

Brian Hrycushko, Ph.D.

Associate Professor
Division of Medical Physics and Engineering
Department of Radiation Oncology
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EDUCATION

<i>University of Texas Health Science Center at San Antonio, San Antonio, TX</i> Ph.D. in Medical Physics (CAMPEP accredited) Graduate School of Biomedical Sciences Dissertation: "Focused Interventional Cancer Radiotherapy Using Lipid Nanoparticle-Carried Radionuclides" GPA: 3.98	2011
<i>Texas A&M University, College Station, TX</i> M.S. in Health Physics Dwight Look College of Engineering Thesis: "An Investigation into the Use of Biokinetic Models when Assessing Intakes of Plutonium" GPA: 4.0	2008
<i>Texas A&M University, College Station, TX</i> B.S. in Physics College of Science Minor: Mathematics Graduated Cum Laude	2006
<i>Texas A&M University, College Station, TX</i> B.S. in Mechanical Engineering Dwight Look College of Engineering Graduated Cum Laude	2006

ACADEMIC APPOINTMENTS AND RELEVANT EMPLOYMENT

Associate Professor – <i>University of Texas Southwestern Medical Center at Dallas</i>	2020-Current
Lead Brachytherapy Physicist - <i>University of Texas Southwestern Medical Center at Dallas</i>	2013-Current
Assistant Professor – <i>University of Texas Southwestern Medical Center at Dallas</i>	2013-2020
Associate affiliation in the graduate faculty of the Biomedical Engineering graduate program – <i>University of Texas Southwestern Medical Center at Dallas</i>	2015-Current
Medical Physics Residency – <i>University of Texas Southwestern Medical Center at Dallas</i>	2011-2013
Teaching Assistant – <i>University of Texas Health Science Center at San Antonio</i>	2008-2011
Radiation Safety Technician – <i>University of Texas at San Antonio</i> Laboratory evaluations, radiation disposal, and wipe tests	2007
Summer Internal Dosimetry Research – <i>Texas A&M University Nuclear Engineering Department, under Dr. John Poston Sr.</i>	2007
Teaching Assistant – <i>Texas A&M University NUEN 302. Introduction of Nuclear Engineering II</i>	2007
Teaching Assistant – <i>Texas A&M University ENGR 111. Foundations of Engineering</i>	2006
Research Experiences for Undergraduates (REU) Program by National Science Foundation (NSF) – <i>Texas A&M University Nanofabrication Laboratory, under Dr. Winfried Teizer</i>	2005

CERTIFICATION AND LICENSURE

American Board of Radiology (ABR) certification – <i>Therapeutic Radiological Physics</i>	2014-Current
Texas Board of Licensure for Professional Medical Physicists – <i>Licensed Medical Physicist MP10592</i>	2014-Current

GRANT/CONTRACT SUPPORT

- Cancer Prevention & Research Institute of Texas (CPRIT) (RP150356) 2015-2019
Peripheral nerve tolerance to single-session stereotactic irradiation
PI: Paul Medin
Role: Co-Investigator
This study aims to determine the radiation tolerance of the peripheral nerves in a large animal model (close analog to humans) so that clinicians can prescribe maximally effective doses while avoiding nerve injury to patients.
- Radiological Society of North America Research Seed Grant (RSD1423) 2014-2016
Local Hypothermia as a Radioprotector During Prostate Stereotactic Body Radiotherapy
PI: Brian Hrycushko
Role: PI
This work aims to test the hypothesis that local hypothermia of the rectum will provide a radioprotective effect during a large, single dose of x-ray irradiation.
- NIBIB/NIH-sponsored Ruth L. Kirschstein NRSA Institutional Research Training Grant (T-32EB000817) 2008-2010
Multidisciplinary Training Program in Human Imaging
PI: Geoffrey Clarke
Role: Graduate Student
The goal of this work is to develop a Multidisciplinary Human Imaging (MDHI) research training program that integrates the investigational activities of physician, imaging scientist and medical physicist teams working on basic science and patient oriented clinical investigations. This project supported my graduate research training in and development in direct intratumoral delivery of radionuclide encapsulated liposomes.

BOOK CHAPTERS

- Solberg T, Medin P, and Hrycushko B (2020). Radiation Physics: Stereotactic. In Gunderson & Tepper, *Clinical Radiation Oncology 5th edition*. Elsevier
- Folkert MR and Hrycushko B (2017). Interstitial Brachytherapy for Liver Tumors: Practical Issues. In Meyer and Scheffer (eds), *Radiation Therapy for Liver Tumors*. Springer International Publishing AG
- Medin P, Hrycushko B, Foster R, and Solberg T (2015). Experimental Spinal Cord and Spinal Nerve Radiation Biology. In Gerszten P & Ryu S (eds), *Spine Radiosurgery 2nd edition*. Thieme
- Solberg T, Medin P, and Hrycushko B (2015). Radiation Physics: Stereotactic. In Gunderson & Tepper, *Clinical Radiation Oncology 4th edition*. Elsevier

