

DAVID ALAN HOOPER

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EDUCATION

Aug 2011	Doctorate in Philosophy – Nuclear Engineering University of Tennessee, Knoxville, TN Dissertation: “Development of a Prognostic Method for Predicting the Production of Undeclared Enriched Uranium” Advisor: Dr. J Wesley Hines Cumulative GPA: 3.87/4.00
Aug 2011	Master of Science – Statistics University of Tennessee, Knoxville, TN Companion degree earned in conjunction with PhD Advisor: Dr. Hamparsum Bozdogan Cumulative GPA: See PhD
Aug 2008	Master of Science – Nuclear Engineering University of Tennessee, Knoxville, TN Thesis: Cavitation of Mercury in a Centrifugal Pump Advisor: Dr. Art Ruggles Cumulative GPA: 3.94/4.00
May 2001	Bachelor of Science – Mechanical Engineering University of Wyoming, Laramie, WY Cumulative GPA: 3.89/4.00

PROFESSIONAL EXPERIENCE

Dec 2021 – Present	Oak Ridge National Laboratory Group Lead – Incident Modeling and Computational Sciences Group Lead 7 to 9 scientists and software developers to develop novel models and software solutions for nuclear incidents such as post-detonation fallout or reactor releases.	Oak Ridge, TN
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PROFESSIONAL EXPERIENCE (continued)

Oct 2012 – Present	Oak Ridge National Laboratory Staff Scientist – Nuclear Forensics Modeling See "Active Projects" below.	Oak Ridge, TN
Oct 2011 – Sep 2012	Oak Ridge National Laboratory Postdoctorate – Nuclear Forensics Modeling Developed models for actinide fractionation and particle attachment for nuclear fallout	Oak Ridge, TN
Oct 2005 – Aug 2006	EPIC Engineering Mechanical Drafter Designed HVAC and plumbing systems for buildings Drafted AutoCAD designs for commercial building mechanical systems.	Charleston, SC
Sep 2001 – Sep 2005	United States Navy Active Duty Officer Instructor at the Naval Nuclear Power Training Command Taught courses relevant to Navy nuclear propulsion in math, physics, chemistry, metallurgy, and radiology to enlisted and officer students. Class Director for roughly 50 junior officers, 2 Captains, and 5 civilians. Honorable Discharge as a Lieutenant.	Charleston, SC

INTERNSHIPS

Aug 2011 – Oct 2011	Oak Ridge National Laboratory Transitional employment between PhD graduation and start of post-doctoral work.	Oak Ridge, TN
May 2010 – Aug 2010	Oak Ridge National Laboratory Maintained and operated the Mock Feed and Withdrawal Facility to generate data for development of enrichment monitoring methodologies.	Oak Ridge, TN
May 2008 – Dec 2008	Oak Ridge National Laboratory Updated the DELFIC fallout modeling code to compliance with ENDF-B/VII standards.	Oak Ridge, TN

ACTIVE PROJECTS

2012 – Pres.	<p>Contributor: Support for National Technical Nuclear Forensics Sponsor: NNSA NA-83 Research and develop physics for nuclear cloud formation and rise, fallout formation and transport, and forensics and consequence assessments. Develop integrated software toolsets for fallout prediction and analysis. Provide fallout prediction and modeling training to the interagency National Technical Nuclear Forensics program.</p>
2019 – 2023	<p>Co-PI: Radar Plume Tracking Sponsor: DTRA Assess the use of radar signatures for detection, classifying, and tracking debris plumes from nuclear and non-nuclear explosions. Develop algorithms for rapidly providing plume information to defense personnel for force protection.</p>
2020 – 2024	<p>Contributor: Uranium Processing Signatures for Nuclear Forensics Sponsor: NNSA NA-22 Develop modeling and analytic capabilities to support the development of experimental testbeds to research signals of interest for detection of uranium processing activities by proliferants. Coordinate with researchers across the multi-laboratory venture to establish a novel comprehensive capability to aid in proliferation detection.</p>
2022 – 2025	<p>Principal Investigator: Aligning Dosimetry and Biomarkers of Lung Injury with Prophylaxis and Mitigation of Damage from Radionuclides and Metals Sponsor: DHA Subject matter expert: support the development of medical countermeasures for the inhalation of nuclear weapon, radiological weapon, or reactor accident debris by military personnel. This research is a collaboration with Northwestern University, Georgia Tech University, University of Florida Gainesville, University of California Berkeley, and Oak Ridge Associated Universities.</p>

