Bryan P. Bednarz, Ph.D.

Associate Professor w/ Tenure
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EDUCATION

Degree	Year	Institution	Department/Organization
BSE	2004	University of Michigan, Ann Arbor, MI	Nuclear Engineering and Radiological Sciences (w/ distinction)
MSE	2005	University of Michigan, Ann Arbor, MI	Nuclear Engineering and Radiological Sciences (w/ distinction)
PhD	2008	Rensselaer Polytechnic Institute, Troy, NY	Nuclear Engineering and Science (w/ distinction)

EMPLOYMENT HISTORY

Dates	Title	Department/Organization
2008-2010	Postdoctoral Research Fellow	Department of Radiation Oncology, Massachusetts General Hospital and Harvard Medical School, Boston, MA
2010-2016	Assistant Professor	Department of Medical Physics, University of Wisconsin, Madison, WI
2016-	Associate Professor (w/ Tenure)	Department of Medical Physics, University of Wisconsin, Madison, WI
2011-	Adjunct Professor	Department of Engineering Physics, University of Wisconsin, Madison, WI
2016-	Co-Founder and Chief Scientific Officer	Voximetry, LLC, Middleton, WI

TEACHING

A. Course Instructor or Teaching Assistant

Dates	Course Title	Role	Department/Organization
Fall 2005	Design of Mechanical Systems	TA	Department of Mechanical, Aerospace and Nuclear Engineering, Rensselaer Polytechnic Institute, Troy, NY
Fall 2008	Radiological Engineering	TA	Department of Mechanical, Aerospace and

			Nuclear Engineering, Rensselaer Polytechnic Institute, Troy, NY
Fall 2011-2016	Radiation Lab – Health Physics	Instructor	Department of Medical Physics, University of Wisconsin, Madison, WI
Spring 2011-	Health Physics and Biological Effects of Radiation	Instructor	Department of Medical Physics, University of Wisconsin, Madison, WI
Summer 2017-	UW/China Summer Program, Health Physics and Biological Effects	Instructor	Department of Medical Physics, University of Wisconsin, Madison, WI
Fall 2017-	Targeted Radionuclide Therapy	Co-Instructor	Department of Medical Physics, University of Wisconsin, Madison, WI
Fall 2019-	Cellular, Molecular, and Radiation Biology	Co-Instructor	Department of Medical Physics, University of Wisconsin, Madison, WI

B. Guest Lectures

Dates	**Course Title**	**Role**	**Department/Organization**
Spring 2006	Intro to Nuclear Engineering and Engineering Physics	Guest	Department of Mechanical, Aerospace and Nuclear Engineering, Rensselaer Polytechnic Institute, Troy, NY
Fall 2009	Intro to Medical Physics	Guest	Department of Radiation Oncology Residency Program, Harvard Medical School, Boston, MA
Spring 2010	Radiation Therapy Physics	Guest	Northeastern University, Boston, MA
Spring 2011	Ionizing Radiation	Guest	Department of Engineering Physics, University of Wisconsin, Madison, WI
Spring 2012	Practicum in Monte Carlo Radiation Transport	Guest	Department of Engineering Physics, University of Wisconsin, Madison, WI
Fall 2013	Targeted Radionuclide Therapy	Guest	Department of Medical Physics, University of Wisconsin, Madison, WI
Spring 2014	Physics of Radiotherapy	Guest	Department of Medical Physics, University of Wisconsin, Madison, WI
Spring 2018	Ionizing Radiation	Guest	Department of Engineering Physics, University of Wisconsin, Madison, WI
Spring 2018	Radiobiology	Guest	Department of Human Oncology, University of Wisconsin, Madison, WI

C. Student Thesis Supervision

Degrees Completed

a) Masters

1. **Paul Wickre**, May 2014
   Thesis Title: NA
   Current Position: Software Engineer, Standard Imaging, Middleton, WI
2. **Steve Ellefson*,** Spring 2016
   Thesis Title: The Development of a ViewRay-Compatible Corrections Algorithm for the ArcCHECK-MR Diode Array

Current Position: Medical Physics Resident, Mayo Clinic, Phoenix, AZ
*co-advised with John Bayouth, Ph.D.

3. **Sabrina Hoffman***, Spring 2016
Thesis Title: NA
Current Position: Medical Physics Resident, Loyola University Medical Center, Maywood, IL
*co-advised with Prof. Bruce Thomadson

b) Doctoral

1. Tyler Fowler*, May 2015
Thesis Title: A Novel High-throughput Irradiator for in vitro Radiation Sensitivity Bioassays
Current Position: Medical Physicist, Community Cancer Center, Roseburg, OR
*co-advised with Randy Kimple, M.D., Ph.D.
2. Youming Yang, Fall 2015
Thesis Title: Concurrent Monte Carlo Transport and Fluence Optimization, Theory, Development and Applications
Current Position: Clinical Assistant Professor, University of California Los Angeles, Los Angeles, CA
3. Abigail Besemer Spring 2016
Thesis Title: Development, Validation and Implementation of a Patient-Specific Monte Carlo 3D Internal Dosimetry Platform
Current Position: Clinical Assistant Professor, University of Nebraska, Lincoln, NE
4. Andrew Shepard, Summer 2018
Thesis Title: An ultrasound-based motion management system utilizing 2D/3D real-time tracking for use in radiotherapy
Current Position: Medical Physics Resident, University of Wisconsin, Madison, WI
5. Charles Matrosic, Spring 2019
Thesis Title: Development of a liver gel-dosimetry motion phantom for real-time image-guided radiotherapy verification
Current Position: Medical Physics Resident, University of Michigan, Ann Arbor, MI
*co-advised with Prof. Wes Culberson

Degrees in Progress

a) Masters

b) Doctoral

1. Ian Marsh (Expected Graduation Fall 2020)
2. David Adam (Expected Graduation Fall 2021)
3. Sydney Jupitz (Expected Graduation Spring 2022)
4. Nadeem Shaheen (Expected Graduation Spring 2023)

Doctoral Thesis Committee Reading Member

1. Patrick Hill, "Fan-Beam Intensity Modulated Proton Therapy," Advisor: Rock Mackie (Spring, 2011)
2. Timothy Szczykutowicz, "Intensity Modulated Computed Tomography," Advisor: Chuck Mistretta (Winter, 2012)
3. Heming Zhen, "Improving Patient-Specific Pre-Treatment Quality Assurance," Advisor: Wolfgang Tome (Spring, 2012)
4. Regina K. Fulkerson, "Dosimetric characterization of surface applicators for use with high dose rate ^{192}Ir and electronic brachytherapy sources," Advisor: Larry DeWerd (Fall, 2012)
5. Laura Bartol, "Spectroscopic characterization of high-energy and high fluence rate photon beams," Advisor: Larry DeWerd (Fall, 2012)
6. Mariela A. Porras-Chaverri, "Patient-oriented Breast Imaging Dosimetry," Advisor: John Vetter (Summer, 2014)

7. Andrew Ellis, "Radiotherapy for Subvolumes in a Moving Target: Methods to Overcome Breathing Variability in Planning and Delivery," Advisor: Wolfgang Tome (Spring, 2013)
8. Martha Malin, "Energy-Based Dosimetry of Low-Energy, Photon-Emitting Brachytherapy Sources," Preliminary Exam, Advisor Larry DeWerd (Fall, 2012)
9. Jeremy Gordon, "Improved Acquisition Efficiency for Hyperpolarized ^{13}C MRI: Application to Brain Metabolism," Advisor: Sean Fain (Spring, 2013)
10. Jialu Yu, "Is Dose Accumulation Required? Implications on Adaptive Dose Guidance," Advisor: Wolfgang Tome (Spring 2013)
11. Stephanie Junell, "Dosimetry for Small and Nonstandard Fields," Advisor: Larry DeWerd (Spring 2013)
12. Alex Robinson, "Development of a Monte Carlo code system with continuous energy adjoint transport capabilities for neutrons and photons," Preliminary Exam, Advisor: Douglass Henderson (Summer, 2013)
13. Jessica Miller, "Characterization and optimization of microionization chambers," Advisor: Larry Deward (Fall, 2013)
14. David Campos, "Radiation Promptly Alters Cancer Live Metabolic Fluxes", Preliminary Exam, Advisor: Michael Kissick (Summer, 2014)
15. Mariajose Bedoya, "Techniques Enhancing Microwave Ablation" Preliminary Exam, Advisor: Christopher Brace (Fall, 2014)
16. Areli Zuniga, "Generalized Tumor Dose for Treatment Planning Decision Support," Advisor: Bhudatt Paliwal (Fall, 2014)
17. Travis McCaw, "Characterization of the interplay effect in step-and-shoot intensity-modulated radiation therapy in the lung," Advisor: Larry DeWerd (Spring, 2015)
18. Tyler Bradshaw, "Target Definition in Biologically Conformal Radiation Therapy," Advisor: Robert Jeraj (Spring, 2015)
19. Benjamin Rosen, "Advanced radiochromic film methodologies for quantitative dosimetry of small and nonstandard fields," Advisor: Larry Dewerd (Spring, 2015)
20. Joshua Reed, "Improved Dosimetry and New Directions for Low-Energy Photon-Emitting Elongated Brachytherapy Sources," Advisor: Larry DeWerd (Summer, 2015)
21. Surendra Prajapati, "Development of small animal radiotherapy within the design of integrated small animal imaging and therapy system: an open-source medical devices (OSMD) initiative," Advisors: Rock Mackie and Robert Jeraj (Summer, 2015)
22. Yue Yan, "Soft-Spectrum-Filter (SPECTER) for Flattening-Filter-Free Beams from TrueBeam System," Advisor: Bhudatt Paliwal (Summer, 2015)
23. Megan Hyun (Formely Wood), "Improving Dose Determination Accuracy in Nonstandard Fields of the Varian TrueBeam Accelerator", Advisor: Larry DeWerd (Spring, 2016)
24. Luke Kersting, "Electron Upgrade of a Forward-Adjoint Continuous Energy Monte Carlo Code," Preliminary Exam, Advisor: Douglass Henderson (Spring, 2016)
25. Elliot Biondo, "Hybrid Monte Carlo/Determinstic Neutron Transport for Shutdown Dose Rate Analysis of Fusion Energy Systems," Advisor: Paul Wilson (Summer, 2016)
26. Michael Lawless, "Kilovoltage X-ray dosimetry for cone beam computed tomography," Larry DeWerd (Spring, 2016)
27. Akire Trestrail, "Directional HDR Brachytherapy," Preliminary Exam Advisor: Bruce Thomadsen (Spring, 2016 retake Summer, 2016)
28. Sabrina Hoffman, "Investigation of Auger electrons from bromine isotopes as a viable therapeutic agent for cancer therapy" Preliminary Exam, Advisor: Bruce Thomadsen (Fall, 2016)
29. Hector Valdovinos, "Production, labeling and in vivo studies with the theranostic positron-emitting radiometals ^{44}Sc, $^{55/58m/55g}Co$, $^{61/64}Cu$, ^{86}Y and ^{69}Ge," Advisor: Jerry Nickles (Spring, 2017)
30. Jessica Fagerstrom, "Optimized Orthovoltage Stereotactic Radiosurgery," Advisor: Wes Culberson (Spring, 2017)
31. Stephanie Harmon, "Bridging the Gap: connecting imaging phenotypes and cellular genotypes" Advisor: Robert Jeraj (Spring, 2017)

