

Kansas State University  
Carl R. Ice College of Engineering  
Alan Levin Department of Mechanical and Nuclear Engineering  
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# Amir A. Bahadori, PhD

## Curriculum Vitae

### Education

2010–2012

**PhD Biomedical Engineering/Medical Physics**, *J. Crayton Pruitt Family Department of Biomedical Engineering – University of Florida, Gainesville, FL, US.*

2008–2010

**MS Nuclear Engineering Sciences/Medical Physics**, *Department of Nuclear and Radiological Engineering – University of Florida, Gainesville, FL, US.*

2003–2008

**BS Mechanical Engineering with Nuclear Engineering Option**, *Alan Levin Department of Mechanical and Nuclear Engineering – Kansas State University, Manhattan, KS, US.*

Summa Cum Laude, with Honors

2003–2008

**BS Mathematics**, *Department of Mathematics – Kansas State University, Manhattan, KS, US.*

Summa Cum Laude

### Experience

2015

**Assistant Professor**, *Alan Levin Department of Mechanical and Nuclear Engineering – Kansas State University, Manhattan, KS, US.*

Director, Radiological Engineering Analysis Laboratory

Affiliate Faculty, KSU Biomedical Engineering Program

Affiliate Researcher, KSU Johnson Cancer Research Center

June - December 2017, KSU TRIGA Mark II Nuclear Reactor Facility Manager

2013–2015

**Physical Scientist**, *Space Radiation Analysis Group – NASA Lyndon B. Johnson Space Center, Houston, TX, US.*

Principal Scientist, NASA Advanced Exploration Systems (AES) RadWorks Radiation Environment Monitor (REM) Project

2010–2013

**Radiation Scientist**, *University of Houston System, Houston, TX, US.*

Contractor for Radiation Health Officer Group - NASA Lyndon B. Johnson Space Center

2008–2012

**Graduate Assistant**, *Advanced Laboratory for Radiation Dosimetry Studies – University of Florida, Gainesville, FL, US.*

2005–2008

**Licensed Reactor Operator**, *Kansas State University TRIGA Mark II Nuclear Reactor Facility, Manhattan, KS, US.*

USNRC License No. OP-70720

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## Funding

### Current Extramural

2019 **Principal Investigator, X-DSMSND: A Dual-Sided Microstructured Semiconductor Neutron Detector with Integrated Pixel Read-Out**, *US Department of Energy/Radiation Detection Technologies, Inc.*, \$62,892.  
19 February 2019 - 18 February 2020

2018 **Co-Investigator, Proposal for a Consortium for Nonproliferation-Enabling Capabilities**, *US Department of Energy/North Carolina State University*, \$1,430,878.  
31 July 2014 - 30 July 2020  
Assumed Co-I role on 31 July 2018

2017 **Principal Investigator, Electronics X-Ray Inspection Shielding and Prediction Simulation**, *US Department of Energy/Honeywell FM&T*, \$514,720.  
12 December 2017 - 30 September 2020

2017 **Principal Investigator, Radiation Transport Simulations in Support of Active Shielding Measurement Campaign**, *National Aeronautics and Space Administration/KBR*, \$430,131.  
13 October 2017 - 30 September 2020

2017 **Co-Investigator, Kansas State University Nuclear Research Fellowship Program**, *US Nuclear Regulatory Commission*, \$393,820.  
30 June 2017 - 29 June 2021

2017 **Co-Investigator, Radiological Systems Research for Detection, Localization, and Isotope Identification**, *US Department of Defense/Space and Naval Warfare Systems Command (SPAWAR)*, Contract maximum value \$2,241,004.  
1 April 2017 - 31 March 2022

### Completed Extramural

2018 **Principal Investigator, A Dedicated Laboratory for Radioactive Sample Handling**, *US Department of Energy*, \$167,493.  
2019 1 October 2018 - 30 September 2019

2018 **Principal Investigator, Solid State Dual Neutron/X-Ray Imager**, *US Department of Energy/Honeywell FM&T*, \$308,303.  
2019 4 January 2018 - 30 September 2019

2018 **Co-Investigator, High-Resolution Scanning of Sub-Surface Lunar Water with Mobile Neutron Energy Spectrometer**, *National Aeronautics and Space Administration/Radiation Detection Technologies, Inc.*, \$8,415.  
2019 27 July 2018 - 25 January 2019

2018 **Co-Investigator, Neutron Interrogation Imaging**, *US Department of Energy/Honeywell FM&T*, \$90,620.  
5 January 2018 - 30 September 2018

2018 **Co-Investigator, Enhanced Gamma-Ray Diagnostics and Imaging**, *US Department of Energy/Honeywell FM&T*, \$56,137.  
5 January 2018 - 30 September 2018

2017  
2018

**Principal Investigator, Control Panel Modernization at the KSU TRIGA Reactor Facility**, *US Department of Energy*, \$1,495,945.

10 September 2015 - 9 September 2018

Assumed PI role on 1 June 2017

Transferred PI role to new Reactor Manager on 12 January 2018

2009–2010

**Student Investigator, NASA Astronaut Dosimetry: Implementation of Scalable Human Phantoms and Benchmark Comparisons of Deterministic versus Monte Carlo Radiation Transport**, *National Aeronautics and Space Administration/Graduate Student Researchers Program*, \$30,000, NNX09AK14H.

15 August 2009 - 14 August 2010

Year 2 (2010–2011) renewal awarded

Hired as NASA contractor prior to Years 2 and 3 of program

### Completed Intramural

2018

**Mentor, KSU Johnson Cancer Research Center Cancer Research Award**, *Student: Prerona Kundu*, \$1,000.

2017  
2018

**Principal Investigator, Miniaturized Neutron Spectrometer for Characterizing Cancer Risk**, *KSU Johnson Cancer Research Center*, \$20,000.