PEER REVIEWED JOURNAL PUBLICATIONS

- Yen A, Choi B, Inam E, Yeh A, Lin MH, Park C, Hrycushko B, Nwachukwu C, Albuquerque K. "Spare the bowel, don't spoil the target: Optimal margin assessment for online cone beam adaptive radiation therapy (OnC-ART) of the cervix". *Pract Radiat Oncol*. S1879-8500. 2022.
- Montalvo SK, Kim N, Nwachukwu C, Alluri P, Parsons D, Lin M, Cai B, Zhuang T, Hrycushko B, Chen L, Timmerman R, Rahimi A. "On the feasibility of improved target coverage without compromising organs at risk using online adaptive stereotactic partial breast irradiation (A-SPBI)". *J Appl Clin Med Phys*, In press. 2022.
- D'Cunha PD, Gonzalez Y, Nwachukwu C, Hrycushko B, Medin P, Owrangi A, Jia X, Albuquerque K. "Change in image-guided planning strategies over time impacts oncologic and survival outcomes for intracavitary cervical cancer brachytherapy," *Brachytherapy*. 21(5), 668-677, 2022.
- Zhang-Velten ER, Parsons D, Lee P, Chambers E, Abdulrahman R, Desai N, Dan T, Wardak Z, Timmerman R, Vusirikala M, Patel P, Simms-Waldrup T, Aquino V, Koh A, Tan J, Iqbal Z, Zhang Y, Reynolds R, Chiu T, Joo M, Hrycushko B, Ouyang L, Lamphier R, Yan Y, Jiang S, Kumar KA, Gu X. "Volumetric modulated arc therapy enabled total body irradiation (VMAT-TBI): Six-year clinical experience and treatment outcomes," *Transplantation and Cellular Therapy*, 28(2), e1-e8, 2022
- Hrycushko B, van der Kogel AJ, Phillips L, Chhabra A, Folkert M, Sayre JW, Vernino S, Hassan-Rezaeian N, Yamada Y, Timmerman R, Medin P. "Brachial plexus tolerance to single-session stereotactic ablative radiation therapy (SAbR) in a pig model," *Int. J. Radiat. Oncol. Biol. Phys*, 112(2), 565-571, 2022
- Wang C, Gonzalez Y, Shen C, Hrycushko B, Jia X. "Simultaneous needle catheter selection and dwell time optimization for preplanning of high-dose-rate brachytherapy of prostate cancer," *Phys Med Biol*, 66(5), 1-14, 2021.
- Hrycushko B and Medin P. "Effects from non-uniform dose distribution in the spinal nerves of pigs: Analysis of NTCP models," *Int. J. Radiat. Oncol. Biol. Phys*. 109(5), 1570-1579, 2021.
- Chiu T, Xiong Z, Parsons D, Folkert MR, Medin PM, Hrycushko B. "Low-cost 3D print-based phantom fabrication to facilitate interstitial brachytherapy training program," *Brachytherapy*. 19(6), 800-811, 2020.
- Gannavarapu B, Hrycushko B, Jia X, Albuquerque K. "Upfront radiotherapy with brachytherapy for medically inoperable and unresectable patients with high-risk endometrial cancer," *Brachytherapy*. 19(2), 139-145, 2020.

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- Hrycushko B, van der Kogel AJ, Phillips L, Folkert M, Sayre JW, Vernino S, Hassan-Rezaeian N, Foster RD, Yamada Y, Timmerman R, Medin P. "Existence of a dose-length effect in spinal nerves receiving single-session stereotactic ablative radiation therapy." *Int. J. Radiat. Oncol. Biol. Phys.*, 106(5), 1010-1016, 2020. (Issue Highlight)
 - Tian Z, Yen A, Zhou Z, Shen C, Albuquerque K, Hrycushko B. "A machine-learning based prediction model of fistula formation after interstitial brachytherapy for locally advanced gynecological malignancies," *Brachytherapy*. 18(4), 530-538, 2019.
 - Albuquerque K, Hrycushko B, Harkenrider MM, Mayadev J, Klopp A, Beriwal S, Petereit DG, Scanderbeg DJ, Yashar C. "Compendium of fractionation choices for gynecologic HDR brachytherapy – An American Brachytherapy Society Task Group Report," *Brachytherapy*. 18(4), 429-436, 2019.
 - Hrycushko B, van der Kogel AJ, Phillips L, Folkert M, Sayre JW, Vernino S, Hassan-Rezaeian N, Foster RD, Yamada Y, Timmerman R, Medin P. "Spinal nerve tolerance to single-session stereotactic ablative radiotherapy (SABr)," *Int. J. Radiat. Oncol. Biol. Phys.*, 104(4), 845-851, 2019.
 - Yen A, Tian Z, Hrycushko B, Albuquerque K. "Risk factors for fistula formation after interstitial brachytherapy for locally advanced gynecological cancers involving vagina," *J. Contemp Brachytherapy*, 10(6), 510-515, 2018.
 - Chen J, Chen H, Zhong Z, Wang Z, Hrycushko B, Zhou L, Jiang S, Albuquerque K, Gu X, Zhen X. "Investigating rectal toxicity associated dosimetric features with deformable accumulated rectal surface dose maps for cervical cancer radiotherapy," *Radiat Oncol*, 13:125, 1-10, 2018.
 - Chiu T, Parsons D, Zhang Y, Hrycushko B, Zhao B, Chopra R, Kim N, Spangler A, Rahimi A, Timmerman R, Jiang S, Lu W, Gu X. "Prototype volumetric ultrasound tomography image guidance system for prone stereotactic partial breast irradiation: Proof-of-concept," *Phys Med Biol*. 63(5), 055004, 2018.
 - Ouyang L, Folkerts M, Zhang Y, Hrycushko B, Lamphier R, Lee P, Chambers E, Ramirez E, Reynolds R, Yan Y, Jiang S, Timmerman R, Desai N, Abdulrahman R, Gu X. "Volumetric modulated arc therapy based total body irradiation: workflow and clinical experience with an indexed rotational immobilization system," *Physics and Imaging in Radiation Oncology*. 4, 22-25, 2017.
 - Liu Y, Stojadinovic S, Hrycushko B, Wardak Z, Lau S, Weiguo L, Yan Y, Jiang S, Zhen X, Timmerman R, Nedzi L, Gu X, "A deep convolution neural network-based automatic delineation strategy for multiple brain metastases stereotactic radiosurgery," *PLoS One*. 12(10), e0185844, 2017.
 - Zhen X, Chen J, Zhong Z, Hrycushko BA, Zhou L, Jiang SB, Albuquerque K, Gu X, "Deep convolution neural network with transfer learning for rectum toxicity prediction in cervical cancer radiotherapy: a feasibility study," *Phys Med Biol*. 62(21), 8246-8263, 2017. (Editor's choice)
 - Ding C, Hrycushko BA, Whitworth L, Li X, Nedzi L, Weprin B, Abdulrahman R, Welch B, Jiang S, Wardak Z, Timmerman RD, "Multi-stage stereotactic radiosurgery for large cerebral arteriovenous malformations using the Gamma Knife platform," *Med. Phys.* 44(10), 5010-5019, 2017.
 - Hrycushko BA, Bing C, Futch C, Wozzak M, Stojadinovic S, Medin PM, Chopra R, "Technical note: system for evaluating local hypothermia as a radioprotector of the rectum in a small animal model," *Med. Phys.* 44(8), 3932-3938, 2017.
 - Ding C, Chun SG, Sumer BD, Nedzi LA, Abdulrahman RE, Yordy JS, Lee P, Hrycushko B, Solberg TD, Ahn C, Timmerman RD, Schwartz DL, "Phantom-to-clinic development of hypofractionated stereotactic body radiotherapy for early-stage glottis laryngeal cancer," *Med. Dosim.* 42(2), 90-96, 2017.
 - Zhou Y, Klages P, Tan J, Chi Y, Stojadinovic S, Yang M, Hrycushko B, Medin P, Pompos A, Jiang S, Albuquerque K, Jia X, "Automated high-dose rate brachytherapy treatment planning for a single-channel vaginal cylinder applicator," *Phys Med Biol*, 62, 4361-4374, 2017.
 - Hrycushko BA, Chopra R, Sayre JW, Richardson JA, Folkert MR, Timmerman RD, Medin PM, "Local hypothermia as a radioprotector of the rectal wall during prostate stereotactic body radiotherapy," *Int. J. Radiat. Oncol. Biol. Phys.* 98(1), 75-82, 2017. (Issue Highlight)
 - Gottumukkala S, Tumati V, Hrycushko B, Folkert M, "Endoluminal and interstitial brachytherapy for the treatment of gastrointestinal malignancies: a systematic review," *Curr Oncol Rep*, 19(1), 1-9, 2017.
 - Liu Y, Stojadinovic S, Hrycushko B, Wardak Z, Lu W, Yan Y, Jiang SB, Timmerman R, Abdulrahman R, Nedzi L, Gu X, "Automatic metastatic brain tumor segmentation for stereotactic radiosurgery applications," *Phys Med Biol*, 61(24), 8440-8461, 2016.
 - Tian Z, Zhang M, Hrycushko BA, Albuquerque K, Jiang SB, Xun J, "Monte Carlo dose calculations for high-dose-rate brachytherapy using GPU accelerated processing," *Brachytherapy*, 15(3), 387-98 2016.
 - Chen H, Zhong Z, Liao Y, Pompos A, Hrycushko BA, Albuquerque K, Zhen X, Zhou L, Gu X, "A non-rigid point matching method with local topology preservation for accurate bladder dose summation in high dose rate cervical brachytherapy," *Phys Med Biol*, 61(3), 1217-37, 2016.
 - Zhen H, Hrycushko BA, Lee H, Timmerman R, Pompos A, Stojadinovic S, Foster R, Jiang S, Solberg T, Gu X, "Dosimetric comparison of Acuros XB with collapsed cone convolution superposition and anisotropic analytic algorithm for stereotactic ablative radiotherapy of thoracic spinal metastases," *J Appl Clin Med Phys*, 16, No4, 2015.
 - Ding C, Solberg TD, Hrycushko BA, Medin P, Whitworth L, Timmerman RD, "Multi-staged robotic stereotactic radiosurgery for large cerebral arteriovenous malformations," *Radiother. Oncol*. 109, 452-456, 2013.
 - Ding C, Solberg TD, Hrycushko BA, Xing L, Heinzerling J, Timmerman RD, "Optimization of normalized prescription isodose selection for stereotactic body radiation therapy: conventional vs. robotic linac," *Med. Phys.* 40, 051705, 2013. (Editor's pick).