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ACTIVE PROJECTS (continued)

2022 – 2026	<p>Principal Investigator: Multi-Scale Evaluation and Mitigation of Toxicities Following Internal Radionuclide Contamination</p> <p>Sponsor: NIAID</p> <p>Subject matter expert: support the development of medical countermeasures for internal contamination from nuclear weapon, radiological weapon, or reactor accident debris to the general population.</p> <p>This research is a collaboration with Northwestern University, Georgia Tech University, University of Florida Gainesville, University of California Berkeley, and Oak Ridge Associated Universities.</p>
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PREVIOUS PROJECTS

2020 – 2022	<p>Contributor: Quantum Signals in a Nuclear Disturbed Environment</p> <p>Sponsor: DTRA</p> <p>Assess the impact of nuclear weapon detonation on ground/satellite and satellite/satellite communications based on the longer term effects, such as artificial van Allen belts, lofted debris, shockwave, gamma radiation.</p>
2020 – 2022	<p>Contributor: CISCC Breach Dose Consequence Assessment</p> <p>Sponsor: EPRI</p> <p>Assess the dosimetric consequences of a potential spent nuclear fuel dry cask leak resulting from a chloride-induced stress corrosion cracking (CISCC) breach of the cask seal.</p>
2018 – 2020	<p>Contributor: Surrogate Debris Formation Using the Particle Dispersion Test Chamber</p> <p>Sponsor: DTRA</p> <p>Develop predictive models of end-to-end production of surrogate post-detonation nuclear debris for technical nuclear forensics applications. Advise surrogate debris production efforts at Oak Ridge National Laboratory with numerical models of isotope production at the High Flux Isotope Reactor and debris production in the Particle Dispersion Test Chamber.</p>

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PREVIOUS PROJECTS (continued)

2018 – 2019	<p>Contributor: Rapid Characterization of Fresh Nuclear Fallout using Full-Spectrum Inverse Transport Methods</p> <p>Sponsor: DTRA</p> <p>Support graduate students at North Carolina State University who are researching novel methods of characterizing fallout isotopics with advanced gamma counting analytics. Advised two PhD students, including one as a dissertation defense committee member.</p>
2018 – 2019	<p>Co-PI: Feasibility of Using Radar for Characterizing and Tracking Plumes</p> <p>Sponsor: DTRA</p> <p>Preliminary exploration of the use of radar or detection, characterization, and prediction of nuclear debris plumes.</p>
2017 – 2018	<p>Contributor: Ratio Analysis and Determination by Intra-Element Nuclide Techniques (RADIANT)</p> <p>Sponsor: DTRA</p> <p>Improve nuclear weapon debris formation model to provide noble gas characterization.</p>
2016 – 2019	<p>Contributor: Ground-Based Collection of Volatile Samples</p> <p>Sponsor: NNSA NA-22</p> <p>Develop a climatologically-based method to predict the optimal locations of ground-based air samplers to collect volatile debris samples from a nuclear explosion. Evaluate the feasibility of using existing sampler networks for notional detonations. Develop the methods into tools within the Airborne Planning Tool.</p>
2015 – 2018	<p>Contributor: Delayed Gamma Rays - New Signature Study</p> <p>Sponsor: DTRA</p> <p>Research novel signatures within delayed gamma signals from nuclear detonations for technical nuclear forensics.</p>
2016	<p>Contributor: Gamma Spectrogram Analysis</p> <p>Sponsor: DTRA</p> <p>Research the application of audio processing algorithms to gamma spectrum analysis of post-nuclear detonation fallout.</p>

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PREVIOUS PROJECTS (continued)

