ASHOK TIWARI, Ph.D.

[Authorized to work lawfully in the USA]
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EDUCATION

8/2022 - 5/2023 **Certificate in Medical Physics (CAMPEP)**
Wake Forest University School of Medicine, Winston-Salem, NC, USA
8/2017 - 5/2022 **PhD in physics**
Thesis: "*Monte Carlo Simulations and Phantom Measurements towards more Quantitative Dosimetry and Imaging in Nuclear Medicine*"
Advisor: John Sunderland
University of Iowa, Department of Physics, Iowa City, IA, USA
8/2015 - 5/2017 **MS in Physics**, *Magna Cum Laude*
University of South Dakota, Department of Physics, Vermillion, SD, USA
2008 - 2012 **MSc in Physics**
Tribhuvan University, Central Department of Physics, Kathmandu, Nepal
2005 - 2008 **BSc in Physics**
Tribhuvan University, National Multiple College, Lalitpur, Nepal

RESEARCH INTERESTS

Medical Physics, Radiation Therapy, Radiopharmaceutical therapy dosimetry, Monte Carlo Simulations

RESEARCH EXPERIENCE

8/2022 - Postdoctoral Research Associate
Advanced Computing for Health Sciences Section, Oak Ridge National Laboratory, Oak Ridge, Tennessee
Experience: Monte Carlo for simulations for radionuclide dosimetry and radiobiology
- PET imaging extravasation dosimetry
- Radiobiology simulations with TOPAS-nBio

7/2022 - 8/2022 Postdoctoral Research Scholar
Department of Radiology, University of Iowa City, Iowa City, Iowa
6/2018 - 5/2022 Graduate Research Assistant
Department of Physics and Radiology, University of Iowa, Iowa City, Iowa
Experience: Radiochromic film (EBT3) and linacs
- Film calibration using 6 MV photons beam
- Film irradiations for beta absorbed dose measurements

Experience with clinical PET/CT scanners and handling radioactive sources
- Discovery MI, Siemens Vision and Biograph mCT scanners
- Phantom scan for PET/CT QA/QC and research
- ^{90}Y, ^{177}Lu for absorbed dose measurements
- ^{18}F, ^{89}Zr, and ^{68}Ga for PET imaging

Monte Carlo simulations using GATE and Geant4 toolkit
- Dose point kernels generation for radiopharmaceutical therapy dosimetry
- Experimental validation of GATE toolkit for radiopharmaceutical therapy dosimetry
- Monte Carlo simulation of long axial-field-of-view PET scanner using GE Discovery MI front-end architecture

8/2015 - 5/2017 Graduate Research Assistant

	Department of Physics, University of South Dakota, Vermillion, South Dakota
Experience:	Liquid scintillator detector for gamma flux measurements

- Gamma flux measurements were performed at underground laboratory located in Soudan, MN to investigate the annual modulation of gamma rays

CLINICAL EXPOSURE (RADIATION THERAPY)

4/2022   Department of Radiation Oncology, Wake Forest University School of Medicine, NC

I have some experience with IMRT and VMAT patient-specific QA with ArcCHECK phantom. During my Certificate in Medical Physics training, I rotated for different therapeutic modalities, including external beam radiation therapy with Elekta linacs (treatment planning, treatment-verification, treatment delivery using photons and electrons beam), HDR brachytherapy with Elekta Flexitorn Afterloader, and Gamma Knife Icon.

TEACHING AND PROFESSIONAL EXPERIENCE

9/2021 - 7/2022	Programmer, MFM SPECT Project
	Department of Radiology, University of Washington, Seattle, WA
8/2017 - 8/2018	Teaching Assistant
	Department of Physics, University of Iowa, Iowa City, IA
8/2015 - 5/2017	Teaching Assistant
	Department of Physics, University of South Dakota, Vermillion, SD
3/2013 - 1/2015	Physics Lecturer
	SS College, Bhaktapur, Nepal
1/2012 - 5/2012	Radiographer
	Sunshine Medical Center, Kathmandu Nepal