32. David Dunkerley, “Development of a 3D device guidance platform for the Scanning-Beam Digital X-ray (SBDX) system”, Advisor: Michael Speidel (Spring, 2017)
33. Wenjun Yang, Monitoring Microwave Ablation Treatment for Liver Tumors Using Ultrasound Elastography,” Advisor: Tomy Varghese (Summer, 2017)
34. Jon Hansen, “Development of a Convex Windowless Extrapolation Chamber to Measure Surface Dose Rate from Episcleral Plaques”, Advisor: Larry DeWerd (Spring, 2018)
35. Kai Ludwig, “Development and Validation of MRI Techniques for Cellular Tracking and Imaging of Organ Function,” Advisor: Sean Fain (Spring, 2018)
36. Daniel Gomez Cardona, “Low Radiation Dose Computed Tomography: Technology Development and Assessment,” Advisor: Guang-Hong Chen (Spring, 2018)
37. Sameer Taneja, “A Characterization of Spectral Variations Resulting from Intensity Modulation for High Energy, High Fluence Photon Beams,” Advisor: Larry DeWerd (Spring, 2018)
38. Taylor Patton, “Quantifying and Modeling Radiation Therapy-Induced Ventilation Changes and Investigating the Robustness of 4DCT-Based Functional Avoidance”, Advisor: John Bayouth (Summer, 2018)
39. Lindsay Bodart, “Real-Time Three-Dimensional Image Guidance Platform Using Transthoracic Echocardiography and X-ray Fluoroscopy,” Preliminary Exam, Advisor: Michael Speidel (Spring, 2019)
40. Eric Simiele, “Characterization of Signal Changes in Light Guides Used for Scintillation Dosimetry in the Presence of a Magnetic Field,” Advisor: Larry DeWerd (Spring, 2019)
41. Vimal Desai, “Towards an Objective Determination of Plan-Class Specific Reference Fields for Nonstandard Linear Accelerator Treatments,” Advisor: Wesley Culberson (Spring 2019)
42. Michael Taylor, “Characterization of a Compact Neutron Generator and 2-Dimensional Neutron Detection Platform for Thermal Neutron Radiography,” Advisors: Douglass Henderson and Paul Deluca (Spring, 2019)
43. Chelsea D'angelo, “Variance Reduction for Multi-physics Analysis of Moving Systems,” Advisor: Paul Wilson (Spring 2019)
44. Moataz S. Harb, “Propagation of Statistical Uncertainty in Mesh-Based Shutdown Dose Rate Calculations,” Advisor: Paul Wilson (Spring 2019)
45. Eli Moll, “Forward and Adjoint Thermal Neutron Methods Development For Use With a Forward-Adjoint Continuous Energy Monte Carlo Code,” Advisor: Douglass Henderson (Spring 2019)
46. Autumn Walter, “Determination of the Effects of filtration on the Relative Biological Effectiveness of the Xoft Axxent Electronic Brachytherapy Source,” Preliminary Exam, Advisor: Larry DeWerd (2019)
47. Leonard Chu Fru, “Measurement of hemoglobin oxygen saturation in tissue with an optical device,” Advisor: Larry DeWerd (Summer 2019)
48. Natalie Viscariello, “Toward Dosimetry Standardization in Radiobiology X-ray Irradiators,” Advisor: Larry DeWerd (Summer, 2019)
49. Carla Winterhalter, “Protons do play dice: Validating, implementing and applying Monte Carlo techniques for proton therapy,” ETH Zurich, Advisor: Anthony Lomax (Summer 2019), *Professional appraisal of thesis
50. Blake Smith, “Dosimetry of a Novel Dynamic Collimation System for Intracranial Pencil Beam Scanning Proton Therapy,” Advisor: Wes Culberson (Fall 2019)
51. Peter Ferjancic, “Probabilistic Incorporation of Uncertainties in Radiation Therapy,” Preliminary Exam, Advisor: Robert Jeraj (Fall 2019)
52. Muhammed Bedir, “An Improved 3D Image-Guidance Methodology for Breast Tumor Localization with an Intra-Operative Handheld Gamma Prove,” Advisor: Bruce Thomadsen (Spring 2020)
53. Chris Kutyreff, “Improved production of and novel radiolabeling strategies for 69/71germanium,” Preliminary Exam, Advisor: Jon Engle (Spring 2020)
54. Philip Britt, “Implementation Of Importance Sampling In Particle Radiation Transport Using Monte Carlo Estimator Results,” Preliminary Exam, Advisor: Douglass Henderson (Spring 2020)
55. Emily King, “Development and Characterization of Absolute Dosimeters for Kilovoltage and Higher Energy Radiation,” Preliminary Exam, Advisor: Wesley Culberson (Spring 2020)

56. Leah Turner, "Development of a Plan-Specific QA System Utilizing 3D Gel Dosimetry for SARRP Mouse Treatments," Preliminary Exam, Advisor: Larry Dewerd (Spring 2020)
57. Dongyoul Lee, "Enhancing the Therapeutic Efficacy of Peptide Receptor Radionuclide Therapy For Neuroendocrine Tumors," Advisor: Michael Schultz, University of Iowa (Spring 2020)

D. Post Docs and Research Scientist

1. Joseph Grudzinski, Ph.D., Associated Research Scientist (Fall 2016- 2019)

E. Undergraduate Students

1. Arjun Dhillon, Department of Physics, Princeton University, Princeton NJ (Summer, 2012, "Investigation of NK-cell interactions with surface ligands using the Metropolis Monte Carlo method"
2. Kai Ludwig, Department of Biochemistry, University of Wisconsin, WI (Summer, 2012), "Exploring autophagy signaling pathways in engineered cell lines post irradiation"
3. Andrew Shepard, Department of Engineering Physics, University of Wisconsin, Madison, WI, AAPM Summer Undergraduate Research Fellowship (Summer, 2013), "A Novel Small Animal MC Framework for Preclinical Trials of TRT Agents"
4. Daniel Giffin, Department of Atmospheric and Oceanic Science, University of Wisconsin, Madison WI (Spring, 2014) , "Inducing 'danger signals' on cancer cells with radiation,"
5. Ian Marsh, Department of Engineering Physics, University of Wisconsin, Madison WI, (Spring, 2014), "Modeling a miniature gamma camera"
6. Grant Meadows, Department of Engineering Physics, University of Wisconsin, Madison, WI (Summer, 2016-Fall, 2016), "Biological Effects of Low Dose Exposures Literature Review"
7. Robert Moskwa, Department of Mathematics, Applied Mathematics, Engineering and Physics Program, University of Wisconsin, Madison WI, (Summer, 2017), "Development of a fast contour propagation technique"
8. Noah Schweitzer, Department of Engineering Physics, University of Wisconsin, Madison, WI, (Spring, 2018), "Monte Carlo modeling of dose enhancement due to gadolinium-labeled alkyl-phospholipid ethers in tumors"
9. Alexander Antonovich Strunets, Biology Major, (Fall 2019), "Microscopic Imaging of Phospholipid Ethers in Cancer Cells"

PATENTS

1. P160396US01 "Radioiodinated Agents for In Situ Immune Modulated Cancer Vaccination," by J. Weichert, P. Sondel, A. Pinchul, Z. Morris, **B. Bednarz**, submitted 2016
2. P160397US01 "Targeted Radiotherapy Chelates for In Situ Immune Modulated Cancer Vaccination," by J. Weichert, P. Sondel, A. Pinchul, Z. Morris, **B. Bednarz**, submitted 2016
3. P160325US01 "Phosholipid Ether Analogs for Imaging and Targeted Treatment of Pediatric Solid Tumors," by M. Otto, **B. Bednarz**, J. Weichert, and D. Baiu, submitted 2016
4. P507194-UW, "Identification Of Respiratory Phases In A Medical Procedure," by J. Mitra, S. Chatterjee, TKF Foo, DTB Yeo, **B Bednarz**, S Jupitz, submitted 2020
5. P200152, "Fast, Pose-Specific Deep Learning-Based Deformable Transformation Models To Guide Ablation Applicator Insertion For Liver Ablation," J Holmes, **B Bednarz**, S Wells, C Brace, J Mitra, T Foo, M MacDonald, S Ghose, C Bhushan, D Yeo submitted 2020

RESEARCH SUPPORT

A. Ongoing Research Support

Hyundai Hope on Wheels — 09/01/2019-08/31/2021
Hyundai

Towards Improving Outcomes In Relapsed/Refractory Childhood Leukemia: Molecular Targeted Radiotherapy With Alkyl Phosphocholine Analogs
Description of goals: Investigate the use of the second-generation APC analog 90Y-NM600 for re-induction therapy in preparation for HSCT, and potentially at other stages of leukemia treatment as well.
Role: Co-I

R01 CA190298-01A1 07/01/15-06/30/2020
NIH/NCI
Real-time Tumor Localization and Guidance For Radiotherapy Using U/S and MRI
Description of goals: The goal of this project is to develop and validate a robust, non-invasive, and cost-effective image-guidance platform to directly track tumor motion using a 4D planar ultrasound transducer during radiation therapy that is coupled to a pre-treatment calibration training image set consisting of a simultaneous 4D ultrasound and 4D MRI acquisition.
Role: PI

SPORE CA196513-01 08/01/2016-07/30/2021
NIH/NCI
The Wisconsin Head and Neck SPORE
Description of goals: The Wisconsin Head and Neck SPORE seeks to identify and translate new scientific discoveries into significant and durable treatment advances for patients with HNC. These advances strive to increase HNC cure rates and diminish normal tissue toxicities.
Role: Co-I