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| 2014 – 2015 | Contributor: Modeling Nuclear Debris Formation in Urban Environments
Sponsor: DTRA
Develop code-to-code capability to model the nuclear fireball with the Sandia National Laboratory code radCTH and the debris transport and isotopics with DELFIC. Apply the coupled code model to urban detonation scenarios. |
| 2014 – 2015 | Principal Investigator: Integration of ARDIMS Data with the Fallout Planning Tool
Sponsor: DHS
Develop a software tool to convert ARDIMS flyover radiation measurements of a fallout field to parameters relevant to the Ground Collection Task Force using DELFIC particle activity modeling. Develop a software tool to update the DELFIC fallout model predictions using measurement data from ARDIMS and other sources. |

PROFESSIONAL SOCIETIES

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| 2021 – Pres. | Member of the American Nuclear Society (ANS) |
| 2017 – Pres. | Member of the Health Physics Society (HPS) |
| 2016 – Pres. | Member of the Institute of Nuclear Materials Management (INMM) |

JOURNAL ARTICLES

- [1] L. Copeland-Hardin, T. Paunesku, J. S. Murley, J. Crentsil, O. Antipova, L. Li, E. Maxey, Q. Jin, **D. Hooper**, B. Lai, S. Chen, and G. E. Woloschak, “Proof of principle study: synchrotron X-ray fluorescence microscopy for identification of previously radioactive microparticles and elemental mapping of FFPE tissues,” *Sci. Rep.*, vol. 13, no. 1, May 2023. DOI: [10.1038/s41598-023-34890-6](https://doi.org/10.1038/s41598-023-34890-6). [Online]. Available: <https://www.nature.com/articles/s41598-023-34890-6>.
- [2] A. Miloshevsky, B. A. Wilson, B. P. Williams, **D. A. Hooper**, W. P. Grice, and N. A. Peters, “Space-based quantum networking in the presence of a nuclear disturbed environment,” *Appl. Opt.*, vol. 62, no. 23, G60–G68, Aug. 2023. DOI: [10.1364/AO.486818](https://doi.org/10.1364/AO.486818). [Online]. Available: <https://opg.optica.org/ao/abstract.cfm?URI=ao-62-23-G60>.