- Li S, Goins B, Hrycushko BA, Phillips WT, Bao A, "Feasibility of eradication of breast cancer cells remaining in post-lumpectomy cavity and draining lymph nodes following intracavitary injection of radioactive immunoliposomes," *Mol. Pharm.* 9, 2513-2522, 2012.
- Bao Q, Hrycushko BA, Dugas JP, Hager FH, Solberg TD, "A technique for pediatric total skin electron irradiation," *Radiat. Oncol.* 7:40, 2012.
- Hrycushko BA, Ware S, Li S, Bao A, "Improved tumour response prediction with equivalent uniform dose in pre-clinical study using direct intratumoural infusion of liposome-encapsulated ^{186}Re radionuclides," *Phys. Med. Biol.* 56, 5721-5734, 2011.
- Hrycushko BA, Li S, Goins B, Otto RA, Bao A, "Direct intratumoral infusion of liposome encapsulated rhenium radionuclides for cancer therapy: Effects of nonuniform intratumoral dose distribution," *Med. Phys.* 38, 1339-1347, 2011. (Editor's pick).
- Hrycushko BA, Gutierrez AN, Goins B, Yan W, Phillips WT, Otto PM, Bao A, "Radiobiological characterization of post-lumpectomy focal brachytherapy with lipid nanoparticle-carried radionuclides," *Phys. Med. Biol.* 56, 703-719, 2011.
- Hrycushko BA, Li S, Shi C, Goins B, Liu Y, Phillips WT, Otto PM, Bao A, "Post-lumpectomy focal brachytherapy for simultaneous treatment of surgical cavity and draining lymph nodes," *Int. J. Radiat. Oncol. Biol. Phys.* 79, 948-955, 2011.

