

John S. Neal, Ph.D.
Oak Ridge National Laboratory

Business Address:

Oak Ridge National Laboratory
P.O. Box 2008, MS-6026
Oak Ridge, TN 37831-6026

Business Phone: (865) 576-8275

EDUCATION

POST-GRADUATE:

<u>Dates Attended</u>	<u>Name and Location</u>	<u>Major Subject</u>
2001-2002	Oak Ridge National Laboratory	Time-Correlated Signatures for Detection of Nuclear Materials

GRADUATE:

<u>Dates Attended</u>	<u>Name and Location</u>	<u>Degree/Year</u>	<u>Major Subject</u>
1995-2001	University of Tennessee (Knoxville)	Ph.D./2001	Radiological/Nuclear Engineering
1991-1992	University of Wisconsin (Madison)	M.S./1992	Experimental Nuclear Physics

UNDERGRADUATE:

<u>Dates Attended</u>	<u>Name and Location</u>	<u>Degree/Year</u>	<u>Major Subject</u>
1982-1986	United States Naval Academy (Annapolis)	B.S./1986	Physics

APPOINTMENTS AND POSITIONS

Program Manager, Mk-18A Am/Cm/Ln Material (2020-Present)

- Provides technical leadership and management for execution of all ORNL activities required to meet technical, schedule, cost, and quality objectives.

Project Controls/Development Manager, Cf-252 (2020-Present)

- Provides management of the resource-loaded schedule and cost plan to reach production plan goals.

Senior Research Staff, Oak Ridge National Laboratory (2018-Present)

- Provide strategic planning support and research and development program management for the Oak Ridge National Laboratory Isotope Program and Isotope Enterprise.

Program Manager, Laboratory Directed Research and Development, Oak Ridge National Laboratory (2014-2018)

- Provided scientific leadership and management of the Oak Ridge National Laboratory's overhead investments in Laboratory Directed Research and Development, Program Development, Named Fellowships, and Strategic Hires.

Research Staff, Oak Ridge National Laboratory (2002-2014)

- Performed research on the synthesis, characterization and design of innovative materials and systems for the detection of nuclear materials.

Medical Physics Consultant, West Physics Consulting (2007-2013)

- Performed radiation shielding survey analyses and nuclear medicine licensing services as a consulting medical physicist.

Post-doctoral Research, Oak Ridge National Laboratory (2001-2002)

- Developed new techniques for acquiring and analyzing time-correlated signatures for the detection of nuclear materials.

Facility Services Control Manager, Y-12 National Security Complex (1997-1999)

- Responsible for creation and implementation of Facility Safety Authorization Basis documentation for nuclear and non-nuclear facilities

Shift Technical Assistant, Y-12 National Security Complex (1995-1997)

- Responsible for interpretation and implementation of facility safety program, nuclear criticality safety issues, radiological controls, DOE Orders, Code of Federal Regulations, ANSI/ASME Standards.

Nuclear Physics Department Research Assistant, University of Wisconsin-Madison (1991-1993)

- Developed a precision flow, UHV gas delivery system for use with atomic beam sources and internal gas targets. Constructed and tested a polarimeter based on the D + T reaction for measuring tensor polarization of deuterium in an internal target fed by a laser driven source. Constructed and tested a Balmer polarimeter for measuring deuterium polarization.

Assistant Professor of Naval Science, University of Wisconsin-Madison (1991-1993)

- Taught undergraduate courses in surface ship operations, navigation, and electronic navigation systems.

Naval Nuclear Engineer, U.S. Navy, (1986-1995)

- Responsible for training of operations personnel on reactor plant theory and operations, engineering watch qualification and watchstanding.

PROFESSIONAL ACTIVITIES

PROFESSIONAL SOCIETY MEMBER

- Institute for Electrical and Electronics Engineers (IEEE)
- American Nuclear Society (ANS)

REVIEWER: Journals

- IEEE Transactions on Nuclear Science
- Nuclear Instruments and Methods A
- Nuclear Instruments and Methods B

REVIEWER: Conferences

- IEEE Nuclear and Space Radiation Effects
- IEEE Aerospace
- International Conference on Environmental Systems
- IEEE 9th International Conference on Inorganic Scintillators and Their Applications

REVIEWER: Grant Applications

- Oak Ridge National Laboratory Seed Money Proposal Review Committee (Chair)
- DOE Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Program Funding Opportunity Reviewer
- Office of Science/Nuclear Physics SBIR/STTR Phase I Reviewer

COMMITTEE MEMBER: Proposal Review

- HBCU/MEI Summer Faculty Research Program
- ORAU/ORNL High Performance Computing Grant Program
- ORNL Technology Innovation Program

OTHER:

- DOE Nuclear Energy University Program (NEUP) Technical Point of Contact: One-Dimensional Nanostructures for Neutron Detection
- Guest Lecturer at the University of Tennessee (NE403/550)
- Mentor/Advisor for NRC HBCU Participation Program Faculty (Dr. H. Basher)
- ORNL Day of Science exhibitor
- Session Chair at Symposium on Radiation Measurements and Applications, Ann Arbor, May 23-25, 2006

PATENTS

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|--------------------------|--|
| Patent No: US 7141799 | Fiber Optic Thermal/Fast Neutron and Gamma Ray Scintillation Detector. Date of Patent: November 28, 2006 |
| Patent No: US 7288771 | Fiber Optic Thermal/Fast Neutron and Gamma Ray Scintillation Detector. Date of Patent: October 30, 2007 |
| Patent No. US 8089047 B2 | Metal-Organic Scintillator Crystals for X-Ray, Gamma Ray, and Neutron Detection. Date of Patent: January 3, 2012 |
| Patent No. US 8177998 B2 | Lithium Loaded Liquid Scintillators. Date of Patent May 15, 2012 |