21 December 2017 - 20 December 2018

2018

**Mentor, KSU Johnson Cancer Research Center Graduate Student Travel Award**, *Student: Rohan Amare*, \$1,200.

2018

**Mentor, KSU Johnson Cancer Research Center Graduate Student Travel Award**, *Student: Rajarshi Pal Chowdhury*, \$900.

2017

**Mentor, KSU Johnson Cancer Research Center Graduate Student Travel Award**, *Student: Rohan Amare*, \$985.

2016

**Mentor, KSU Johnson Cancer Research Center Cancer Research Award**, *Student: Elshaddai Abamegal*, \$1,000.

## Publications

### Refereed Publications

- [1] M. Kroupa, T. Campbell-Ricketts, **A. A. Bahadori**, R. Pal Chowdhury\*, A. Empl, S. George, and T. O'Brien. Extravehicular electron measurement based on an intravehicular pixel detector. *Journal of Geophysical Research - Space Physics*, 2019, Accepted.
- [2] G. Wilson\*, **A. A. Bahadori**, and H. Bindra. Radioactively driven colloids: A special case of anomalous diffusion. *Journal of Applied Physics*, 126:124308, 2019.
- [3] **A. A. Bahadori**, R. Pal Chowdhury\*, M. Kroupa, T. Campbell-Ricketts, A. Firan, D. J. Fry, R. Gaza, S. P. George, L. S. Pinsky, N. N. Stoffle, R. R. Rios, and C. J. Zeitlin. Slowing-down and stopped charged particles cause angular dependence for absorbed dose measurements. *Radiation Physics and Chemistry*, 155:89–96, 2019.
- [4] L. A. Stegeman\*, Q. Pease\*, T. J. Hieber, D. Sarkar, S. W. Oxandale, S. L. Bellinger, Z. C. Leseman, and **A. A. Bahadori**. Neutron spectrum unfolding with a planar

- miniaturized fast-neutron detector. *Transactions of the American Nuclear Society*, 120:740–743, 2019.
- [5] M. Pinilla, A. Hellinger, L. Vo, W. Dunn, W. McNeil, and **A. Bahadori**. Design studies using MCNP6® for an oil well logging prototype tool and a test facility. *Radiation Physics and Chemistry*, page 108393, 2019.
- [6] M. P. Pfeifer\*, N. Simerl, J. Porter, W. J. McNeil, and **A. A. Bahadori**. Comparison of MCCAD and DAGMC for predictive capability with BGA inspection systems. *Transactions of the American Nuclear Society*, 120:767–770, 2019.
- [7] R. Pal Chowdhury\*, L. A. Stegeman\*, J. E. Barzilla, D. J. Fry, A. Goel, M. L. Lund, S. M. Madzunkov, and **A. A. Bahadori**. Three-dimensional charge distribution for electrostatic space radiation shielding. *Transactions of the American Nuclear Society*, 120:744–747, 2019.
- [8] D. Laramore\*, W. J. McNeil, and **A. A. Bahadori**. Design of a micro-nuclear-mechanical system for strain measurement. *Radiation Physics and Chemistry*, 155:209–212, 2019.
- [9] R. Pal Chowdhury\*, L. A. Stegeman\*, and **A. A. Bahadori**. Evaluation of Russian Roulette and particle splitting Monte Carlo methods for space radiation transport. *Transactions of the American Nuclear Society*, 118(1):805–808, 2018.
- [10] M. Kroupa, **A. A. Bahadori**, T. Campbell-Ricketts, S. P. George, N. Stoffle, and C. Zeitlin. Light ion isotope identification in space using a pixel detector based single layer telescope. *Applied Physics Letters*, 113(17):174101, 2018.
- [11] M. Kroupa, **A. A. Bahadori**, T. Campbell-Ricketts, S. George, and C. Zeitlin. Kinetic energy reconstruction with a single layer particle telescope. *Applied Physics Letters*, 112(13):134103, 2018.
- [12] R. Amare\*, **A. A. Bahadori**, and S. Eckels. Modeling heat regulation with a structured mesh, finite volume approach in a voxelized domain. In *ASME 2018 International Mechanical Engineering Congress and Exposition*, pages V003T04A057–V003T04A057. American Society of Mechanical Engineers, 2018.
- [13] **A. Bahadori**, E. Semones, M. Ewert, J. Broyan, and S. Walker. Measuring space radiation shielding effectiveness. *EPJ Web Conf.*, 153:04001, 2017.
- [14] **A. A. Bahadori**, J. A. Roberts, M. Kroupa, and D. J. Fry. Reconstructing solar particle event spectra from absorbed dose measurements. *Transactions of the American Nuclear Society*, 116(1):909–912, 2017.
- [15] T. C. Slaba, **A. A. Bahadori**, B. D. Reddell, R. C. Singleterry, M. S. Cloudsley, and S. R. Blattnig. Optimal shielding thickness for galactic cosmic ray environments. *Life Sciences in Space Research*, 12:1 – 15, 2017.

