Douglas E. Peplow
Distinguished R&D Staff Member
Oak Ridge National Laboratory

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Areas of technical expertise include: Monte Carlo code development, variance reduction, development of hybrid Monte Carlo/deterministic methods for shielding calculations, and application of hybrid methods to difficult shielding problems. Currently active in: the application of radiation transport calculations to nuclear security and non-proliferation problems. Past areas of interest have included medical applications of radiation transport, facility vulnerability calculations and other defense-related applications of radiation transport and nuclear decay calculations.

Professional Experience

Distinguished R&D Staff Member (Nuclear Engineer), Oak Ridge National Laboratory
1/2016 – present Nuclear Energy and Fuel Cycle Division, Nuclear Nonproliferation Division (and their predecessors)

Leadership role in projects: Strategic Laboratory Assessment for Surplus Plutonium Disposition, Mobile Reactor Shielding, NA-22 Modeling Urban Scenarios & Experiments (MUSE), Activation Foil Integrated Detector System (AFIDS) Risk Reduction, Updated Specific Gamma-Ray Dose Constants.

Contributor in projects: Modeling UF_6 Cylinders, Space Applications of Radiation Transport, Radiological Anomaly Detection And Identification (RADAI); Update of the PNNL Materials Compendium, NA-84 Transform Prompt Effects Methodology; Quick Demonstration of the Basic Capabilities of AFIDS.

Senior R&D Staff Member (Nuclear Engineer), Oak Ridge National Laboratory
10/2006 – 12/2015 Reactor and Nuclear Systems (and its predecessors)

Leadership role in projects: NA-22 Modeling and Simulation Tool to Improve Urban Search Planning (OPTUS); BAE Neutron Induced Gamma Activation Dose of the Bradley Fighting Vehicle; NA-42 Advanced Multi-Dimensional Forward and Inverse Modeling; NRC Fluence Shielding, Methods, and Data for HTGRs; ORNL Seed Project on Advanced Variance Reduction Methods for Active Interrogation Modeling; lead developer of Monaco/MAVRIC in SCALE 6, SCALE 6.1 and SCALE 6.2; NA-22 Systematic Assessment of Neutron & Gamma-ray Backgrounds Relevant to Operational Modeling; DTRA PWR Facility Dose Modeling; DTRA Nuclear Vulnerability Analyses with MCNP; Member of the SCALE Leadership Team (2008-2014).

Contributor in projects: DTRA Cherenkov/Glass Forensic Neutron Detector – developed analysis software and GUI; NA-22 Activation Foil Integrated Detector System (AFIDS) – analysis and demonstration; LDRD on Revolutionary Radiation Transport; NA-22 Methods Development for ADVANTG (angular CADIS); USAF, Air Force Technical Applications Center project; Other classified projects; SCALE – various testing of nuclear data libraries.

R&D Staff Member (Nuclear Engineer), Oak Ridge National Laboratory
9/1999 – 9/2006 Nuclear Science and Technology Division (and its predecessors)

Lead developer in projects: Monaco/MAVRIC in SCALE, the first production code system to use automated hybrid variance reduction; VISAC (Visual Interactive Site Analysis Code) analysis code and GUI for DTRA Nuclear Facilities Vulnerability Analysis project.

Contributor in projects: NA-22 Activation Foil Integrated Detector System (AFIDS) for nuclear weapon attribution – GUI development; Medical physics projects including NIH grants and ORNL SEED project with UNC; Revised and benchmarked HFIR MCNP model; Explored radiation damage modeling in photographic film for Kodak.

Postdoctoral Research Associate, North Carolina State University
3/1999 – 9/1999 Department of Nuclear Engineering
Finished research and publications on Monte Carlo methods and differential sampling techniques.

Education

Ph.D. Nuclear Engineering, North Carolina State University, March 1999
Dissertation Title: Monte Carlo Mammography Image Simulation with Measured Coherent Scattering Form Factors and Differential Sampling
Designed experiments and measured photon scattering data from tissue samples at the Synchrotron Light Source at BNL. Conducted research in Monte Carlo modeling of medical mammographic imaging detector systems and synchrotron imaging systems. Authored several specialized Monte Carlo codes, including new differential sampling methods.

M.S. Nuclear Engineering, North Carolina State University, December 1993
Thesis Title: Sodium Iodide Detector Response Functions Using Simplified Monte Carlo Simulation and Principal Components
Conducted research in Monte Carlo modeling of gamma ray detectors. Authored a package for computing NaI detector response using principal components of prior Monte Carlo calculations.

