**Dr. Brandon Augustus Wilson**

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**OBJECTIVE**

I am seeking a position in the nuclear security field that utilizes my strong engineering, problem solving, communication, and leadership skills.

**EDUCATION**

The Ohio State University January 2017

Doctorate of Philosophy in Nuclear Engineering

Dissertation: *Evaluation of Optical Fiber Sensors in High Temperature and Nuclear Reactor Environments*

Master of Science in Nuclear Engineering May 2016

Concentration: Intelligence and Security Studies

Bachelor of Science May 2013

Major: Engineering Physics

Minor: Nuclear Engineering

**RESEARCH EXPERIENCE / WORK**

Oak Ridge National Laboratory, Oak Ridge, TN July 2021- Present

R&D Staff

* Testing rad hard materials and sensors for nuclear thermal propulsion
* Investigating space radiation effects on quantum communication detectors
* Modeling high-altitude nuclear detonations and its effects on the ionosphere
* Fabricating and analyzing doped UO2 fuel for intentional forensics applications
* Reactor modeling of doped UO2 fuel for reactivity penalties and transmutation studies
* Researching the deposition and radiation dose from the inhalation of radioactive particulates
* Radiation transport modeling and data collection of NDA methods for analysis of UF6 cylinders

Oak Ridge National Laboratory, Oak Ridge, TN January 2019- July 2021

Nuclear Forensics Postdoctoral Researcher

* Researched space-based nuclear detonation detection (SNDD)
* Nuclear fallout and forensics research
* COMSOL modeling of nuclear detonations, the resulting cloud rise and the fallout debris
* Created a model to simulate underground nuclear detonations and the resulting fallout
* Investigated the feasibility of free space optical links to satellites for quantum communications and the effects nuclear weapons have on them
* Lead writer of the Radiation Section of the FEMA Nuclear Detonation Response Planning Guidance Strategy Document
* Helped co-author a multi-million-dollar proposal on intentional forensics for special nuclear material

Ohio State Nuclear Engineering, Columbus, OH January 2017- January 2019

Postdoctoral Researcher

* Conducted research on the effects of radiation on the optical properties of sapphire and silica
* Created MCNP models to optimize the irradiation of materials in the Ohio State Research Reactor
* Worked on an optical fiber gamma thermometer system that incorporated ‘Big Data’ algorithms to optimize the power levels in nuclear reactors
* Manager of four graduate students and head safety officer for the lab
* Authored/co-authored six Department of Energy proposals and won 4 for a total amount of 1.2 million
* Published 9 first author and 4 coauthored papers
* Received a patent on a new fiber optic sensor design

Ohio State Nuclear Engineering, Columbus, OH April 2013 – January 2017

Graduate Research Assistant

* Lead graduate researcher on two Department of Energy (DOE) projects involving optical sensing survivability in nuclear reactors
* Wrote quarterly project reports for both DOE projects in addition to yearly presentations to DOE officials
* Built an irradiation facility in the Ohio State Research Reactor (OSURR) capable of irradiating materials while simultaneously heating the materials to temperatures up to 1600 °C
* Created an MCNP model of the irradiation facility I built in the OSURR and validated the model with experimental data from the facility
* Conducted multiple experiments involving the neutron activation and material damage from placing various materials into nuclear reactors

Ohio State Scarlet Laser Lab, Columbus, OH June 2012 – May 2013

Undergraduate Research Assistant

* Upgraded a 3 Joule femtosecond laser at the Edison Welding Institute
* Wrote a code to simulate the light amplification in the Scarlet Laser Facility

**SECURITY CLEARANCE**

DOE Q-Clearance August 2019

**PROFESSIONAL CLASSES**

* Defense Nuclear Weapons School Kirtland AFB - February 2020 – 1 week
* MCNP Expert Class Los Alamos National Lab - March 2019 – 1 week
* SCALE Shielding Class Oak Ridge National Lab - February 2019 – 1 week
* Nuclear Non-Proliferation, Security & Safeguards Brookhaven National Lab - June 2014 - 3 weeks

**LAB SKILLS**

* Rad-worker training; extensive experience with the handling of radioactive material
* Proficient with fiber optics, optics and laser setup and operation
* High temperature and cryogenic experiments and handling
* Soldering, PCB, and electrical wiring experience and knowledge