- [16] M. M. Sands, D. Borrego, M. R. Maynard, **A. A. Bahadori**, and W. E. Bolch. Comparison of methods for individualized astronaut organ dosimetry: Morphometry-based phantom library versus body contour autoscaling of a reference phantom. *Life Sciences in Space Research*, 15:23 – 31, 2017.
- [17] M. Kroupa, T. Campbell-Ricketts, **A. Bahadori**, and A. Empl. Techniques for precise energy calibration of particle pixel detectors. *Review of Scientific Instruments*, 88(3):033301, 2017.
- [18] J. W. Wilson, T. C. Slaba, F. F. Badavi, B. D. Reddell, and **A. A. Bahadori**. Solar proton exposure of an ICRU sphere within a complex structure part I: Combinatorial geometry. *Life Sciences in Space Research*, 9:69–76, 2016.
- [19] T. C. Slaba, J. W. Wilson, F. F. Badavi, B. D. Reddell, and **A. A. Bahadori**. Solar proton exposure of an ICRU sphere within a complex structure part II: Ray-trace geometry. *Life Sciences in Space Research*, 9:77–83, 2016.
- [20] J. W. Wilson, T. C. Slaba, F. F. Badavi, B. D. Reddell, and **A. A. Bahadori**. 3DHZETRN: Shielded ICRU spherical phantom. *Life Sciences in Space Research*, 4:46–61, 2015.
- [21] J. W. Wilson, T. C. Slaba, F. F. Badavi, B. D. Reddell, and **A. A. Bahadori**. 3DHZETRN: Neutron leakage in finite objects. *Life Sciences in Space Research*, 7:27–38, 2015.
- [22] **A. Bahadori**, D. Miglioretti, R. Kruger, M. Flynn, S. Weinmann, R. Smith-Bindman, and C. Lee. Calculation of organ doses for a large number of patients undergoing CT examinations. *American Journal of Roentgenology*, 205(4):827–833, 2015.
- [23] N. Stoffle, L. Pinsky, M. Kroupa, S. Hoang, J. Idarraga, C. Amberboy, R. Rios, J. Hauss, J. Keller, **A. Bahadori**, et al. Timepix-based radiation environment monitor measurements aboard the International Space Station. *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 782:143–148, 2015.
- [24] M. Kroupa, **A. Bahadori**, T. Campbell-Ricketts, A. Empl, S. M. Hoang, J. Idarraga-Munoz, R. Rios, E. Semones, N. Stoffle, L. Tlustos, et al. A semiconductor radiation imaging pixel detector for space radiation dosimetry. *Life Sciences in Space Research*, 6:69–78, 2015.
- [25] J. W. Wilson, T. C. Slaba, F. F. Badavi, B. D. Reddell, and **A. A. Bahadori**. Advances in NASA radiation transport research: 3DHZETRN. *Life Sciences in Space Research*, 2:6–22, 2014.
- [26] L. S. Pinsky, J. Idarraga-Munoz, M. Kroupa, H. Son, N. Stoffle, E. Semones, **A. A. Bahadori**, D. Turecek, S. Pospíšil, J. Jakubek, Z. Vykydal, H. Kitamura, and Y. Uchihori. Medipix in space on-board the ISS. *Journal of Radiation Research*, 55(S1):i62–i63, 2014.
- [27] L. Pinsky, S. M. Hoang, J. Idarraga-Munoz, M. Kroupa, N. Stoffle, **A. Bahadori**, E. Semones, H. Kitamura, S. Kodaira, J. Jakubek, et al. Summary of the first

year of Medipix-based space radiation monitors on the ISS. In *2014 IEEE Aerospace Conference*, pages 1–8. IEEE, 2014.

- [28] **A. A. Bahadori**, T. Sato, T. C. Slaba, M. R. Shavers, E. J. Semones, M. Van Baalen, and W. E. Bolch. A comparative study of space radiation organ doses and associated cancer risks using PHITS and HZETRN. *Physics in Medicine and Biology*, 58(20):7183, 2013.
- [29] T. C. Slaba, S. R. Blattnig, B. Reddell, **A. Bahadori**, R. B. Norman, and F. F. Badavi. Pion and electromagnetic contribution to dose: Comparisons of HZETRN to Monte Carlo results and ISS data. *Advances in Space Research*, 52(1):62–78, 2013.
- [30] L. Pinsky, S. Hoang, J. Idarraga, M. Kroupa, N. Stoffle, E. Semones, **A. Bahadori**, S. Pospíšil, J. Jakubek, Z. Vykydal, and D. Turecek. Summary of the experience with the first use of Medipix-based radiation measurements on the ISS. In *Proceedings of the International Astronautical Congress, IAC*, volume 1, pages 106–110. IAC, 2013.
- [31] **A. A. Bahadori**, M. Van Baalen, M. R. Shavers, E. J. Semones, and W. E. Bolch. Dosimetric impacts of microgravity: an analysis of 5th, 50th and 95th percentile male and female astronauts. *Physics in Medicine and Biology*, 57(4):1047, 2012.
- [32] **A. A. Bahadori**, M. Van Baalen, M. R. Shavers, C. Dodge, E. J. Semones, and W. E. Bolch. The effect of anatomical modeling on space radiation dose estimates: a comparison of doses for NASA phantoms and the 5th, 50th, and 95th percentile male and female astronauts. *Physics in Medicine and Biology*, 56(6):1671, 2011.
- [33] **A. A. Bahadori**, P. Johnson, D. W. Jokisch, K. F. Eckerman, and W. E. Bolch. Response functions for computing absorbed dose to skeletal tissues from neutron irradiation. *Physics in Medicine and Biology*, 56(21):6873, 2011.
- [34] L. Pinsky, C. Amberboy, **A. Bahadori**, A. Burian, A. Empl, J. Hauss, J. Jakubek, H. Kitamura, K. Lee, S. Pospisil, E. Semones, N. Stoffle, D. Turecek, Y. Uchihori, Z. Vykydal, N. Yasuda, and N. Zapp. Preparing for active personal dosimetry on the International Space Station. In *Proceedings of the International Astronautical Congress, IAC*, volume 1, pages 193–199, 2011.
- [35] D. Jokisch, D. Rajon, **A. A. Bahadori**, and W. Bolch. An image-based skeletal model for the ICRP reference adult male—specific absorbed fractions for neutron-generated recoil protons. *Physics in Medicine and Biology*, 56(21):6857, 2011.
- [36] P. B. Johnson, **A. A. Bahadori**, K. F. Eckerman, C. Lee, and W. E. Bolch. Response functions for computing absorbed dose to skeletal tissues from photon irradiation—an update. *Physics in Medicine and Biology*, 56(8):2347, 2011.
- [37] A. Cebula, D. Gilland, L.-M. Su, D. Wagenaar, and **A. Bahadori**. A novel SPECT camera for molecular imaging of the prostate. In *SPIE Proceedings*, volume 8143. SPIE, 2011.