B.S. Physics, *Summa Cum Laude,* Western Illinois University, May 1991

Publications - Archival Journal Articles

130. Georgeta Radulescu, Kaushik Banerjee, Thomas M. Miller, and Douglas E. Peplow, "Skyshine Calculations for a Large Spent Nuclear Fuel Storage Facility with SCALE 6.2.3", *Nuclear Technology* (2021). https://doi.org/10.1080/00295450.2020.1842702

127. James M. Ghawaly Jr., Andrew D. Nicholson, Douglas E. Peplow, Christine M. Anderson-Cook, Kary L. Myers, Daniel E. Archer, Michael J. Willis, and Brian J. Quiter, "Data for Training and Testing Radiation Detection Algorithms in an Urban Environment," *Scientific Data* **7**, article 328 (2020). https://doi.org/10.1038/s41597-020-00672-2

121. Andrew D. Nicholson, Douglas E. Peplow, Michael J. Willis, and Daniel E. Archer, "Generation of Synthetic Data for a Radiation Detection Algorithm Competition," accepted for *IEEE Transactions on Nuclear Science* **67**(8), 1968–1975 (2020). https://doi.org/10.1109/TNS.2020.3001754

118. C. Celik, D. E. Peplow, G. G. Davidson, M. W. Swinney, "A Directional Detector Response Function for Anisotropic Detectors," *Nuclear Science and Engineering* **193**(12), 1355–1370 (2019). https://doi.org/10.1080/00295639.2019.1631028

117. D. E. Peplow, K. Banerjee, G. G. Davidson, I. R. Stewart, M. W. Swinney, J. N. Wagner, "Preliminary Validation of the Shift Monte Carlo Code for Fixed-Source Radiation Transport Problems," *Nuclear Technology* **206**(1), 107–125 (2020). https://doi.org/10.1080/00295450.2019.1625663

116. D. E. Peplow, "Specific Gamma-Ray Dose Constants with Current Emission Data," *Health Physics* **118**, 402–416 (2020). https://doi.org/10.1097/HP.0000000000001136

112. M. S. Bandstra, B. J. Quiter, K. J. Bilton, J. C. Curtis, T. H. Joshi, R. Meyer, V. Neguy, K. Vetter, D. E. Archer, D. E. Hornback, D. E. Peplow, C. E. Romano, M. W. Swinney, T. L. McCullough, M. S. L. McLean, "Attribution of Gamma-ray Background Collected by a Mobile Detector System to its Surroundings using Panoramic Video," *Nuclear Instruments and Methods in Physics Research Section, A* 954 (2020) 161126. https://doi.org/10.1016/j.nima.2018.08.085

110. M. W. Swinney, D. E. Peplow, B. W. Patton, A. D. Nicholson, D. E. Archer, and M. J. Willis, "A Methodology for Determining the Concentration of Naturally Occurring Radioactive Materials in an Urban Environment," *Nuclear Technology* **203**(3), 325−335 (2018). https://doi.org/10.1080/00295450.2018.1458558

105. A. D. Nicholson, D. E. Hornback, I. Garishvili, D. E. Archer, W. R. Ray, D. E. Peplow, M. W. Swinney, and G. G. Davidson, "Multi-Agency Urban Search Experiment Detector and Algorithm Test Bed," *IEEE Transactions on Nuclear Science* **64**(7), 1689–1695, (2017). https://doi.org/10.1109/TNS.2017.2677092

97. A. M. Ibrahim, D. E. Peplow, R. E. Grove, J. L. Peterson, and S. R. Johnson, "The Multi-Step CADIS Method for Shutdown Dose Rate Calculations and Uncertainty Propagation," *Nuclear Technology* **192**(3) 286–298 (2015). https://doi.org/10.13182/NT15-1

95. A. M. Ibrahim, D. E. Peplow, J. L. Peterson, and R. E. Grove, "Shutdown Dose Rate Analysis Using the Multi-Step CADIS Method," *Fusion Science & Technology* **68**(3) 700–704 (2015). https://doi.org/10.13182/FST15–123

92. A. M. Ibrahim, P. P. H. Wilson, M. E. Sawan, S. W. Mosher, D. E. Peplow, J. C. Wagner, T. M. Evans, and R. E. Grove, "Automatic Mesh Adaptivity for Hybrid Monte Carlo/Deterministic Neutronics Modeling of Difficult Shielding Problems," *Nuclear Science and Engineering* **181**, 49–59 (2015). https://doi.org/10.13182/NSE14-94

91. B. T. Rearden, L. M. Petrie, D. E. Peplow, K. B. Bekar, D. Wiarda, C. Celik, C. M. Perfetti, A. M. Ibrahim, S. W. D. Hart, M. E. Dunn, and W. J. Marshall, "Monte Carlo Capabilities of the SCALE Code System," *Annals of Nuclear Energy* **82**, 130–141 (2014). https://doi.org/10.1016/j.anucene.2014.08.019

82. A. M. Ibrahim, D. E. Peplow, J. L. Peterson, and R. E. Grove, "Novel Hybrid Monte Carlo/Deterministic Technique for Shutdown Dose Rate Analyses of Fusion Energy Systems," *Fusion Engineering and Design* **89**(9–10), 1933–1938 (2014). https://doi.org/10.1016/j.fusengdes.2014.03.014