PUBLICATIONS**Refereed Articles:**

1. Lee K., et al.: Measurement of Spin Observables Using a Storage Ring with Polarized Beam and Polarized Internal Gas Target. Physical Review Letters, Vol. 70, No. 6, February 1993, pp. 738-741.
2. Miller, M.A., et al.: Measurement of Quasielastic $^3\text{He}(p,pN)$ Scattering from Polarized ^3He and the Three-Body Ground State Spin Structure. Physical Review Letters, Vol. 74, No. 4, January 1995, pp. 502-505.
3. Milner, R.G., et al.: The spin dependent momentum distributions of the neutron and proton in ^3He . Physics Letters B, Vol. 379, Nos. 1-4, June 27, 1996, pp. 67-72.
4. Neal, J.S. and Townsend, L.W.: Predicting Dose-Time Profiles of Solar Energetic Particle Events Using Bayesian Forecasting Methods. IEEE Transactions on Nuclear Science, Vol. 48, No. 6, December 2001, pp. 2004-2009.
5. Cooper, J.C.; Koltick, D.S.; Mihalczo, J.T.; Neal, J.S.: Evaluation of ZnO(Ga) Coatings as Alpha Particle Transducers within a Neutron Generator. Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment, Vol. 505, Nos. 1-2, June 1, 2003, pp. 498-501.
6. Mihalczo, J.T.; Mattingly, J.K.; Neal, J.S.; Mullens, J.A.: NMIS plus gamma spectroscopy for attributes of HEU, PU and HE detection. Nuclear Instruments and Methods in Physics Research Section B, Vol. 213, 2004, pp. 378-384.
7. Pozzi, S. A.; Neal, J. S.; Oberer, R. B.; Mihalczo, J. T.: Monte Carlo Analysis of Neutron Detection with a BaF₂ Scintillation Detector. IEEE Transactions on Nuclear Science, volume 51, number 3, June 2004.
8. Neal, J. S. and Townsend, L. W.: Prediction of Solar Particle Event Proton Dose Using Early Dose Rate Measurements. Acta Astronautica, 56, 2005, pp. 961-968.
9. Neal, J. S. and Townsend, L. W.: Multiple Solar Particle Event Dose Time Profile Predictions Using Bayesian Inference. Radiation Protection Dosimetry 116 (1-4) 38 (2005).
10. Townsend, L. W. and Neal, J. S.: A Simple Method for Solar Particle Energetic Event Dose Forecasting. Radiation Measurements, 41 (9-10), 2006, pp. 1136-1141.
11. Hausladen, P. A.; Neal, J. S; and Mihalczo, J. T.: An Alpha Particle Detector for a Portable Neutron Generator for the Nuclear Materials Identification System (NMIS). Nuclear Instruments & Methods in Physics Research B 241, 835 (2005).
12. Mullens, J. A.; Neal, J. S.; Hausladen, P. A.; Pozzi, S. A.; and Mihalczo, J. T.: Fast coincidence counting with active inspection systems. Nuclear Instruments & Methods in Physics Research B 241, 804 (2005).
13. Pozzi, S.A.; Oberer, R.B.; and Neal, J. S.: Analysis of the response of capture-gated organic scintillators. IEEE Transactions on Nuclear Science 52 (6), 3141 (2005).
14. Neal, J.S.; Boatner, L.A; Spurrier, M.; Szupryczynski, P., Melcher, C. L., "Cerium-doped mixed-alkali rare-earth double phosphate scintillators for thermal neutron detection" Nuclear Instruments and Methods in Physics Research A, 579, 19-22, 2007.
15. Neal, J. S.; Boatner, L. A.; Giles, N. C.; Halliburton, L. E.; Derenzo, S. E.; Bourret-Courchesne, E. D.: Comparative Investigation of the Performance of ZnO-Based Scintillators for Use as Alpha Particle Detectors. Nuclear Instruments & Methods in Physics Research A 568 (2), 803 (2006).
16. Giles, N. C; Xu, C.; Callahan, M. J.; Neal, J. S.; Boatner, L. A.; Effects of phonon coupling and free carriers on band-edge emission at room temperature in n-type ZnO. Applied Physics Letters 89 (25), 251906 (2006).