Department Research Grant 1/1/2018-12/31/2019
UW Dept. of Radiology
First-in-Human Study of 51MnCl$_2$ PET
Description of goals: To perform the first-in-human imaging study of $^{31}MnCl_2$ for imaging functional β-cell mass.
Role: Co-I

UW SEED Grant 07/1/2018-06/30/2020
UW Graduate School
RAPID: an extremely fast Monte Carlo dose computing software for nuclear medicine
Description of goals: This project aims to develop a low-cost MC-based RT dosimetry system optimized for heterogeneous GPU/CPU computing and to demonstrate the performance advantage of RAPID against established methods used at UW-Madison using clinical PET/CT datasets.
Role: PI

U01CA233102-01 09/01/18 – 08/31/23
NIH/NCI
Immunomodulation of the Tumor Microenvironment with Molecular Targeted Radiotherapy to Facilitate an Adaptive Anti-Tumor Immune Response to Combined Modality Immunotherapies
Description of goals: The goal of this project is to develop a new approach, representing a dramatic shift in the treatment of metastatic cancer, utilizing immune responses to recognize and destroy cancer (known as immunotherapy) in combination with low-dose radiation therapy, which substantially improves the anti-tumor potency of the immunotherapy regimens that are created.
Role: Co-I

T32 CA0090206 08/1/1978-05/31/2020
NIH/NCI NRSA

UW Radiological Training Grant
Description of goals: To support Ph.D. and postdoctoral research related to cancer. The goal of this training program is to prepare physicists and engineers for research careers in radiological physics and dosimetry as well as in functional, anatomical, and interventional medical imaging as it applies to the detection and treatment of cancer.
Role: Mentor

B. Completed Research Support

Department Research Grant 7/1/2018-6/30/2019
UW Dept. of Radiology
Intraoperative Image-based Localization for Breast Surgery
Description of goals: This project aims to improve the accuracy of this particular surgical approach and eliminate re-excisions by providing live-time, three-dimensional augmented-reality image guidance for the surgeon.
Role: Co-I

Childhood Cancer Research Grant 07/1/2018-06/30/2019
St. Baldrick's Foundation
Improving Anti-Cancer Immune Responses to Targeted Radionuclide Therapy
Description of goals: To test a drug in combination with radiotherapy that has shown to reduce or deplete immunosuppressive cells from tumors, and lead to increased numbers of cancer killing immune cells in the cancer tissue. In mouse models of pediatric cancer, we will combine this drug with a particular form of radiotherapy, called radionuclide therapy that uses radioactive substances which are injected into the bloodstream to carry their radioactive load directly to tumor cells.
Role: Co-I

UW2020: WARF Discovery Initiative 08/01/2016-07/30/2018
Wisconsin Alumni Research Foundation
Combining Radiotherapeutic with Antitumor Antibody and IL2 to Create a Potent In Situ Cancer Vaccine
Description of goals: This project brings together two very distinct cutting-edge disciplines in cancer treatment research: 1) systemically administered targeted radiotherapy and 2) locally-directed, antibody-mediated, cancer immunotherapy. Our preliminary data suggest that powerful synergy should result from combining these approaches. The goal of this work is destruction of visible macroscopic tumor in a way that enables the destroyed cancer cells to function as a potent in situ vaccine that creates tumor-specific T cell immunity able to eradicate persistent residual metastatic disease, potentially for any type of tumor in any location.
Role: Co-PI

STTR-Virtual Phantoms, Inc. 12/01/2015-11/30/2018
NIH/NCI
Archer – An Extremely Fast Monte Carlo Radiation Dose Computing Software
Description of goals: The goal of this project is to develop very fast treatment planning capabilities using state-of-the-art GPU/CPU technology.
Role: Sub Contract-PI

Carbone Cancer Center Pilot Award 09/13/12-03/31/13
UW Carbone Cancer Center
Autophagy in the Tumor Microenvironment: A Potential Target for Radiation Sensitization
Description of goals: The goals of this research are to determine the conditions under which radiation induces autophagy in head and neck cancer and how this process is modulated by HPV and to examine the relationship between autophagy and tumor microenvironment in HPV+ and HPV- HNC tumorgrafts.

Role: Co-PI

Carbone Cancer Center Pilot Award 07/01/12-06/30/14
UW Carbone Cancer Center
Monitoring of ^{19}F-labeled NK Cell Trafficking for Cancer Immunotherapy Using MRI
Description of goals: To optimize NK cell infusions by first making them visible by MRI using a nonradioactive isotope of fluorine, ^{19}F, and them tracking them in vivo and to test whether local irradiation of a tumor causes the tumor to present "danger signals" that attract NK cells after infusion and makes tumors more susceptible to NK cells
Role: Co-I

Graduate School Fall Competition 07/01/13-06/30/14
University of Wisconsin Graduate School
A Novel Small Animal Dosimetry Platform to Facilitate Preclinical Trials for Targeted Radionuclide Therapy
Description of goals: The goal of this research is to develop a Monte Carlo-based small animal dosimetry platform to facilitate the evaluation of a variety of ongoing and forthcoming preclinical trials at UW.
Role: PI

R01 CA158800-04 09/12/11-07/31/15
NIH/NCI
PET/CT Imaging of Malignant Brain Tumors with ^{124}I-NM404
Description of goals: This project investigates the utility of a new tumor imaging agent, NM404, to more accurately characterize malignant brain tumors in humans.
Role: Co-I

SBIR Phase I/II Fast Track - Cellectar 10/01/2015-12/31/2016
NIH/NCI
I-125-CLR1404 as a (Neo)adjuvant Treatment Option for Triple-Negative Breast Cancer
Description of goals: The goal of this project is to investigate the use of I-125-CLR1404 as a (neo)adjuvant treatment option for triple-negative breast cancer. This project will address the unmet clinical need for an efficacious therapy for TNBC that will significantly improve the quality of life and increase long-term survival. Multi-scale dosimetry will be performed to investigate the effectiveness of the proposed treatment.
Role: Sub Contract-PI

R21 CA198392-01 07/01/15-6/30/2017
NIH/NCI
A cancer-targeted phospholipid ether analog for molecular radiotherapy of pediatric solid tumors
Description of goals: The goal of this project is to investigate the highly tumor selective phospholipid ether analog CLR1404 as scaffold for delivery of radioiodine isotopes for molecular radiotherapy and personalized dosimetry in pre-clinical rodent models of pediatric solid cancers. The project has a strong potential to increase the dismal survival rate of children with these particularly deadly tumors.
Role: PI

Graduate School Fall Competition 07/01/16-06/30/17
University of Wisconsin Graduate School
A concurrent Monte Carlo dose calculation and fluence optimization platform with low memory footprint
Description of goals: The goal of this research is to develop a Monte Carlo-based treatment planning solution that performs dose calculation and optimization concurrently.
Role: PI

PUBLICATIONS

A. Books and Books Chapters

1. **B. Bednarz**, "Chapter 15: Applications of Computational Phantoms," in The Phantoms of Medical and Health Physics, The Phantoms of Medical and Health Physics, Devices for Research and Development, Springer, (2014)
2. **B. Bednarz** and J. Vetter, Chapter 2: Quality and Safety in Medical Imaging," Quality and Safety in Medical Imaging, Edited by J. P. Kanne, Wolters-Kluwer (2016)
3. S. Kry, **B. Bednarz**, R.M. Howell, "Chapter 22: Dose outside the treatment volume in external beam therapy," 3D Dosimetry Clinical Dosimetry in Modern Radiation Therapy, Edited by B. Mijnheer, CRC Press (2016)
4. P. Deluca and **B. Bednarz**, Principles of Radiation Protection, Taylor and Francis, *in preparation* (2021)
5. **B. Bednarz**, A. Besemer, I. Marsh, and J. Grudzinski, "RAPID – A Monte Carlo Dosimetry Platform for Radiopharmaceutical Therapy," Monte Carlo Calculations in Nuclear Medicine: Therapeutic Applications (2nd Edition), Edited by H. Zaidi, Institute of Physics *in preparation* (2020)

B. Peer-Reviewed and Archived Journal Papers and Conference Proceedings

(students marked with *)

1. P. Charland, I. Chetty, L. Paniak, **B. Bednarz**, and B. Fraass, "Enhanced spectral discrimination through the exploitation of interface effects in photon dose data," *Med. Phys.* **31**, 264-276, (2004)
2. J. Zhang, **B. Bednarz**, and X.G. Xu, "An investigation of voxel geometries for MCNP-based radiation dose calculations," *Operational Radiat. Safety*, **91** Suppl. 2, S59-S65 (2006)
3. **B. Bednarz** and X.G. Xu, "A feasibility study to calculate unshielded fetal doses to pregnant patients in 6-MV photon treatments using Monte Carlo methods and anatomically realistic phantoms," *Med. Phys.* **35**, 3054-3061 (2008)
4. J. Gu, **B. Bednarz**, X.G. Xu, and S. Jiang, "Assessment of patient organ doses and effective doses using the VIP-Man adult male phantom for selected cone-beam CT imaging procedures during image guided radiation therapy," *Radiat. Prot. Dosim.* 131(4), 431-443 (2008)
5. Xu XG, Bednarz B, Paganetti H. A review of dosimetry students on external beam radiation treatment with respect to second cancer induction. Phys. Med. Biol. 53: R193-R241. 2008. **Among the top-10 most cited papers in Physics in Medicine and Biology (PMB) in two years ending July 2010**
6. B. Han, **B. Bednarz**, Y. Danon, R. Block, and X.G. Xu, "Evaluation of the Nuclear Activation of Tungsten Plates for Future Modeling of a Medical Accelerator Target," *Proceedings in Nuclear Technology*, **168**, 576-579 (2009)
7. **B. Bednarz**, B. Han, and X.G. Xu, "Comparison of photoneutron yields in MCNPX using different photonuclear cross section data for typical radiation therapy energy ranges," *Proceedings in Nuclear Technology*, **168**, 270-273 (2009)
8. B. Han B., **B. Bednarz**, X.G. Xu, "A study of the shielding used to reduce leakage and scattered radiation in a pregnant patient treated with a 6-MV external x-ray beam," *Health Physics Journal* 97, 6, 581-589 (2009)
9. J. Gu, **B. Bednarz**, P. Carracappa, X.G. Xu, "The development, validation and application of a multidetector CT (MDCT) scanner model for assessing pregnant patient organs doses using Monte Carlo methods," *Phys. Med. Biol.* **54**, 2699-2717 (2009)
10. **B. Bednarz** and X.G. Xu, "Monte Carlo modeling of a 6- and 18-MV Varian Clinac medical accelerator for in-field and out-of-field dose calculations: development and validation," *Phys. Med. Biol.* **54**, N43-N57 (2009)
11. **B. Bednarz** and X.G. Xu, "Calculated organ doses from selected prostate treatment plans using Monte Carlo simulations and an anatomically-realistic computational phantom," *Phys. Med. Biol.* **54**, 5271-5286 (2009)
12. B. Han, X.G. Xu, and **B. Bednarz**, "Applications of a Monte Carlo computational framework of a medical accelerator used for radiation treatment," Proceedings of the International Conference on