HONORS, AWARDS AND SCHOLARSHIPS

- Best Presenter Award, 11th Annual Oak Ridge Postdoctoral Association Research Symposium, ORNL, May 18-19, 2023.
- Ballard and Seashore Dissertation Fellowship 2022 (award amount $10,500), University of Iowa.
- Research Assistantship, Department of Physics and Radiology, University of Iowa.
- Teaching Assistantship, Department of Physics, University of Iowa.
- Teaching Assistantship, Department of Physics, University of South Dakota.
- Graduate Studentship, Central Department of Physics, Tribhuvan University, Nepal.
- Scholarship (NPR 25,000) from Ministry of Environment, Science and Technology, Nepal.
- Travel award ($1000), Seoul National University, Seoul Korea, to attend "11th Edoardo Amaldi Conference on Gravitational Waves", June 21-26 (2015), Gwangju, South Korea.
- Travel award ($800), International graduate summer school in Aeronautics and Astronautics, July 15-23 (2014), Beihang University, Beijing, China.

JOURNAL PUBLICATIONS (Most recent to earliest)

11. **Tiwari A.,** Merrick M., Graves S., and Sunderland J. J. Alpha dose point kernels and their potential application in labelling FAPI-radiotherapeutics. *Med Phys, (in review),* 2022.
10. **Tiwari A.,** Merrick M., Graves S., and Sunderland J. J. Monte Carlo evaluation of hypothetical long axial field-of-view PET scanner using GE Discovery MI PET front-end architecture, *Med Phys,* 49:1139-1152, 2022.

9. Graves S., Martin M., **Tiwari A**., Merrick M., and Sunderland J. J. SIR-Spheres$^{®}$ activity measurements reveal systematic miscalibration, *JNM,* 63 (8) 1131-1135, 2022; DOI: https://doi.org/10.2967/jnumed.121.262650.

8. Graves S., **Tiwari A.,** Merrick M. J., Hyer D., Flynn R., Kruzer A., Nelson A., Dewaraja Y., Mirando D., and Sunderland J. J. Accurate resampling of radial dose point kernels to a Cartesian matrix for voxelwise dose calculation, *Med Phys*, *(in review),* 2022.

7. Merrick M. J., Rotsch D. A., **Tiwari A.,** Nolen J., Brossard T., Song J., Wadas T. J., Sunderland J. J., and Graves S. A. Half-Life of ^{67}Cu, *J. Phys. Commun.* 5 085007, 2021.

6. **Tiwari A.,** Sunderland J., Graves S., Strand S., and Flynn R. Absorbed dose distributions from beta-decaying radionuclides: experimental validation of Monte Carlo tools for radiopharmaceutical dosimetry. *Med Phys,* 47(11):5779-5790, 2020.

5. Merrick M. J., Rotsch D. A., **Tiwari A.,** Nolen J., Brossard T., Song J., Wadas T. J., Sunderland J. J., and Graves S. A. Imaging and Dosimetric Characteristics of ^{67}Cu. *Phys Med Biol* 66, 035002, 2021.

4. **Tiwari A.,** Graves S., and Sunderland J. The Impact of Tissue Type and Density on Dose Point Kernels for Patient-Specific Voxel-Wise Dosimetry: A Monte Carlo Investigation. *Radiat Res*, 193 (6): 531–542, 2020.

3. Zhang C., Mei D.-M., **Tiwari A**., and Cushman P. Reply to "Comment of 'Observation of annual modulation induced by γ rays from (α, γ) reactions at the Soudan Underground Laboratory'", *Phys Rev C* 101, 049802, 2020.

2. **Tiwari A.,** Zhang C., Mei D.-M., and Cushman P. Observation of annual modulation induced by γ rays from (α, γ) reactions at the Soudan Underground Laboratory, *Phys Rev C*, Vol. 96, No. 4, 2017.

1. **Tiwari A.,** and Khanal U., Gravitational radiation from a particle in bound orbit around the black hole; relativistic correction, *J. Phys.: Conf. Ser.* 716, 012024, 2016.