17. Hausladen, P. A; Bingham, P.; **Neal, J. S.**; Mullens, J. A.; Mihalczo, J. T.: Portable Fast-Neutron Radiography with the Nuclear Materials Identification System for Fissile Material Transfers. Nuclear Instruments & Methods in Physics Research B **261**, 387 (2007).
18. Miller, L. F.; Preston, J.; Pozzi, S.; Flaska, M.; **Neal, J.**: Digital Pulse Shape Discrimination. Radiation Protection Dosimetry doi: 10.1093/rpd/ncm052 (2007).
19. **Neal, J.S.**; Boatner, L.A.; Wisniewski, D.J.; Ramey, J. O. New Rare-Earth-Activated Phosphate Glass Scintillators. SPIE Conference Proceedings, Vol. 6706, 670618, pp. 1-10.
20. **Neal, J.S.**; Giles, N.C.; Yang, X.; Wall, R. A.; Ucer, B. K.; Williams, R. T.; Wisniewski, D.J.; Boatner, L.A.; Rengarajan, V.; Nause, J.; Nemeth, B. Evaluation of melt-grown, ZnO single crystals for use as α -particle detectors, IEEE Transactions on Nuclear Science, Vol. 55, No. 3, pp. 1397-1403 (2008).
21. Wisniewski, D. J.; Boatner, L. A.; **Neal, J. S.**; Jellison, G. E.; Ramey, J. O.; North, A.; Wisniewska, M.; Payzant, A. E.; Howe, J. Y.; Lempicki, A.; Brecher, C.; Glodo, J. Development of Novel Polycrystalline Ceramic Scintillators, IEEE Transactions on Nuclear Science , Vol. 55, No. 3, pp. 1501-1508 (2008).
22. Chakoumakos, B.C.; Custelcean, R.; Ramey, J. O.; Kolopus, J. A.; Jin, R.; **Neal, J. S.**; Wisniewski, D. J.; Boatner, L. A.: Cerium chloride – methanol adduct crystals, $\text{CeCl}_3(\text{CH}_3\text{OH})_4$: preparation, crystallography, and scintillation properties, Crystal Growth and Design, Vol. 8, No. 7, pp. 2070-2072 (2008).
23. Wisniewski, D.; Boatner, L. A.; Ramey, J. O.; Wisniewska, M.; **Neal, J. S.**; Jellison, G. E., Exploratory research on the development of novel Ce^{3+} -activated phosphate glass scintillators, IEEE Transactions on Nuclear Science , Vol. 55, No. 6, pp. 3692-3702 (2008).
24. Boatner, L. A.; Wisniewski, D.; **Neal, J. S.**; Ramey, J. O.; Kolopus, J. A.; Chakoumakos, B. C.; Wisniewska, M.; Custelcean, R., "Single-crystal $\text{CeCl}_3(\text{CH}_3\text{OH})_4$: A new metal-organic cerium chloride methanol adduct for scintillator applications," Applied Physics Letters, 93, 1 (2008).
25. **Neal, J.S.**; Nichols, T.F.; Townsend, L.W., "Importance of predicting the dose temporal profile for large solar energetic particle events," Space Weather, Vol. 6, No. 9, S09004 (2008).
26. **Neal, J. S.**; Devito, D. M.; Armstrong, B. L.; Hong, M.; Kesanli, B.; Yang, X.; Giles, N. C.; Howe, J. Y.; Ramey, J. O.; Wisniewski, D. J.; Wisniewska, M.; Munir, Z. A.; Boatner, L. A., "Investigation of ZnO-based polycrystalline ceramic scintillators for use as α -particle detectors," IEEE Transactions on Nuclear Science , Vol. 56, No. 3, pp. 892-898 (2009).
27. **Neal, J.S.**; Boatner, L.A.; Bell, Z.W.; McConchie, S.M.; Wisniewski, D.; Ramey, J.O.; Kolopus, J.A.; Chakoumakos, B.C.; Wisniewska, M.; Custelcean, R, "A New Scintillator for Fast Neutron Detection: Single-Crystal $\text{CeCl}_3(\text{CH}_3\text{OH})_4$," IEEE Transactions on Nuclear Science , Vol. 57, No. 3, pp. 1692-1696 (2010).
28. **John S. Neal**, Lynn A. Boatner, Joanne O. Ramey, Dariusz Wisniewski, James A. Kolopus, Nerine J. Cherepy, and Stephen A. Payne, "The Characterization of Eu^{2+} -Doped Mixed Alkaline-Earth Iodide Scintillator Crystals," Nuclear Instruments and Methods in Physics Research A, 643, 75-78, 2011.
29. Mei Hong, Daniela Fredrick, David M. DeVito, Jane Howe, Xiaocheng Yang, Nancy Giles, **John S. Neal**, and Zuhair Munir, "Characterization of Green-Emitting Translucent Zinc Oxide Ceramics Prepared Via Spark Plasma Sintering," International Journal of Applied Ceramic Technology, 8, 725-733, 2011.
30. Lynn A. Boatner, **John S. Neal**, Matthew A. Blackston, James A. Kolopus, and Joanne O. Ramey, "Dual-Chamber/Dual-Anode Proportional Counter Incorporating an Intervening Thin-Foil Solid Neutron Converter", Nuclear Instruments and Methods in Physics Research A, 693, (2012), 244-252
31. Lynn A. Boatner, **John S. Neal**, James A. Kolopus, Joanne O. Ramey, and Hatice Akkurt, "The Characterization of Scintillator Performace at Temperatures up to 400 Degrees Centrigrade," Nuclear Instruments and Methods in Physics Research A, 709 (2013) 95-107.

32. L. A. Boatner, **J. S. Neal**, J. O. Ramey, B. C. Chakoumakos, and R. Custelcean, E. V. D. van Loef, K. S. Shah, and G. Markosyan, "New Cerium-Based Metal-Organic Scintillators for Radiation Detection", Nuclear Instruments and Methods in Physics Research A, 703 (2013) 138-144.
33. L. A. Boatner, **J. S. Neal**, J. O. Ramey, B. C. Chakoumakos, and R. Custelcean, "The Observation of Scintillation in a Hydrated Inorganic Compound: $\text{CeCl}_3 \cdot 6\text{H}_2\text{O}$ ", Applied Physics Letters, 103 (2013) 141909.
34. L. A. Boatner, J. O. Ramey, J. A. Kolopus, **J. S. Neal**, "Divalent Europium Doped and Un-doped Calcium Iodide Scintillators: Scintillator Characterization and Single Crystal Growth", Nuclear Instruments and Methods in Physics Research A, 786 (2015) 23-31.

Proceedings of Conference and Symposia, Reports:

1. Jones, C.E.; Holt, R.J.; Poelker, M.; Potterveld, D.H.; Kowalczyk; Buchholz, M.; **Neal, J.**; and van den Brand, J.F.J.: Measurement of pzz of the Laser-Driven Polarized Deuterium Target. Proceedings of the Workshop on Polarized Ion Sources and Polarized Gas Targets, Madison, WI, May 23-27, 1993, AIP Conference Proceedings 293, pp. 131-137.
2. Mihalczo, J.T.; White, J.D.; Mattingly, J.K.; Mullens, J.A.; McEvers, J.A.; **Neal, J.S.**; and Oberer, R. B.: Oak Ridge Multiple Attribute System (ORMAS) for Pu, HEU, HE, Chemical Agents, and Drugs. ORNL/TM-2001/175, September 2001.
3. Mattingly, J.K.; **Neal, J.S.**; and Mihalczo, J.T.: Time-Dependent Coincidence Method to Measure Plutonium Mass and Multiplication. Y/LB-16, 121, December 2001.
4. Mihalczo, J.T.; Mattingly, J.K.; and **Neal, J.S.**: NMIS with Gamma Spectrometry for Attributes of Pu and HEU, Explosives and Chemical Agents. Y/LB-16, 123, Rev. 1, May 2002.
5. Cooper, C.; Koltick, D.; Mihalczo, J.T.; and **Neal J.S.**: Evaluation of ZnO(Ga) Coatings as Alpha Particle Transducers within a Neutron Generator. Y/LB-16, 125, May 2002.
6. Mihalczo, J.T.; Mattingly, J.K.; and **Neal, J.S.**: NMIS with Gamma Spectrometry for Attributes of Pu, HEU, and Detection of HE and Chemical Agents. Y/LB-16, 124, May 2002.
7. Mihalczo, J.T. and **Neal, J.S.**: Methods for Verification of the Hydrogen and Boron Content of the RCSB for Storage of HEU at the HEUMF. ORNL/TM-2002/253, November 2002.
8. **Neal, J.S.**; Pozzi, S.A.; Edwards, J.D.; and Mihalczo, J.T.: Measurements of Water and B4C Content of Rackable Can Storage Boxes for HEU Storage at the HEUMF at the Y-12 National Security Complex. ORNL/TM-2002/254, December 2002.
9. Townsend, L.W.; and **Neal, J.S.**: A Simple Method for Solar Energetic Particle Event Dose Forecasting. 3rd International Workshop on Space Radiation Research, Port Jefferson, New York, May 16-20, 2004.
10. **Neal, J.S.**; Boatner, L.A.; Spurrier, M.; Szupryczynski, P., Melcher, C. L.: Cerium-doped mixed-alkali rare-earth double phosphate scintillators for x- and gamma-ray detection. SPIE Conference Proceedings, Vol. 6319, 631907, pp. 1-8.
11. Wisniewski, D.J.; Boatner, L.A.; **Neal, J.S.**; Jellison, G.E.; Ramey, J.O.; North, A; Wisniewski, M.; Lempicki, A.; Brecher, C.; Glodo, J. Performance of new ceramic scintillators for gamma- and X-ray detection. SPIE Conference Proceedings, Vol. 6706, 670619, pp. 1-12.
12. L. A. Boatner, D. Wisniewski, **J. S. Neal**, Z. W. Bell, J. O. Ramey, J. A. Kolopus, B. C. Chakoumakos, R. Custelcean, M. Wisniewska, and K. E. Peña, "Rare-Earth Tri-Halide Methanol-Adduct Single-Crystal Scintillators for Gamma Ray and Neutron Detection," Proceedings of the SPIE, Vol. 7449, 74491E (2009).
13. L. A. Boatner, J. O. Ramey, J. A. Kolopus, **J. S. Neal**, N. J. Cherepy, S. A. Payne, P. R. Beck, A. Burger, E. Rowe, and P. Bhattacharya, "Advances in the growth of alkaline-earth halide single crystals for scintillator detectors," Proceedings of the SPIE, Vol. 9213, 92130J (2014).