## Technical Papers

- [1] J. W. Wilson, C. M. Werneth, T. C. Slaba, F. F. Badavi, B. D. Reddell, and **A. A. Bahadori**. Neutron Angular Scatter Effects in 3DHZETRN: Quasi-Elastic. NASA/TP-2017-219597, NASA Langley Research Center, Hampton, VA, 2017.
- [2] J. W. Wilson, T. C. Slaba, C. M. Werneth, F. F. Badavi, B. D. Reddell, and **A. A. Bahadori**. Advances in NASA Radiation Transport: 3DHZETRN-v2. NASA/TP-2017-219665, NASA Langley Research Center, Hampton, VA, 2017.
- [3] N. Stoffle, H. Nounu, K. Lee, and **A. Bahadori**. Comparison of Passive and Active Exploration Flight Test 1 Radiation Detector Measurements with Trapped Proton and Vehicle Shielding Model Calculations. NASA/TP-2016-218599, NASA Johnson Space Center, Houston, TX, 2016.
- [4] J. W. Wilson, T. C. Slaba, F. F. Badavi, B. D. Reddell, and **A. A. Bahadori**. Solar Proton Transport within an ICRU Sphere Surrounded by a Complex Shield: Combinatorial Geometry. NASA/TP-2015-218980, NASA Langley Research Center, Hampton, VA, 2015.
- [5] J. W. Wilson, T. C. Slaba, F. F. Badavi, B. D. Reddell, and **A. A. Bahadori**. A Study of Neutron Leakage in Finite Objects. NASA/TP-2015-218692, NASA Langley Research Center, Hampton, VA, 2015.
- [6] **A. A. Bahadori**, E. J. Semones, R. Gaza, M. Kroupa, R. R. Rios, N. N. Stoffle, T. Campbell-Ricketts, L. S. Pinsky, and D. Turecek. Battery-operated Independent Radiation Detector Data Report from Exploration Flight Test 1. NASA/TP-2015-218575, NASA Johnson Space Center, Houston, TX, 2015.
- [7] T. C. Slaba, J. W. Wilson, F. F. Badavi, B. D. Reddell, and **A. A. Bahadori**. Solar Proton Transport within an ICRU Sphere Surrounded by a Complex Shield: Ray-Trace Geometry. NASA/TP-2015-218994, NASA Langley Research Center, Hampton, VA, 2015.
- [8] J. W. Wilson, T. C. Slaba, F. F. Badavi, B. D. Reddell, and **A. A. Bahadori**. A 3DHZETRN Code in a Spherical Uniform Sphere with Monte Carlo Verification. NASA/TP-2014-218271, NASA Langley Research Center, Hampton, VA, 2014.
- [9] J. W. Wilson, T. C. Slaba, F. F. Badavi, B. D. Reddell, and **A. A. Bahadori**. 3D Space Radiation Transport in a Shielded ICRU Tissue Sphere. NASA/TP-2014-218530, NASA Langley Research Center, Hampton, VA, 2014.

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## Patents

2018

**Switchable Passive Neutron Source**, Serial Number 62/722,030; PCT Patent Application No. PCT/US19/47925, Inventors: W. J. McNeil, **A. A. Bahadori**, KSURF Disc. No.: 2018-085; Attorney Docket No. 51452-PRO.

Provisional filed 23 August 2018

PCT filed 23 August 2019

2018

**MINIATURIZED FAST NEUTRON SPECTROMETER**, *Serial Number 62/721,239; PCT Patent Application No. PCT/US2019/047441*, Inventors: **A. A. Bahadori**, Z. Leseman, KSURF Disc. No.: 2018-090; Attorney Docket 51260-PCT.

Provisional filed 22 August 2018

PCT filed 21 August 2019

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## Thesis/Dissertation

### PhD Dissertation

**TITLE** NASA Astronaut Dosimetry: Implementation of Scalable Human Phantoms and Benchmark Comparisons of Deterministic versus Monte Carlo Radiation Transport

**ADVISOR** Professor Wesley E. Bolch

**FUNDING** US National Aeronautics and Space Administration

### MS Thesis

**TITLE** Skeletal Neutron Dose Response Functions: A New Protocol for Evaluating Dose to Active Marrow and Bone Endosteum

**ADVISOR** Professor Wesley E. Bolch

**FUNDING** University of Florida

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## Invited Talks

### Extramural

2019

**Collaborating with Industry on Radiological Engineering Research**, *Nuclear Engineering Colloquium*, The University of Tennessee, Knoxville, TN, US.  
17 April 2019

2017

**NASA Timepix-based Radiation Monitoring: Past and Current Projects**, *Physics Talk*, Wichita State University, Wichita, KS, US.  
29 March 2017

2016

**Bahadori Research Summary**, *Rensselaer Radiation Measurement & Dosimetry Group*, Rensselaer Polytechnic Institute, Troy, NY, US.  
5 February 2016

2015

**Space Radiation Protection: An Evolving Field**, *Alan Levin Department of Mechanical and Nuclear Engineering*, Kansas State University, Manhattan, KS, US.  
23 January 2015

2011

**Mathematics in Space Radiation Protection**, *KSU Undergraduate Mathematics Seminar*, Kansas State University, Manhattan, KS, US.  
31 October 2011

2009

**Skeletal Neutron Absorbed Dose Response Functions**, *Committee 2 Task Group on Dose Calculations*, International Commission on Radiological Protection (ICRP), Ottawa, ON, CA.  
20 April 2009

### Intramural



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2018

**Monte Carlo Methods: Mathematical Foundation and Applications**, *KSU Undergraduate Mathematics Seminar*, Kansas State University, Manhattan, KS, US.  
3 December 2018

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2018

**KSU Nuclear Engineering Option, ME 101: Introduction to Mechanical Engineering**, Kansas State University, Manhattan, KS, US.  
6 November 2018

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2016

**Nuclear Engineering at Kansas State University, ME 101: Introduction to Mechanical Engineering**, Kansas State University, Manhattan, KS, US.  
29 November 2016

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2016

**Bahadori Research Summary**, *Student Chapter of the American Society of Mechanical Engineers*, Kansas State University, Manhattan, KS, US.  
27 April 2016