Mathematics, Computational Methods and Reactor Physics, Saratoga Springs, May 3-7, on CD-ROM, (2009)

13. H. Paganetti, B. Athar, **B. Bednarz**, "Dose rate effects when estimating risks for second malignancies: In regard to Fontenot et al (Int. J. Radiat. Oncol. Biol. Phys. 2009;74:616-22)," *Int. J. Radiat. Oncol. Biol. Phys.* 75 (5) 1623-1625 (2009)
14. B. Athar, **B. Bednarz**, J. Seco, C. Hancox, and H. Paganetti "Comparison of out-of-field photon doses in 6-MV IMRT and neutron doses in proton therapy for adult and pediatric patients," *Phys. Med. Biol.* 55, 2879-2891 (2010)
15. **B. Bednarz**, B. Athar, X. G. Xu, "A comparative study on the risk of second primary cancers in out-of-field organs associated with radiotherapy of localized prostate carcinoma using Monte Carlo-based accelerator and patient models," *Med. Phys.* 37 (5), 1987-1994 (2010)
16. **B. Bednarz**, J. Daartz, H. Paganetti, "Dosimetric accuracy of planning and delivering small proton therapy fields," *Phys. Med. Biol.* 55, 7425-7438 (2010)
17. **B. Bednarz**, H-M Lu, M. Engelsman, H. Paganetti, "Uncertainties and correction methods when modeling passive scattering proton therapy treatment heads with Monte Carlo," *Phys. Med. Biol.* 56, 2837-2854 (2011)
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C. Conference Abstracts

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2. M. Furler, **B. Bednarz**, and X.G. Xu, "The use of Computer Aided Design (CAD) to assist in the development of IMRT geometries in MCNP," presented at the Health Physics Society Annual Meeting, Providence, RI (2006)
3. X.G. Xu, **B. Bednarz**, and B. Wang, "Measured and simulated organ doses for IMRT and 3D-CRT," transactions of the American Nuclear Society, **95**, 613-614 (2006)
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5. **B. Bednarz**, B. Wang, and X.G. Xu, "Measured and simulated non-target whole-body dose for selected IMRT and 3D-CRT treatment plans," presented at the American Association of Physicists in Medicine Annual Meeting, Orlando, FL (2006)
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8. **B. Bednarz** and X.G. Xu, "Monte Carlo based calculations of neutron activation in a medical linear accelerator," presented at the Health Physics Society Annual Meeting, Portland, OR (2007) **winner of the H. Wade Patterson Award Best Student Accelerator Presentation**
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14. J. Gu, V. Taranenko, **B. Bednarz**, P. Caracappa, X.G. Xu, "A preliminary study to assess dose to pregnant females and fetuses undergoing CT examinations," presented at the Health Physics Society Annual Meeting, Pittsburg, PA (2008)
15. **B. Bednarz** and X. G. Xu, "Methods to calculate organ doses due to scattered radiation from external beam radiation treatment using various patient phantoms and Monte Carlo simulations," presented at the American Association of Physicists Annual Meeting, Houston, TX (2008)
16. B. Han, A. Dorgue, **B. Bednarz**, X.G. Xu, "ATOM phantom measurement and Monte Carlo simulations for organ doses from IMRT" presented at the American Association of Physicists Annual Meeting, Anaheim, CA (2009)
17. U. Titt, **B. Bednarz**, H. Paganetti, R. Mohan, "Comparing Geant4 and MCNPX for joint research to minimize uncertainties in proton therapy," presented at the American Association of Physicists Annual Meeting, Anaheim, CA (2009)
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31. X.G. Xu, B. Han, A. Ding, **B. Bednarz**, G.T.Y. Chen, D. Riper. Monte Carlo Simulations and Particle Tracking for Optimization of a 4D Time-Resolving Range Telescope in Proton Treatment. The Joint International Conference of the 7th Supercomputing in Nuclear Application and the 3rd Monte Carlo (SNA + MC2010), Tokyo, Japan (2010)
32. Y.M. Yang* and **B. Bednarz**, "Monte Carlo Investigation on dose perturbations in the lung due to constant magnetic fields during MRIgRT," presented at AAPM Annual Meeting, Vancouver, BC (2011)
33. **B. Bednarz**, T.R. Mackie, D.M. Polans, N. Sheibani, "A dedicated small animal proton delivery system for AMD research," presented at the ANS Winter Meeting, Washington, D.C. (2011)
34. **B. Bednarz**, A. Besemer*, Y.M. Yang*, "A Monte Carlo-based small animal dosimetry platform for pre-clinical trials: proof of concept," presented at the AAPM Annual Meeting, Charlotte, NC (2012)
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36. Y.M. Yang*, **B. Bednarz**, "A Monte Carlo feasibility study for calculating dose perturbations in patient geometries due to homogenous magnetic fields from MRIgRT," presented at the AAPM annual meeting, Charlotte, NC (2012)
37. M.N. Bouchlaka, M.R. Olsen, J.W. Gordon, D.J. Niles, **B. Bednarz**, S.B. Fain, C.M. Capatini, "Optimizing ^{19}F-MRI for monitoring of adoptive cellular therapies in vivo," presented at the International Conference on Immunotherapy in Pediatric Oncology, Frankfurt, Germany (2012)
38. T.W. Speer, P. Bernhardt, **B. Bednarz**, P. Harari, J. Saker, B. Thomadson, "Feasibility of the Systemic Cure of Cancer with Targeted Radionuclide Therapy (TRT)," presented at the American Society of Therapeutic Radiation Oncology annual meeting, Boston, MA (2012)
39. J. Saker, E. Armstrong, **B. Bednarz**, A Besemer*, M. Farhoud, J. Weichert, P. Harari, Combination external beam and internal radiation via CLR1404 in the treatment of head and neck squamous cell carcinoma xenografts," presented at the American Association for Cancer Research annual meeting, Washington, D.C. (2013)
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42. T.F. Fowler*, R. Fulkerson, J. Micka, R. Kimple, **B. Bednarz**, "A fully automated micro-irradiator for in vitro radiobiology research," presented at the Health Physics Society annual meeting, Madison, WI (2013)
43. D. Riley, Y.M. Yang*, D. Campos, P. Wickre*, T.F. Fowler*, and **B. Bednarz**, "Hot Cell Shielding Design for 124I-NM404: A novel PET imaging agent," presented at the Health Physics Society annual meeting, Madison, WI (2013)
44. **B. Bednarz**, "A Pilot Project-based Learning Course in Health Physics at the University of Wisconsin – Madison," presented at the Health Physics Society annual meeting, Madison, WI (2013)
45. **B. Bednarz**, J. Gordon, S. Fain, M. Bouchlaka, C. Capitini, "Monitoring of ^{19}F-Labeled Immune Cell Trafficking During Radiotherapy Using MRI," presented at the American Association of Physicists in Medicine annual meeting, Indianapolis, IN (2013)
46. T Fowler*, R. Fulkerson, J. Micka, R. Kimple, **B. Bednarz**, "Development of a Novel High-Throughput Variable Dose Rate Irradiator for in Vitro Radiobiology Research," presented at the American Association of Physicists in Medicine annual meeting, Indianapolis, IN (2013)
47. A. Besemer*, J. Grudzinski, B. Titz, P. Wickre, L. Hall, J. Weichert, **B. Bednarz**, "Towards Personalized Dosimetry Using Diapeutic Radiopharmaceuticals," presented at the American Association of Physicists in Medicine annual meeting, Indianapolis, IN (2013)
48. Y M Yang*, M. Geurts, J. B. Smilowitz, E. Sterpin, **B. Bednarz**, "Exploiting the Rotational Symmetry of Tomotherapy to Reduce Dose Perturbations From MRI-Guided Radiotherapy: A Monte Carlo Investigation," presented at the American Association of Physicists in Medicine annual meeting, Indianapolis, IN (2013)
49. **B. Bednarz**, S. Fain, J. Gordon, M. Bouchlaka, C. Capitini, "Immune cell trafficking during radiation therapy – a potential predictive marker for therapeutic response," presented at the Radiological Society of North America annual meeting, Chicago, IL (2013)
50. L. Su, Y. M. Yang*, **B. Bednarz**, X. Du, T. Liu, E Sterpin, X. G. Xu, "ARCHERRT – A GPU-based Monte Carlo Radiotherapy Dose Calculation Engine and its Application to Helical Tomotherapy, presented at SNA&MC 2013 Conference, Paris, France (2013)
51. A. Shepard*, T.F. Fowler*, A. Besemer*, **B. Bednarz**, "A Highly Focused Small Animal Irradiator For Preclinical Trials of Low Energy Sources," presented at the American Nuclear Society Winter Meeting, Washington D.C. (2013)
52. K. Ludwig, J.W. Gordon, M.N. Bouchlaka, C.M. Capitini, **B. Bednarz**, S. B. Fain, "In-vivo tracking of 19F-labeled natural killer cells with MRI in lymphoid tumor model at 4.7T," to be presented at International Society for Magnetic Resonance in Medicine Annual Meeting, Milan Italy (2014)
53. A. Besemer*, L. Hall, B. Titz, J. Grudzinski, J. Weichert, **B. Bednarz**, "Impact of PET and MRI Threshold-based Tumor Volume Segmentation on Targeted Radionuclide Therapy Dosimetry," presented at the Society for Brain Mapping and Therapeutics (SBMT) Congress, Sydney Australia (2014)
54. K. Ludwig, M. Bouchlaka, J. Gordon, **B. Bednarz**, C. Capitini, S. Fain, "Quantifying 19F-Labeled Human Natural Killer Cell-Trafficking with MRI," presented at the American Association of Physicists in Medicine annual meeting, Austin, TX (2014)
55. Y. M. Yang*, C. Zankowski, M. Svatos, **B. Bednarz**, "Towards a passively optimized phase-space Monte Carlo (POPMC) treatment planning method: a proof a principle," presented at the American Association of Physicists in Medicine annual meeting, Austin, TX (2014)
56. T.F. Fowler*, J. Martin, A. Shepard*, A. Bailey, K. Nickel, R Kimple, **B. Bednarz**, "Biological validation of a novel high-throughput irradiator for predictive radiation sensitivity bioassays," presented at the American Association of Physicists in Medicine annual meeting, Austin, TX (2014)
57. L. Su, Y.M. Yang*, **B. Bednarz**, E Sterpin, X. Du, T. Liu, X.G. Xu, "Application of ARCHERRT – A GPU-based Monte Carlo dose engine for radiation therapy – to tomotherapy and patient-independent