Published Abstracts:

1. Mattingly, J.K.; **Neal, J.S.**; and Mihalczo, J.T.: Time-Dependent Coincidence Method to Measure Plutonium Mass and Multiplication. American Nuclear Society Annual Meeting, Hollywood, FL, June 9-13, 2002. ANS transactions page 336-337
2. **Neal, J. S.**; and Townsend, L. W.: Prediction of Solar Particle Event Dose Time Profiles Using Dose Rate Measurements. American Nuclear Society 2002 Winter Meeting, Washington, D.C., November 17-21, 2002. ANS Transactions page 405.
3. **Neal, J.S.**; Edwards, J.D.; and Mihalczo, J.T.: Neutron Counting Measurements of BoroBond Blocks. American Nuclear Society Annual Meeting, San Diego, CA, June 1-5, 2003. ANS transactions page 103-104.
4. **Neal, J.S.**; Edwards, J.D.; and Mihalczo, J.T.: Gamma Spectroscopy Measurements of BoroBond Blocks. American Nuclear Society Annual Meeting, San Diego, CA, June 1-5, 2003. ANS transactions page 98-99.
5. **Neal, J.S.**; Edwards, J.D.; and Mihalczo, J.T.: Neutron Transmission Measurements of BoroBond Blocks. American Nuclear Society Annual Meeting, San Diego, CA, June 1-5, 2003. ANS transactions page 100-102.
6. **Neal, J.S.**; Edwards, J.D.; and Mihalczo, J.T.: Method for Verification of the Hydrogen and Boron Content of the RCSB for Storage of HEU at the HEUMF. American Nuclear Society Annual Meeting, San Diego, CA, June 1-5, 2003. ANS transactions page 105-106.
7. **Neal, J. S.**; and Townsend, L. W.: Prediction of Solar Particle Event Dose Time Profiles Using Dose Rate Measurements. American Nuclear Society 2002 Winter Meeting, Washington, D.C., November 17-21, 2002. ANS Transactions page 405.

SCIENTIFIC PRESENTATIONS**Conference Presentations:**

1. Jones, C.E.; Holt, R.J.; Poelker, M.; Potterveld, D.H.; Kowalczyk; Buchholz, M.; **Neal, J.**; and van den Brand, J.F.J.: Measurement of pzz of the Laser-Driven Polarized Deuterium Target. Proceedings of the Workshop on Polarized Ion Sources and Polarized Gas Targets, Madison, WI, May 23-27, 1993.
2. Townsend, L.W.; **Neal, J.S.**; and Hines, J.W.: Solar Particle Event Doses and Dose Rates for Interplanetary Crews: Predictions Using Artificial Intelligence and Bayesian Inference. COSPAR XXXIII Scientific Assembly, Warsaw, Poland, July 16-23, 2000.
3. **Neal, J.S.**; and Townsend, L.W.: Solar Particle Event Dose and Dose Rate Distributions: Parameterization of Dose-Time Profiles Using Bayesian Inference and Markov Chain Monte Carlo Methods. American Nuclear Society Radiation Protection and Shielding Division Conference on Radiation Protection for our National Priorities, Spokane, WA, September 17-21, 2000, pp. 470-477.
4. **Neal, J. S.**; and Townsend, L. W.: Prediction of Solar Particle Event Dose Time Profiles Using Dose Rate Measurements. American Nuclear Society Radiation Protection and Shielding Division Topical Meeting, Santa Fe, NM, April 14-17, 2002.
5. Cooper, J. C.; Koltick, D. S.; Mihalczo, J. T.; and **Neal, J. S.**: Evaluation of ZnO(Ga) Coatings as Alpha Particle Transducers within a Neutron Generator. Symposium on Radiation Measurements and Applications, Ann Arbor, MI, May 21-23, 2002.
6. Mattingly, J.K.; **Neal, J.S.**; and Mihalczo, J.T.: Time-Dependent Coincidence Method to Measure Plutonium Mass and Multiplication. American Nuclear Society Annual Meeting, Hollywood, FL, June 9-13, 2002.