81. A. M. Ibrahim, P. P. H. Wilson, M. E. Sawan, S. W. Mosher, D. E. Peplow, and R. E. Grove, "Assessment of Fusion Facility Dose Rate Map Using Mesh Adaptivity Enhancements of Hybrid Monte Carlo/Deterministic Techniques," *Fusion Engineering and Design* **89**(9–10), 1875–1879 (2014). https://doi.org/10.1016/j.fusengdes.2014.02.046

68. J. C. Wagner, D. E. Peplow, and S. W. Mosher, "FW-CADIS Method for Global and Semi-Global Variance Reduction of Monte Carlo Radiation Transport Calculations," *Nuclear Science and Engineering* **176**, No. 1, 37–57 (2014). https://doi.org/10.13182/NSE12-33

62. D. E. Peplow, T. M. Miller, B. W. Patton, and J. C. Wagner, "Hybrid Monte Carlo/Deterministic Methods for Accelerating Active Interrogation Modeling," *Nuclear Technology* **182**(1), 63–74 (2013). https://doi.org/10.13182/NT13-A15827

55. J. C. Wagner, S. W. Mosher, T. M. Evans, D. E. Peplow and J. A. Turner, "Hybrid and Parallel Domain-Decomposition Methods Development to Enable Monte Carlo for Reactor Analyses," *Progress in Nuclear Science and Technology* **2**, 815–820 (2011). https:/doi.org/10.15669/pnst.2.815

54. A. M. Ibrahim, M. E. Sawan, S. W. Mosher, T. M. Evans, D. E. Peplow, P. P. H. Wilson, J. C. Wagner, "Global Evaluation Of Prompt Dose Rates In ITER Using Hybrid Monte Carlo/Deterministic Techniques," Proceedings of the Nineteenth Topical Meeting on the Technology of Fusion Energy (TOFE) (Part 2), *Fusion Science and Technology* **60**(2), 676–680 (2011). https://doi.org/10.13182/FST11-A12462

52. A. M. Ibrahim, S. W. Mosher, T. M. Evans, D. E. Peplow, M. E. Sawan, P. P. H. Wilson, J. C. Wagner and T. Heltemes, "ITER Neutronics Modeling Using Hybrid Monte Carlo/Deterministic and CAD-based Monte Carlo Methods," *Nuclear Technology* **175**(1), 251–258 (2011). https://doi.org/10.13182/NT175-251

51. J. M. Risner, D. Wiarda, T. M. Miller, D. E. Peplow, B. W. Patton, M. E. Dunn, and B. T. Parks, "Development and Testing of the VITAMIN-B7/BUGLE-B7 Coupled Neutron-Gamma Multigroup Cross-Section Libraries," *Journal of ASTM International* **9**(5) (2012). https:/doi.org/10.1520/JAI104130

50. J. C. Wagner, D. E. Peplow, S. W. Mosher, and T. M. Evans, "Review of Hybrid (Deterministic/Monte Carlo) Radiation Transport Methods, Codes, and Applications at Oak Ridge National Laboratory," *Progress in Nuclear Science and Technology* **2**, 808–814 (2011). http://dx.doi.org/10.15669/pnst.2.808

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40. D. E. Peplow, T. M. Evans and J. C. Wagner, "Simultaneous Optimization of Tallies in Difficult Shielding Problems," *Nuclear Technology* **168**(3), 785–792 (2009). https://doi.org/10.13182/NT09-9

36. J. C. Wagner, D. E. Peplow and T. M. Evans, "Automated Variance Reduction Applied to Nuclear Well-Logging Problems," *Nuclear Technology* **168**(3), 799–809 (2009). https://doi.org/10.13182/NT09-A9309

23. F. C. DiFilippo, L. S. Papiez, V. P. Moskvin, D. E. Peplow, C. M. DesRosiers, J. O. Johnson, R. D. Timmerman, M. E. Randall and R. A. Lillie, "Contamination dose from photoneutron processes in bodily during therapeutic radiation delivery," *Medical Physics* **30**(10), 2849–2854 (2003). https://doi.org/10.1118/1.1612947

22. D. E. Peplow, C. D. Sulfredge, R. L. Sanders, R. H. Morris and T. A. Hann, "Calculating Nuclear Power Plant Vulnerability Using Integrated Geometry and Event/Fault Tree Models," *Nuclear Science and Engineering* **146**(1), 71–87 (2004). https://doi.org/10.13182/NSE04-A2394

15. D. E. Peplow and K. Verghese, "Digital Mammography Image Simulation Using Monte Carlo," *Medical Physics* **27**(3), 568–579 (2000). https://doi.org/10.1118/1.598896

14. D. E. Peplow and K. Verghese, "Differential Sampling for the Monte Carlo Practitioner," An invited paper in *Progress in Nuclear Energy* **36**(1), 39–75 (2000). https://doi.org/10.1016/S0149-1970(99)00024-4

13. D. E. Peplow and K. Verghese, "Differential Sampling Applied to Mammography Image Simulation," *Nuclear Science and Engineering* **135**(2), 103–122 (2000). https://doi.org/10.13182/NSE00-A2128 This paper won the 1999 ANS Mark Mills Award.