CONFERENCE ORAL PRESENTATIONS

- Chiu TD, Gonzales Y, Xiong Z, Jia X, Godley A, Albuquerque K, Nwachukwu C, Hrycushko B, "3D-printed ovoids with rotational needle guides for patient-specific hybrid applicator gynecologic brachytherapy." American Brachytherapy Society Annual Meeting, (presented by Brian Hrycushko). 2022.
 - Medin PM, Hrycushko BA, Phillips L, Sayre J, Folkert MR, Vernino S, Hassan-Rezaeian N, Yamada Y, Van Der Kogel AJ, "Brachial plexus tolerance to single-session stereotactic ablative radiotherapy (SABR): A pig model." Proceedings of the American Society for Radiation Oncology. *Int J Radiat Oncol Biol Phys*, Vol105, Issue 1, S221-S222, (presented by Paul Medin) 2019
 - Medin PM, Hrycushko BA, Phillips L, Sayre J, Folkert MR, Vernino S, Foster RD, Hassan-Rezaeian N, Yamada Y, Van Der Kogel AJ, "The dose-length effect in spinal nerves receiving single-session stereotactic ablative radiation therapy (SABR)." Proceedings of the American Society for Radiation Oncology. *Int J Radiat Oncol Biol Phys*, Vol102, Issue 3, S74, (presented by Paul Medin) 2018
 - Liu H, Liu Y, Stojadinovic S, Hrycushko B, Wardak Z, Lau S, Lu W, Yan Y, Jiang S, Zhen X, Timmerman R, Nedzi L, Gu X, "Online automatic brain metastases segmentation web platform for stereotactic radiosurgery." 60th Annual Meeting of the American Association of Physicists in Medicine, Snap oral, 2018
 - Medin PM, Hrycushko B, Phillips L, Vernino S, Foster R, Sayre S, Yamada Y, van der Kogel A, "Spinal nerve tolerance to single-session stereotactic ablative radiotherapy (SABR)", Proceedings of the American Society for Radiation Oncology. *Int J Radiat Oncol Biol Phys*, Vol99, Issue 2, S76, (presented by Paul Medin) 2017
 - Chen J, Chen H, Zhong Z, Hrycushko B, Zhou L, Jiang S, Albuquerque K, Zhen X, Gu X, "Rectal toxicity prediction in cervical cancer radiotherapy using support vector machine and deformable accumulated surface dose," 59th Annual Meeting of the American Association of Physicists in Medicine. Oral Presentation. 2017
 - Zhen X, Chen J, Zhong Z, Hrycushko B, Zhou L, Jiang S, Albuquerque K, Gu X, "Transfer learning using deep convolution neural networks for rectum toxicity prediction in cervical cancer radiotherapy," 59th Annual Meeting of the American Association of Physicists in Medicine. Oral Presentation. 2017
 - Liu Y, Stojadinovic S, Hrycushko B, Wardak Z, Lu W, Yan Y, Jiang S, Zhen X, Timmerman R, Abdulrahman R, Nedzi L, Gu X, "Automatic delineation strategy for brain metastases using deep convolution neural network," 59th Annual Meeting of the American Association of Physicists in Medicine. Snap Oral. 2017
 - Zhen X, Chen J, Zhong Z, Hrycushko B, Jiang S, Albuquerque K, Gu X, "Exploring deep convolution neural networks with transfer learning for rectum toxicity prediction in cervical cancer radiotherapy," American Brachytherapy Society Annual Meeting, Oral Presentation. 2017.
 - Medin PM, Hrycushko BA, Vernino S, Foster RD, Sayre J, Yamada Y, Van Der Kogel A.J. "Spinal nerve tolerance to single-session stereotactic ablative radiation therapy (SABR)," Proceedings of the American Society for Radiation Oncology. *Int J Radiat Oncol Biol Phys*, Vol 96, Issue 2, S216, (presented by Paul Medin) 2016
 - Hrycushko BA and Medin P, "On spinal nerve toxicity from single-session SABR in pigs and the translation of small animal NTCP models," 58th Annual Meeting of the American Association of Physicists in Medicine, Oral presentation (presented by Brian Hrycushko), 2016
 - Chiu T, Zhang Y, Hrycushko BA, Zhao B, Chopra R, Jiang S, Gu X, "Prototype for an in-room supercompounded 3D volumetric ultrasound image guidance system for prone breast SBRT," 58th Annual Meeting of the American Association of Physicists in Medicine, Oral presentation (presented by Tsuicheng Chiu), 2016
 - Ouyang L, Folkerts M, Hrycushko BA, Lamphier R, Lee H, Yan Y, Jiang S, Timmerman R, "Volumetric modulated arc therapy for total body irradiation," 58th Annual Meeting of the American Association of Physicists in Medicine, Oral presentation (presented by Luo Ouyang), 2016
 - Chiu T, Hrycushko BA, Zhao B, Jiang S, Gu X, "Development of a supercompounded 3D volumetric ultrasound image guidance system for prone accelerated partial breast irradiation (APBI)," 57th Annual Meeting of the American Association of Physicists in Medicine, Oral presentation (presented by Tsuicheng Chiu), 2015.
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- Hrycushko BA, Chopra R, Futch C, Bing C, Wodzack M, Stojadinovic S, Jiang S, Medin P, "Fabrication and testing of a 3D-printed small animal rectal cooling device to evaluate local hypothermia as a radioprotector during prostate SBRT," 57th Annual Meeting of the American Association of Physicists in Medicine, Snap-oral presentation (presented by Paul Medin), 2015.
- Tan J, Yan Y, Hager F, Gu X, Jia X, Pompos A, Foster R, Stojadinovic S, Yang M, Hrycushko BA, Folkerts M, Zhao B, Medin P, Ding C, Jiang S, "Auto weekly – an automated online weekly chart check system for medical physics," 57th Annual Meeting of the American Association of Physicists in Medicine, Snap-oral presentation (presented by Jun Tan), 2015.
- Tan J, Shi F, Hrycushko BA, Medin P, Stojadinovic S, Pompos P, Yang M, Albuquerque K, Jia X, "An automated treatment plan quality assurance program for tandem and ovoid high dose-rate brachytherapy," 57th Annual Meeting of the American Association of Physicists in Medicine, Oral presentation (presented by Jun Tan), 2015.
- Hrycushko BA, Stojadinovic S, Pompos A, Medin P, Jia X, Yang M, Nedzi L, Schwartz D, Folkert MR, "Commissioning and acceptance testing of a high dose rate ³²P plaque for intraoperative brachytherapy of the spinal dura," American Brachytherapy Society Annual Meeting, Snap-oral (presented by Brian Hrycushko), 2015.
- Shi F, Hrycushko BA, Tan J, Medin P, Stojadinovic S, Pompos A, Yang M, Albuquerque A, Jia X, "An automated treatment plan quality assurance program for tandem and ovoid high dose-rate brachytherapy," American Brachytherapy Society Annual Meeting, Snap-oral (presented by Xun Jia), 2015.
- Tian Z, Zhang M, Hrycushko BA, Stojadinovic S, Jiang S, Jia X, "Development of an ultra-fast Monte Carlo dose engine for high dose rate brachytherapy," 56th Annual Meeting of the American Association of Physicists in Medicine, Oral presentation (presented by Zhen Tian), 2014.
- Zhen X, Pompos A, Chen H, Yan H, Zhou Linghong, Jiang S, Gu X, "Towards accurate OAR dose summation in cervical HDR brachytherapy: applying a non-rigid point matching method to bladder deformation," American Brachytherapy Society Annual Meeting, Oral presentation (presented by Brian Hrycushko), 2014.
- Medin PM, Foster RD, Hrycushko BA, Solberg TD, "Animals versus humans, a comparative analysis of spinal cord tolerance to stereotactic ablative radiotherapy," 11th International Stereotactic Radiosurgery Society Congress, Oral presentation (presented by Paul Medin), 2013.
- Ding C, Solberg T, Hrycushko BA, Medin P, Whitworth L, Timmerman R, "Inverse planning for multi-stage robotic stereotactic radiosurgery for large cerebral arteriovenous malformations," 55th Annual Meeting of the American Association of Physicists in Medicine, Oral presentation (presented by Chuxiong Ding), 2013.
- Bao Q, Hrycushko BA, Dugas J, Hager F, Solberg T, "A technique for pediatric total skin electron irradiation," American Association of Physicists in Medicine Spring Clinical Meeting, Oral presentation (presented by Qinan Bao), 2012.
- Hrycushko BA, Ware S, Li S, Goins B, Zarzabal L, Phillips WT, Bao A, "Cancer therapy through altered tumor microenvironment combined with multiple intratumoral infusions of liposome-encapsulated ¹⁸⁶Re radionuclides," Society of Nuclear Medicine Annual Meeting, Oral presentation (presented by Ande Bao), 2011.
- Li S, Goins B, Hrycushko BA, Yan W, Phillips WT, Otto PM, Bao A, "Nuclear and fluorescent imaging studies of post-lumpectomy focal therapy to eradicate remaining breast cancer cells using dual labeled liposomes," Society of Nuclear Medicine Annual Meeting, Oral presentation (presented by Shishong Li), 2010.
- Hrycushko BA, Li S, Shi C, Liu Y, Bao A, "Novel post-lumpectomy breast cancer brachytherapy with the capability of simultaneous focal lymph node irradiation," 51st Annual Meeting of the American Association of Physicists in Medicine, Oral presentation (presented by Brian Hrycushko), 2009.