INVITED AND RECENT TALKS

6. Absorbed doses from accidental extravasation of radiotracers in PET imaging. **Tiwari A.**, Andriotty M., Agasthya G., Osborne D., and Kapadia A. Research Symposium ORPA, Oak Ridge National Laboratory, Oak Ridge, May 18-19, 2023 (Best presenter award).

5. Experimental validation of Monte Carlo simulations to quantify DNA damage in breast cancer cells following exposure to ^{225}Ac. **Tiwari A.**, Gonzalez M. T., Andriotty M., Agasthya G., and Kapadia A. Research Symposium ORPA, Oak Ridge National Laboratory, Oak Ridge, May 18-19, 2023.

4. Dose point kernels and their potential application in labeling FAPI-compounds. **Tiwari A.,** Merrick MJ., Graves S., and Sunderland J. ARIA Workshop on "Evolving Targeted Therapies for Cancer", Oak Ridge National Lab, Nov 2-3, (2022). https://aria-workshop.ornl.gov/speakers/ashok-tiwari/

3. Simulations of therapeutic alpha-emitting radionuclides in various tissues. **Tiwari A.** and Sunderland J., OpenGATE Virtual Meeting, Nov 18, (2021).

2. GATE simulation of Discovery MI PET scanner and its extended version. **Tiwari A.** and Sunderland J., GATE Scientific Meeting, Virtual Edition, May 10, (2021).

1. Dosimetry of therapeutic beta emitters using GATE Monte Carlo simulation and its experimental validation for radiopharmaceutical therapy. **Tiwari A.**, GATE Technical Meeting, Virtual Edition, Sep 10 (2020).

CONFERENCE PRESENTATIONS AND ABSTRACTS (Peer reviewed)

18. Experimental validation of Monte Carlo simulations for quantifying DNA damage in breast cancer cells exposed to ^{225}Ac. **Tiwari A.,** Gonzalez M. T., Andriotty M., Agasthya G., and Kapadia A. (17th ICRR Meeting 2023).

17. Absorbed doses from accidental extravasation of radiotracers in PET imaging. **Tiwari A.,** Andriotty M., Agasthya G., Osborne D., and Kapadia A. (AAPM Annual Meeting 2023, Houston, TX).

16. Estimation of DNA damage from radionuclide irradiation in a single cell. **Tiwari A.**, Andriotty M., Inman P., Agasthya G., and Kapadia A. (SEAAPM Scientific Meeting 2023, Feb 2-4, Huntsville, AL).

15. Evaluation of therapeutic alpha emitters for their potential to be used in FAPI compounds. **Tiwari A.**, Graves S., Merrick MJ., and Sunderland J. (SNMMI Annual Meeting 2022).

14. Longitudinal PET/CT Imaging of ^{64}Cu for Radiopharmaceutical Therapy Dosimetry. Merrick M., Dunnwald L., **Tiwari A.**, Sunderland J., and Graves S. (AAPM Annual Meeting 2021).

13. A Comprehensive PET-CT scanner characterization performance assessment paradigm and database. Sunderland J. and **Tiwari A.**, Journal of Nuclear Medicine, May 2021, 62 (supplement 1) 1398, (SNMMI Annual meeting, 2021).

12. Evaluation of a scalable qSPECT calibration method for radiopharmaceutical dosimetry. Graves S., Merrick M., **Tiwari A.,** and Sunderland J., Journal of Nuclear Medicine, May 2021, 62 (supplement 1) 143, (SNMMI Annual meeting, 2021).

11. Monte Carlo simulation of 4-ring Discovery MI PET/CT scanner and its extended axial field-of-view to 2 m. **Tiwari A.**, Merrick M. J., Graves S. A., and Sunderland J., Journal of Nuclear Medicine May 2021, 62 (supplement 1) 1150, (SNMMI Annual Meeting, 2021).

10. Experimental validation of Monte Carlo-generated beta absorbed doses for 3D voxelwise dosimetry. **Tiwari A.**, Graves S., Strand S. and Sunderland J., Journal of Nuclear Medicine May 2020, 61 (supplement 1) 533, (SNMMI Annual Meeting 2020).