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2016

**Bahadori Research Summary**, *Student Chapter of the American Nuclear Society*, Kansas State University, Manhattan, KS, US.  
11 February 2016

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## Contributed Talks

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2019

**Dual-Modality Imaging with Pixelated Microstructured Semiconductor Neutron Detector**, *Medipix Open Meeting*, Geneva, CH.  
17 September 2019

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2019

**Three-dimensional charge distribution for electrostatic space radiation shielding**, *2019 American Nuclear Society Annual Meeting*, Presented by R. Pal Chowdhury\*, Graduate Research Assistant, Minneapolis, MN, US.  
9–13 June 2019

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2019

**Comparison of MCCAD and DAGMC for predictive capability with BGA inspection systems**, *2019 American Nuclear Society Annual Meeting*, Presented by M. Pfeifer\*, Graduate Research Assistant, Minneapolis, MN, US.  
9–13 June 2019

Best Presentation Award, Computational Tools for Radiation Protection and Shielding–1

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2019

**Neutron spectrum unfolding with a planar miniaturized fast-neutron detector**, *2019 American Nuclear Society Annual Meeting*, Presented by L. Stegeman\*, Graduate Research Assistant, Minneapolis, MN, US.  
9–13 June 2019

Best Presentation Award, Radiation Protection and Shielding: General

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2019

**A Novel, Population-based Approach to Astronaut Radiation Risk**, *3rd International Conference on Dosimetry and its Applications (ICDA-3)*, Lisbon, PT.  
27–31 May 2019

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2019

**Low Energy Gamma-ray Response and Time Dependent MCNP Simulation of the KSU Benchmarking Facility**, *Consortium for Nonproliferation Enabling Capabilities Workshop 2019*, Presented by S. Sharma\*, Graduate Teaching Assistant, Raleigh, NC, US.  
6 February 2019

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- 2018 **Radioactively Driven Colloids**, *71st Annual Meeting of the American Physical Society's (APS) Division of Fluid Dynamics (DFD)*, Presented by G. Wilson\*, Graduate Research Assistant, Atlanta, GA, US.  
18–20 November 2018
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- 2018 **Modelling Heat Regulation with a Structured Mesh, Finite Volume Approach in a Voxelized Domain**, *2018 American Society of Mechanical Engineers (ASME) International Mechanical Engineering Congress and Exposition (IMECE)*, Presented by R. Amare\*, Graduate Research Assistant, Pittsburgh, PA, US.  
9–15 November 2018
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- 2018 **Radiation Dose Measurement on Printed Circuit Boards**, *47th WANTO/JOWOG 39*, Kansas City, MO, US.  
6–9 November 2018
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- 2018 **PHITS Simulation of Galactic Cosmic Rays on Mars: Code and Model Description**, *2nd MSL RAD Mars Space Radiation Modeling Workshop*, Presented by M. Pfeifer\*, Graduate Research Assistant, Boulder, CO, US.  
16–18 October 2018
- 
- 2018 **PHITS Simulation of Galactic Cosmic Rays on Mars: Results**, *2nd MSL RAD Mars Space Radiation Modeling Workshop*, Presented by M. Pfeifer\*, Graduate Research Assistant, Boulder, CO, US.  
16–18 October 2018
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- 2018 **Photon Production in Hydrogenous Space Radiation Shields**, *Health Physics Society 63rd Annual Meeting*, Cleveland, OH, US.  
15–19 July 2018
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- 2018 **Ethics in Space Radiation Protection**, *Health Physics Society 63rd Annual Meeting*, Cleveland, OH, US.  
15–19 July 2018
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- 2018 **Evaluation of Russian Roulette and Particle Splitting Monte Carlo Methods for Space Radiation Transport**, *2018 American Nuclear Society Annual Meeting*, Presented by R. Pal Chowdhury\*, Graduate Research Assistant, Philadelphia, PA, US.  
17–21 June 2018
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- 2018 **PHITS Modeling to Estimate Dose on Mars Due to Solar Events**, *American Nuclear Society Student Conference 2018*, Presented by M. Pfeifer\*, Graduate Research Assistant, Gainesville, FL, US.  
5–7 April 2018
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- 2018 **The Effects of Worn Detector Location on Neutron Detector Measurement**, *American Nuclear Society Student Conference 2018*, Presented by L. Stegeman\*, Undergraduate Researcher, Gainesville, FL, US.  
5–7 April 2018
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- 2017 **Slowing and Stopping Charged Particles Cause Angular Dependence for Absorbed Dose Measurements**, *10th International Topical Meeting on Industrial Radiation and Radioisotope Measurement Applications (IRRMA X)*, Chicago, IL, US.  
9–13 July 2017

2017

**Reconstructing Solar Particle Event Spectra from Absorbed Dose Measurements**, *2017 American Nuclear Society Annual Meeting*, San Francisco, CA, US.  
11–15 June 2017

2017

**Validation of Voxel Based Ray Tracer Code with 3D-HZETRN**, *American Nuclear Society Student Conference 2017*, Presented by R. Pal Chowdhury\*, Graduate Teaching Assistant, Pittsburgh, PA, US.  
6–9 April 2017

2016

**Measuring Space Radiation Shielding Effectiveness**, *13th International Conference on Radiation Shielding – Radiation Protection & Shielding Division Topical Meeting 2016 of American Nuclear Society*, Paris, FR.  
3–6 October 2016

2016

**Penetrating Heavy Charged Particle Dose Measurements are Invariant with Angle of Incidence**, *Health Physics Society 61st Annual Meeting*, Spokane, WA, US.  
17–21 July 2016

2014

**Development of the Battery-operated Independent Radiation Detector**, *The 19th Annual Workshop on Radiation Monitoring for the International Space Station*, Krakow, PL.  
9–11 September 2014

2012

**NASA Medipix Space Dosimetry**, *Medipix2 Open Meeting*, Geneva, CH.  
19 September 2012

2012

**Medipix-Based Space Dosimetry at NASA: An Overview of Current Projects**, *The 17th Annual Workshop on Radiation Monitoring for the International Space Station*, Austin, TX, US.  
4–6 September 2012