9. D. E. Peplow, "Fiestaware Radiography," *The Physics Teacher* **37**(5), 316–318 (1999).

7. D. E. Peplow, "Direction Cosines and Polarization Vectors for Monte Carlo Photon Scattering," *Nuclear Science and Engineering* **131**(1), 132–136 (1999). https://doi.org/10.13182/NSE99-A2024

6. D. E. Peplow and K. Verghese, "Measured Molecular Coherent Scattering Form Factors of Animal Tissues, Plastics and Human Breast Tissue," *Physics in Medicine & Biology* **43**(9), 2431–2452 (1998). https://doi.org/10.1088/0031-9155/43/9/001

4. R. P. Gardner, C. L. Barrett, W. Haq and D. E. Peplow, "Efficient Monte Carlo Simulation of O-16 Neutron Activation and N-16 Decay Gamma-Ray Detection in a Flowing Fluid for On-Line Oxygen Analysis or Flow Rate Measurement," *Nuclear Science and Engineering* **122**(3), 326–343 (1995). https://doi.org/10.13182/NSE96-A24168

3. P. Guo, D. E. Peplow and R. P. Gardner, "Natural Gamma-Ray Log Interpretation: Semi-Empirical, Principal Components Analysis and Monte Carlo Multiply Scattered Components Approaches," *Nuclear Geophysics* **9**(4), 305–318 (1995). https://doi.org/10.1016/0969-8086(95)00007-E

1. D. E. Peplow, R. P. Gardner and K. Verghese, "Sodium Iodide Detector Response Functions Using Simplified Monte Carlo Simulation and Principal Components," *Nuclear Geophysics* **8**(3), 243–259 (1994).

Publications - Full Conference Papers

120. Michael B. R. Smith and Douglas E. Peplow, "Official Release of The Radioisotope Power System Dose Estimation Tool (RPS-DET)," IEEE Aerospace Conference, Big Sky, Montana, March 7–14, 2020.

103. I. Garishvili, D. E. Hornback, D. E. Archer, A. D. Nicholson, D. E. Peplow, G. G. Davidson, M. W. Swinney, J. Peltz, M. S. L. McLean, and B. J. Quiter, "MUSE - Multi-agency Urban Search Experiments," poster at SORMA West (IEEE Symposium on Radiation Measurements and Applications), Berkeley, CA (2016).

99. B. T. Rearden, K. B. Bekar, C. Celik, K. T. Clarno, M. E. Dunn, S. W. D. Hart, A. M. Ibrahim, S. R. Johnson, B. R. Langley, J. P. Lefebvre, R. A. Lefebvre, W. J. Marshall, U. Mertyurek, D. E. Mueller, D. E. Peplow, C. M. Perfetti, L. M. Petrie, Jr., A. B. Thompson, D. Wiarda, W. A. Wieselquist, and M. L. Williams, "Criticality Safety Enhancements For Scale 6.2 And Beyond," International Cooperation in Nuclear Criticality Safety 2015, 1255–1269, Charlotte, NC, Sept. 13–17, 2015.

94. A. M. Ibrahim, D. E. Peplow, and R. E. Grove, "Acceleration Of Shutdown Dose Rate Monte Carlo Calculations Using The Multi-Step CADIS Hybrid Method," ANS MC2015 - Joint International Conference on Mathematics and Computation (M&C), Supercomputing in Nuclear Applications (SNA) and the Monte Carlo (MC) Method, Nashville, TN, April 19–23, 2015, on CD-ROM, American Nuclear Society, LaGrange Park, IL (2015).

90. B. T. Rearden, L. M. Petrie, D. E. Peplow, K. B. Bekar, D. Wiarda, C. Celik, C. M. Perfetti, M. E. Dunn, and S. W. D. Hart, "Enhancements in Continuous-Energy Monte Carlo Capabilities for SCALE 6.2," PHYSOR 2014, Kyoto, Japan (Sept 28–Oct 3, 2014).

83. G. Radulescu, R. A. Lefebvre, D. E. Peplow, M. L. Williams, and J. M. Scaglione, "Dose Rate Analysis Capability for Actual Spent Fuel Transportation Cask Contents," Proceedings of the Institute of Nuclear Materials Management (INMM) 55th Annual Meeting, Atlanta, GA, July 20–24, 2014.