- [3] B. A. Wilson, **D. A. Hooper**, A. Miloshevsky, W. P. Grice, and N. A. Peters, "Effects of a nuclear-disturbed environment on electromagnetic wave propagation through the atmosphere," *Opt. Express*, vol. 31, no. 3, pp. 3881–3896, Jan. 2023. DOI: [10.1364/OE.475466](https://doi.org/10.1364/OE.475466). [Online]. Available: <https://opg.optica.org/oe/abstract.cfm?URI=oe-31-3-3881>.
- [4] B. A. Wilson, A. Miloshevsky, **D. A. Hooper**, W. Grice, and N. A. Peters, "Optical noise in a free-space quantum communications link from natural and nuclear disturbed environments," *New Journal of Physics*, vol. 24, no. 6, pp. 063035–20, 2022. DOI: [10.1088/1367-2630/ac77f4](https://doi.org/10.1088/1367-2630/ac77f4). eprint: <https://iopscience.iop.org/article/10.1088/1367-2630/ac77f4/epub>. [Online]. Available: <https://iopscience.iop.org/article/10.1088/1367-2630/ac77f4>.
- [5] R. Abergel, J. Aris, W. E. Bolch, S. A. Dewji, A. Golden, **D. A. Hooper**, D. Margot, C. G. Menker, T. Paunesku, D. Schaeue, and G. E. Woloschak, "The enduring legacy of Marie Curie: impacts of radium in 21st century radiological and medical sciences," *International Journal of Radiation Biology*, vol. 0, no. 0, pp. 1–9, 2022, PMID: 35030065. DOI: [10.1080/09553002.2022.2027542](https://doi.org/10.1080/09553002.2022.2027542). eprint: <https://www.tandfonline.com/doi/pdf/10.1080/09553002.2022.2027542>. [Online]. Available: <https://www.tandfonline.com/doi/abs/10.1080/09553002.2022.2027542>.
- [6] B. A. Wilson, A. Miloshevsky, **D. A. Hooper**, and N. A. Peters, "Radiation-induced dark counts for silicon single-photon detectors in space," *Phys. Rev. Applied*, vol. 16, p. 064049, 6 Dec. 2021. DOI: [10.1103/PhysRevApplied.16.064049](https://doi.org/10.1103/PhysRevApplied.16.064049). [Online]. Available: <https://link.aps.org/doi/10.1103/PhysRevApplied.16.064049>.
- [7] A. Rosenstrom, E. Asano, K. Griffin, C. Lee, **D. Hooper**, and S. Dewji, "Dose Coefficient Calculation for Use in Dosimetry Assessment of a Fission-Based Weapon," *Radiation Research*, vol. 196, no. 3, pp. 272–283, 2021. DOI: [10.1667/RADE-21-00012.1](https://doi.org/10.1667/RADE-21-00012.1). [Online]. Available: <https://doi.org/10.1667/RADE-21-00012.1>.
- [8] **D. A. Hooper**, B. A. Wilson, A. Miloshevsky, B. P. Williams, and N. A. Peters, "Effects of a Nuclear Disturbed Environment on a Quantum Free Space Optical Link," *Opt. Express*, vol. 29, no. 17, pp. 27254–27277, Aug. 2021. DOI: [10.1364/OE.433223](https://doi.org/10.1364/OE.433223). [Online]. Available: <http://www.opticsexpress.org/abstract.cfm?URI=oe-29-17-27254>.
- [9] R. B. Hayes, R. P. O'Mara, and **D. A. Hooper**, "Initial TL/OSL/EPR Considerations For Commercial Diatomaceous Earth In Retrospective Dosimetry And Dating," *Radiation Protection Dosimetry*, Feb. 2019. DOI: [10.1093/rpd/ncz013](https://doi.org/10.1093/rpd/ncz013).

CONFERENCE PAPERS

* – Presenting Author

- [1] N. S. V. Rao*, **D. Hooper**, and J. Ladd-Lively, "On feature, classifier and detector fusers for 235u signatures using gamma spectral counts," in *2022 IEEE International Conference on Multisensor Fusion and Integration for Intelligent Systems (MFI)*, Sep. 2022, pp. 1–6. DOI: [10.1109/MFI55806.2022.9913854](https://doi.org/10.1109/MFI55806.2022.9913854).