CONFERENCE POSTER PRESENTATIONS

- Gonzalez Y, Hrycushko B, Jia X, Visak J, Dunton N, Smith L, Nwachukwu C, Albuquerque K, Chiu T, "Custom 3D-printed interstitial applicator template library for HDR brachytherapy," 64th Annual Meeting of the American Association of Physicists in Medicine, Interactive Poster, 2022.
- Gonzalez Y, Meng B, Parsons D, Hrycushko B, Zhuang T, Cai B, Zhang Y, Westover K, Iyengar P, Godley A, Jiang S, Lin M, "Benchmark CBCT-based adaptive online radiotherapy for SAbR of thoracic malignancies," 64th Annual Meeting of the American Association of Physicists in Medicine, Interactive Poster, 2022.
- Parsons D, Chen L, Lee H, Zhang Y, Cai B, Zhuang T, Hrycushko B, Park C, Gonzalez Y, Zhong X, Visak J, Nwachukwu C, Kim N, Alluri P, Rahimi A, Lin M, "A dosimetric comparison for adaptive cone-beam CT and MRI based radiotherapy for stereotactic partial breast irradiation," 64th Annual Meeting of the American Association of Physicists in Medicine, Poster, 2022.
- Zhuang T, Parsons D, Gonzalez Y, Gibbard G, Lin M, Cai B, Hrycushko B, Nguyen D, Reynolds R, Godley A, Pompos A, Desai N, Jiang S, "On-couch IMRT treatment for prostate cancer patients without an individualized pre-treatment plan," 64th Annual Meeting of the American Association of Physicists in Medicine, Poster, 2022.
- Lee H, Hrycushko B, Xiong Z, Folkert M, Desai N, Garant A, Chiu T, "3D printed patient-specific HDR brachytherapy applicator for penile cancer plesiotherapy," 63 Annual Meeting of the American Association of Physicists in Medicine, Poster, 2021.
- Xiong Z, Zhong Y, Joo M, Eraj S, Gannavarapu B, Morgan H, All S, Hrycushko B, Jia X, Folkert M, Medin P, Chiu T, "A simulation-based mastery learning program for ultrasound-guided interstitial prostate brachytherapy using a low-cost 3D printed phantom," 63 Annual Meeting of the American Association of Physicists in Medicine, Poster, 2021