2011

**Improvements to the Ionizing Radiation Risk Assessment Program for NASA Astronauts**, *Space Forum 2011*, Moscow, RU.  
18–21 October 2011

2011

**Automation of PCXMC and IMPACT for NASA Astronaut Medical Imaging Dose and Risk Tracking**, *2011 Joint AAPM/COMP Meeting*, Vancouver, BC, CA.  
31 July–4 August 2011

2011

**Comparison of Organ Dosimetry for Astronaut Phantoms: Earth-Based vs. Microgravity-Based Anthropometry and Body Positioning**, *2011 Joint AAPM/COMP Meeting*, Vancouver, BC, CA.  
31 July–4 August 2011

2010

**Effect of Anatomical Modeling on Space Radiation Dose Estimates: A Comparison of Doses for NASA Dosimetry Phantoms and University of Florida Hybrid Phantoms**, *Health Physics Society 55th Annual Meeting*, Salt Lake City, UT, US.  
27 June–1 July 2010

2009

**Skeletal Neutron Dose Response Function Development for Hydrogen**, *2009 American Nuclear Society Student Conference*, Best presentation in Medical Physics Therapy Section, Gainesville, FL, US.  
2–5 April 2009

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## Poster Presentations

2019

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**Charge Drift Modeling and Fabrication of Pixelated Semiconductor Neutron Detectors**, *Consortium for Nonproliferation Enabling Capabilities Workshop 2019*, Presented by D. Laramore\*, Graduate Research Assistant, Raleigh, NC, US.  
6 February 2019

2019

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**Real-Time Determination of Dose to Printed Circuit Board Electronics Imparted by X-ray Inspection Machine Sources**, *Consortium for Nonproliferation Enabling Capabilities Workshop 2019*, Created by M. Pfeifer\*, Graduate Research Assistant; presented by W. McNeil, Raleigh, NC, US.  
6 February 2019

2018

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**Statistical Analysis of Solar Energetic Particle Events and PHITS Modeling to Estimate Dose on Mars**, *Kansas State University College of Engineering Undergraduate Research Poster Forum*, Presented by F. Alghamdi, Undergraduate Researcher, Manhattan, KS, US.  
26 April 2018

2017

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**Modelling Thermoregulatory Blood Flow in a Voxelized Human Phantom**, *1st IEEE EMBS International Summer School on Computer Modeling in Medicine*, Presented by R. Amare\*, Graduate Research Assistant, Charleston, SC, US.  
11–17 June 2017

2017

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**Predicting Organ Morphometry from External Measurements: A Pilot Study**, *Kansas State University College of Engineering Undergraduate Research Poster Forum*, Presented by E. Stallbaumer, Undergraduate Researcher, Manhattan, KS, US.  
27 April 2017

2017

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**Probability Modeling for Total Event Integrated Fluence of Solar Proton Events: SEPEM Server Data Adjustments**, *Kansas State University College of Engineering Undergraduate Research Poster Forum*, Presented by B. Bombardier, Undergraduate Researcher, Manhattan, KS, US.  
27 April 2017

2017

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**Investigating Secondary Cancer Risk Using a Water Phantom Simulation**, *Kansas State University Developing Scholars Program Research Poster Symposium*, Presented by E. Abamegal, Undergraduate Researcher, Manhattan, KS, US.  
9 April 2017

2017

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**Variance reduction using HZETRN2015 for solar particle event transport: Response function comparison**, *2017 NASA Human Research Program Investigators' Workshop*, Co-authored by M. Pfeifer\*, Graduate Research Assistant, Galveston, TX, US.  
23–26 January 2017

2009

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**Skeletal Neutron Dose Response Function Development for Use in Proton Therapy**, *American Association of Physicists in Medicine 51st Annual Meeting*, Anaheim, CA, US.  
26–30 July 2009

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## Other Conference and Workshop Participation

2018

**42nd Committee on Space Research (COSPAR) Scientific Assembly**, Pasadena, CA, US.  
14–22 July 2018

2017

**Test, Research, and Training Reactors (TRTR) 2017**, San Diego, CA, US.  
17–21 September 2017

2017

**Solar Heliospheric and INterplanetary Environment (SHINE) Conference 2017**, Saint-Sauveur, QU, CA.  
24–28 July 2017

2017

**Solar Energetic Particles (SEP), Solar Modulation and Space Radiation: New Opportunities in the AMS-02 Era #2**, Washington, DC, US.  
24–26 April 2017

2016

**2016 Marshall Space Flight Center NASA EPSCoR Technical Interchange Meeting**, Huntsville, AL, US.  
9 September 2016

2016

**1st MSL RAD Mars Space Radiation Modeling Workshop**, Boulder, CO, US.  
28–30 June 2016

2015

**2015 NASA Human Research Program Investigators' Workshop**, Galveston, TX, US.  
13–15 January 2015

2014

**2014 NASA Human Research Program Investigators' Workshop**, Galveston, TX, US.  
12–13 February 2014

2013

**2013 NASA Human Research Program Investigators' Workshop**, Galveston, TX, US.  
12–14 February 2013

2012

**23rd Annual NASA Space Radiation Investigators' Workshop**, Durham, NC, US.  
8–11 July 2012

2012

**12th FLUKA Course**, *Thomas Jefferson National Accelerator Facility*, Newport News, VA, US.

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## Research Advisees

### Past Graduate Students

2018  
2019

**Graham Wilson**, *MS in Mechanical Engineering (Co-Advised with H. Bindra)*.  
Thesis: Anomalous Diffusion and Self-Propulsion of Radioactive Colloidal Particles  
Current Position: Engineer at Bettis Atomic Power Laboratory, Pittsburgh, PA, US

### Current Graduate Students

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**2019 Luke Stegeman**, *MS Student*, Graduate Research Assistant, Simulation and Testing of a Novel, Miniaturized Fast Neutron Spectrometer; NASA Active Radiation Shielding Simulation.