**COMPUTER SKILLS**

* Programming Languages: Python, MATLAB
* Microsoft Office: Word, PowerPoint, Excel and Project
* CAD Packages: SolidWorks, Autodesk Inventor, Eagle Cad
* Nuclear Codes: MCNP-6, SCALE 6.2, SRIM/TRIM
* Multi-physics/CFD Codes: COMSOL

**NON-TECHNICAL SKILLS**

*Project Management/ Organizational Skills*:

* Won seven project proposals with the DOE/NNSA that resulted in a total award of $5,675,000
* Completed a DOE project ahead of schedule on a project involving the TREAT reactor
* Lead a group of more experienced peers in the writing of a federal strategy document
* Completed an MBA class at Ohio State on project management
* Organized lab work & group meetings as a graduate student at OSU
* Mentored an intern for the first year of my postdoc at ORNL

*Communication/ Writing Skills:*

* Authored/coauthored over 20 papers in Peer Reviewed journals and meeting transactions
* Won best paper for the young members group, at the summer 2017 ANS Conference
* Presented and briefed DOE/NNSA representatives with project reports at annual project meetings
* Peer reviewer for IEEE Nuclear Transactions Journal

*Patents*

*Internal Cladding in Sapphire Optical Device and Method of making* US 15928411

*Publications*

1. B. Wilson, T. Birri, T. Blue, "Evaluation of Optical Fiber Bragg Gratings in a Nuclear Reactor," *Trans. Am. Nucl. Soc. 116*, San Francisco, CA, 2017
2. B. Wilson, K. McCary, T. Blue, “Optimization of Silica Optical Fiber for High Temperature, Radiation Environments”, *Trans. Am. Nucl. Soc. 116*, San Francisco, CA, 2017
3. C. Petrie, B. Wilson, T. Blue, "In-situ Gamma Radiation-Induced Attenuation in Sapphire Optical Fibers Heated to 1000 °C," Journal of the American Ceramic Society Vol. 97 (2014), p. 3150-3156.
4. B. Wilson, B. Reinke, C. Petrie, T. Blue, “Distributed Temperature Measurements using Optical Fiber in the OSU Nuclear Reactor,” *Trans. Am. Nucl. Soc. 113*, Washington, DC, 2015
5. Benjamin Reinke, Joshua Jarrell, Max Chaiken, Brandon A. Wilson, Thomas E. Blue, Wolfgang Windl, Bryan D. Esser, Lei Cao, “Long-term 500 C Testing of High Temperature 4H-SiC Schottky Diode Alpha Particle Detectors for Pyroprocessing,” *Trans. Am. Nucl. Soc. 113*, Washington, DC, 2015
6. T. E. Blue and B. A. Wilson, "Effect of Gamma-Ray and Neutron Heating as Interfering Input for the Measurement of Temperature Using Optical Fiber Sensor System," in IEEE Transactions on Nuclear Science, vol. 64, no. 11, pp. 2774-2781, Nov. 2017.
7. Brandon A. Wilson and Thomas E. Blue, “Creation of an Internal Cladding in Sapphire Optical Fiber Using the 6Li(n,α)3H”, IEEE Sensors Journal, vol. 17, no. 22, pp. 7433-7439, Nov.15, 15 2017.
8. Brandon A. Wilson, Christian M. Petrie, Thomas E. Blue, “High Temperature Effects on the Light Transmission through Sapphire Optical Fiber”, *Journal of the American Ceramic Society*, Vol 101, Issue 5 (2018), pp. 122-127.
9. Brandon A. Wilson, Kelly M. McCary, Neil R. Taylor, Andrew Kauffman, Thomas E. Blue and Raymond Cao, “The Creation of a High Temperature Irradiation Facility in the Ohio State Research Reactor” *Trans. Am. Nucl. Soc. 117*, Washington, DC, 2017
10. Anthony Birri, Kelly McCary, Brandon Wilson, Thomas E. Blue, “Thermally Induced Bend Loss of Silica Optical Fiber” *Trans. Am. Nucl. Soc. 117*, Washington, DC, 2017
11. Anthony Birri, Kelly McCary, Brandon Wilson, Thomas E. Blue, “Thermally Induced Bend Loss of Silica Optical Fiber” *IEEE Sensors Journal*, August 2018