- [2] B. A. Wilson*, A. Miloshevsky, **D. A. Hooper**, W. Grice, and N. A. Peters, "Effects on communications wavelengths from an atmospheric nuclear detonation," in *2022 IEEE Research and Applications of Photonics in Defense Conference (RAPID)*, Sep. 2022, pp. 1–2. DOI: [10.1109/RAPID54472.2022.9911553](https://doi.org/10.1109/RAPID54472.2022.9911553).
- [3] N. Rao*, **D. A. Hooper**, and J. L. Ladd-Lively, "Study of Classifiers for U-235 Source Signatures Using Gamma Spectral Measurements," in *Proceedings of the 63rd Annual Meeting of the Institute of Nuclear Materials Management*, Jul. 2022.
- [4] N. A. Peters*, M. Alshokan, J. C. Chapman, P. G. Evans, **D. A. Hooper**, W. P. Grice, H. H. Lu, J. M. Lukens, R. C. Pooser, C. E. Marvinney, A. Miloshevsky, B. P. Williams, and B. A. Wilson, "Quantum Networking and Communications at Oak Ridge National Laboratory," in *IEEE INFOCOM Network Science for Quantum Communication Networks Workshop*, Jun. 2022, pp. 1–6. DOI: [10.1109/INFOCOMWKSHP54753.2022.9797980](https://doi.org/10.1109/INFOCOMWKSHP54753.2022.9797980).
- [5] N. Rao*, **D. A. Hooper**, and J. Ladd-Lively, "Study of classifiers for u-235 source signatures using gamma spectral measurements," Jul. 2022. [Online]. Available: <https://www.osti.gov/biblio/1883835>.
- [6] B. A. Wilson*, A. Miloshevsky, **D. A. Hooper**, B. P. Williams, and N. A. Peters, "Nuclear disturbed environmental effects on space-based single photon detectors," in *2021 IEEE Research and Applications of Photonics in Defense Conference (RAPID)*, Aug. 2021, pp. 1–2. DOI: [10.1109/RAPID51799.2021.9521449](https://doi.org/10.1109/RAPID51799.2021.9521449).
- [7] **D. A. Hooper***, J. J. Henkel, and M. Whitaker, "Application of Condition-Based Monitoring Techniques for Remote Monitoring of a Simulated Gas Centrifuge Enrichment Plant," Jan. 2012. [Online]. Available: <https://www.osti.gov/biblio/1055099>.
- [8] **D. A. Hooper***, V. J. Jodoin, R. W. Lee, and M. Monterial, "Predictive Fallout Composition Modeling: Improvements and Applications of the Defense Land Fallout Interpretive Code," Jan. 2012. [Online]. Available: <https://www.osti.gov/biblio/1047030>.
- [9] M. Monterial*, V. J. Jodoin, J. P. Lefebvre, D. E. Peplow, and **D. A. Hooper**, "Automating the Coupling of ORIGEN with GADRAS via the Fallout Analysis Tool for National Technical Nuclear Forensics," Jan. 2012. [Online]. Available: <https://www.osti.gov/biblio/1047031>.
- [10] J. Whitaker* Jr., J. R. Garner, M. Whitaker, D. Lockwood, K. V. Gilligan, J. R. Younkin, **D. A. Hooper**, J. J. Henkel, and A. M. Krichinsky, "New Measures to Safeguard Gas Centrifuge Enrichment Plants," Jan. 2011. [Online]. Available: <https://www.osti.gov/biblio/1018989>.

OTHER CONFERENCE PRESENTATIONS

* – Presenting Author

- [1] N. Rao*, **D. A. Hooper**, and J. L. Ladd-Lively, *Study of Pu-239 and U-235 Gamma Signatures Using Classifier and Regression Methods*, CoDA, Santa Fe, NM, Mar. 2023.
- [2] N. Rao*, **D. A. Hooper**, and J. L. Ladd-Lively, *Data Analytics of Low-Level U-235 Source Signatures for Classification Using Gamma Spectral Measurements*, NuFor, Institute of Physics, London, England, Oct. 2022.
- [3] N. A. Peters*, B. P. Williams, **D. A. Hooper**, A. Miloshevsky, and W. Grice, *Quantum State Estimation of Entanglement in a Quantum Communications Network in a Nuclear Disturbed Environment*, Quantum Summit, Oak Ridge, TN, Oct. 2022.
- [4] **D. A. Hooper***, E. D. Kabela, and M. R. Brown, *Radar for tracking postdetonation debris - preliminary findings*, 66th Annual Meeting of the Health Physics Society, Phoenix, AZ, Jul. 2021.
- [5] **D. A. Hooper***, E. D. Kabela, and J. P. Lefebvre, *Optimization of a Ground Sampler Network for Post-detonation Debris Collection*, 66th Annual Meeting of the Health Physics Society, Phoenix, AZ, Jul. 2021.
- [6] A. Rosenstrom*, E. Asano, **D. A. Hooper**, K. Griffin, C. Lee, and S. Dewji, *ICRP and UF/NCI Reference Voxel Phantom Series Dose Coefficient Simulation For Use In Dosimetry Assessment of Fission-Based Weapon*, 66th Annual Meeting of the Health Physics Society, Phoenix, AZ, Jul. 2021.
- [7] M. R. Brown, E. D. Kabela*, and **D. A. Hooper**, *Tracking Low Reflectivity Non meteorological Radar Returns*, 101st Annual American Meteorological Society Meeting, New Orleans, LA, Jan. 2021.
- [8] **D. A. Hooper**, E. D. Kabela*, and J. P. Lefebvre, *New Tools for the Creation of an Optimal Air Sampling Network*, 101st Annual American Meteorological Society Meeting, New Orleans, LA, Jan. 2021.
- [9] M. Purves*, **D. A. Hooper**, J. P. Lefebvre, R. W. Lee, and V. J. Jodoin, *Integration of DELFIC with SCIPUFF*, GMU Atmospheric Transport and Dispersion Conference, Fairfax, VA, Jun. 2018.