IMRT," presented at the American Association of Physicists in Medicine annual meeting, Austin, TX (2014)

58. A. Besemer*, B. Titz, J. Grudzinski, J. Weichert, L. Hall, **B. Bednarz**, "Optimizing the combination of targeted radionuclide therapy agents using a multi-scale patient-specific Monte Carlo dosimetry platform," presented at the American Association of Physicists in Medicine annual meeting, Austin, TX (2014)
59. A. Besemer* and **B. Bednarz**, "Validation of a patient-specific Monte Carlo targeted radionuclide therapy dosimetry platform," presented at the American Association of Physicists in Medicine annual meeting, Austin, TX (2014)
60. **B. Bednarz**, K. Ludwig, S. Fain, "In vivo monitoring of fluorinated inhalational anesthetics using 19F MRI: a pilot study," presented at the American Association of Physicists in Medicine annual meeting, Austin, TX (2014)
61. M. Bedir, B. Cox, S. Graves, S. Hoffman, K. Pedersen, A. Schroeder, N. Weisse, **B. Bednarz**, "Dosimetric assessment of radium-223 radionuclide therapy using whole body pharmacokinetic modeling," presented at the 8th International Conference on Isotopes meeting, Chicago, IL (2014)
62. **B. Bednarz**, A. Besemer*, J. Grudzinski, B. Titz, P. Wickre, J. Weichert, L. Hall, "Towards multiscale personalized dosimetry for diapeutic radiopharmaceuticals," **INVITED**, presented at the 8th International Conference on Isotopes meeting, Chicago, IL (2014)
63. **B. Bednarz**, "Overview of the forthcoming AAPM TG-158 Report, "Measurements and calculations of doses outside the treatment volume from External Beam Radiation Therapy," **INVITED**, presented at the ANS RPSD Meeting, Knoxville, TN (2014)
64. I. Marsh* and **B. Bednarz**, "Towards "Virtual" Intra-operative SPECT or PET Guided Surgery: Advances in Image Reconstruction and Registration Using Deterministic Radiation Transport Simulation," presented at the ANS Winter Meeting, Anaheim, CA (2014)
65. M. Bouchlaka, J. Gordon, K. Ludwig, D. Niles, B. Bednarz, S. Fain, C. Capitini, "12F-MRI for tracking NK cells after adoptive transfer," Proceedings of the Immunology 2014 Meeting, J. Immun. 192 (1 Supplement) (2014)
66. A. Bailey, T. L. Fowler*, K. P. Nickel, **B. Bednarz**, R. Kimple, "Biological validation of a novel high-throughput irradiator for predictive radiation sensitivity bioassays," presented at the American Association of Cancer Research Meeting, Philadelphia, PA (2015)
67. K. Cao, **B. Bednarz**, L.S. Smith, T.K. Foo, K.A. Patwardhan, "Respiration induced fiducial motion tracking in ultrasound using an extended SFA approach," presented at the SPIE Ultrasonic Imaging and Tomography Meeting, Orlando, FL (2015)
68. T. Liu, N. Wolfe, L. Su, C.D. Carothers, **B. Bednarz**, X.G. Xu, "Near real-time GPU and MIC-based Monte Carlo code ARCHER for radiation dose calculations in voxelized and mesh phantoms," presented at the 5th International Workshop on Computational Human Phantoms, Seoul, South Korea (2015)
69. C. Matrosic*, W. Culberson, B. Rosem, E. Madsen, G. Frank, **B. Bednarz**, "Initial characterization of a gel patch dosimeter for in vivo dosimetry," presented at the American Association of Physicists in Medicine annual meeting, Anaheim, CA (2015)
70. S. Taneja, L.C. Fru, V. Desai, J. Lentz, M. Scarpelli, E. Simiele, A. Trestrail, **B. Bednarz**, "Development of a radiation monitoring device using a low-cost CCD camera following radionuclide therapy," presented at the American Association of Physicists in Medicine annual meeting, Anaheim, CA (2015)
71. S. Ellefson*, W. Culberson, **B. Bednarz**, L. DeWerd, J. Bayouth, "Analysis of ArcCHECK Diode Array Performance for ViewRay Quality Assurance," presented at the American Association of Physicists in Medicine annual meeting, Anaheim, CA (2015)
72. A. Besemer*, J. Grudzinski, B. Titz, **B. Bednarz**, "Evaluation of dosimetric uncertainties in individualized targeted radionuclide therapy (TRT) treatment planning using pre-clinical data," presented at the American Association of Physicists in Medicine annual meeting, Anaheim, CA (2015)
73. Y.M. Yang*, M. Svatos, C. Zankowski, **B. Bednarz**, "Demonstration of a concurrent Monte Carlo dose calculation and fluence optimization platform with low memory footprint," presented at the American Association of Physicists in Medicine annual meeting, Anaheim, CA (2015)

74. **B. Bednarz**, "Calculation techniques (including Monte Carlo) for determining Non-target photon, electron and neutron doses," **INVITED**, presented at the American Association of Physicists in Medicine annual meeting, Anaheim, CA (2015)
75. **B. Bednarz,** "First Update on a Real-time Tumor Localization and Guidance Platform for Radiotherapy Using US and MRI, presented at the American Nuclear Society Winter Meeting, Washington DC (2015)
76. D. Adam* and **B. Bednarz**, "Assessment of the Proton Boron Fusion Reaction or Practical Radiation Therapy Applications Using MCNP6, presented at the American Association of Physicists in Medicine annual meeting, Washington D.C. (2016)
77. A. Besemer*, I. Marsh*, **B. Bednarz**, "Impact of Temporal Image Coregistration Methods on 3D Internal Dose Calculations in Targeted Radionuclide Therapy," presented at the American Association of Physicists in Medicine annual meeting, Washington D.C. (2016)
78. H. Petroccia, E. Ogluin, W. Culberson, **B. Bednarz**, N. Mendenhall, W. Bolch, "A Monte Carlo Study of Out-of-Field Doses From Cobalt-60 Teletherapy Units Intended for Historical Correlations of Dose to Normal Tissue," presented at the American Association of Physicists in Medicine annual meeting, Washington D.C. (2016)
79. M. Aima, N. Viscariello, T. Patton, **B. Bednarz**, "Radioative Seed Localization for Breast Lumpectomy," presented at the American Association of Physicists in Medicine annual meeting, Washington D.C. (2016)
80. C. Matrosic*, A. McMillan, J. Holmes, **B. Bednarz**, W. Culberson, "Investigation of DEFGEL Dosimetry Using MRI," presented at the American Association of Physicists in Medicine annual meeting, Washington D.C. (2016)
81. S. Prajapati, X. Mo, **B. Bednarz**, M. Lawless, C. Hammer, R. Flynn, D. Westerly, R. Jeraj, T. Mackie, "Development and Validation of Dose Calculation for An Open-Source kV Treatment Planning System for Small Animal Radiotherapy," presented at the American Association of Physicists in Medicine annual meeting, Washington D.C. (2016)
82. A. Shepard* and **B. Bednarz**, "Development of a Learning Based Block Matching Algorithm for Ultrasound Tracking in Radiotherapy," presented at the American Association of Physicists in Medicine annual meeting, Washington D.C. (2016)
83. A. Shepard*, C. Matrosic*, J. Zagzebski, **B. Bednarz**, "Development of a Programmable Motion Testbed for the Validation of Ultrasound Tracking Algorithms," presented at the American Association of Physicists in Medicine annual meeting, Washington D.C. (2016)
84. I. Marsh*, M. Otto, J. Weichert, D. Baiu, **B. Bednarz**, "Pre-Clinical Radionuclide Therapy Dosimetry in Several Pediatric Cancer Xenografts," presented at the American Association of Physicists in Medicine annual meeting, Washington D.C. (2016)
85. T. Liu, H. Lin, C. Shi, X. Tang, **B. Bednarz**, X.G. Xu, "Modeling of Radiotherapy Linac Source Terms Using ARCHER Monte Carlo Code: Performance Comparison of GPU and MIC Computing Accelerators," presented at the American Association of Physicists in Medicine annual meeting, Washington D.C. (2016)
86. **B. Bednarz** and A. Besemer, "Radiation-Induced Second Cancer Risk Estimates from Radionuclide Therapy," International Conference on Radiation Shielding (ICRS) 13 and RPSD 2016, Paris, France (2016)
87. **B. Bednarz**, I. Marsh, D.C. Baiu, A.E. Boruch, A.S. De, S. Bhattacharya, J. Jeffery, Q. Zhao, L. Hall, J. Weichert, M. Otto, "Demonstration of a Correlation Between Tumor Absorbed Dose and Response in Several Pediatric Tumor Xenografts Treated With Radioiodinated CLR1404 Alkyl-phospholipid Ether," American Nuclear Society Annual Meeting, San Francisco CA (2017)
88. A. Shepard*, B. Wang, D. Mills, R. Darrow, H. Chan, T. Foo, **B. Bednarz**, "A Real-Time 3D Ultrasound Tracking Algorithm with Simultaneous Templates for Use in Radiotherapy," presented at the American Association of Physicists in Medicine annual meeting, Denver, CO (2017)
89. A. Shepard*, C. Matrosic*, J. Zagzebski , **B. Bednarz**, "Use of a Deformable Ultrasound Phantom for Tracking Algorithm Development and Validation," presented at the American Association of Physicists in Medicine annual meeting, Denver, CO (2017)