2019 ANS Annual Meeting Best Presentation Award, Radiation Protection and Shielding: General

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**2018 Diego Laramore**, *PhD Student (Co-Advised with W. McNeil)*, Graduate Research Assistant, Pixelated Microstructured Semiconductor Neutron Detector.

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**2018 Sanchit Sharma**, *PhD Student*, Graduate Research Assistant, Honeywell Neutron Interrogation Imaging.

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**2016 Rohan Amare**, *PhD Student (Co-Advised with S. Eckels)*, Graduate Research Assistant, Human Thermal Modeling using Advanced Computational Phantoms.

IMECE2018 Track 4 Student Paper Competition Finalist

2017, 2018 KSU Johnson Cancer Research Center Graduate Student Travel Award

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**2016 Rajarshi Pal Chowdhury**, *PhD Candidate*, Graduate Research Assistant, NASA Active Radiation Shielding Simulation.

2018 KSU Johnson Cancer Research Center Graduate Student Travel Award

2016-2017, Graduate Teaching Assistant

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**2016 Michael Pfeifer**, *MS Student*, Graduate Research Assistant, Modeling the Martian Radiation Environment; Honeywell Electronics X-Ray Simulation.

2017–Present, US Nuclear Regulatory Commission Graduate Fellowship

2019 ANS Annual Meeting Best Presentation Award, Computational Tools in Radiation Protection and Shielding–1

### Undergraduate

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**2019 Emily Domann**, GEANT4 Evaluation of Mouse Exposures at the NASA Space Radiation Laboratory.

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**2019 Kaitlyn Smallfoot**, Testing of Miniaturized Fast Neutron Spectrometer.

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**2019 Jack Casburn**, Ancillary Data Acquisition in Support of Electronics X-Ray Shielding and Prediction Project; Testing of Handheld Surface Scanner.

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**2018 Eric Giunta**, MSND-Timepix Modeling with PHITS, MCNP, and AllPix<sup>2</sup>.

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**2017 Luke Stegeman**, Human Body Shielding of Neutron Detectors; Neutron Beam Chopper Simulation; Simulation of a Novel, Miniaturized Fast Neutron Spectrometer; NASA Active Radiation Shielding Simulation.

2017 NUSIK Program Participant (US Nuclear Regulatory Commission)

2018 Alan Levin Department of Mechanical and Nuclear Engineering Outstanding Senior  
Began graduate studies with REAL in Summer 2019

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**2018 Prerona Kundu**, Modeling Output of Photon Radiotherapy Machines; Biophysical Modeling of Radiation Effects.

2018 KSU Johnson Cancer Research Center Cancer Research Award

2018 Roy G. Post Foundation Undergraduate Scholarship

2019 Udall Undergraduate Scholarship Honorable Mention

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**2018 Zachary Plymesser**, MSND-Timepix Modeling with COMSOL Multiphysics.

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**2018 Austin Mackey**, Honeywell Electronics X-Ray Measurements.

- 2018
 **Margaret Jones**, Honeywell Electronics X-Ray Measurements.
- 2017
 **Quentin Pease**, Simulation and Construction of a Novel, Miniaturized Fast Neutron Spectrometer.
- 2017
 **Faisal Alghamdi**, Exploring Relationships Among Energy Channels in Solar Particle Events.
- 2017
 **Lucas Wodrich**, Space Nuclear Reactor Perturbation from Solar Activity.  
2017 NUSIK Program Participant (US Nuclear Regulatory Commission)
- 2016
 **Eshaddai Abamegal**, Application of NASA Quality Factor to Charged Particle Radiotherapy.  
2016 KSU Johnson Cancer Research Center Cancer Research Award  
2016-2017 KSU Developing Scholars Program Participant
- 2016
 **Blake Bombardier**, Probability Modeling for Total Event Integrated Fluence of Solar Proton Events: SEPEM Data Server Adjustments.
- 2016
 **Emily Stallbaumer**, Predicting Organ Morphometry from External Measurements: A Pilot Study.  
2016-2017 KSU Women in Engineering Laboratory Experience Participant

## Teaching Experience

- 2019
 **NE 495, Elements of Nuclear Engineering**, *Instructor of Record*, KSU Alan Levin Department of Mechanical and Nuclear Engineering (MNE).  
Fall 2019
- 2017
 **NE 690, Radiation Protection and Shielding**, *Instructor of Record*, KSU MNE.  
Fall 2017, Fall 2018, Fall 2019
- 2019
 **NE 620/860, Radiation and Human Health**, *Instructor of Record*, KSU MNE.  
Spring 2019 (new course)
- 2016
 **NE 648, Nuclear Reactor Laboratory**, *Instructor of Record*, KSU MNE.  
Spring 2016, Spring 2017, Spring 2018
- 2017
 **ME 575, Interdisciplinary Industrial Design Projects 2**, *Instructor of Record*, KSU MNE.  
Spring 2017
- 2016
 **NE 495, Elements of Nuclear Engineering**, *Guest Lecturer*, KSU MNE.  
Fall 2016
- 2016
 **ME 574, Interdisciplinary Industrial Design Projects 1**, *Instructor of Record*, KSU MNE.  
Fall 2016
- 2007
 **NE 250, Reactor Operations Laboratory**, *Undergraduate Laboratory Instructor*, KSU MNE.  
Spring 2007, Fall 2007

## Honors and Awards

- 2019
 **NASA Group Achievement Award**, *Advanced Radiation Protection Thick Target GCR Shielding*.