7. Mihalczo, J. T.; Mattingly, J. K.; **Neal, J. S.**; and Mullens, J.: NMIS Plus Gamma Spectroscopy for Attributes of HEU, PU and HE Detection. Institute of Nuclear Materials Management Annual Meeting, Orlando, FL, June 23-27, 2002.
8. Mattingly, J. K.; **Neal, J. S.**; and Mihalczo, J. T.: NMIS Passive Time-Dependent Coincidence Measurements for Plutonium Mass and Multiplication. Institute of Nuclear Materials Management Annual Meeting, Orlando, FL, June 23-27, 2002.
9. Oberer, R.B.; Chiang, L.G.; Phillips, L. D.; Mattingly, J.K.; **Neal, J.S.**; and Mihalczo, J.T.: Hemispherical ²⁵²Cf Fission Chambers for Better Discrimination of Alpha Particle Decay Products. Institute of Nuclear Materials Management Annual Meeting, Orlando, FL, June 23-27, 2002.
10. **Neal, J.S.**; Holcomb, D.E.; Mattingly, J.K.; and Mihalczo, J.T.: A ZnO(Ga) Alpha Particle Detector for a Portable Neutron Generator for the Nuclear Materials Identification System (NMIS). Institute of Nuclear Materials Management Annual Meeting, Orlando, FL, June 23-27, 2002.
11. **Neal, J.S.**; and Townsend, L.W.: Forecasting of Solar Particle Event Doses Using Bayesian Inference. 2003 IEEE Aerospace Conference, Big Sky, MT, March 8-15, 2003.
12. **Neal, J.S.**; and Townsend, L.W.: Prediction of Solar Particle Event Proton Dose Using Early Dose Rate Measurements. 14th IAA Humans in Space Symposium, Banff, Alberta, Canada, May 18-22, 2003.
13. **Neal, J.S.**; Edwards, J.D.; and Mihalczo, J.T.: Neutron Counting Measurements of BoroBond Blocks. American Nuclear Society Annual Meeting, San Diego, CA, June 1-5, 2003.
14. **Neal, J.S.**; Edwards, J.D.; and Mihalczo, J.T.: Gamma Spectroscopy Measurements of BoroBond Blocks. American Nuclear Society Annual Meeting, San Diego, CA, June 1-5, 2003.
15. **Neal, J.S.**; Edwards, J.D.; and Mihalczo, J.T.: Neutron Transmission Measurements of BoroBond Blocks. American Nuclear Society Annual Meeting, San Diego, CA, June 1-5, 2003.
16. **Neal, J.S.**; Edwards, J.D.; and Mihalczo, J.T.: Method for Verification of the Hydrogen and Boron Content of the RCSB for Storage of HEU at the HEUMF. American Nuclear Society Annual Meeting, San Diego, CA, June 1-5, 2003.
17. **Neal, J.S.**; Bryan, W.L.; Edwards, J.D.; Pozzi, S.A.; and Mihalczo, J.T.: Pulse Shape Discrimination for the Nuclear Materials Identification System (NMIS). Institute of Nuclear Materials Management Annual Meeting, Phoenix, Arizona, July 13-17, 2003.
18. **Neal, J.S.**; Edwards, J.D.; Pozzi, S.A.; and Mihalczo, J.T.: NMIS Plus Gamma Spectrometry for Verification of Water and B4C Content of the Isolating Material for Storage at HEUMF. Institute of Nuclear Materials Management Annual Meeting, Phoenix, Arizona, July 13-17, 2003.
19. Pozzi, S.A; **Neal, J.S.**; Oberer, R.A.; and Mihalczo, J.T.: Monte Carlo Analysis of Neutron Detection with a BaF2 Detector. Institute of Electrical and Electronic Engineers Nuclear Science Symposium, Portland, Oregon, October 19-25, 2003.
20. Bryan, W.L.; Britton, C.L.; Mihalczo, J.T.; **Neal, J.S.**; Pozzi, S.A.; and Tucker, R.W.: Fast Neutron - Gamma Pulse Shape Discrimination of Liquid Scintillation Signals for Time Correlated Measurements. Institute of Electrical and Electronic Engineers Nuclear Science Symposium, Portland, Oregon, October 19-25, 2003.
21. Wood, R.T.; **Neal, J.S.**; Britton, C.R.; and Mullens, J.A.: Autonomous Control Capabilities for Space Nuclear Power Systems. Space Technologies and Applications International Forum, Autonomous Operations and Control Technologies for Space Nuclear Power Systems session, Albuquerque, New Mexico, February 8-12, 2004.
22. A. L. Qualls, E. D. Blakeman, S. R. Greene, S. H. Kim, J. O. Johnson, **J. S. Neal**, K.W. Childs, J.C. Conklin and P.J. Otaduy: Optimization of Space Reactor Power Systems using Genetic Algorithms. Space Technologies and Applications International Forum, Autonomous Operations and Control Technologies for Space Nuclear Power Systems session, Albuquerque, New Mexico, February 8-12, 2004.