90. C. Matrosic*, I. Marsh*, W. Culberson, B. Bednarz, "Evaluation of Dose Redistribution Due to Deformation with 3D MRI Gel Dosimetry," presented at the American Association of Physicists in Medicine annual meeting, Denver, CO (2017)
91. I. Marsh*, J. Grudzinski , A. Besemer , J. Weichert , P. Harari , **B. Bednarz**, "Towards Integrated Treatment Planning of Combined External Beam Radiotherapy and Targeted Radionuclide Therapy," presented at the American Association of Physicists in Medicine annual meeting, Denver, CO (2017)
92. H. Lin, T. Liu, L. Su, C. Shi, X. Tang, D. Adam*, **B. Bednarz**, X.G. Xu, "Monte Carlo Modeling and Simulation of the Varian TrueBeam LINAC Using Heterogeneous Computing," presented at the American Association of Physicists in Medicine annual meeting, Denver, CO (2017)
93. D. Adam*, A Besemer, I Marsh*, K. Kloepping, L. Hall, J. Grudzinski, J. Weichert, M. Otto, **B. Bednarz**, "Towards Patient-Specific Treatment Planning of External Beam Radiotherapy Involving Radiosensitizers Using Nuclear Medicine Imaging," presented at the American Association of Physicists in Medicine annual meeting, Denver, CO (2017)
94. **B. Bednarz**, W Lee, D Mills, D Shoudy, H Chan, J Sabatini, E Fiveland, B Wang, J Mitra, R Darrow, W Culberson, A Shepard*, C Matrosic*, A McMillan*, J Holmes*, J Zagzebski*, S Smith*, T Foo, "A Hands-Free MR-Compatible Volumetric Ultrasound Probe for Real-Time Motion Management During External Beam Radiotherapy," presented at the American Association of Physicists in Medicine annual meeting, Denver, CO (2017)
95. PM Carlson, C Heinze, J Grudzinski, R Hernandez, SD Gillies, H Loibner, AL Rakhmilevich, M Otto, **B. Bednarz**, J Weichert, PM Sondel, ZS Morris, "Molecular targeted radiotherapy facilitates in situ vaccination in a syngeneic murine melanoma model" submitted to Society of Immunotherapy for Cancer Annual Meeting (2017)
96. S Veerankutty, PM Carlson, DC Baiu, C Heinze, AE Boruch, AK Erbe, JJ Grudzinski, R Hernandez, **B. Bednarz**, JP Weichert, PM Sondel, ZS Morris, M Otto, "Molecular-targeted radiotherapy with an alkyl-phosphocholine analog leads to immunomodulation in a syngeneic murine melanoma model," submitted to Society of Immunotherapy for Cancer Annual Meeting (2017)
97. LT Hall, B Titz, SB Perlman, HT Robins, **B. Bednarz**, J Grudzinski, et al., "PET/CT Imaging of the Alkylphosphocholine Analog 124I-CLR1404 in High and Low-Grade Brain Tumors," RSNA, Chicago, IL (2017)
98. W. Lee, H. Chan, P. Chan, T. Fiorillo, E. Fiveland, T. Foo, D. Mills, A. Patel, J. Sabatini, D. Shoudy, S. Smith, **B. Bednarz**, "A Magnetic Resonance Compatible E4D Ultrasound Probe for Motion Management of Radiation Therapy," presented at IEEE UFFC Symposium (2017)
99. LT Hall, B Titz, SB Perlman, HT Robins, **B. Bednarz**, J. Weichert, J. Kuo, "PET/CT Imaging of the Alkylphosphocholine Analog 124I-CLR1404 in Brain Tumors," World Federation of Nuclear Medicine and Biology (2017)
100. I.R. Marsh*, B. Titz, J. J. Jeffery, R. Moskwa, **B. Bednarz**, J. J. Grudzinski, "Targeted I-125 Auger electron radiotherapy for the treatment of triple-negative breast cancer," Society of Nuclear Medicine and Molecular Imaging Annual Meeting, Philadelphia, PA (2018)
101. I.R. Marsh*, J.J. Jeffery, J.J. Grudzinski, C. Li, B.L. Cox, R. Hernandez, P.M. Harari, **B. Bednarz**, "Impact of phantom-based partial volume corrections on *in vivo* dosimetry of theranostic molecularly targeted radionuclide therapy in patient-derived xenograft murine models," Society of Nuclear Medicine and Molecular Imaging Annual Meeting, Philadelphia, PA (2018)
102. R. Hernandez, R. Patel, J.J. Grudzinski, P. Carlson, R. Sriramaneni4, R. Brown, **B. Bednarz**, P. Sondel, Z. Morris, J. Weichert, "Combination of Targeted Radionuclide Therapy and Checkpoint Blockade Augments Therapeutic Response in a Syngeneic Murine Model of Melanoma," Society of Nuclear Medicine and Molecular Imaging Annual Meeting, Philadelphia, PA (2018)
103. A Shepard*, C Matrosic , J Radtke , W Culberson , **B Bednarz,** "The Dosimetric Effect of Motion Management System Latency On Radiotherapy Treatments"**,** presented at the American Association of Physicists in Medicine annual meeting, Nashville, TN (2018)
104. S Graves, D Hyer, R Flynn, **B Bednarz,** "Dose Kernels in Water for More Than 700 Radioisotopes," presented at the American Association of Physicists in Medicine annual meeting, Nashville, TN (2018)

105. D Adam*, H Lin, T Liu, P Caracappa, X Xu, **B Bednarz,** "Implementation of Heterogeneous Computing Methods and Development of An EGSnrc-Based External Beam Dose Engine for Validating a GPU-Based Monte Carlo Code, ARCHER", presented at the American Association of Physicists in Medicine annual meeting, Nashville, TN (2018)
106. S Jupitz*, A Shepard, P Hill, **B Bednarz,** "Correlation Between Tumor and Vessel Motion in the Liver," presented at the American Association of Physicists in Medicine annual meeting, Nashville, TN (2018)
107. C Matrosic*, I Marsh, B Palmer , J Hull , **B Bednarz** , W Culberson, "Deformable Anthropomorphic Abdominal Phantom for the Validation of Deformable Dose Accumulation Algorithms and Intrafractional Motion Management Systems," presented at the American Association of Physicists in Medicine annual meeting, Nashville, TN (2018)
108. A Shepard*, C Matrosic, S Jupitz , J Radtke , W Culberson , **B Bednarz**, "Linac Triggering Latency Quantification for Consideration in Intra-Fraction Motion Management Systems," presented at the American Association of Physicists in Medicine annual meeting, Nashville, TN (2018)
109. H Lin, D Adam*, T Lui, P Caracappa, **B Bednarz**, XG Xu, "Development of ARCHER towards clinical use: modeling and simulating of Varian LINAC for radiation therapy dose calculations," ANS RPSD-2018, Sante Fe, NM (2018)
110. **B. Bednarz** et al, "Simultaneous MR and Ultrasound Image Acquisition in a Human Using a Hands-Free, MR-compatible, Volumetric Ultrasound Transducer for Image Guided Radiation Therapy," RSNA, Chicago, IL (2018)
111. D Adam*, T Liu , P Caracappa , X Xu, **B Bednarz**, "Implementation and Benchmarking of Volumetric Modulated Arc Therapy (VMAT) Modeling in the GPU-Based High-Performance Monte Carlo Code ARCHER," presented at the American Association of Physicists in Medicine annual meeting, San Antonio, TX (2019)
112. D Adam*, N Schweitzer , S Hoffman , B Thomadsen , **B Bednarz**, "Initial Benchmarking of a Monte Carlo-Based Microdosimetry Platform for the Analysis of Targeted Radionuclide Therapy Agents In-Vitro," presented at the American Association of Physicists in Medicine annual meeting, San Antonio, TX (2019)
113. S Jupitz*, J Holmes , A Shepard, J Mitra, T Foo, **B Bednarz**, "Evaluation of Simultaneous MR and Ultrasound Image Acquisition Using Liver Vessels," presented at the American Association of Physicists in Medicine annual meeting, San Antonio, TX (2019)
114. I Marsh*, R Hernandez, M Turek, J Grudzinski, J Weichert, Z Morris, D Vail, B Bednarz, "Dosimetric Impact of Prolonged [Y-86]-NM600 PET/CT Imaging for Immunomodulatory Molecular Radiotherapy with [Y-90]-NM600," presented at the American Association of Physicists in Medicine annual meeting, San Antonio, TX (2019)
115. C Matrosic*, W Culberson, **B Bednarz**, "Benchmarking of An Anthropomorphic Deformable Abdominal Phantom for Image Guided Radiotherapy Validation," presented at the American Association of Physicists in Medicine annual meeting, San Antonio, TX (2019)
116. I Marsh*, A Besemer*, **B Bednarz**, "Patient-specific alpha particle dosimetry using Radiopharmaceutical Assessment Platform for Internal Dosimetry (RAPID)," to be presented at the ASTRO annual meeting, Chicago, IL (2019)
117. D Adam*, S Hoffman*, **B Bednarz**, "Development of a Monte Carlo-based microdosimetry platform for the analysis of targeted radionuclide therapy agents in vitro," presented at the ASTRO annual meeting, Chicago, IL (2019)
118. S. Jupitz*, **B Bednarz**, "Feasibility Study of Simultaneous MR and 4D Ultrasound Imaging for IGRT," presented at the ASTRO annual meeting, Chicago, IL (2019)
119. J. Weichert, **B. Bednarz**, R. Hernandez, J. Grudzinski, R. Patel, P. Sondel, Z. Morris, "Combining Low Dose, Targeted Radionuclide Therapy with Immunotherapy for the Treatment of Solid Tumors," presented at Radiation Research Society Annual Meeting, San Diego, CA (2019)
120. R. Brown, R. Hernandez, J.J. Grudzinski, L. Zangl, I. Arthur, A. Pieper, I.R. Marsh*, **B. Bednarz**, J. Weichert, P.M. Sondel, "Ability of Molecular Targeted Radionucleotide Therapy and Anti-CTLA-4 to

Prevent Spontaneous Metastases in a Preclinical Lewis Lung Carcinoma Mode," presented at ASTRO, Chicago, IL (2019)