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- Puentes C, Banks T, Hrycushko B, Jia X, Nwachukwu C, Albuquerque K, "Multidisciplinary consensus and evaluation of gynecological high-dose-rate (HDR) brachytherapy," Proceedings of the American Society for Radiation Oncology. Int J Radiat Oncol Biol Phys, 2021.
 - D'cunha P, Gonzalez Y, Hrycushko B, Jia X, Medin P, Banks T, Owrangi A, Nwachukwu C, Albuquerque K, "Change in image-guided planning strategies over time impacts global outcomes for intracavitary cervical cancer brachytherapy," Proceedings of the American Society for Radiation Oncology. Int J Radiat Oncol Biol Phys, 2021.
 - Gannavarapu B, Hassan Rezaeian N, Oneill D, Hrycushko B, Folkert M, Callan A, Timmerman R, "Intraosseous high dose rate (HDR) with intramedullary nailing for long bone metastases-a feasibility study," Proceedings of the American Society for Radiation Oncology. Int J Radiat Oncol Biol Phys, 2020.
 - Hassan Rezaeian N, Gannavarapu BS, Folkert MR, Timmerman RD, Hrycushko B, "Evaluation of a model-based dose calculation algorithm (Acuros) for intraosseous high dose rate brachytherapy (HDR) with intramedullary nailing for bone metastases," Proceedings of the American Society for Radiation Oncology. Int J Radiat Oncol Biol Phys, 2020.
 - O'neill DE, Gannavarapu B, Hrycushko B, Folkert M, Timmerman R, Callan AK, "Intramedullary brachytherapy for the treatment of long bone metastatic disease," Musculoskeletal Tumor Society Annual Meeting, Poster, 2020.
 - Xiong Z, Parsons D, Gannavarapu B, Nwachukwu C, Folkert M, Jia X, Medin P, Albuquerque K, Hrycushko B, Chiu T, "Developing a novel 3D print-based phantom to facilitate ultrasound-guided interstitial gynecologic brachytherapy training simulation," 62nd Annual Meeting of the American Association of Physicists in Medicine, Poster, 2020.
 - Gannavarapu B, Hassan Rezaeian N, Hannan R, Folkert M, Garant A, Timmerman R, Hrycushko B, Desai N, "Focal salvage high dose rate (HDR) brachytherapy after neurovascular-sparing prostate stereotactic ablative radiation therapy (SAbR): a pilot dosimetric study," Proceedings of the American Society for Radiation Oncology. Int J Radiat Oncol Biol Phys, 2019
 - Hassan Rezaeian N, Gannavarapu B, Hannan R, Folkert M, Garant A, Timmerman R, Hrycushko B, Desai N, "Feasibility study of focal salvage high dose rate (HDR) brachytherapy after neurovascular-sparing prostate stereotactic ablative radiation therapy (SAbR)," *Med Phys*, 46(6):E232, 2019
 - Chiu TD, Parsons D, Folkert MR, Medin PM, Hrycushko B, "3D print-based prostate phantom for ultrasound-guided interstitial HDR brachytherapy training program," *Brachytherapy*, 18(3):S71-S72, 2019
 - Gonzalez Y, Yang M, Hrycushko B, Medin P, Pompos A, Albuquerque K, Jia X, "Time mangament analysis of physicist planning for image guided adaptive brachytherapy (IGABT) for cervical cancer," *Brachytherapy*, 18(3):S108, 2019
 - Gannavarapu BS, Hrycushko B, Jia X, Albuquerque K, "Inoperable patients with high-risk endometrial cancer (HREC)-Is brachytherapy worth the effort?" *Brachytherapy*, 18(3):S100-S101, 2019
 - Tian Z, Yen A, Zhou Z, Chen C, Albuquerque K, Hrycushko B, "Prediction of development of rectovaginal fistula following interstitial brachytherapy for advanced cervix cancer using machine learning." 60th Annual Meeting of the American Association of Physicists in Medicine, e-Poster, 2018
 - Medin PM, Hrycushko B, Phillips L, Sayre J, Foster RD, van der Kogel AJ, "Spinal nerve tolerance to single-session stereotactic ablative radiotherapy." 5th Innovations in Cancer Prevention and Research Conference, Poster, 2017
 - Hrycushko BA, Chiu H, Folkert MR, "Template-based high dose rate endobronchial brachytherapy for palliation of previously irradiated obstructive lung lesions." Palliative Care in Oncology Symposium, Poster, 2016
 - Ding C, Hrycushko BA, Abdulrahman R, Whitworth L, Jiang S, Timmerman R, "Dosimetric impact of patient setup rotational errors for multi-staged large AVM Gammaknife radiosurgery." 58th Annual Meeting of the American Association of Physicists in Medicine, Poster, 2016
 - Zhen X, Chen H, Liao Y, Zhou L, Hrycushko BA, Albuquerque K, Gu X, "Accurate dose volume parameter calculation for revealing rectum dose-toxicity effects using deformable registration in cervical cancer brachytherapy: a pilot study," 58th Annual Meeting of the American Association of Physicists in Medicine, Poster, 2016
 - Hrycushko BA, Yang M, Albuquerque KA, Folkert M, "Standard high dose rate brachytherapy plan template generation as part of a comprehensive brachytherapy program," American Brachytherapy Society Annual Meeting, Poster, 2016
 - Folkert M, Hrycushko BA, Desai N, Albuquerque A, Meyer J, Abdulrahman R, Hager F, Foster R, Jia X, Pompos A, Medin P, Timmerman R, "Development of a comprehensive brachytherapy and intraoperative radiation therapy program at UT Southwestern (UTSW)," American Brachytherapy Society Annual Meeting, Poster, 2016
 - Medin P, Foster R, Vernino S, Meyer J, Van der Kogel A, Sayre J, Yamada Y, Hrycushko BA, Timmerman R, "Spinal nerve tolerance to single-session stereotactic ablative radiotherapy," 4th Innovations in Cancer Prevention and Research Conference, Poster 2015
 - Yan Y, Meyer J, Timmerman R, Hrycushko BA, Chen B, Saha D, Jiang S, "Feasibility study on three-dimensional GRID therapy in conventional linacs," 57th Annual Meeting of the American Association of Physicists in Medicine, Poster, 2015
 - Mao W, Hrycushko BA, Yan Y, Foster R, Albuquerque K, "Monitoring tumor motion in real-time with EPID imaging during cervical cancer treatment," 57th Annual Meeting of the American Association of Physicists in Medicine, Poster, 2015
 - Li Y, Tian Z, Hrycushko BA, Jiang S, Jia X, "Validations of dose calculation accuracy of Acuros BV in high-dose-rate (HDR) brachytherapy with a shielded cylinder applicator using Monte Carlo simulation," 57th Annual Meeting of the American Association of Physicists in Medicine, Poster, 2015
 - Hrycushko BA, Meyer J, Sutphin P, Pillai A, Kalva S, Timmerman R, Folkert MR, "Dosimetric and economic comparison of interstitial high-dose-rate brachytherapy to stereotactic body radiation therapy for liver lesions," American Brachytherapy Society Annual Meeting, Poster, 2015.