23. S.H. Kim, A. L. Qualls, E. D. Blakeman, **J. S. Neal**, and S.R. Greene: Development of Optimization Methodology for Space Reactor Power System Design. Space Technologies and Applications International Forum, Autonomous Operations and Control Technologies for Space Nuclear Power Systems session, Albuquerque, New Mexico, February 8-12, 2004.
24. Mullens, J.A.; Mihalczco, J.T.; Pozzi, S.A.; and **Neal, J.S.**: Monitoring the Flow of Fissile Liquids. 7th International Conference on Facility Operations – Safeguards Interface, February 29 – March 5, 2004.
25. Wood, R.T.; Brittain, C.R.; March-Leuba, J.; Mullens, J.A; and **Neal, J. S.**: Autonomous Control for Generation IV Nuclear Plants. 14th Pacific Basin Nuclear Conference, March 21-25, 2004, Sheraton Waikiki Hotel, Honolulu, Hawaii.
26. **Neal, J.S.** and Townsend, L.W.: Multiple Solar Particle Event Dose Time Profile Predictions Using Bayesian Inference. International Conference on Radiation Shielding and 13th Topical Meeting on Radiation Protection Shielding, Funchal, Madeira Island, Portugal, May 9-14, 2004.
27. Townsend, L.W.; and **Neal, J.S.**: A Simple Method for Solar Energetic Particle Event Dose Forecasting. 3rd International Workshop on Space Radiation Research, Port Jefferson, New York, May 16-20, 2004.
27. **Neal, J.S.**; Mihalczco, J.T.; Koltick, D. S.; and Cooper, C. J.: Update on a ZnO(Ga) Alpha Particle Detector for a Portable Neutron Generator for the Nuclear Materials Identification System (NMIS). Institute of Nuclear Materials Management Annual Meeting, Orlando, Florida, July 18-22, 2004.
28. **Neal, J.S.**; Mihalczco, J.T.: Large Plastic Scintillation Detectors for the Nuclear Materials Identification System. Institute of Nuclear Materials Management Annual Meeting, Orlando, Florida, July 18-22, 2004.
29. Pozzi, S.A. ; **Neal, J.S.**; Edwards, J.D.; McClanahan, J.P.; and Mihalczco, J.T.: Analysis of Scintillator Pulse Shapes for Neutron – Gamma Ray Discrimination. Institute of Nuclear Materials Management Annual Meeting, Orlando, Florida, July 18-22, 2004.
30. Mihalczco, J. T.; **Neal, J. S.**; and Pozzi, S. A.: Fission Source Location from NMIS Third Order Time Correlation Measurements. Institute of Nuclear Materials Management Annual Meeting, Orlando, Florida, July 18-22, 2004.
31. **Neal, J. S.**; Cooper, J. C.; Koltick, D. S.; Mihalczco, J. T.; Bourret-Courchesne, E.; and Derenzo, S. E.: Evaluation of ZnO:Ga Alpha Detectors for Use in Neutron Generators. Institute of Electrical and Electronic Engineers Nuclear Science Symposium, Rome, Italy, October 16-22, 2004.
32. **Neal, J. S.**; Mihalczco, J. T.; Cooper, J. C.; and Koltick, D. S.: An Alpha Particle Detector for a Portable Neutron Generator for the Nuclear Materials Identification System (NMIS), Conference of the Application of Accelerators in Research and Industry, Fort Worth, Texas, October 10-15, 2004.
33. Hausladen, P. A.; **Neal, J. S.**; and Mihalczco, J. T.: An Alpha Particle Detector for a Portable Neutron Generator for the Nuclear Materials Identification System (NMIS), Conference of the Application of Accelerators in Research and Industry, Fort Worth, Texas, October 10-15, 2004.
34. Mullens, J. A.; **Neal, J. S.**; Hausladen, P. A.; Pozzi, S. A.; and Mihalczco, J. T: Fast Coincidence Counting with Active Inspection Systems, Conference of the Application of Accelerators in Research and Industry, Fort Worth, Texas, October 10-15, 2004.
35. **Neal, J. S.**; Cooper, J. C.; Koltick, D. S.; Mihalczco, J. T.; Bourret-Courchesne, E.; and Derenzo, S. E.: Evaluation of ZnO:Ga Alpha Detectors for Use in Neutron Generators. Institute of Electrical and Electronic Engineers Nuclear Science Symposium, Rome, Italy, October 16-22, 2004.
36. Pozzi, S. A.; Oberer, R. B.; and **Neal, J. S.**: Analysis of the response of capture-gated organic scintillators. Institute of Electrical and Electronic Engineers Nuclear Science Symposium, Rome, Italy, October 16-22, 2004.
37. **Neal, J. S.**; Mihalczco, J. T; and Hausladen, P. A.: Floor Effect Elimination with a DT Generator, Fall 2004 INMM Central Region Chapter Meeting, Oak Ridge, Tennessee, November 17, 2004.

38. Mullens, J. A.; Neal, J. S.; and Mihalczko, J. T.: Tomographic Image and Detector Coincidence Measurements for HEU Object Inspection, Fall 2004 INMM Central Region Chapter Meeting, Oak Ridge, Tennessee, November 17, 2004.
39. Neal, J. S.; Nichols, T. F.; and Townsend, L. W.: Forecasting Dose for Large Solar Energetic Particle Events: Is There Time to Predict? 2005 IEEE Aerospace Conference, Big Sky, MT, March 5-12, 2005.
40. Neal, J. S.; Boatner, L. A.; Giles, N. C.; Luo, M.; Xu, C.; Garces, N. Y.; and Halliburton, L. E.: Investigation of Zinc Oxide-Based Scintillators. Institute of Electrical and Electronic Engineers Nuclear Science Symposium, Puerto Rico, October 23-29, 2005.
41. Neal, J. S.; Hausladen, P. A.; and Mihalczko, J. T.: Update on a ZnO:Ga Alpha Particle Detector for a Portable Neutron Generator for the Nuclear Materials Identification System (NMIS). Institute of Nuclear Materials Management Annual Meeting, Nashville, July 16-20, 2006
42. Neal, J. S.; Boatner, L. A.; Spurrier, M.; Szupryczynski, P.; Melcher, C. L.: Cerium-doped Mixed-Alkali Rare-Earth Double-Phosphate Scintillators for X- and Gamma-Ray Detection. SPIE, San Diego, August 14-16, 2006
43. Hausladen, P. A.; Bingham, P.; Neal, J. S.; Mullens, J. A.; Mihalczko, J. T., Portable Fast-Neutron Radiography with the Nuclear Materials Identification System, Conference of the Application of Accelerators in Research and Industry, Fort Worth, Texas, August 20-25, 2006.
44. Neal, J. S.; Boatner, L. A.; Derenzo, S. E.; and Bourret-Courchesne, E. D. The Effects of Thermochemical Treatments on the Scintillation and Photoluminescence Properties of ZnO Single Crystals. Institute of Electrical and Electronic Engineers Nuclear Science Symposium, San Diego, October 29- November 4, 2006.
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50. Yang, X.; Giles, N. C.; Neal, J. S.; Kesanli, B.; Howe, J. Y.; Ramey, J. O., Armstrong, B. L.; Boatner, L. A. Photoluminescence Study of ZnO:Ga for Scintillator Applications, U.S. Workshop on the physics and chemistry of II-VI Materials, Baltimore, October 30- November 1, 2007.
51. J. O. Ramey, B. C. Chakoumakos, R. Custelcean, J. A. Kolopus, Rongying Jin, L. A. Boatner, **John Neal**, and Darius Wisniewski, "Novel lanthanide chloride – methanol adduct crystals, $\text{LnCl}_3(\text{CH}_3\text{OH})_x(\text{H}_2\text{O})_y$ as scintillators for gamma ray and neutron detectors," presented at the 2008 Meeting of the American Crystallographic Association, Knoxville, Tennessee, May 31 – June 5, 2008.
52. B. C. Chakoumakos, R. Custelcean, J. O. Ramey, J. A. Kolopus, Rongying Jin, L. A. Boatner, **J. S. Neal**, and D. J. Wisniewski, "Novel Lanthanide Chloride-Methanol Adducts as Scintillators for γ -ray and Neutron Detectors," presented at the American Conference on Neutron Scattering, Santa Fe, New Mexico May 11-15, 2008.
53. Neal, J. S.; Devito, D. M.; Armstrong, B. L.; Hong, M.; Kesanli, B.; Yang, X.; Giles, N. C.; Howe, J. Y.; Ramey, J. O.; Wisniewski, D. J.; Wisniewska, M.; Munir, Z. A.; Boatner, L. A., "Development of ZnO-based