79. B. T. Rearden, L. M. Petrie, D. E. Peplow, K. B. Bekar, D. Wiarda, C. Celik, C. M. Perfetti, A. M. Ibrahim, S. W. D. Hart, and M. E. Dunn, "Monte Carlo Capabilities of the SCALE Code System," Joint International Conference on Supercomputing in Nuclear Applications and Monte Carlo 2013 (SNA + MC 2013), La Cité des Sciences et de l'Industrie, Paris, France, October 27–31, 2013.

78. B. T. Rearden, M. E. Dunn, D. Wiarda, C. Celik, K. Bekar, M. L. Williams, D. E. Peplow, C. M. Perfetti, I. C. Gauld, W. A. Wieselquist, J. P. Lefebvre, R. A. Lefebvre, F. Havlůj, S. E. Skutnik, and K. J. Dugan, "Overview of SCALE 6.2," Nuclear Criticality Safety Topical Meeting, Wilmington, NC, September 29–October 3, 2013, on CD-ROM, American Nuclear Society, LaGrange Park, IL (2013).

77. T. M. Miller and D. E. Peplow, "Guidance Detailing Methods to Calculate Criticality Accident Alarm Detector Response and Coverage," Nuclear Criticality Safety Topical Meeting, Wilmington, NC, September 29–October 3, 2013, on CD-ROM, American Nuclear Society, LaGrange Park, IL (2013).

76. A. M. Ibrahim, D. E. Peplow, K. B. Bekar, C. Celik, J. M. Scaglione, D. Ilas, and J. C. Wagner, "Hybrid Technique in SCALE for Fission Source Convergence Applied to Used Nuclear Fuel Analysis," Nuclear Criticality Safety Topical Meeting, Wilmington, NC, September 29–October 3, 2013, on CD-ROM, American Nuclear Society, LaGrange Park, IL (2013).

75. K. B. Bekar, C. Celik, D. Wiarda, D. E. Peplow, B. T. Rearden, and M. E. Dunn, "Enhancements in Continuous-Energy Monte Carlo Capabilities in SCALE," Nuclear Criticality Safety Topical Meeting, Wilmington, NC, September 29–October 3, 2013, on CD-ROM, American Nuclear Society, LaGrange Park, IL (2013).

70. A. M. Ibrahim, D. E. Peplow, S. W. Mosher, J. C. Wagner, T. M. Evans, P. P. H. Wilson, and M. E. Sawan, "Automatic Mesh Adaptivity for CADIS and FW-CADIS Neutronics Modeling of Difficult Shielding Problems," 2013 International Conference on Mathematics & Computational Methods Applied to Nuclear Science and Engineering (M&C 2013), Sun Valley, ID, May 5–9, 2013.

69. D. E. Peplow, "Comparison of Hybrid Methods for Global Variance Reduction in Shielding Calculations," 2013 International Conference on Mathematics & Computational Methods Applied to Nuclear Science and Engineering (M&C 2013), Sun Valley, ID, May 5–9, 2013.

63. M. Monterial, V. J. Jodoin, J. P. Lefebvre, D. E. Peplow, and D. L. Hooper, "Automating the Coupling of ORIGEN with GADRAS via the Fallout Analysis Tool for National Technical Nuclear Forensics," *Proceedings of the Institute of Nuclear Materials Management (INMM) 53rd Annual Meeting*, Orlando, FL, July 2012.

60. B. T. Rearden, L. M. Petrie, D. E. Peplow, M. A. Jessee, D. Wiarda, M. L. Williams, R. A. Lefebvre, J. P. Lefebvre, I. C. Gauld, and S. Goluoglu, "SCALE 6.1 Enhancements for Nuclear Criticality Safety," Physor 2012, April 2012.

59. A. M. Ibrahim, D. E. Peplow, J. C. Wagner, S. W. Mosher, and T. M. Evans, "Acceleration of Monte Carlo Criticality Calculations Using Deterministic-Based Starting Sources," Physor 2012, April 2012.

58. B. T. Rearden, L. M. Petrie, D. E. Peplow, M. A. Jessee, D. Wiarda, M. L. Williams, R. A. Lefebvre, J. P. Lefebvre, I. C. Gauld, and S. Goluoglu, "SCALE 6.1 Enhancements for Nuclear Criticality Safety", International Conference on Nuclear Criticality, Sept 2011.

53. V. J. Jodoin, R. W. Lee, D. E. Peplow, and J. P. Lefebvre, "Application of The Origen Fallout Analysis Tool and the DELFIC Fallout Planning Tool to National Technical Nuclear Forensics," ANS EPRRSD - 13th Robotics & Remote Systems for Hazardous Environments - 11th Emergency Preparedness & Response, Knoxville, TN, August 7–10, 2011, on CD-ROM, American Nuclear Society, LaGrange Park, IL (2011).