121. J. Grudzinski, K. Sorensen, M. Gracz, **B. Bednarz**, P. Wickre. "Torch: A Treatment Planning System for Personalized Radiopharmaceutical Therapy." 32nd Annual Congress of the European Association of Nuclear Medicine, Oct. 12-16, Barcelona, Spain (2019)
122. J. Grudzinski, R. Hernandez, I. R. Marsh*, R. B. Patel, E. Aluicio-Sarduy, J. Engle, Z. Morris, **B. Bednarz**, J. Weichert, "NM600, a theranostic alkylphosphocholine chelate, shows promise as a universal tumortargeting agent," 32nd Annual Congress of the European Association of Nuclear Medicine, Oct. 12-16, Barcelona, Spain (2019)
123. I. R. Marsh*, J. J. Grudzinski, R. Hernandez, J. P. Weichert, M. Otto, **B. P. Bednarz**, "Direct Comparison of Theranostic [124/131I]-NM404 and [124/131I]-MIBG Dosimetry in a Murine Xenograft Model of Neuroblastoma," 32nd Annual Congress of the European Association of Nuclear Medicine, Oct. 12-16, Barcelona, Spain (2019)
124. **B. Bednarz**, "Modeling the biological effectiveness of nonuniform dose distributions delivered from selective internal radiation therapy," 32nd Annual Congress of the European Association of Nuclear Medicine, Oct. 12-16, Barcelona, Spain (2019)
125. I. R. Marsh*, R. Hernandez, M. Turek, E. Aluicio-Sarduy, J. J. Grudzinski, R. Patel, P. Carlson, M. Otto, P. M. Sondel, J. W. Engle, Z. Morris, J. P. Weichert, D. Vail, **B. P. Bednarz**, "Prospective Theranostic Treatment Planning for Patient-Specific Low-Dose Molecularly Targeted Radiotherapy to Enhance Immunotherapeutic Response," 32nd Annual Congress of the European Association of Nuclear Medicine, Oct. 12-16, Barcelona, Spain (2019)
126. **B. Bednarz**, "A Geant4-based Voxel S-value Generator For Radiopharmaceutical Therapy," 32nd Annual Congress of the European Association of Nuclear Medicine, Oct. 12-16, Barcelona, Spain (2019)
127. Massey C, Hernandez R, Grudzinski JJ, Marsh IR*, Aluicio-Sarduy E, Turek M, Engle JW, Morris Z, **Bednarz B**, Vail D, Weichert J. Preliminary evaluation of a broad-scope tumor targeting alkylphosphocholine chelate in canines with spontaneous tumors. SNMMI Annual Meeting; Jun 13-16, 2020; New Orleans, LA.
128. Grudzinski J, Bates AM, Hernandez R, Sosa GA, Nystuen E, Emma S, Sumiec EG, Pieper A, Patel R, Aluicio-Sarduy E, Engle J, Marsh I*, **Bednarz B**, Weichert J, Morris Z. Targeted Radionuclide Therapy Combined with IL-2 Immunotherapy Improves Response to Immune Checkpoint Inhibition in a Syngeneic Murine Model of Head and Neck Cancer. SNMMI Annual Meeting; Jun 13-16, 2020; New Orleans, LA.
129. Vail DM, Hernandez R, MaGee K, Turek MM, Marsh I*, **Bednarz B**, Weichert JP, Sondel PM, Albertini MR, Kurzman ID, Morris ZS. A multimodality radioimmunotherapy approach to treating advanced stage cancer in companion dogs. European Society of Veterinary Oncology Annual Meeting; May 27-30, 2020; Siracusa, Italy.
130. Sosa GA, Bates AM, Nystuen E, Emma S, Sumiec G, Pieper A, Patel R, Hernandez R, Grudzinski J, **Bednarz B**, Marsh I*, Weichert J, Morris Z. In Vivo Efficacy of NKTR-214, Immune Checkpoint Inhibition, and Targeted Radionuclide Therapy in Syngeneic Murine Models of Head and Neck Cancer. AACR Annual Meeting; Apr 25, 2020; San Diego, CA. Poster.
131. Jagodinsky JC, Arthur IS, Castillo JS, Chakravarty I, Zangl LM, Brown RJ, Patel RB, Jin W, Carlson PM, Hernandez R, Grudzinski JJ, Marsh IR*, Weichert JP, **Bednarz BP**, Morris ZS. Comparing type 1 interferon response activation in tumor cells following external beam radiotherapy versus targeted radionuclide therapy. AACR Annual Meeting; Apr 24-29, 2020; San Diego, CA.
132. Bates AM*, Patel R, Hernandez R, Grudzinski JJ, Sosa GA, Marsh I*, **Bednarz B**, Pieper A, Nystuen E, Sarah S, Sumiec EG, Weichert JW, Morris Z. 90Y-NM600 targeted radionuclide therapy combined with bempegaldesleukin (NKTR-214) and immune checkpoint inhibition enhances the immune response in a syngeneic murine model of head and neck cancer. Immuno-Oncology Young Investigators' Forum; Apr 16-18, 2020; Houston, TX.
133. Bates AM*, Patel R, Hernandez R, Grudzinski JJ, Sosa GA, Marsh I*, **Bednarz B**, Pieper A, Nystuen E, Emma S, Sumiec EG, Weichert J, Morris Z. 90Y-NM600 targeted radionuclide therapy combined

with bempegaldesleukin (NKTR-214) and immune checkpoint inhibition enhances the immune response in a syngeneic murine model of head and neck cancer. RRS Winter Workshop: Challenges & Solutions in the Era of Targeted Radionuclide-Based Therapy; Mar 4-6, 2020; Big Sky, MT.

134. Carlson PM, Patel R, Rodriguez M, Xun C, Hernandez R, Grudzinski J, Rakhmilevich A, Kim K, Birstler J, Marsh I*, **Bednarz B**, Weichert JP, Sondel PM, Morris ZS. Low dose targeted radionuclide therapy enhances propagation of the antitumor response following in situ vaccination in a syngeneic murine melanoma model. RRS Winter Workshop: Challenges & Solutions in the Era of Targeted Radionuclide-Based Therapy; Mar 4-6, 2020; Big Sky, MT.
135. D Adam*, J Grudzinski, **B Bednarz**, "A Comparison of External Beam Radiotherapy and Radiopharmaceutical Lineal Energy Distributions Using Monte Carlo Track Structure Simulations," presented at the American Association of Physicists in Medicine annual meeting, Vancouver, CA (2020)
136. D Adam*, I Marsh*, T Bradshaw, P Hill, B Cox, J Grudzinski, P Harari, **B Bednarz**, "Patient-Specific Partial Volume Corrections Using a 3D Printed Anthropomorphic Head and Neck Phantom," presented at the American Association of Physicists in Medicine annual meeting, Vancouver, CA (2020)
137. I Marsh*, J Grudzinski, **B Bednarz**, "The Dosimetric Impact of Deformable Registration On Multi-Timepoint Internal Dosimetry Studies," presented at the American Association of Physicists in Medicine annual meeting, Vancouver, CA (2020)
138. A Bertinetti*, **B Bednarz**, B Palmer, R Hernandez, B Smith, C Hammer, J Grudzinski, W Culberson, "Determination of Absorbed-Dose-To-Water From Common Targeted Radionuclide Therapy Agents," presented at the American Association of Physicists in Medicine annual meeting, Vancouver, CA (2020)
139. S Jupitz*, J Zagzebski, J Holmes, D Mills, W Lee, H Chan, A Patel, L Smith, **B Bednarz**, "Image Quality Assessment of a MR-Compatible E4D Ultrasound Probe for Image Guided Radiation Therapy," presented at the American Association of Physicists in Medicine annual meeting, Vancouver, CA (2020)
140. Q Cheng, H Yang, Y Xu, X Pei, L Mao, Q Ren, A Wu, D Adam*, **B Bednarz**, P Caracappa, X Xu, "Modeling and Testing of a Virtual Source Model for An Independent Monte Carlo Radiation Dose QA Software with the Magnetic Field Option," presented at the American Association of Physicists in Medicine annual meeting, Vancouver, CA (2020)
141. K Magee, R Hernandez, MM. Turek, I Marsh, **B Bednarz**, J Grudzinski, JP Weichert, PM. Sondel, MR Albertini, ZS Morris, DM Vail, "A multimodality radioimmunotherapy approach to treating advanced stage cancer in companion dogs," Veterinary Cancer Society Annual Meeting, Daytona Beach, FL (2020)

SERVICES

A. Invited Professional and Public Lectures

1. "Proton Monte Carlo," PTCOG 49 Educational Workshop, Chiba, Japan, May 2010
2. "Forum on the Nuclear Emergency in Japan," University of Wisconsin Energy Institute, Madison, WI, March 2011
3. "Update of the Nuclear Emergency in Japan," University of Wisconsin Energy Institute, Madison, WI, May 2011
4. "The LNT Hypothesis – Implications in Science, Policy and Society," Department of Engineering Physics, Madison, WI, November 2011
5. "Overview of the forthcoming TG-158 Report on measurements and calculations of doses outside the treatment volume from external beam radiation therapy," Department of Medical Physics, Madison, WI, December 2011
6. "The Uses of Ionizing Radiation in Medicine," Congressional Briefing hosted by the ANS, Washington D.C., August 1, 2012
7. "Motion Management In Radiotherapy," GE Global Research Center, Niskayuna, NY, September 2013
8. "The Value of Radiopharmaceutical Dosimetry," Cellectar Biosciences, Madison, WI, September 2014
9. "Replacing the Manikin: From Model- to Patient-based Radionuclide Therapy Dosimetry," Argonne National Laboratory, Lemont, IL, November 2014
10. "The Future of Radiological Engineering in Oncology (And Why Its Important)" Department of Medical Physics, Madison, WI, January 2016

11. "Image Guided Radiotherapy for Liver," MR and PET/MR Research Review, GE Healthcare, Waukesha, WI, March 2016
12. "Imaging and Dosimetry of CLR1404 in Mice and Humans," Jack Fowler Symposium, UW School of Medicine and Public Health, Madison, WI February 2017
13. "Selective Targeting of the Cell Membrane; Attacking the Tumour House of Cards," Plenary Lecture at the European Association of Nuclear Medicine, Vienna, Austria October 2017
14. "The Role of Radiation Dosimetry in Theranostic Medicine," University of Iowa, Iowa City, Iowa November 2017
15. "A Hands-Free MR-Compatible Volumetric Ultrasound Probe for Real-Time Motion Management During External Beam Radiotherapy," Massachusetts General Hospital, Boston, MA November 2017
16. "Image Guided Radiotherapy for Liver," MR and PET/MR GE Research Review, University of Wisconsin, Madison, Madison, WI, March 2018
17. "The Rationale for Dosimetry in Systemic Radiopharmaceutical Therapy," NCI Workshop on SRT Dosimetry, National Cancer Institute, Rockville, MD, April 2018
18. "ICRU Stakeholder – Perspective from a Small US Start-Up," ICRU Stakeholders Meeting, Reykjavic, Iceland, August 2018
19. "The Promise – and Perils – of Radiation Dosimetry in Theranostic Medicine," Mayo Clinic, Rochester, MN, November 2018
20. "Radionuclide Therapy for Pediatric Patients: MIBG and Beyond," Mayo Clinic, Rochester, MN, November 2018
21. "A Hands-Free MR-Compatible Volumetric Ultrasound Probe for Real-Time Motion Management During External Beam Radiotherapy," Quantitative Imaging in Radiation Therapy Working Group, National Cancer Institute (NCI), Web Presentation, November, 2018
22. "Implications of Heterogeneous Dose Distributions for Radiopharmaceutical Therapy Revisited" CIMRS Annual Meeting, Gaithersburg, MD, April 2019
23. "Multi-scale radiation transport modeling for radiopharmaceutical therapy," Computational Modeling and Image Processing of Biomedical Problems Symposium, Houghton, MI, June 2019
24. "FDA-Approved (and Upcoming) Dosimetry Software," AAPM Annual Meeting, July 2019
25. "Theranostic Treatment Planning for Precise Radiopharmaceutical Therapy," Targeted Radionuclide Therapy Conference, Madison, WI, September 2019
26. "Radiation Dosimetry for CLR 131 Pediatric Patients," Medical Advisory Meeting for Cellectar Biosciences, Jersey City, New Jersey, September 2019