- polycrystalline ceramic scintillators for use as α -particle detectors,” 2008 Symposium on Radiation Measurements and Applications (SORMA West 2008), Berkeley, California June 2-5 (2008).
54. Kesanli, B.; Hua, H.; Hong, K.; Neal, J.S.; Dai, S., “New copolymer architectures for next generation plastic neutron scintillators,” 2008 Symposium on Radiation Measurements and Applications (SORMA West 2008), Berkeley, California June 2-5 (2008).
 55. Ucer, K.B., Wall, R.A., Lipke, K., Williams, R.T., Millers, D., Smits, K., Grigorjeva, L., Neal, J.S., Boatner, L.A., Time-resolved absorption and luminescence following electron/hole excitation in ZnO 2008 International Conference on Excitonic Processes in Condensed Matter, Kyoto University, Japan, June 22-27, 2008.
 56. Boatner, L. A.; Wisniewski, D.; Neal, J. S.; Bell, Z. W.; Ramey, J. O.; Kolopus, J. A.; Chakoumakos, B. C.; Wisniewska, M.; Custelcean, R.: The Cerium Chloride-Methanol Adduct $\text{CeCl}_3(\text{CH}_3\text{OH})_4$: A New Metal Organic Scintillator Crystal for Gamma Ray and Neutron Detection. Materials Research Society Spring Meeting, San Francisco, April 13-17, 2009.
 57. DeVito, D. M.; Neal, J. S.; Yang, X.; Hong, M.; Armstrong, B. L.; Howe, J. Y.; Kesanli, B.; Ramey, J. O.; Giles, N. C.; Munir, Z. A.; Boatner, L. A.: Fabrication of Polycrystalline Zinc Oxide Scintillators for Radiation Detection. Materials Research Society Spring Meeting, San Francisco, April 13-17, 2009.
 58. Boatner, L. A.; Wisniewski, D.; Neal, J. S.; Bell, Z. W.; Ramey, J. O.; Kolopus, J. A.; Chakoumakos, B. C.; Wisniewska, M.; Custelcean, R.: Cerium Trichloride Methanol Adduct Single-Crystal Scintillators for Neutron and Gamma Ray Detection. SPIE, San Diego, August 2-6, 2009.
 59. Boatner, L. A.; Wisniewski, D.; Neal, J. S.; Bell, Z. W.; Ramey, J. O.; Kolopus, J. A.; Chakoumakos, B. C.; Wisniewska, M.; Custelcean, R.: The Growth and Characterization of New Rare-Earth Metal-Organic Single Crystals – Including the Gamma Ray and Neutron Scintillator Crystal. 17th American Conference on Crystal Growth and Epitaxy, Lake Geneva, WI, August 9-14, 2009.
 60. Lynn A. Boatner, John S. Neal, D. Wisniewski, Joanne Oxendine Ramey, James A. Kolopus, Bryan C. Chakoumakos, Monika Wisniewska, and Radu Custelcean, “New Scintillators for Combined Gamma-Ray/Fast Neutron Detection: Single-Crystal $\text{LaBr}_3(\text{CH}_3\text{OH})_4\text{:Ce}$ and $\text{CeCl}_3(\text{CH}_3\text{OH})_4$,” Presented at the 2009 IEEE Nuclear Science Symposium and Medical Imaging Conference, Orlando, Florida, October 25-31 (2009).
 61. John S. Neal, David M. DeVito, John J. Henry, Jr., Beth L. Armstrong, Xiaocheng Yang, Nancy C. Giles, Jane Y. Howe, and Lynn A. Boatner, “Investigations of Spark Plasma Sintering Techniques for Fabricating ZnO-based Polycrystalline Ceramic Scintillators,” Presented at the 2009 IEEE Nuclear Science Symposium and Medical Imaging Conference, Orlando, Florida, October 25-31 (2009).
 62. Lynn A. Boatner and John S. Neal, “Alternative Neutron Detectors to Eliminate the Use of ^3He for Homeland Security, Nonproliferation, and Other Applications,” to be presented at the Institute of Nuclear Materials Management (INMM) Annual Meeting, Baltimore, Maryland, July 11-15 (2010).
 63. John S. Neal, Lynn A. Boatner, Joanne O. Ramey, Dariusz Wisniewski, James A. Kolopus, Nerine J. Cherepy, and Stephen A. Payne, “The Characterization of Eu^{2+} -Doped Mixed Alkaline-Earth Iodide Scintillator Crystals,” 2010 IEEE Nuclear Science Symposium and Medical Imaging Conference, Knoxville, Tennessee October 30- November 6 (2010).

Invited Conference Presentations:

1. Neal, J. S.; and Townsend, L. W.: Prediction of Solar Particle Event Dose Time Profiles Using Dose Rate Measurements. American Nuclear Society 2002 Winter Meeting, Washington, D.C., November 17-21, 2002.
2. Mihalczko, J.T.; Mattingly, J.K.; Neal, J.S.; Pozzi, S.A.; and Mullens, J.A.: Oak Ridge Multiple Attribute System (ORMAS) For Pu, HEU, HE, and Chemical Agents. American Physical Society Annual Meeting 2003 Austin, Texas, March 3-7, 2003

3. **Neal, J. S.**; Boatner, L. A.; Jellison, G. E.; and Wright, G.: Radiation detection materials synthesis, crystal growth, and characterization at Oak Ridge National Laboratory. Symposium on Radiation Measurements and Applications, Ann Arbor, May 23-25, 2006.
4. Boatner, L. A.; **Neal, J. S.**; Bell, Z. W.; Kolopus, J. A.; and Akkhurt, H., "The Characterization of Scintillator Performance at Elevated Temperatures up to 400 Degrees Centigrade," Materials Research Society Spring Meeting San Francisco, CA, April 25-29, 2013.
5. L. A. Boatner, J. O. Ramey, J. A. Kolopus, **J. S. Neal**, N. J. Cherepy, S. A. Payne, P. R. Beck, A. Burger, E. Rowe, and P. Bhattacharya, "Advances in the growth of alkaline-earth halide single crystals for scintillator detectors," SPIE Conference on Hard X-ray, Gamma-Ray and Neutron Detector Physics XVI, San Diego, CA, August 18-20, 2014.