48. J. C. Wagner, T. M. Evans, S. W. Mosher, D. E. Peplow and J. A. Turner, "Hybrid and Parallel Domain-Decomposition Methods Development to Enable Monte Carlo for Reactor Analyses," proceedings of the Joint International Conference on Supercomputing in Nuclear Applications and Monte Carlo 2010 (SNA + MC2010), Hitotsubashi Memorial Hall, Tokyo, Japan, October 17–20, 2010.

47. J. C. Wagner, D. E. Peplow, S. W. Mosher, and T. M. Evans, "Review of Hybrid (Deterministic/Monte Carlo) Radiation Transport Methods, Codes, and Applications at ORNL," proceedings of the Joint International Conference on Supercomputing in Nuclear Applications and Monte Carlo 2010 (SNA + MC2010), Hitotsubashi Memorial Hall, Tokyo, Japan, October 17–20, 2010.

38. J. C. Wagner, E. D. Blakeman, and D. E. Peplow, "FW-CADIS Method for Variance Reduction of Monte Carlo Calculations of Detailed Distributions and Multiple Localized Quantities," in the proceedings of the 2009 International Conference on Advances in Mathematics, Computational Methods, and Reactor Physics (M&C 2009), Saratoga Springs, New York, May 3–7, 2009.

37. D. E. Peplow and Lester M. Petrie, Jr., "Criticality Accident Alarm System Modeling With SCALE," in the proceedings of the 2009 International Conference on Advances in Mathematics, Computational Methods, and Reactor Physics (M&C 2009), Saratoga Springs, New York, May 3–7, 2009.

21. D. E. Peplow and Y. Y. Azmy, "GipGui: A GUI for the GIP Cross Section Preparation Code," Poster/presentation at the ANS M&C 2003, the Nuclear Mathematical and Computational Sciences Conference, *A Century in Review - A Century Anew* April 6–10, 2003, Gatlinburg, TN.

18. C. D. Sulfredge, R. L. Sanders, D. E. Peplow, R. H. Morris and T. A. Hann, "Graphical Expert System for Analyzing Nuclear Facility Vulnerability," *Transactions of I/ITSEC* 2002 (Interservice/Industry Training, Simulation and Education Conference).

11. D. E. Peplow and K. Verghese "Differential Sampling for Monte Carlo Mammographic Image Simulation" *Proceedings of SPIE* **3771**, 98–111 (1999).

Publications – Technical Reports

XX. Arzu Alpan, Cihangir Celik, Douglas E. Peplow and Mathieu N. Dupont, *SCALE 6.3.0 Validation: Radiation Shielding*, ORNL/TM-2020/1500/v4 ¿Rev1?, Oak Ridge National Laboratory, Oak Ridge, Tennessee, XXX 2022.

146. Daniel E. Archer, Keith C. Bledsoe, Paul Hausladen, Matthew Heath, James M. Ghawaly, Jr., Douglas E. Peplow, Jason M. Richards, Paul B. Rose, Jr., Nathan D. See, Brandon A. Wilson, Glenn A. Fugate and Derrick Seiner, *2022 Annual Report on OR21-AdvNDAVerificationUF6-PD2Nd Advanced NDA Methods to Enhanced Verification Measurements of UF6*, PNNL-33522, Pacific Northwest National Laboratory, Richland, Washington, November 2022. (FOUO)

145. Robert E. Grove, Arzu Alpan, Keith C. Bledsoe, Douglas E. Peplow, R. Blake Wilkerson, *Strategic Laboratory Assessment Program FY22 Annual Update Report for Task 2B Radiation Dose Modeling & Simulation*, ORNL/SPR-2022-2645, Oak Ridge National Laboratory, Oak Ridge, Tennessee, September 30, 2022. (OUO)

141. R. Blake Wilkerson, Arzu Alpan, Keith C. Bledsoe, Robert E. Grove, Patricia L. Lee, Justin M. Munson, Douglas E. Peplow, Joel M. Risner, Katherine E. Royston, Brooke H. Stagich, Deanna Stimac, *Dose Estimation for Five Isotopic Mixtures in the K-Area Interim Surveillance Process*, ORNL/TM-2022/2464, Oak Ridge National Laboratory, Oak Ridge, Tennessee, June 2022. (OUO)

140. Arzu Alpan, Keith C. Bledsoe, Robert E. Grove, Douglas E. Peplow, R. Blake Wilkerson, *Component Library for Dose Rate Modeling in the K-Area Interim Surveillance Process*, ORNL/TM-2022/2451, Oak Ridge National Laboratory, Oak Ridge, Tennessee, June 2022. (OUO)

138. Douglas E. Peplow, Cihangir Celik, Charles R. Daily, Nicholas J. Prins, Georgeta Radulescu, Michael B. R. Smith, R. Blake Wilkerson, *Shielding Analysis to Support the X-energy Mobile*

Reactor Design – Phase IB, ORNL/TM-2022/2392, Oak Ridge National Laboratory, Oak Ridge, Tennessee, February 2022. (UCNI)