B. University, School and Departmental Committees and Dates for Each

- UW Department of Medical Physics Admissions Committee Member (Fall 2010-current)
- UW Department of Medical Physics Curriculum Committee Member (Spring 2011-current)
- UW Medical Radiation Research Center Advisory Committee Member (Spring 2014-2017)
- University Radiation Safety Committee Member (Spring 2014-2015)
- University Radiation Safety Executive Committee Vice Chair (2015-present)
- UW Department of Medical Physics Preliminary Exam and Dissertation Defense Policy/Procedural Working Group Member (Spring 2015-current)
- UW Department of Medical Physics Executive Committee Member (2016-present)
- UW Department of Medical Physics Oral Qualifier Examination Committee Member (2016-present)

C. Professional Societies and Organizations

American Nuclear Society (ANS) 2001-2018

- Student Vice President, University of Michigan Chapter, 2004
- Subcommittee on Radiological Release and Health Effects from the Fukushima Disaster, 2011
- Elected Member of the Executive Committee of the Biology and Medicine Division, 2012-
- Elected Vice-Chair of the Biology and Medicine Division, 2014-2015

- Elected Chair of the Biology and Medicine Division, 2015-2016
- Elected Secretary of the Biology and Medicine Division, 2016-2017
- ANS Biology and Medicine Division Awards Committee, 2014-
- Appointed Member of ANS Special Committee on Government Relations, 2016-
- Technical Committee, International Conference on Radiation Shielding/ANS Radiation Protection and Shielding Topical Joint Conference (RPSD2010), Las Vegas, 2010
- Session Co-Chair, Session: Therapeutic Beams – The Wider I/O Chain, ANS Winter Meeting, Washington D.C., 2011
- Session Co-Chair, Session: Biology and Medicine General, ANS Winter Meeting, San Diego, CA, 2012
- Session Organizer and Co-Chair, Session: New Horizons in Medical Health Physics, ANS Annual Meeting, Atlanta, GA, 2013
- Publication Co-Chair, 8th International Conference on Isotopes and Expos, Chicago, IL, 2014
- Technical Program Committee, Applications in Nuclear Medicine – Therapeutics and Production and Application of Alpha Emitters, 8th International Conference on Isotopes and Expos, Chicago, IL, 2014
- Technical Program Committee, 18th Topical Meeting of the Radiation Protection and Shielding Division of ANS, Knoxville, TN, 2014
- Session Organizer and Chair, Session: Radiation Transport Applications in Medicine, ANS Annual Meeting, New Orleans, LA, 2016
- Session Chair, Session: Biology and Medicine – General, ANS Annual Meeting, San Francisco, CA

American Association of Physicist in Medicine (AAPM) 2004-present

- Co-Chair, Task Group 158 on "Measurements and Calculation of Doses Outside the Treatment Volume," 2011-2016
- AAPM Summer Undergraduate Fellowship Advisor (2013)
- Session Co-Chair, Session: "Tumor Tracking", 2016 AAPM Annual Meeting, Washington D.C.
- AAPM Annual Meeting Abstract Reviewer (2011, 2015, 2016, 2017)
- Session Co-Chair, Session: "Tracking and Image Guidance", 2017 AAPM Annual Meeting, Denver, CO
- Session Co-Chair, Session: "Treatment Planning III", 2017 AAPM Annual Meeting, Denver, CO
- Vice Chair, Ad Hoc Committee on Recommendations for Better Integrating Radionuclide Therapy, 2018-present
- Session Co-Chair, Session: "Treatment Implications of Motion Management". 2018 AAPM Annual Meeting, Nashville, TN
- Co-Chair, AAPM Ad Hoc Committee on Recommendations for Better Integrating Radionuclide Therapy, 2018-present

Health Physics Society (HPS) 2005-2008, 2012-2013

- Co-Chair, Special Session on Low Dose Radiation Research, HPS Annual Meeting, Madison, WI, 2013

National Cancer Institute (NCI)

- Member of the Quantitative Imaging in Radiation Therapy Working Group, 2018-present
- Member of the Radiopharmaceutical Dosimetry Working Group, 2018-present

D. Reviewer of Grants

- Mail Reviewer, Special Emphasis Grant Panel – Oral and Dental Health (2015)
- Reviewer, Special Emphasis Panel - NCI Clinical and Translational Exploratory and Developmental Studies (2017)
- Reviewer, Special Emphasis Panel, ZCA1 SRB-X (O1) S, NCI Clinical and Translational Exploratory and Developmental Studies (2017)
- Reviewer, Special Emphasis Panel, Radiation Therapeutics and Biology Study Section, (2017)

- Reviewer, Special Emphasis Panel, ZRG1 OTC-E (02) M, Radiation Therapeutics and Biology Study Section, (2018)
- Reviewer, Special Emphasis Panel, ZRG1 OTC-E (02) M, Radiation Therapeutics and Biology Study Section, (2018)
- Reviewer, Special Emphasis Panel, ZCA1 SRB-X (M1), Radiation Therapeutics and Biology Study Section, (2020)

E. Reviewer of Manuscripts

- Guest Editor, *Medical Physics Journal*, (2017)
- Reviewer, *Medical Physics Journal*, (2009-present)
- Reviewer, *International Journal of Radiation Oncology, Biology and Physics*, (2010-present)
- Reviewer, *Physics in Medicine and Biology*, (2010-present)
- Reviewer, *Proceedings of the IEEE*, (2011-present)
- Reviewer, *Computational and Mathematical Methods in Medicine*, (2012-present)
- Reviewer, *Journal of Radiological Protection*, (2013-present)
- Reviewer, *Journal of Applied Clinical Medical Physics* (2013-present)
- Reviewer, *Nuclear Inst. and Methods in Physics Research*, A (2014-present)
- Reviewer, *Radiation Measurements* (2014-present)
- Reviewer, *Radiation Physics and Chemistry* (2014-present)
- Reviewer, *Applied Physics Letters* (2014-present)
- Reviewer, *Journal of Radioanalytical and Nuclear Chemistry* (2014)
- Reviewer, *Nuclear Science and Engineering*, (2015-present)
- Reviewer, *Computer Methods and Programs in Biomedicine* (2015-present)
- Reviewer, *Radiotherapy and Oncology*, (2016-present)
- Reviewer, *Theragnostics*, (2017-present)
- Reviewer, *Medical Image Analysis*, (2017-present)
- Reviewer, *Physics & Imaging in Radiation Oncology*, (2017-present)
- Reviewer, *Cancer Biotherapy and Radiopharmaceuticals*, (2019-present)
- Reviewer, *European Journal of Nuclear Medicine and Molecular Imaging Physics*, (2020-present)
- Reviewer, *BMC Veterinary Research*, (2020-present)
- Reviewer, *Journal of Physics D*, (2020-present)
- Reviewer, *Pediatric Blood & Cancer*, (2020-present)

CERTIFICATION

American Board of Radiology (ABR): Part I – August 2010

HONORS AND AWARDS

A. Personal

- University of Michigan Club of Greater Lansing Scholarship (2000)
- University of Michigan Department of Nuclear Engineering and Radiological Science Undergraduate Merit Scholarship (2001)
- Alpha Nu Sigma Honors Society Inductee
- Health Physics Society Travel Grant (2006,2007)
- H. Wade Patterson Award for best student accelerator paper at the HPS Annual Meeting (2007)
- International Conference on Radiation Shielding Travel Grant (2008)
- American Nuclear Society Everitt P. Blizard Scholarship Award – declined (2008)
- Rensselaer Polytechnic Institute Founder's Award (2008)
- Physics in Medicine and Biology Highlights of 2008 (2008)

- UW Graduate School Travel Grant (2013,2015)
- AAPM Town Hall Poster Selection, AAPM Annual Meeting (2013)
- ANS "Best of RPSD 2014" Selection, ANS Annual Meeting (2014)
- The Ride Scholar, UW Madison (2018)
- Medical Physics Journal Top 10 Downloaded Article 2017 (2018)
- Medical Physics Journal Top 20 Downloaded Article 2017-2018 (2019)

B. Students

- UW Science and Medicine Research Scholar, Tyler Fowler (2011-2015)
- Standard Imaging AAPM Travel Award, Abby Besemer (2012,2013)
- Igus® Young Engineer's Support Program, Tyler Fowler (2013)
- ANS Student Travel Award, Abby Besemer (2013)
- Standard Imaging AAPM Travel Award, Tyler Fowler (2013)
- AAPM Young Investigator Competition Finalist, Abby Besemer (2013)
- UW Radiological Training Grantee, Ming Yang (2013-2015)
- AAPM Summer Undergraduate Fellowship, Andrew Shepard (2013)
- AAPM Young Investigator Competition Finalist, Kai Ludwig (co-author, 2014)
- UW Student Research Grants Competition Travel Award, Abby Besemer (2015)
- NCC-AAPM Meeting Young Investigator Competition, 2nd Place, Charlie Matrosic (2015)
- AAPM Young Investigator Competition Finalist, David Adam (2017)
- Standard Imaging AAPM Travel Award, David Adam (2017)
- Standard Imaging AAPM Travel Award, Andrew Shepard (2017)
- UW Radiological Training Grantee, Andrew Shepard (2017)
- The Ride Student Scholar Award, Ian Marsh (2018)
- SNMMI Annual Meeting Young Investigator Awards Symposium, Ian Marsh (2018)
- WISCIENCE Public Service Fellows Program, Sydney Jupitz (2018)
- UW Student Research Grants Competition Travel Award, Charlie Matrosic, (2018)
- 10th IC3DDose Best Student Paper Award, Charlie Matrosic, (2018)
- UW Radiological Training Grantee, Ian Marsh (2019-)
- SNMMI Alavi–Mandell Award, Ian Marsh (2020)
- ACR Medical Physics Graduate Student Travel Scholarship, Ian Marsh (2020)