Conference Posters:

1. **Neal, J. S.**; and Townsend, L. W.: Dose and Dose Rate Prediction for Solar Particle Events Using a Dosimetry Based Bayesian Forecasting Methodology. 2001 American Radiation Safety Conference & Exposition (46th Annual Meeting of the Health Physics Society), Cleveland, OH, June 10-14, 2001.
2. **Neal, J. S.**; and Townsend, L. W.: Predicting Dose-Time Profiles of Solar Energetic Particle Events Using Bayesian Forecasting Methods. 2001 IEEE Nuclear and Space Radiation Effects Conference, Vancouver, BC, July 16-20, 2001.
3. Bryan, W.L.; Britton, C.L.; Mihalczo, J.T.; **Neal, J.S.**; Pozzi, S.A.; and Tucker, R.W.: Fast Neutron - Gamma Pulse Shape Discrimination of Liquid Scintillation Signals for Time Correlated Measurements. Institute of Electrical and Electronic Engineers Nuclear Science Symposium, Portland, Oregon, October 19-25, 2003.
4. Pozzi, S. A.; Oberer, R. B.; and **Neal, J. S.**: Analysis of the response of capture-gated organic scintillators. Institute of Electrical and Electronic Engineers Nuclear Science Symposium, Rome, Italy, October 16-22, 2004.
5. Wisniewski, D.J.; Boatner, L.A; **Neal, J.S.**; Jellison, G.E.; Ramey, J.O.; North, A.; Wisniewski, M.; Lempicki, A.; Brecher, C. Development of novel polycrystalline ceramic scintillators, IEEE 9th International Conference on Inorganic Scintillators and Their Applications, Winston-Salem, June 4-8, 2007.
6. DeVito, D. M., Armstrong, B., Ramey, J. O., Howe, J., Boatner, L.A., **Neal, J.S.**, and Giles, N.C. The Effects of Synthesis Methods on the Properties of ZnO:Ga Nanoparticle Ceramic Scintillators, American Vacuum Society Annual Meeting, Seattle, October 2007.
7. Wisniewski, D.; Boatner, L. A.; **Neal, J. S.**; Ramey, J. O.; Jellison, G. E.; Wisniewska, M.; Lempicki, A.; and Brecher, C. Properties of Novel LSO:Ce Polycrystalline Ceramic Scintillators. Institute of Electrical and Electronic Engineers Nuclear Science Symposium, Honolulu, October 23- November 3, 2007.
8. L. A. Boatner, D. J. Wisniewski, **J. S. Neal**, J. O. Ramey, J. A. Kolopus, B. C. Chakoumakos, and R. Custelcean, "CeCl₃(CH₃OH)₄ – Cerium chloride-methanol adduct single crystals: A new metal-organic scintillator material," to be presented at the 2008 Symposium on Radiation Measurements and Applications (SORMA West 2008), Berkeley, California June 2-5 (2008).
9. D.M. DeVito, **J. S. Neal**, M. Hong, B. Kesanli, J. O. Ramey, B. L. Armstrong, X. Yang, N.C. Giles, J. Y. Howe, D. J. Wisniewski, M. Wisniewska, Z. A. Munir, and L. A. Boatner, "Development of a Polycrystalline Zinc Oxide Scintillator for Radiation Detection", American Vacuum Society Annual Meeting, Boston, October 2008.
10. Yang, X.; **Neal, J. S.**; Boatner, L. A.; and Giles, N. C. "Photoluminescence and Absorption from Highly Conductive N-type ZnO," Materials Research Society Annual Meeting, Boston, December 2008.
11. Yang, X.; DeVito, D. M.; Hong, M.; **Neal, J. S.**; Munir, Z. A.; Howe, J. Y.; Boatner, L. A.; and Giles, N. C. "Scintillation and Photoluminescence from Ceramic ZnO and ZnO:Ga," Materials Research Society Annual Meeting, San Francisco, April 2009.

12. **Neal, J. S.**; Boatner, L. A.; DeVito, D. M.; Henry, J. J.; Armstrong, B. L.; Yang, X.; Giles, N. C.; and Howe, J. Y. "Investigation of Spark Plasma Sintering Techniques for Fabricating ZnO-based Polycrystalline Ceramic Scintillators," IEEE Nuclear Science Symposium, Orlando, October 2009.
13. **John S. Neal**, Lynn A. Boatner, Joanne O. Ramey, Dariusz Wisniewski, James A. Kolopus, Nerine J. Cherepy, and Stephen A. Payne, "The Characterization of Eu²⁺-Doped Mixed Alkaline-Earth Iodide Scintillator Crystals," 2010 IEEE Nuclear Science Symposium and Medical Imaging Conference, Knoxville, Tennessee October 30- November 6 (2010).
14. D. Wisniewski, A. Czerniak, A. J. Wojtowicz, L. A. Boatner, and **J.S. Neal**, "Spectroscopy of Eu²⁺ - activated mixed alkaline-earth iodide scintillators," IWASOM'2011, The Third International Workshop on Advanced Spectroscopy and Optical Materials, Gdansk, Poland (2011).
15. **John S. Neal**, Lynn A. Boatner, Zane W. Bell, Hatice Akkurt, and Mike McCarthy, "Evaluation of Neutron and Gamma Detectors for High Temperature Logging Applications," 2nd Annual Future of Instrumentation International Workshop (FIIW 2011), Oak Ridge, Tennessee, November 7-8 (2011).
16. Lynn A. Boatner, **John S. Neal**, Matthew A. Blackston, James A. Kolopus, and Joanne O. Ramey, "Dual-Chamber/Dual-Anode Proportional Counter Incorporating an Intervening Thin-Foil Solid Neutron Converter", Symposium on Radiation Measurements and Applications (SORMA 2012), Oakland, CA, May 14-17, 2012.
17. **John S. Neal**, Lynn A. Boatner, John T. Mihalczko, "High Spatial and Temporal Resolution Particle Detectors", INMM 53rd Annual Meeting, July 15-19, 2012 in Orlando, Florida.