TECHNICAL REPORTS

- [1] E. D. Kabela, **D. A. Hooper**, M. R. Brown, C. D. Cooke, and T. P. Norby, "Fiscal Year 2021 Annual Report for Battlefield Radar Plume Tracking Project," Oak Ridge National Laboratory, Oak Ridge, TN, ORNL/SPR-2021/2335, Official Use Only, Mar. 2022.
- [2] P. A. Taylor, A. D. Braatz, T. B. Walker, **D. Hooper**, B. Grogan, and K. Dayman, "Production of Surrogate Nuclear Debris Using a Plasma Torch," Oak Ridge National Laboratory, Oak Ridge, TN, ORNL/TM-2020/1823, Official Use Only / Export Controlled, Apr. 2021.
- [3] E. D. Kabela, **D. A. Hooper**, M. R. Brown, and T. P. Norby, "Fiscal Year 2020 Annual Report for Battlefield Radar Plume Tracking Project," Oak Ridge National Laboratory, Oak Ridge, TN, ORNL/SPR-2020/1814, Official Use Only, Nov. 2020.

- [4] E. D. Kabela, **D. A. Hooper**, B. K. Daniel, M. R. Brown, and M. A. Anderson, "Weather Radar Use in Plume Tracking and Characterization," Oak Ridge National Laboratory, Oak Ridge, TN, ORNL/TM-2019/1287, Official Use Only, Jan. 2020.
- [5] **D. A. Hooper**, E. Kabela, J. P. Lefebvre, S. J. Cope, and V. J. Jodoin, "Ground-Based Collection of Volatile Samples: Optimal Sampler Networks," Oak Ridge National Laboratory, Oak Ridge, TN, ORNL/TM-2018/1101, Official Use Only, Dec. 2018.
- [6] J. P. Lefebvre, **D. A. Hooper**, M. W. Swinney, E. D. Kabela, and V. J. Jodoin, "Final Development of the Airborne Debris Collection Planning Tool," Oak Ridge National Laboratory, Oak Ridge, TN, ORNL/TM-2018/1100, Official Use Only, Dec. 2018.
- [7] E. D. Kabela, S. C. Moss, D. B. Koch, B. K. Daniel, V. J. Jodoin, **D. A. Hooper**, S. T. Fiorino, J. E. Schmidt, B. J. Elmore, V. Melnikov, D. Zrnica, and P. Zhang, "Feasibility of Using Radar for Characterizing and Tracking Plumes," Tech. Rep., May 2018. DOI: [10.2172/1436044](https://www.osti.gov/biblio/1436044). [Online]. Available: <https://www.osti.gov/biblio/1436044>.
- [8] J. P. Lefebvre, **D. A. Hooper**, M. W. Swinney, E. D. Kabela, and V. J. Jodoin, "The Airborne Debris Collection Planning Tool," Oak Ridge National Laboratory, Oak Ridge, TN, ORNL/TM-2017/741, Official Use Only / Export Controlled, Apr. 2018.
- [9] M. C. Welliver, **D. A. Hooper**, C. Cioce, D. Guildenbacher, J. Hubbard, and D. Weimann, "Final Report - Modeling of Nuclear Debris Formation in Urban Environments," Sandia National Laboratories, Albuquerque, NM, SNL RA 599644, Official Use Only / Export Controlled, Feb. 2017.
- [10] **D. A. Hooper** and V. J. Jodoin, "Revision of the DELFIC Particle Activity Module," Tech. Rep., Sep. 2010. DOI: [10.2172/1028737](https://www.osti.gov/biblio/1028737). [Online]. Available: <https://www.osti.gov/biblio/1028737>.