12. Neil R Taylor, Kelly M. McCary, Brandon A. Wilson, Thomas E. Blue, Dianne Ezell, “A Lumped Parameter Model of Heat Flow Through a High Temperature Fission Chamber” *Trans. Am. Nucl. Soc. 117*, Washington, DC, 2017
13. B. Wilson, Ph.D. dissertation: "Evaluation of Optical Fiber Sensors in High Temperature and Nuclear Reactor Environments," The Ohio State University, Columbus, 2017.
14. B. Reinke, T.E. Blue, B. Wilson, M. Eades. “Design and MCNP6 simulation of the OSU Cryogenic Irradiation Facility.” *Trans. Am. Nucl. Soc.* *112,* San Antonio, TX, 2015
15. McCary, Wilson, “In-pile Ofdr Sensing with Fiber Bragg Gratings In Sapphire Optical Fiber”, *Trans. Am. Nucl. Soc. 117*, Washington, DC, 2019
16. Inman, Wilson, Jodoin, Atmospheric Gamma Ray Transport from a Radioactive Cloud to a Low Earth Orbit Satellite using MCNP, *Trans. Am. Nucl. Soc. 117*, Washington, DC, 2019
17. Brandon A. Wilson and Thomas E. Blue, “Quasi-Distributed Temperature Sensing using Type-II Fiber Bragg gratings in Sapphire Optical Fiber to Temperatures up to 1300°C”, *IEEE Sensors Journal*, October 2018
18. B. A. Wilson, S. Rana, H. Subbaraman, N. Kandadai and T. E. Blue, “Modeling of the Creation of an Internal Cladding in Sapphire Optical Fiber Using the 6Li(n,α)3H Reaction”, *Journal of Lightwave Technology*, December, 2018
19. A. Birri, B. Wilson and T. Blue, “Deduced Refractive Index Profile Changes of Type I and Type II Gratings When Subjected to Ionizing Radiation”, *IEEE Sensors Journal*, July 2019
20. K McCary, A. Birri, B. Wilson and T. Blue, “Response of Distributed Fiber Optic Temperature Sensors to High-Temperature Step Transients”, *IEEE Sensors Journal*, November 2018
21. Wilson, Brandon A., Alexander Miloshevsky, David A. Hooper, and Nicholas A. Peters. "Radiation-Induced Dark Counts for Silicon Single-Photon Detectors in Space." *Physical Review Applied* 16, no. 6 (2021): 064049
22. Wilson, Brandon A., Alexander Miloshevsky, David A. Hooper, Brian P. Williams, and Nicholas A. Peters. "Nuclear Disturbed Environmental Effects on Space-based Single Photon Detectors." In *2021 IEEE Research and Applications of Photonics in Defense Conference (RAPID)*, pp. 1-2. IEEE, 2021.
23. Hooper, David A., Brandon A. Wilson, Alexander Miloshevsky, Brian P. Williams, and Nicholas A. Peters. "Effects of a nuclear disturbed environment on a quantum free space optical link." *Optics Express* 29, no. 17 (2021): 27254-27277.
24. Hooper, D.A., Miloshevsky, A., Wilson, B.A., Williams, B.P. and Peters, N.A., 2021, August. Estimation of Optical Channel Signal Loss Following a Near-Surface Nuclear Detonation. In *2021 IEEE Research and Applications of Photonics in Defense Conference (RAPID)* (pp. 1-2). IEEE.
25. Peters, N. A., Muneer Alshowkan, J. C. Chapman, P. G. Evans, David A. Hooper, W. P. Grice, H-H. Lu et al. "Quantum Networking and Communications at Oak Ridge National Laboratory." In *IEEE INFOCOM 2022-IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS)*, pp. 1-6. IEEE, 2022.
26. Wilson, Brandon A., Alexander Miloshevsky, David A. Hooper, Warren Grice, and Nicholas A. Peters. "Optical noise in a free-space quantum communications link from natural and nuclear disturbed environments." *New Journal of Physics* 24, no. 6 (2022): 063035.
27. Wilson, B., Ezell, N.D., Steiner, T., Hutchins, E. and Heilbronn, L., 2022. *In-Pile High-Temperature Testing Vehicle for Nuclear Thermal Rocket Instrumentation, Materials, and Fuel Testing*. Oak Ridge National Lab.(ORNL), Oak Ridge, TN (United States).