137. Nathan D. See, Jason M. Richards, James M. Ghawaly, Jr., Daniel E. Archer, Brandon A. Wilson, Keith C. Bledsoe, Douglas E. Peplow, Glenn A. Fugate, *2021 Annual Report on OR21-AdvNDAVerificationUF6-PD2Nd Advanced NDA Methods to Enhance Verification Measurements of UF_6*, ORNL/SPR-2021/2322, Oak Ridge National Laboratory, Oak Ridge, Tennessee, October 2021. (ECI)

136. Douglas E. Peplow, F. Arzu Alpan, Keith C. Bledsoe, Robert E. Grove, Patricia L. Lee, Justin M. Munson, Joel M. Risner, Brooke H. Stagich, Deanna Stimac, R. Blake Wilkerson, *Accelerating the K-Area Interim Surveillance Glovebox Dose Assessment with ADVANTG*, ORNL/TM-2022/1498, Oak Ridge National Laboratory, Oak Ridge, Tennessee, January 2022.

135. Cihangir Celik, Douglas E. Peplow, Mathieu N. Dupont, Georgeta Radulescu, *SCALE 6.2.4 Validation: Radiation Shielding*, ORNL/TM-2020/1500/v4, Oak Ridge National Laboratory, Oak Ridge, Tennessee, August 31, 2021.

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"Advanced Variance Reduction Strategies for Optimizing Mesh Tallies in MAVRIC" at the American Nuclear Society Winter Meeting, Washington, DC, November 14, 2007. (Invited talk.)

"Monaco/MAVRIC: Computational Resources for Radiation Protection and Shielding in SCALE" at the American Nuclear Society Winter Meeting, Albuquerque, NM, November 16, 2006. (Invited talk.)

"Automated Variance Reduction for SCALE Shielding Calculations," at the American Nuclear Society's 14th Biennial Topical Meeting of the Radiation Protection and Shielding Division, Carlsbad, NM, April 5, 2006.

"Photon Beam Transport in a Voxelized Human Phantom Model: Discrete Ordinates vs Monte Carlo" at the American Nuclear Society's 14th Biennial Topical Meeting of the Radiation Protection and Shielding Division, Carlsbad, NM, April 3, 2006.

Invited panelist in "Java Pros and Cons - Roundtable" at the American Nuclear Society Annual Meeting, Pittsburgh, PA, June 16, 2004.

"GipGui: A GUI for the GIP Cross Section Preparation Code" Poster/presentation at the Nuclear Mathematical and Computational Sciences Conference (Mathematics & Computation Division of the American Nuclear Society), Gatlinburg, TN, April 9, 2003.

"Calculating Nuclear Power Plant Vulnerability Using Integrated Geometry and Event/Fault Tree Models" at the American Nuclear Society Winter Meeting, 8th Topical Meeting for Emergency Preparedness & Response, Washington, DC, November 20, 2002.

"Differential Sampling Applied to Mammography Image Simulation" at the American Nuclear Society Winter Meeting, Long Beach, CA, November 17, 1999. This was an invited talk to discuss the *Nuclear Science and Engineering* paper that won the American Nuclear Society's Mark Mills award.

"Differential Sampling for Monte Carlo Mammographic Image Simulation" at the Annual Meeting of SPIE (International Society for Optical Engineering), Denver, CO, July 19, 1999.

"Collaborative Learning in Small Groups in a Mathematics Intensive NE Course" at the American Society for Engineering Education (ASEE) Annual Conference & Exposition, Charlotte, NC, June 22, 1999.

"Monte Carlo Modeling of Mammographic Images" at the American Nuclear Society Winter Meeting, Washington, DC, November 18, 1998.

"Monte Carlo Image Simulation in Support of Improvements in Mammography" at the American Nuclear Society Winter Meeting, Albuquerque, NM, November 17, 1997. (Invited talk.) Winner of the American Nuclear Society Reactor Physics Division's "Best Paper" Award.