9. Monte Carlo validation of convolution-based voxelwise dosimetry. Graves S., **Tiwari A.**, Kruzer A., Nelson A., Mirando D., Dewaraja Y., and Sunderland J., Journal of Nuclear Medicine May 2020, 61 (supplement 1) 1019, (SNMMI Annual Meeting 2020).

8. Collapsed-cone convolution superposition for improved accuracy of voxelwise dosimetry. Graves S., **Tiwari A.**, and Sunderland J., Journal of Nuclear Medicine May 2020, 61 (supplement 1) 535, (SNMMI Annual Meeting 2020).

7. Production, SPECT Imaging, and Initial Evaluation of ^{67}Cu for Theranostic Applications. Merrick M. J., Rotsch D., **Tiwari A.**, Nolen J., Brossard T., Song J., Wadas T. J., Sunderland J. J., Graves S. A., (AAPM Annual Meeting, 2020).

6. Measurements of dose point kernels using GATE Monte Carlo toolkit for personalized convolution dosimetry. **Tiwari A.**, Graves S., Sunderland J., Journal of Nuclear Medicine 60 (supplement 1), 274-274, (SNMMI Annual Meeting, 2019), Anaheim, California, USA.

5. Impact of Kernel Truncation On ^{177}Lu-DOTATATE and ^{131}I-MIBG Voxelwise Dosimetry. Graves S., **Tiwari A.**, Hyer D., Flynn R., Buatti J., Sunderland J., MEDICAL PHYSICS 46 (6), E316-E316, (AAPM Annual Meeting, 2019).

4. Toward best practice voxel-wise ^{177}Lu dosimetry: kernel generation, scanner characterization, and convolution-based dose calculation. Graves S., **Tiwari A.,** Menda Y., Madsen M., Sunderland J., Journal of Nuclear Medicine 60 (supplement 1), 119, (SNMMI Annual Meeting, 2019), CA, USA.

3. The study of the correlation between (alpha, gamma) induced events with respect to Radon annual modulation. **Tiwari A.**, Zhang C. and Mei D. M., (APS Meeting, 2017), Washington DC, USA.

2. (alpha, gamma) reaction induced background events for rare event experiments. **Tiwari A.**, Zhang C., and Mei D. M., (APS Division of Nuclear Physics Meeting, 2016), Vancouver, Canada.

1. Gravitational radiation from a particle in bound orbit around black hole; relativistic correction. **Tiwari A.** and Khanal U, (11th Edorado Amaldi Conference on Gravitational Waves, 2015), Gwangju, South Korea.

PROFESSIONAL MEMBERSHIPS

- *Junior Member* - American Association of Physicist in Medicine (AAPM) [2023 -]
- *Member* - National Postdoctoral Association [2023 -]
- *Associate Member* - Society of Nuclear Medicine and Molecular Imaging (SNMMI) [2017 - 2022]
- *Student Member* - Golden Key International Honour Society [2017 - 2022]

JOURNAL REVIEWER

- Medical Physics

EXPERTISE AND COMPUTING SKILLS

- High-Performance Computing (research computing, big data handling)
- Confident in the use of various operating systems: Linux, Windows, MacOS
- Programming and software skills
  - ➢ Monte Carlo Simulation: Geant4, GATE platform, TOPAS toolkit
  - ➢ ROOT data analysis framework
  - ➢ Programming: MATLAB, Python, C++
  - ➢ Interactive computing: Jupyter Notebook (Pandas, Numpy, Matplotlib)
  - ➢ JSON, Qt widget toolkit
  - ➢ Image analysis tools: ITK-SNAP, ImageJ, Amide, 3D Slicer and DICOM
  - ➢ Github, DOCKER
  - ➢ AutoCAD modeling
  - ➢ Image reconstruction software: STIR, CASToR

LEADERSHIP ROLES

- Vice President, Nepalese Student Association, University of Iowa [2017 – 2021]

REFERENCES

- Provided upon request