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- Shi F, Hrycushko BA, Tan J, *et al*, "An automated treatment plan quality assurance program for tandem and ovoid high dose rate brachytherapy," American Brachytherapy Society Annual Meeting, Poster, 2015.
 - Pinho DF, Yuan Q, Bailey AA, Bolton-Ronacher J, Hrycushko BA, Albuquerque K, *et al*, "Pelvic magnetic resonance imaging for radiation planning in cervical cancer," 37th Annual Course of the Society of Computed Body Tomography & Magnetic Resonance, Poster, 2014.
 - Ding C, Hrycushko BA, Jiang SB, Whitworth L, Li X, Abdulrahman R, Nedzi L, Choe K, Xing L, Solberg TD, Timmerman RD, "Multistage stereotactic radiosurgery for large intracranial arteriovenous malformations: Gamma Knife vs. CyberKnife," 56th Annual Meeting of American Society of Radiation Oncology, Poster, 2014.
 - Pinho DF, Yuan Q, Bailey AA, Bolton-Ronacher J, Hrycushko BA, Albuquerque K, *et al*, "Pelvic magnetic resonance imaging for radiation planning in cervical cancer," 100th Scientific Assembly and Annual Meeting of the Radiological Society of North America, Poster, 2014.
 - Ding C, Hrycushko BA, Jiang S, Whitworth L, Timmerman R, "Novel multi-stage stereotactic radiosurgery technique for large cerebral arteriovenous malformations using the Gammaknife system," 56th Annual Meeting of the American Association of Physicists in Medicine, Poster, 2014.
 - Ding C, Hrycushko BA, Jiang S, Meyer J, Timmerman R, "Radiobiological dose comparison of single fraction SRS, multi-fraction SRT and multi-stage SRS of large target volumes using the linear-quadratic formula," 56th Annual Meeting of the American Association of Physicists in Medicine, Poster, 2014.
 - Gu X, Hrycushko BA, Lee P, Lamphier R, Jiang S, Abdulrahman R, Timmerman R, "Volumetric modulated total body irradiation using a rotational lazy-Susan-like immobilization system," 56th Annual Meeting of the American Association of Physicists in Medicine, Poster, 2014.
 - Hrycushko BA, Pinho DF, Pedrosa I, Medin PM, Albuquerque K, "MRI versus CT contouring of the high-risk CTV for HDR intracavitary brachytherapy of cervical cancer patients: love's labor lost in the dose?" American Brachytherapy Society Annual Meeting, Poster, 2014.
 - Zhen H, Hrycushko BA, Pompos A, Foster R, Yan Y, Stojadinovic S, Solberg T, Gu X, "Verification and evaluation of Acuros XB dose calculations for stereotactic ablative radiotherapy of the thoracic spine," 55th Annual Meeting of the American Association of Physicists in Medicine, Poster, 2013.
 - Ding C, Chun S, Hrycushko BA, Solberg T, Timmerman R, "Validation of dose escalation in hypofractionated hemi-larynx irradiation of early-stage true vocal cord cancer based on anthropomorphic phantom measurements," 55th Annual Meeting of the American Association of Physicists in Medicine, Poster, 2013.
 - Ding C, Hrycushko BA, Solberg T, "4-dimensional dosimetric comparison of stereotactic body radiation therapy for lung tumor: with versus without tumor tracking technique," 55th Annual Meeting of the American Association of Physicists in Medicine, Poster, 2013.
 - Hrycushko BA, Bao Q, Medin P, Solberg T, "Clinical implementation of anthropomorphic lung phantom for patient-specific SABR QA," 54th Annual Meeting of the American Association of Physicists in Medicine, Poster, 2012.
 - Hrycushko BA, Ware S, Li S, Goins B, Bao A, "Improved dose-response relationship for focal cancer therapy using liposome-encapsulated ¹⁸⁶Re radionuclides," Joint American Association of Physicists in Medicine / Canadian Organization of Medical Physicists Annual Meeting, Poster, 2011.
 - Hrycushko BA, Ware S, Li S, Goins B, Phillips WT, Otto RA, Bao A, "Improved cancer therapy via neoadjuvant anti-angiogenic therapy prior to intratumoral infusion of liposome-encapsulated ¹⁸⁶Re radionuclides," The Cancer Therapy and Research Center Annual Symposium, Poster, 2010.
 - Hrycushko BA, Li S, Goins B, Phillips WT, Bao A, "Retention, distribution, and clearance of liposomes following intratumoral infusion," National Institute of Biomedical Imaging and Bioengineering (NIBIB) Training Grantees Meeting, Poster, 2010.

TEACHING EXPERIENCE

- LDR/HDR Prostate Brachytherapy Hands-on Simulation Lab for MD and PhD residents (UTSW)
 - Mentor to Medical Physics Residents (UTSW) – 3 month clinical rotations
 - Medical Physics track of Biomedical Engineering Graduate Program (UTSW) – *LDR Brachytherapy*
 - Medical Physics track of Biomedical Engineering Graduate Program (UTSW) – *HDR Brachytherapy*
 - Radiation Physics Certificate Program (UTSW) – *Radiation biology*
 - Radiation Physics Certificate Program (UTSW) – *Radiation monitoring of personnel*
 - Radiation Physics Certificate Program (UTSW) – *Brachytherapy*
 - Radiation Oncology Residents (UTSW) - *Brachytherapy*
 - Radiation Oncology Residents (UTSW) – *Linear accelerators and diagnostic X-ray machines*
 - Radiation Therapy Technologists (UTSW) – *Radiation dose distribution and scatter analysis*
 - Teaching Assistant (UTHSCSA) – *Nuclear medicine*
 - Teaching Assistant (Texas A&M University) – *Introduction of nuclear engineering II*
 - Teaching Assistant (Texas A&M University) – *Foundations of engineering*
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INVITED TALKS

- Hrycushko BA, "HDR Prostate Brachytherapy," Southwest AAPM Annual Meeting, 2020
 - Hrycushko BA, "Accidents in radiotherapy and what we can learn from our mistakes," North Texas Society of Radiation Therapists Fall Symposium, 2012.
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CLINICAL LEADERSHIP AND INNOVATION