- 2018
**Zeldovich Medal for Scientific Commission F, Life Sciences as Related to Space**, *Jointly awarded by Russian Academy of Sciences and Committee on Space Research of the International Council for Science (COSPAR).*
- 2017
**Highly Regarded Nuclear Engineering Professor**, *Recognized by OnlineEngineeringPrograms.com.*
- 2017
**Kansas State University College of Engineering Research Proposal Teamwork Award.**
- 2015
**NASA Group Achievement Award**, *Advanced Exploration Systems RadWorks Project.*
- 2012
**NASA Group Achievement Award**, *Advanced Exploration Systems Deep Space Habitat Project.*
- 2008–2012
**University of Florida Alumni Graduate Award.**
- 2009–2010
**NASA Graduate Student Researchers Program Fellowship.**
- 2008–2010
**American Nuclear Society Graduate Scholarship.**  
2008–2009 Walter Meyer Scholarship  
2009–2010 Vern R. Dapp Memorial Scholarship
- 2008
**Honorable Mention**, *National Science Foundation Graduate Fellowship.*
- 2008
**Outstanding Senior**, *Kansas State University Department of Mechanical and Nuclear Engineering.*
- 2008
**Outstanding Senior**, *Kansas State University Department of Mathematics.*
- 2006–2008
**American Nuclear Society Undergraduate Scholarship.**  
2006–2007 Angelo F. Bisesti Memorial Scholarship  
2007–2008 Joseph R. Dietrich Memorial Scholarship
- 2006–2008
**Department of Energy Nuclear Engineering/Health Physics Scholarship.**
- 2006–2008
**National Academy for Nuclear Training Scholarship.**
- 2003–2007
**Kansas State University Putnam Scholarship.**

## Professional Service

### Extramural

- 2019
**Co-Chair, Working Group on Revision to Position Statement 41 on Low Level Ionizing Radiation Exposure**, *American Nuclear Society.*
- 2019
**Secretary, Radiation Protection and Shielding Division**, *American Nuclear Society.*
- 2019
**Associate Member, ANS-2.22 Working Group, Environmental Radiological Monitoring at Operating Nuclear Facilities**, *American Nuclear Society.*
- 2018
**Reviewer**, *Advances in Space Research.*



2018 **Reviewer**, *Journal of Radiation Protection*.

2018 **Member, Government Relations Committee**, *Health Physics Society*.

2017 **Reviewer**, *Life Sciences in Space Research*.

2016 **Associate Member, ANS-6.4.2 Working Group, Specification for Radiation Shielding Material**, *American Nuclear Society*.

2017 **Session Chair, Dosimetry in Space Applications**, *3rd International Conference on Dosimetry and its Applications (ICDA-3)*.

2019 **Reviewer**, *NASA Future Investigators in Earth and Space Science Technology (FINESST) Heliophysics Program*.

2019 **Reviewer**, *41st Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)*.

2018 **Panelist**, *NASA Astrophysics Science SmallSat Studies (AS<sup>3</sup>)*.

2018 **Session Chair, Contemporary Topics**, *Health Physics Society 63rd Annual Meeting*.

2017 **Session Chair, Dosimetry and Detector Applications II**, *10th International Topical Meeting on Industrial Radiation and Radioisotope Measurement Applications (IR-RMA X)*.

2017 **Session Judge, Radiation Protection and Shielding, Biology and Medicine, Accelerator Applications**, *American Nuclear Society Student Conference 2017*.

2017 **Reviewer**, *Radiation & Environmental Biophysics*.

2017 **Reviewer**, *NASA Experimental Program to Stimulate Competitive Research (EPSCoR)*.

2017 **Reviewer**, *IEEE Transactions on Radiation and Plasma Medical Sciences*.

2016 **Reviewer**, *NASA Space Technology Research Fellowship Program*.

### Intramural

2018 **Member**, *KSU MNE Undergraduate Program & ABET Assessment Committee*.

2018 **Member**, *KSU Situational Awareness Working Group*.

2017 **Faculty Advisor**, *KSU Alpha Nu Sigma*.

2016 **Faculty Advisor**, *KSU American Nuclear Society Student Chapter*.

2018 **Member**, *KSU TRIGA Mark II Nuclear Reactor Facility Supervisor Search Committee*.

2018 **Senior Design Poster Evaluator**, *KSU MNE*.

2017 **Senior Design Sponsor**, *KSU MNE, X-Ray and Neutron Radiography with a DSLR Camera System*.

2017 **Ex Officio Member**, *KSU Reactor Safeguards Committee*.

2017 **Chairman**, *KSU TRIGA Mark II Nuclear Reactor Facility Manager and Supervisor Search Committees*.

2016

**Judge**, *KSU Research and the State Graduate Poster Forum.*

2016

**Judge**, *KSU College of Engineering Undergraduate Research Poster Forum.*

2007

**Student Mentor**, *KSU MNE, ME 101, Introduction to Mechanical Engineering.*

## Affiliations

2018

**Associate**, *Committee on Space Research of the International Council for Science (COSPAR).*

2017

**Member**, *International Radiation Physics Society.*

2017–Present, Vice Treasurer

2016

**Member**, *American Nuclear Society.*

2005–2011, Student Member

2019–Present, Secretary of Radiation Protection and Shielding Division (RPSD)

2015

**Member**, *American Academy of Health Physics.*

2011

**Life Member**, *Kansas State University Alumni Association.*

2009

**Member**, *Health Physics Society.*

2016–Present, Member, Mid-America Chapter of the Health Physics Society

2007

**Member**, *Alpha Nu Sigma.*

2004

**Member**, *Tau Beta Pi.*

2008–2014

**Member**, *American Association of Physicists in Medicine.*

2008–2011

**Member**, *University of Florida Society of Health and Medical Physics Students.*

2010–2011, Treasurer

## Professional Development

2019

**Security Clearance at TOP SECRET Level.**

Interim Security Clearance at TOP SECRET Level held from 2018–2019

Security Clearance at SECRET Level held from 2013–2018

2017

**KSU TRIGA Mark II Nuclear Reactor Facility Unescorted Access.**

Previously held from 2005–2008

2015

**Diplomate of the American Board of Health Physics.**

Certified in the comprehensive practice of Health Physics

Recertified through December 31, 2023

2010

**Medical Physics Rotation**, *Mayo School of Health Sciences, Jacksonville, FL, US.*

2007

**Passed Fundamentals of Engineering Examination.**