SCALE Training Instructor

Monaco/MAVRIC 6.2, February 5–7, 2020 at ORNL (2 days)
Monaco/MAVRIC 6.2, January 31–February 1, 2019 at ORNL (2 days)
Monaco/MAVRIC 6.2, November 8–9, 2018 at ORNL (2 days)
KENO-IV/ORIGEN, November 13–15, 2017 at AFIT (3 days)
Monaco/MAVRIC 6.2, October 19–20, 2017 at ORNL (2 days)
Monaco/MAVRIC 6.2, March 2–4, 2016 at ORNL (2 days)
Monaco/MAVRIC 6.2, June 15–18, 2015 at NRC Headquarters (3.5 days)
New Features in SCALE 6.2 Workshop & Poster, April 19, 2015 at the M&C 2015 Nashville Topical
Monaco/MAVRIC 6.1, February 4–6, 2015 at ORNL (2 days)
SCALE 6.1 MAVRIC Tutorial, September 13, 2014 at the RPSD 2014 Knoxville Topical (2 hours)
Monaco/MAVRIC 6.1, March 26–28, 2014 at ORNL (2 days)
Monaco/MAVRIC 6.1, Oct 30–Nov 1, 2013 at ORNL (2 days)
Monaco/MAVRIC 6.1, materials preparation for April 2011 ORNL class
Monaco/MAVRIC 6.1, October 20–22, 2010 at ORNL (2 days)
Monaco/MAVRIC 6.1, August 17–18, 2010 at NRC Headquarters (2 days)
Monaco/MAVRIC 6.1, June 9–11, 2010 at ORNL (2 days)
SCALE6/MAVRIC Tutorial, April 23, 2010 at the RPSD 2010 Topical (Half-day)
SCALE6/Denovo Tutorial, April 23, 2010 at the RPSD 2010 Topical (Half-day)
SCALE6/MAVRIC Tutorial, April 8, 2010 at the ANS Student Conference (Half-day)
Monaco/MAVRIC, March 10–12, 2010 at ORNL (2 days)
SCALE6/MAVRIC Tutorial, November 19, 2009 at the ANS Winter Meeting (Half-day)
Monaco/MAVRIC, October 21–23, 2009 at ORNL (2 days)
SCALE6/MAVRIC Tutorial, May 3, 2009 at the M&C 2009 Topical (Half-day)
Monaco/MAVRIC, April 1–3, 2009 at ORNL (2 days)
Monaco/MAVRIC, October 29–31, 2008 at ORNL (2 days)
CAAS Modeling, July 29–30, 2008 at NRC (2 days)
Monaco/MAVRIC, September 20–21, 2007 at ORNL (2 days)
Monaco/MAVRIC, August 22–23, 2006 at NRC Headquarters (2 days)

Professional Organizations

American Nuclear Society
- Member, 1991–current
- Mathematics & Computation Division Treasurer, 2005–2006
- Radiation Protection and Shielding Division Executive Committee, 2011–2014
- RPSD 2014 Conference Treasurer

Sigma Xi, 1994–2007
American Society for Engineering Education, 1994–2007

Awards

UT-Battelle Award – Community Outreach, 2018
Significant Event Award, for Support to DOE in response to the crisis at Fukushima, 2011
UT-Battelle Award – Team Accomplishment, Engineering Research and Development, 2010
Nuclear Science & Technology Division Scientific and Technical Award, December 2006

American Nuclear Society Mark Mills Award, 1999
Alpha Nu Sigma, the nuclear engineering honor society (NCSU), 1995
National Science Foundation Engineering Education Scholar, 1995
Graduate Student Certificate for Outstanding Teaching (NCSU), 1994, 1995, 1996
Nuclear Engineering Teaching Fellow (NCSU), 1994–1996
Preparing the Professoriate (NCSU), 1994–1995
Sigma Xi, the Scientific Research Society (NCSU), 1994
Institute of Nuclear Power Operations Graduate Fellowship (NCSU), 1991
Dean's Fellowship (NCSU), 1991
Sigma Pi Sigma physics honor society (WIU), 1991
Walter Eller physics scholarship (WIU), 1991
Phi Kappa Phi honor society (WIU), 1991
Foundation Scholarship (WIU), 1988
Eagle Scout, Boy Scouts of America, 1986

Student Interns at Oak Ridge National Laboratory

2006	Kun Li	University of Illinois
2008	Ahmad M. Ibrahim	University of Wisconsin
	Jinan Yang	University of Michigan
2009	Ahmad M. Ibrahim	University of Wisconsin
2010	Timothy M. Flaspoehler	Georgia Institute of Technology
	David P. Hartmangruber	Georgia Institute of Technology
2011	Timothy M. Flaspoehler	Georgia Institute of Technology
	Nicholas E. Horelik	Massachusetts Institute of Technology
2015	Jeffrey M. Miller	Grand Valley State University
2018	Jackson N. Wagner	Texas A&M University

Thesis Committees

LTC Peter R. Exline, *Optimization of Activation Foil Passive Neutron Detectors*, Ph.D., Georgia Institute of Technology, advised by Prof. Nolan Hertel, March 25, 2019.

Timothy M. Flaspoehler, *Evaluating Radiation Indicators in the VHTR Power Plant Using MAVRIC*, Master of Science, Georgia Institute of Technology, advised by Prof. Bojan Petrovic, June 14, 2012.

Gary B. Zeigler, II, *Direct Detection of Microcalcification Pairs in Simulated Digital Mammograms*, Master of Science, NC State University, advised by Prof. K. Verghese, September 2002.

Other Mentoring

Post-Doc Mathew W. Swinney (FY2016 – FY2018).
New staff R. Blake Wilkerson (FY2021 –)