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| ▪ Lead brachytherapy physicist | 2013 – Current |
| ▪ Medical Physics Residency Program Evaluation Committee | 2015 – Current |
| ▪ HDR/LDR brachytherapy team huddle | 2015-Current |
| ▪ GYN disease oriented team (Rad Onc) | 2014-Current |
| ▪ GU disease oriented team (Rad Onc) | 2016-Current |
| ▪ GI disease oriented team (Rad Onc) | 2016 |
| ▪ Brachytherapy section of Departmental Technology Committee | 2014 |
| ▪ Departmental Expansion/Innovation Committee | 2014 |
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CLINICAL SERVICE AND EXPERIENCE

Brachytherapy – (helped development of hospital-based HDR brachytherapy operating room for IORT program, eye plaque program, LDR prostate program, HDR prostate program, bronchial program, esophageal program, P32 dural plaque program, and 3D-printing HDR applicators program)

- Varisource ix HDR afterloader – acceptance, commissioning, QA testing
- Shielding calculations for HDR brachytherapy operating room
- Treatment planning systems – Brachyvision, Pinnacle, Variseed, Vitesse, Eyephysics, Mim
- Acceptance and QA testing of applicators
- Site specific experience:
 - HDR brachytherapy Gyn (T&O, T&O + interstitial, T&R, cylinder, shielded cylinder, syed)
 - HDR biliary brachytherapy
 - HDR esophageal brachytherapy
 - HDR bronchial brachytherapy
 - HDR keloid brachytherapy
 - HDR H.A.M. intraoperative brachytherapy
 - HDR prostate brachytherapy – real-time ultrasound based
 - HDR intraosseous brachytherapy
 - LDR prostate brachytherapy (I125, Pd103, Cs131)
 - LDR brain brachytherapy (I125, Cs131)
 - LDR eye plaques
 - LDR GammaTile
 - Sr90 intravascular brachytherapy
 - P32 spinal dural plaques
 - Liquid P32 brachytherapy for craniopharyngioma
 - Liquid P32 pigmented villonodular synovitis

Linac Therapy

- Elekta Agility, Varian Ethos, Varian TrueBeam, Varian VitalBeam, Varian 2100 EX, Varian Trilogy, Brainlab Vero, Xstrahl superficial unit
- Daily, monthly, annual QA (IBA blue phantom, Omni pro accept)
- IROC dosimetry and credentialing
- Treatment planning systems and DICOM viewers – Ethos, Eclipse, Pinnacle, iPlan, Velocity, DICOMan
- AlignRT, Active Breathing Coordinator

Other

- IMRT QA
 - In Vivo dosimetry
 - Dosimeters - Ion chamber, diodes, radiochromic film (EBT2 and EBT3), radiographic film (portal pack, EDR2, XV), optically stimulated luminescent detectors
 - Record & Verify system – Mosaik (Initial, weekly, final, special physics chart review)
 - Philips Brilliance Big Bore CT Simulator (daily and monthly QA)
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MANUSCRIPT REVIEW SERVICE

- International Journal of Radiation Oncology, Biology, Physics
- Radiotherapy and Oncology
- Advances in Radiation Oncology
- Medical Physics
- International Journal of Radiation Biology

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- Journal of Applied Clinical Medical Physics
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HONORS AND AWARDS

- American Brachytherapy Society Prostate LDR/HDR Scholarship Education and Simulator Training Workshop (2017)
 - American Brachytherapy Society HDR Fellowship (2014)
 - Texas A&M Society of Physics Students (Secretary)
 - Research Experience for Undergraduates (REU) Program funded by NSF
 - Texas A&M Society of Physics Students (Treasurer)
 - Pi Tau Sigma (Mechanical Engineering Honor Society)
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INSTITUTIONAL SERVICE

- Medical Physics Certificate Program Steering Committee 2018 - current
 - Dissertation committee – Jace Grandinetti 2020-current
 - Dissertation committee – Yesenia Gonzalez 2018-current
 - Biomedical engineering exam 1 committee member – Yesenia Gonzalez 2018
 - Biomedical engineering exam 1 committee member – Qi Wang 2017
 - Biomedical engineering exam 1 committee member – Elizabeth Polsdofer 2018
 - Associate member of Graduate School of Biomedical Sciences 2015 - current
 - Biomedical engineering works in progress seminar evaluator 2017-current
 - UTSW Medical School admissions interviewer 2017 - 2020
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PROFESSIONAL MEMBERSHIPS

- American Association of Physicists in Medicine (AAPM)
 - American Society for Radiation Oncology (ASTRO)
 - American Brachytherapy Society (ABS)
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PROFESSIONAL SERVICE

- American Association of Physicists in Medicine Working Group on Medical Errors in Brachytherapy – 2022 - current
- American Brachytherapy Society Educational Committee – 2022 – current
- American Brachytherapy Society Educational GU Subcommittee – 2022 – current
- American Brachytherapy Society Educational Physics Subcommittee – 2022 – current
- American Association of Physicists in Medicine Summer School faculty volunteer - 2022
- American Association of Physicists in Medicine Brachytherapy Subcommittee – 2021 - current
- American Board of Radiology Medical Physics Board Exam Oral Examiner – 2021, 2022
- American Board of Radiology Therapy Medical Physics Part 2 Exam Assembly - 2021
- American Board of Radiology Clinical and General Part 1 Exam Assembly - 2021
- American Board of Radiology OLA question rater – 2020 - current
- Member of American Board of Radiology Medical Physics Clinical Committee – 2019 - current
- Self-Assessment Module (SAM) reviewer for American Board of Radiology – 2018 – current
- Southwest AAPM Annual Meeting – discussant for Imaging/Contouring/Dose constraints session – 2020
- Southwest AAPM Annual Meeting – discussant for Common Pitfalls in HDR Brachytherapy session – 2020
- Southwest AAPM Annual Meeting – brachytherapy physics expert for HDR brachytherapy workshop - 2020
- Southwest AAPM Annual Meeting Young Investigator's Symposium abstract reviewer - 2020
- American Brachytherapy Society Annual Meeting Prostate simulation workshop circulator – 2019
- AAPM Annual Meeting abstract reviewer - 2018