, Proton Therapy Research Rounds at: Hollond Proton Therapy Center; 2025; Netherlands.
6. **Mossahebi S.** Clinical Implementation of Automated Gating System and Voluntary Breath Holding for Intensity Modulated Proton Therapy. Presentation at: University College London Hospitals; June 2026; London, United Kingdom.

7. **Poirier Y.** Challenges and opportunities in FLASH UHDR dosimetry for protons and electrons using plastic scintillators. Oral presentation at: MAC AAPM Joint Annual Meeting & DMV Proton Symposium; October 24-25, 2026; Washington, DC.
8. **Yao W.** Improving proton dose delivery via range-based patient setup. Oral presentation at: MAC AAPM Joint Annual Meeting & DMV Proton Symposium; October 24-25, 2026; Washington, DC.